



November 5, 2021

Mr. Michael S. Regan, Administrator  
U.S. Environmental Protection Agency  
Air and Radiation Docket and Info. Center Mail Code: 28221T  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

Re: Docket No. EPA–HQ–OAR–2021–0382 - Advance Notice of Proposed Rulemaking for Potential Future Regulation Addressing Pyrolysis and Gasification Units 86 FR 50296

Dear Administrator Regan:

The Pennsylvania Department of Environmental Protection (DEP) appreciates the opportunity to provide comments on the United States Environmental Protection Agency’s (EPA) advance notice of proposed rulemaking (ANPRM) for Potential Future Regulation Addressing Pyrolysis and Gasification Units.

### **Introduction**

EPA is seeking comments and data to assist in the consideration of potential changes to existing regulations under the Clean Air Act (CAA) Section 129 for the development of regulations pertaining to pyrolysis and gasification units that are used to convert solid and semi-solid feedstocks, including solid waste (e.g., municipal solid waste (MSW), commercial and industrial waste, hospital/medical/infectious waste, sewage sludge, and other solid waste), biomass, plastics, tires, and organic contaminants in soils and oily sludges to useful products such as energy, fuels, and chemical commodities.

Many existing operations that incorporate pyrolysis and gasification have been regulated by the EPA under Section 129 of the CAA, which imposes certain emissions guidelines and performance standards for the various types of solid waste incinerators. However, pyrolysis and gasification have been inconsistently defined and managed under the existing Section 129 rules. EPA believes that there is considerable confusion in the regulated community regarding the applicability of Section 129 to pyrolysis and gasification units. Therefore, EPA is collecting information on the full spectrum of gasification and pyrolysis units, regardless of the outputs.

### **General**

Pennsylvania has a municipal wastewater sewage sludge gasification facility in Morrisville Borough, Bucks County called [Ecoremedy LLC](#) (Ecoremedy). Ecoremedy operates a sludge gasification operation next to the Morrisville Wastewater Treatment Plant for a fixed fee per ton. The facility was granted an exemption in March 2021 from an Air Quality Plan Approval because the operation was a temporary pilot project. The process consists of a sludge drying

loop, a gasifier/oxidation/air tempering/heat exchanger loop, a knockout box, and a cyclone. The process is controlled by a wet scrubber and carbon adsorption unit. The plant is not currently operating because of an August 2021 fire in the storage area.

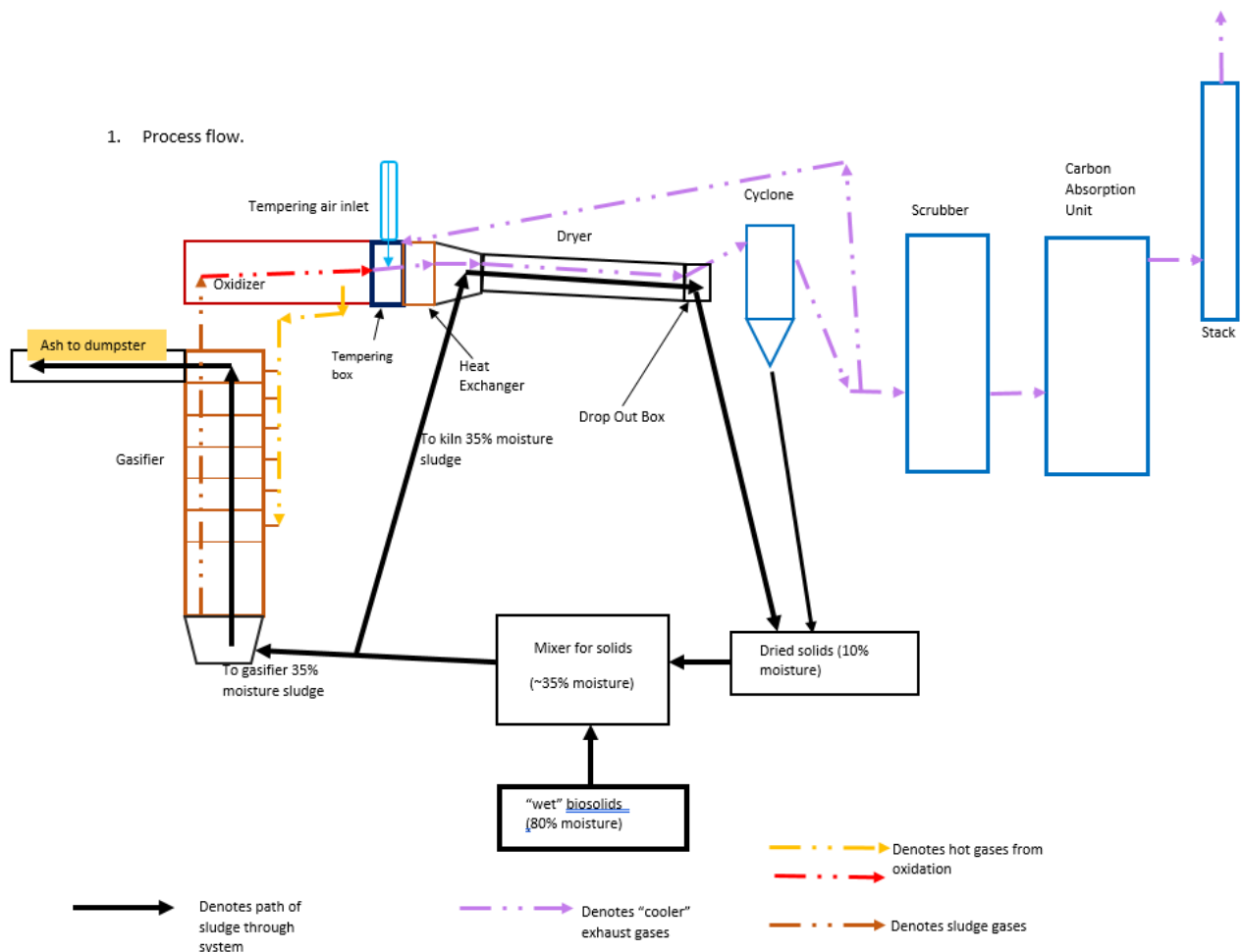
At EPA's request, DEP is providing the following information about the Ecoremedy Morrisville facility:

- Construction date: *The plant was originally constructed in 2019 for research.*
- Startup date: *The exact date is not known, but startup occurred in 2019.*
- Physical address (e.g., state and city): *95 Riverview Avenue, Morrisville, PA 19067*
- Brief description of the technology including the primary purpose of the technology (e.g., to convert MSW into syngas) and how the products (thermal energy, tar, char) are utilized: *Sewer sludge cake is received by the facility on a tipping floor. The sludge is fed to a mixing box where the new sludge (80% moisture) mixes with dried sludge (10% moisture) in a proportion to create a 34-37% moisture feed for the gasifier. The gasifier consists of a moving grate which transports the sludge across the heating zones. The sludge is heated to 700° to 900°F under low oxygen conditions using a combination of air heated from a heat exchanger burning the volatile off-gases in an oxidizer (afterburner) and supplemental natural gas burners, when needed. The solid remainder of the sludge (ash) is water quenched then transferred to a transport container. Waste permit WMGM065SE001 permits the drying and gasification of municipal wastewater sewage sludge (biosolids) for the beneficial use as an alternative fuel source in cement kilns, boilers, and power plants.*

*In the oxidizer, oxygen rich ambient air is introduced to the gases which auto-ignite. The oxidizer operates at temperatures between 1,800° and 2,200°F for complete combustion. Exhaust from the oxidizer is then tempered with ambient air and passes through a heat exchanger (used to heat air for gasifier). With the temperature dropped to 750° to 900°F, the exhaust passes through a direct contact rotary dryer which dries incoming sludge for use in gasifier. After the dryer, the exhaust passes through a drop out box, multicyclone, scrubber and carbon-filter unit before being discharged to the atmosphere.*

- Design type (e.g., indirect heated gasifier or pyrolysis chamber in combination with a thermal oxidizer): *See above, indirect heat with oxidizer.*
- Additional process equipment (e.g., feed dryer): *Conveyors, mixing hopper, bins, dryer, drop out box, and a cyclone. The drop out box and cyclone are considered part of process, not emissions controls, since they recycle the recovered particulate back into the sludge coming from dryer.*
- Description of process parameters for the pyrolysis or gasifier chamber which are monitored to ensure proper operation (such as temperature, residence time in reactor, etc.): *Temperature monitored.*

- Air pollution control devices or other abatement/upgrade systems and description of operating parameters which are monitored to ensure proper operation: Temperature, pressure drop, and liquid flow monitored at scrubber; pressure drop monitored at carbon unit.
- Process flow diagram identifying all emission release points to the atmosphere for the facility with or without air pollution or abatement control:



- Air emissions data related to: No emissions data are available for the unit. The unit was scheduled for a stack test on 8/25/2021 but a fire destroyed the building and damaged the equipment and thus the plant is not currently in operation.

- Emissions from the pyrolysis or gasification chamber(s): *Unknown. A stack test was scheduled for August 2021 but did not occur due to facility operations halting after the fire.*
- Emissions from downstream combustion devices (e.g., thermal oxidizer) where gases produced by the pyrolysis or gasification unit are combusted: *N/A*
- All applicable state and local air regulations specific to the pyrolysis or gasification unit: *25 Pa, Code §123.13; § 123.21; §123.41. No local ordinances as of 10/15/2021.*
- Feedstock composition (e.g., plastics, tires, MSW): *Municipal wastewater sewage sludge.*
- Facility design capacity (e.g., tons of feedstock per day): *13.2 tons per day.*
- Mode of operation (e.g., batch or continuous): *Continuous*
- Heat recovery, if any (e.g., feed dryer): *Direct exhaust used to dry sludge and heat exchanger for preheating gasifier.*
- Operating hours per day and number of operating days per year: *The operating hours were planned to be 24/7.*
- Nature of operation (e.g., commercial or research and development): *R&D transitioning to commercial.*
- Plant energy conversion efficiency (i.e., percentage of feedstock energy value that is transformed to and contained in the end product): *Unknown*
- Recovery of materials for recycling, if applicable: *After processing, the remaining biosolids is permitted for use as alternative fuel source in boilers, power plants and cement kilns as per the waste permit.*
- Beneficial offsets (compared to disposal of feedstock or avoided fossil-fuel or petrochemical use or emissions) for different end-product alternatives: *Unknown*
- Distance to market for liquid or gaseous fuels: *No liquid or gas produced for sale.*
- Market prices for energy products: *Unknown*
- Market prices for recyclable and other byproduct streams: *None*

The EPA mentioned in the ANPRM two other gasification facilities in Pennsylvania, namely:

- Ecoremedy – Flintrock Farms: *Ecoremedy has a corporate/academic partnership with Harrisburg Area Community College (HACC). [R&D Center \(HACC\) - Ecoremedy \(ecoremedyllc.com\)](#). This project gasified poultry litter into syngas. It operated from November 2013 until the summer of 2015.*
- Continental Energy Associates: *The owner of the facility removed the anthracite coal refuse (culm) gasification process years ago.*

Pennsylvania has another facility called Gettysburg Energy & Nutrient Recovery Facility located in Tyrone Township, Adams County. The Energy & Nutrient Recovery Facility (ENRF) uses gasification technology to produce synthesis gas that is combusted to create thermal energy for power generation and process heat. The facility was constructed circa 2012 and began operations on December 12, 2012. The facility operated intermittently for several years, never at full production, and was ultimately idled in September 2017, and has not operated since. To restart operations, the facility needed to be re-permitted due to its inactivity. The new plan approval was issued on July 7, 2020, but the facility has not yet restarted. Per the issued plan approval, the facility can process 9,000 lb./hr. chicken manure.

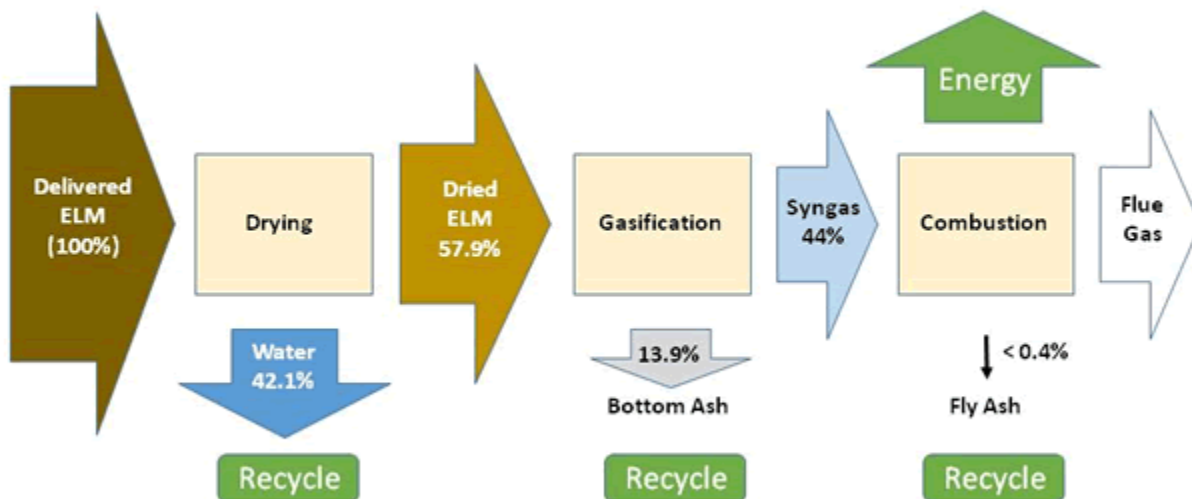
The facility would process egg layer manure (ELM) in a gasifier that transforms volatile solids into a combustible gas and combusts that gas in a secondary combustion chamber to generate heat. The hot flue gases are drawn through a heat recovery steam generator to produce steam. The steam would be used to dry the ELM and possibly drive a steam turbine to produce electric power.

Filterable particulate emissions from the ENRF main stack are controlled by a baghouse. The facility has installed a dry sorbent injection (DSI) system to control HCl, SO<sub>x</sub>, condensable particulate matter, and dioxin/furan emissions from the main plant stack. The facility has installed a wet scrubber to control ammonia emissions from the dryer stack. The facility has also installed a baghouse to control filterable particulate emissions from the dryer stack. The baghouse is estimated to provide greater than 99% reduction in PM<sub>10</sub>. The facility has also proposed to install a baghouse bag leak detection system. Source testing has not been completed for this facility.

The expected potential facility emissions after consideration of enforceable throughput restrictions are: 99.0 tons per year of NO<sub>x</sub>, 45.42 tons per year of VOCs, 22.38 tons per year of SO<sub>x</sub>, 5.26 tons per year of HCl, 1.88 ton per year of CO, and 12.11 tons per year of total PM. The facility is a State Only Synthetic Minor facility.

The facility is subject to the Best Available Technology (BAT) provisions of 25 Pa. Code Section 127.1 and 127.12(a)(5), and 40 CFR Part 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, and 40 CFR Part 63, Subpart J—National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.

The Complete Utilization of Egg Layer Manure\*



\* Based on Gettysburg Energy & Nutrient Recovery Facility

DEP appreciates the opportunity to provide comments and technical information for EPA’s ANPRM for Potential Future Regulation Addressing Pyrolysis and Gasification Units.

If you have any questions or comments, please contact Mark Hammond, Director for the Bureau of Air Quality, by e-mail at mahammond@pa.gov, or by telephone at 717.787.9702.

Sincerely,

Patrick McDonnell  
Secretary