



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Four Penn Center – 1600 John F Kennedy Blvd
Philadelphia, Pennsylvania 19103-2852

Report Title: Clean Air Act Inspection of City of Wilmington Water Pollution Control Facility
Inspection Date(s): September 21, 2022
Regulatory Program(s): Title V

Company Name: City of Wilmington Water Pollution Control Facility
Facility Name: Same
Facility Location: 12th Street and Hay Road
Wilmington, DE 19809
Latitude: 39.72954 **Longitude:** -75.504334
County/Parish: New Castle
AFS Number: 1000300389
Permit Number: AQM-003/00389
NAICS Code: 221320 **SIC:** 4952
Unique Project #: 3E22CA007A

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I. Introduction

The United States Environmental Protection Agency (EPA) conducted a Clean Air Act (CAA) inspection at City of Wilmington Water Pollution Control Facility (WPCF or Facility) to verify compliance with applicable State and Federal regulations. The Delaware Department of Natural Resources and Environmental Control (DNREC) was notified of the inspection on September 6, 2022, via email. On September 18, 2022, EPA notified the Facility of the planned inspection via phone and email. EPA emailed a list of records for review to Alex Reznik, prior to the inspection (see Attachment 1). These records are listed in the Records Review section of the report.

A. Summary of the Facility

The Facility is located at 12th Street and Hay Road in Wilmington Delaware. The Facility is a publicly owned waste-water treatment facility that uses an activated sludge process to treat both municipal sewage and industrial wastewaters generated by local industrial users. Additionally, industrial users also may utilize New Castle County's "dump" site that receive waste hauled by tanker truck and disposed of on a one-time basis. Mr. Reznik indicated that the Facility is designed to handle up to 134 million gallons per day (MGD) of wastewater, but typically treats roughly 70 MGD. Currently, due to lower-than-average rainfall, the WPCF is processing approximately 65 MGD. The facility discharges treated water to the Delaware River, and the activated sludge process results in the generation of solid waste and sludge digester gas which must be combusted.

The Facility received a Title V Permit Number AQM-003/00389 from DNREC issued on August 7, 2019.

City of Wilmington Water Pollution Control Facility is classified as major source of hazardous air pollutants (HAP). The Facility is subject to the following federal regulations:

- 40 C.F.R. Part 63 Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters
- 40 C.F.R. Part 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
- 40 C.F.R. Part 63 Subpart VVVV National Emissions Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works

B. Inspection Opening Conference

At 9:10am on September 21, 2022, EPA inspectors arrived at the Facility for a CAA Inspection and conducted a brief opening conference. City of Wilmington Water Pollution Control Facility was represented by Alex Reznik, and Liie Hill was available to provide secondary support. Both Mr. Reznik and Ms. Hill are employed by Jacobs Engineering, the contracted operator for both the WPCF and the Wilmington Renewable Energy Biosolids Facility (REBF) co-located at the

site. Also, Kathy Pirestani of DNREC was present. EPA inspectors, Erin Willard, and Stafford Stewart presented their credentials and explained the purpose of the visit was to conduct a CAA inspection to determine compliance with the CAA permit and any applicable regulations. Additionally, EPA informed the facility representatives of their right to claim any confidential business information (CBI). At that time, Mr. Reznik did not claim any photos or documentation as CBI.

II. Site Activity/Process Description

As stated above, the Facility is a municipal and industrial wastewater treatment plant, receiving co-mingled wastewater from the City of Wilmington and surrounding areas of New Castle County. There are three force mains that convey wastewater to the Facility. The WPCF is permitted and designed to receive up to 134 MGD, with an allowable bypass operational scheme during times of very high flow. Currently, the flow to the Facility is approximately 65 MGD. The site was previously contracted to Honeywell, who also built and designed the adjacent biosolids energy facility (REBF); however, when that contract expired, Jacobs Engineering secured a new long-term operational contract with the City of Wilmington.

There are approximately 45 industrial users throughout the system, and a “dump station”, where waste producers can pay a flat rate to empty a tanker truck into the wastewater system. The City of Wilmington has issued three of those waste permits (Noramco Amtrak, and Delaware Solid Waste Authority). The remaining industrial waste users, and the operation of the dump station, are permitted and controlled by New Castle County, which is a wholly separate entity with no staffing or oversight overlap with the City of Wilmington. The WPCF does not have control over any of the New Castle issued permits, nor does it have a full complement of information from New Castle County on each of those industrial users, including flows and chemicals being discharged. Staff indicated that the HAP and volatile organic compound (VOC) emissions calculations for both the WPCF and the REBF are based on composite influent samples that are gathered bi-annually in May and October.¹

The WPCF is an activated sludge process, where influent undergoes primary settling in large tanks, allowing heavy solids, grit, and other non-biodegradable materials to be removed from the influent. Water is then conveyed to numerous aeration tanks, where blowers use ambient air to provide aeration, which facilitates biological activity to digest organic matter in the water. Secondary settling is then used to allow activated sludge to settle, some of which is recycled back into the aeration tanks, and some of which must be sent to sludge digesters for further processing. Water flowing out of the secondary clarifiers is then disinfected and discharged to

¹ Because the WPCF has limited information on most of the industrial users in the system, due to the permitting authority structure, the Facility does not seem to have adequate information to capture the “worst case” scenario of VOC and HAP inputs to the system, and design of a sampling plan that would gather useful data for permitting.

the Delaware River. All the settling and aeration tanks are open to the atmosphere and are listed in the permit as sources of air emissions.

Sewage sludge removed from the secondary settling tanks is conveyed to a thickening process, where the addition of polymer thickens the sludge and assists in some primary water removal. Thickened sludge is then pumped into the sewage sludge digesters. The Facility has six digesters; however, only five of them are operational. Digester #3 became inoperable in 1998 and currently doesn't have a roof. Each digester processes roughly 1.47 MGD. The sludge digesters are large tanks with a floating roof – the tank is an anaerobic environment, where bacteria digest organic material in the sludge, producing methane. The methane migrates to the top of each digester, where piping conveys it out of each tank. Retention time for sludge in each tank is roughly 28 days, and the Facility maintains a temperature of roughly 99°F in each digester.

Heat for the digesters is supplied by a set of sludge boilers, one per digester, that are rated at 1.2 mmBTU each. Each boiler combusts digester gas generated by the digesters (methane) and is not permitted to burn fuel oil. Mr. Reznik indicated that the boilers run continuously as long as the digester is being utilized. If a boiler unexpectedly becomes inoperable, two digesters can be operated on one boiler. The digester tanks will decrease in temperature by one degree per day without the supplemental heat from the boilers, and if the digester temperature falls too low, the microorganisms in the digester will die. Mr. Reznik and Ms. Hill further explained that once the REBF repairs/redesigns a blower at its facility, the REBF will also be able to provide supplemental heat to the digesters.

After completion of the digestion process, the sludge carries the designation of Class B sludge, and can be used for some land applications. The WPCF sends its wasted sludge to a sludge dryer owned and operated by the REBF, where excess water is removed via heating. Due to the temperature increase, the sludge generated by the REBF carries a Class A sludge definition and can be land applied at farms for human food uses.

Currently, 20% of the collected digester gas is combusted in the sludge boilers, and the remaining 80% must be flared at the WPCF. There are three flares included in the permit; however, only two are operational. Typically, one flare is receiving digester gas and actively combusting it, and the other is on standby with a pilot flame. The third flare will be removed during a planned project for refurbishing the digester floating roofs. There is no alarm on the flares for loss of a pilot light, but the SCADA system does monitor temperatures at the two operational flares. Visible emission (VE) readings for the flares are recorded daily on a log and tracked in an Excel spreadsheet.

The opening conference concluded at 10:10 am.

III. Observations

EPA and DNREC inspectors were led on a walkthrough of the Facility at 10:10am by Mr. Reznik and Ms. Hill of Jacobs Engineering. EPA inspectors noted photographs of the process would be taken during the Facility walkthrough (Attachment 2).

The inspection team walked towards the sludge digesters and were able to view the flares located on the roof of the sludge building. Flare 1 had a visible flame. Mr. Reznik pointed out the Gravity Belt building, which was constructed in 1994. Mr. Reznik showed the inspection team the belt press, where polymer is added to the sludge, facilitating dewatering of the sludge. The belt filter is permeable, so as the sludge solids form flocculent, water squeezes through; this water is sent back to the Facility headworks for treatment, and the resulting dewatered sludge is conveyed to the digesters. Mr. Reznik indicated that when sludge is being added to the digesters, the SCADA system automatically adjusts the flow so that the same amount goes to each unit.

The inspection team then went to the Old Digester Building, which was built in the 1950s. Currently, Digester #2 is down for cover maintenance, so it is not in use. When planning an outage event, the Facility stops adding undigested sludge to the unit, and allows the digester process to complete to the point of no longer generating gas, which takes approximately two months. Sludge is then pumped down to the other digesters, and the remaining small amount of sludge in the bottom of the digester is dewatered by a contracted mobile company and landfilled.

The sludge boilers heat a water bath to roughly 180°F, and the sludge is circulated through tubes to heat the sludge. This heating and recirculation occurs on a continual basis, to keep the sludge at an optimum temperature for the digestion process. When fresh sludge is being mixed into a digester, the injection point is located such that it is added to heated digester sludge just before a boiler so the temperature of the mix can be brought up quickly without affecting the overall temperature of the digester tank.

The boilers all have 1994 construction dates. If for any reason, the temperature of the water exceeds 185°F, digester gas is automatically routed to the flare to prevent the temperature from getting too high and killing the microorganisms in the tanks. The #4 boiler was out of service on the day of the inspection, and since the #2 digester is also out of service, the #2 boiler was being utilized to heat the #4 digester.

Each of the sludge boilers are subject to the requirements of 40 C.F.R. Part 63 Subpart DDDDD, and are therefore required to undergo tune-ups and air to fuel ratio evaluations as required in the rule; this requirement is also present in the Title V permit.

After viewing the boilers, the inspection team proceeded to the roof of the digester building to observe the construction of the digester floating roofs (specifically Digester #5) and the digester gas collection piping. The seal on the floating roof is a thin layer of sludge that forms a crust that moves up and down with the roof. Markings on the edge of the tank showed freeboard values, and Mr. Reznik indicated that each digester has roughly two days of freeboard storage available.

Jacobs Engineering currently has a project planned to replace the roofs on Digesters #5 and #6, which will improve general sludge heating. Mr. Reznik pointed out the gas collection piping in the center of the roof and indicated that blowers are utilized to move gas through the system to the combustion sources.

The inspection team went back to ground level to briefly view the headworks of the plant, where the three force mains mix. A Kohler emergency generator installed in 2017 was observed, in the area of the Screen Building; this unit only operates for emergency purposes to keep the traveling screens moving at the influent of the Facility. If the screens do not move to removed solids trapped in the screens, it causes a blockage and can eventually force raw wastewater to overflow on the ground. Mr. Reznik said that the unit is on an AutoStart schedule for periodic testing on Fridays.

The walkthrough concluded at 12:15 pm.

IV. Records Review

The records review commenced immediately after the plant walkthrough at 12:15 pm. Ms. Alison Quimby, Sustainability and Environmental Compliance Manager for the City of Wilmington, had arrived at the site and was present for the records review and to answer further questions about the relationship between the City of Wilmington and New Castle County. She reiterated that there is a cooperative agreement in place but that it has no clause or requirement for New Castle County to share information with the City of Wilmington regarding the permitted industrial users in New Castle County. Further, the fee structure for those users is set up so payments for the use of the system go to New Castle County and not directly to the WPCF.

EPA inspectors reviewed documents requested in the September 20, 2022, email to Mr. Reznik (see Attachment 1). Records were reviewed at the time of the inspection by Erin Willard, and subsequently submitted via EPA's GoAnywhere file sharing service on October 5, 2022. Below are the records requested and provided electronically. Electronic records were reviewed to gain an overview of how the required data is managed. EPA noted that the records listed below all appeared to be available on the various spreadsheets.

Mr. Reznik indicated that the sludge boilers do not have fuel meters, but rather the fuel usage in each boiler is assumed to be the value calculated by the total amount of gas generated out of the digesters, minus the gas flared. The flares are equipped with gas flow meters and the values are continuously recorded. Further, Mr. Reznik indicated that the gas system is set so that at approximately 5" of water column pressure within the system, a valve allows the gas to go to the boilers. Once the value reaches roughly 8", excess gas automatically routes to the flare(s) and then at 11" pressure relief valves (PRV) will open to prevent the system from becoming over pressurized. The PRVs would only be used if there was an emergency situation that resulted in a large amount of gas not being combusted. The following are the records that were requested by EPA:

1. Monthly average wastewater influent flow in MGD.
2. Annual VOC concentration in wastewater
3. Feed rate to each sludge digester on a daily basis
4. Digester gas amounts generated from each digester on a monthly basis, and the flow rates of digester gas to each flare and the REBF facility² on a daily and monthly basis
5. Pilot light monitoring data, including any instances where a pilot was out, and the corrective action for the issue.
6. Digester gas analysis, including heating value and any other parameters sampled for.
7. NO_x, CO, NMOC, SO₂, CO, PM, VOC and HAP emissions from each flare on a monthly and annual basis.
8. Sludge heater fuel daily fuel usage, tune-up records and energy assessment records
9. All Subpart DDDDD compliance reports.
10. Daily visible emissions surveys/monitoring for each combustion unit.

V. Closing Conference

After the records review, EPA inspectors, Mr. Reznik, Ms. Hill, and Ms. Pirestani had a brief closing conference to ask additional questions and discuss observations. The EPA inspectors noted that the investigation is on-going, and any areas of concern identified in the final report do not necessarily reflect a violation or deviation, rather, they are areas that will require further investigation. EPA also noted that they would issue an inspection report within in 60 days, with a copy to DNREC. Simultaneously, EPA will perform a detailed review of records and may have additional questions. The inspection concluded at approximately 1:30pm.

The following have been identified as *potential* issues noted during the inspection or based on information gathered during the inspection.

- The current designation of the facility (along with the REBF) is a major source for HAPs and VOCs emissions based on modeling performed at the time of construction, completed by Honeywell. Jacobs Engineering has applied for a new minor source permit, using the basis of two annual influent samples for 11 years. EPA will review this data, to ascertain if the body of sampling data is adequate to support a permitting change from major source to minor source status.
- EPA will review the industrial users' contributions to the system, in relationship to applicability of 40 C.F.R. Part 63 Subpart VVV National Emissions Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works.

² Note that currently, due to blower issues, no digester gas is sent to the REBF for combustion.

VI. List of Attachments

Attachment 1: Email correspondence to Aleksey Reznik of records requested to review during inspection

Attachment 2: Photo Log