
**AIR QUALITY IMPACT INVESTIGATION OF THE
COVANTA RENEWABLE ENERGY, LLC FACILITY**

SUBMITTED TO:

PLYMOUTH TOWNSHIP
700 BELVOIR ROAD
PLYMOUTH MEETING, PA 19462

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1. INTRODUCTION

The Covanta Plymouth Renewable Energy LLC (Covanta) waste energy plant (Facility) is located in in Plymouth Township, Montgomery County, Pennsylvania. The plant processes municipal solid waste to generate steam and electricity. Plymouth Township has received numerous complaints from its residents regarding noxious and offending odors which are suspected to be emitted from the Facility. Plymouth Township retained Curtin & Heefner, LLP and Ambient Air Quality Services, Inc. to investigate the various issues related to the impact of operation of the Facility on the citizens of Plymouth Township. Specifically, the following was performed:

- Identify the issues for the source of the complaints
- Review Facility data for regulatory compliance (PADEP File Review)
- Determine if the emissions pose a health risk
- Determine cause of the odors and other emissions

The results of this investigation are described in the following sections of this report:

- Summary of events
- Air Quality Impact Assessment
- Conclusion and Recommendations

2. SUMMARY OF EVENTS

Plymouth Township has received numerous complaints from its residents regarding noxious and offending odors which are suspected to be emitted from the Covanta Plymouth Renewable Energy LLC waste energy plant located in Plymouth Township. A summary of the complaints and actions taken based on materials received thus far from both Covanta and the Pennsylvania Department of Environmental Protection (PADEP), and the current status of the investigation, are described in the following sections.

2.1 BACKGROUND

Covanta operates two municipal waste incinerators (MWIs) at its Facility. Covanta receives waste from a variety of sources to be incinerated. In operating the MWIs, Covanta is required to operate continuous emissions monitoring systems (CEMS) to monitor air contaminants that are released. Each quarter, Covanta submits reports from the CEMS to PADEP for review. PADEP reviews the reports for compliance with acceptable emission standards and, if applicable, any penalty to be imposed for failure to comply.

Data collected from the CEMS reports we have obtained thus far centers around the levels of Carbon Monoxide (CO), Hydrochloric Acid (HCl), and the temperature at which the MWIs are operated. CO has an emission standard of 100ppm in a 4-hr average while the HCl emission standard is a maximum of 29ppm or a 95% or higher reduction in a 24-hr average. The incinerators are expected to operate at a minimum temperature of 1,800°F.

Covanta received a total penalty of \$35,032 in the first quarter of 2018 for failure to comply with these standards. Specifically, its incinerators exceeded the CO and HCl emission standards and operated at a temperature lower than 1,800°F. This penalty was later reduced to \$27,833 based on a shutdown exemption for one of its incinerators. In 2019, PADEP imposed a penalty of \$2,142 for the first two quarters of the year, based on Covanta's failure to comply with CO emissions and temperature standards. In both years, Covanta entered a Consent Assessment of Civil Penalty (CACP) and paid the related penalties.

The Facility's violations and subsequent settlements pursuant to CACPs dates back to the first quarter of 2008 through the second quarter of 2010 for violations of CO, HCl, Nitrogen Dioxide (NO₂) and temperature standards. Per Covanta's Regional Environmental Manager, Joseph Walsh,

under certain conditions, nitric oxide can “yield a brown/yellow plume accompanied by an acid odor.”

2.2 RECENT COMPLAINTS

2.2.1 June 10- 12, 2019

On June 10, 2019, the Facility experienced a shutdown due to an electrical malfunction. PADEP received calls from residents complaining of seeing smoke and hearing a loud noise emanating from the Facility. PADEP contacted Covanta’s environmental specialist, Kim Bradford, to inquire as to what was taking place. PADEP Air Quality Specialist, Nichole Walko, did not go to the location. Rather, Walko spoke to Bradford, who explained what took place regarding the shutdown. Walko contacted the complainants and relayed the information, explaining that, based on the information from Bradford, the steam was purely water vapor.

On June 11, 2019, PADEP received a total of 87 calls concerning noise and odor emanating from the Facility. This time, Walko did visit the area. Walko smelled the odor of burning material at the intersection of Colwell Lane and Sandalwood Road and also in the Cardinal View neighborhood. Walko returned to the area with Ricky Carter from PADEP’s Waste Program at around 9:15am, and detected the same odors in the same locations.

Walko and Carter visited the Facility and met with Kim Bradford. At the time of their visit, the Facility was accepting waste but had not yet started the MWIs and no odor was detected at the Facility. Later that day, around 12:10pm, Walko received another call complaining of “toxic smoke” coming from the Covanta plant and blowing into the neighborhood. Walko returned to the location approximately 30 minutes after the call and witnessed the smoke and “discomforting odors.” Walko described the smoke plume as “dense and stretch[ing] over the neighborhood and into Conshohocken.” She witnessed this for approximately another 30 minutes. Walko, along with a number of Plymouth Township Fire Department members, and Jim Wallace, the Code Enforcement Director, canvassed the area in an attempt to locate the source of the smell. Walko and the Township officials were unable to definitely locate the source of the odor but suspected it was coming from Covanta as the incinerators reportedly began charging up around 12:30pm.

On June 12, 2019, Carter and Kevin Bauer from PADEP's Waste Program visited the Facility again. While conducting the walk through, Carter and Bauer detected a faint electrical burning odor near the Facility's transformer which was similar to the odor detected the previous day.

On a call later in the day, Covanta explained that after the electrical malfunction and shutdown on June 10, the plant began powering back up from 9:30pm – 11:30pm. MWI-1 was in the heating up phase from 2:32am – 12:30pm on June 11th, and began combusting trash around 12:30pm. MWI-2 was in its heating up phase from 2:53am – 5am on June 12th. PADEP requested that Covanta provide a full detail of what caused the shutdown and the repairs completed in order to bring the plant back online. PADEP also requested that Covanta complete an investigation to determine what caused the odors, and suggested the Covanta complete an odor survey. Finally, PADEP requested that Covanta submit their emissions data to demonstrate that there were no excess emissions from the Facility.

Covanta commissioned Trinity Consultants to perform an air dispersion study of the MWIs which, based on the community complaints of the smoke and odors, focused on the presence of NO₂ during the startup of the MWI-1. The study, which was conducted on July 11, 2019 during the startup of the MWI-1, attempted to duplicate the conditions which existed on Jun 11, 2019. The study reported that the emissions recorded during the startup and operation were well below the guidelines set by the National Ambient Air Quality Standard (NAAQS) and Acute Exposure Level Guidelines and also below the NIOSH standards for CO, HCl and NO₂ emissions.

Walsh further reported that the Facility shutdown was triggered by a shortage in a DC power cable which led to multiple breaker trips. The tray in which the cable sat was located, per the Facility's original design, next to the ash discharger. It appears that ash accumulation over time led to the deterioration of the cable. To address this issue, the Facility cleaned the area, repaired the fire blanket and began obtaining contractor quotes for the installation of a more permanent preventative fire-resistant material and relocation of the tray, which they hoped to have completed by early 2020.

On Monday, June 15, 2019, at approximately 7:30 am, Units 1 and 2 of the Covanta Plymouth Facility shut down and steam was vented to the atmosphere. At approximately 9:15 am on June 15, the Facility had lost all power and shut down. The incident has been reported to PADEP, which came out to the residential neighborhood, but did not go into the plant. David Sharp of Covanta reported to the Township that the only odors he could detect were in the parking lot of the Facility. The wind was blowing S-SW, away from the homes. The neighbors heard a noise at

this time. While they did not complain of odors, they were concerned that they may have been exposed to harmful/toxic emissions.

2.2.2 July 14 and 18, 2019

On July 14, 2019, PADEP received calls reporting an odor of burning plastic when the wind blew. Upon investigation, the Facility confirmed that it had to shut down MWI-2 because an item got stuck in the ash discharger. During the shutdown, the auxiliary burners remained in service and operated normally. PADEP and the Facility agreed that, in the future, the Facility would: 1) provide PADEP at least a 24 hour notice, by email, of any planned startup and shutdown; 2) have a representative conduct odor an survey during the shutdown and startup; 3) inform PADEP within 72 hours of an unplanned shutdown with a summary of the event; and if available, Facility personnel would conduct an odor surveillance in the surrounding neighborhoods of Colwell Street and Sandwood Road during the shutdown; and 4) inform PADEP of the anticipated restart timeline for the boiler.

On July 18, PADEP received two calls complaining of loud noises and smoke coming from the Facility. In speaking with the Facility, PADEP was informed that the MWI-2 was vented on that day while maintenance on the boiler feeder was being conducted. Facility personnel also went to the surrounding neighborhood and did not detect any odors. On July 31, 2019, PADEP found the Facility to be in compliance with the emission standards requirements.

2.2.3 August 2019

In August 2019 Covanta commissioned Odor Science & Engineering, Inc. to complete an odor evaluation for the surrounding area to independently assess odor sources and their impact on the areas around the Facility. The Facility performed a planned shutdown during the study, to try and replicate the past times when odors were reported to PADEP. The five day study found no odors similar to burnt plastic or electrical odor. The study found that offending odors, such as spicy food, faint bleach scent, burning match, etc., came from local homes, the Ikea parking lot, and the tire companies in the area. The report further concluded that any scent coming from the Facility was so low on the scent scale and localized (could smell trash by the truck entry to the Facility) that a person of normal sensitivity would not smell it.

2.2.4 September 5, 2019

Complaints, although somewhat slowed down, continued in August and September 2019. PADEP began emailing complainants who had provided their email addresses with updates on the efforts to identify the cause of the odors. On September 5, 2019, PADEP received an anonymous tip that the Facility's boilers could not maintain an 1,100 degree temperature during start up, and while burning could only reach a temperature below 1,200 degrees. The tip further informed PADEP that it is not until the garbage was burning for approximately 20-30 minutes that the boilers reach the required temperature of 1,800 degrees. The tip stated that the operators manually circumvented the roof temperature by using the temperature in the middle of the boiler and that after the garbage has been burning for a while, the operators switch back to the roof temperature to show that they are in compliance. Per PADEP, however, there are no sensors in the middle of the boilers because the sensors could not withstand such high temperatures. Additionally, based on Walko's review of the "facility's raw minute by minute CEMS data" from the then latest start-up, the "combustion temperature gradually increased to 1,927 degree...and when the MSW [solid waste] was introduced, the temperature gradually increased to 2,200-2,300 degrees." Walko confirmed with the Facility that this temperature pattern was typical during start up. Based on her review, Walko did determine there was no evidence that the Facility was falsifying data or using multiple temperature sensors.

2.2.5 October 15-16 and 19, 2019

On October 15, PADEP received approximately 82 phone calls complaining of loud noise and a burning plastic/acidic smell. On October 16, PADEP received 19 calls complaining of malodors from the Facility. PADEP investigated and did detect a burning plastic odor in several locations. There were two complaints of ash on cars and personal outdoor furniture. PADEP collected samples of the ash from one complainant and submitted it for testing. Testing revealed that the material was organic material and not ash.

Per PADEP, the Facility reported that on October 15, it had an unplanned shutdown when it lost all power due to a malfunction of the main electrical breaker. With this loss of power, the operators had to use fire hoses to stop the fire in the unit which caused smoke to emanate from the building and most likely caused the odors smelled by residents. The majority of the complaints received on October 15th were around the time that MWI-2 began heating up. PADEP asked the Facility to investigate what caused the smells during that start up. Although the Facility uses CEMs, PADEP

was unable to review the emissions amount for October 15th since there were no readings due to the loss of power.

PADEP issued a Notice of Violation for the October 15 incident. Specifically, PADEP found the Facility in violation of: 1) not notifying DEP within 2 hours after the malfunction as required by their permit; 2) allowing emissions to emanate from the roof of the boiler building; 3) allowing malodorous air contaminants to be emitted into the atmosphere beyond their property boundaries; 4) failing to operate the combustion chamber at greater than 1,800 degrees; and 5) causing the release of uncontrolled emissions into the outdoor atmosphere.

On October 19, 2019, PADEP received approximately nine complaints regarding a smell of electrical or plastic burning coming from the Facility. Upon investigation, PADEP's Emergency Coordinator, Ben Russell, met with several citizens who expressed annoyance and discomfort being caused by the chemical-like odor. Russell also detected the same odor in the neighborhood and during his walk around the exterior of the Facility – on the east side of the building. Russell was informed by Mike Morales, the Facility's site supervisor, that boiler #1 had shut down Friday night and was still offline on Saturday. Russell said he did not notice any odor while he was in the building, and that the odor had dissipated when he went outside the building a second time. PADEP issued another Notice of Violation to Covanta for this incident. In response to PADEP's October Notices of Violation, Covanta advised that it was taking certain corrective actions that included procuring a spare electrical breaker, replacement of rooftop silencers and installation of bypass condenser silencers, electrical upgrades and combustor maintenance. Odor complaints were also received on October 25th and 29th. However, Covanta maintains that it had representatives in the neighborhood performing odor and noise observation those days and they did not observe any that were associated with the Facility.

2.2.6 November 2019

The complaints continued into November 2019. On November 1, 2019, there was a complaint at 10:50pm that ash was on the complainant's house and car. Covanta responded to this complaint by pointing out that its ash and metals hauling operations stop at 4pm daily. Throughout the remainder of the month of November, PADEP received several phone calls reporting odor coming from the Facility. Walko investigated the majority of the complaints and found no odor detected in the areas from where the complaints were received.

2.2.7 December 2019

On December 15, 2019, PADEP received several calls complaining of a burning rubber/plastic/acrid odor. These complaints were investigated and found to be meritorious resulting in another violation issued to Covanta for allowing malodorous air to be emitted into the atmosphere outside its property in violation of its operating permit. Covanta responded to the Notice of Violation by outlining a number of efforts it had taken and would take to minimize the off-site odors, including establishing a facility community hotline for community feedback, use of a formal odor complaint log, completing repairs to openings in the tipping floor building exterior, refurbishing existing vents, filters in the roof of the tipping floor over the pit, and conducting daily odor monitoring around the perimeter of the site. Covanta also reported that on December 30, 2020, there was another Facility shutdown that resulted in noise and odor complaints. This shutdown was again caused by a loss of power.

2.2.8 January/February 2020

On January 30, 2020, Covanta submitted a proposal to PADEP seeking approval to use a new fire suppression foam to smother the waste and terminate combustion if there is a plant trip. Covanta also advised that it would evaluate the feasibility of a permanent backup power supply to operate an existing baghouse fan that would evacuate fugitive emissions during plant trips. PADEP responded with a number of follow-up questions, including asking for the ingredients of the foam, how it would be applied, and if Covanta researched the Waste Management and Water Quality impacts of the foam. In February 2020, Covanta provided responses to PADEP's questions regarding the contents of, and other information related to, the foam. Covanta noted that it was not aware of this product being used at other waste to energy plants. With regard to the permanent backup power, Covanta advised that it had found technical and operational feasibility challenges for the provision of such backup power and, as such, the proposed foam system field test was deemed to be more reliable, less technically complex, more time sensitive and the preferred approach to minimize fugitive emissions during a plant trip.

PADEP drafted a Field Sampling Plan (Plan) which proposed using summa canisters to collect background samples and ambient air samples and using EPA Method TO-15 to analyze the samples. The Plan was forwarded to PA Department of Health (PADOH) and the Agency for Toxic Substances and Disease Registry (ATSDR) for comment. Both responded that the TO-15 method does not analyze for the pollutants that are of concern, and that the sampling should take place

over a period of 18-24 months. PADOH and ATSDR indicated that the Plan would not adequately answer the questions regarding the odors and health concerns. Together with PADOH and ATSDR, PADEP decided that the Plan was not feasible to continue.

2.2.9 June 15, 2020

On June 15, 2020, two uncontrolled shutdowns occurred as the result of an electrical failure.

One of the shut downs resulted in the failure of the Facility's air pollution control devices.

PADEP issued a June 24, 2020 Notice of Violation in response to this incident. In response to this incident, Covanta advised PADEP that it would re-route power lines and undertake fire foam suppression testing.

3. AIR QUALITY IMPACT ASSESSMENT

Operation of the Covanta plant produces air quality emissions which are discharged from a stack after passing through an air pollution control system. The air pollution control system has been designed to capture and destroy air pollutants so that the Facility does not produce ground level air quality levels above state and federal ambient air quality standards. The NAAQS have been established to protect the public health and welfare. The level of emissions from the stack has been established by the PADEP and incorporated into the Title V Operating permit to ensure the public health and welfare is protected. The Facility is required to operate a Continuous Emission Monitoring (CEM) system that measures and records the pollutant emissions levels from the stack and to ensure that Facility is not discharging emissions above the limits in the Operating Permit.

Measurements of the air quality in the Plymouth Township area surrounding the Covanta Facility is the direct method to determine the potential air quality impact of air pollutants discharged from the Facility. Unfortunately, no such appropriate air quality monitoring measurements are available. Thus, an assessment of the potential air quality impacts of the Covanta Facility is limited to the review of several documents as surrogates for direct air quality monitoring measurements. The following documents were reviewed to assess the potential adverse air quality impact of the Covanta Facility:

- Annual Relative Accuracy Testing Audit (RATA) Report (June 2019)
- Annual Volatile Organic Compound Compliance Emission Test Program (June 2019)
- Annual Compliance Test Program (November 2019)
- Air Dispersion Modeling Report (July 2019)
- Odor Evaluation In the Area Surrounding the Covanta Plymouth Renewable Energy Facility (August 2019)

A brief review of each of these reports in terms of identifying potential adverse air quality impact is provided below.

3.1 ANNUAL RATA REPORT (JUNE 2019)

TRC Environmental Corporation conducted Relative Accuracy Test Audits (RATA) on the Continuous Emissions Monitoring Systems (CEMS) and Continuous Opacity Monitoring systems (COMS) for Covanta on June 12-13, 2019. Additionally, initial CO CEMS certification was conducted on four backup CEMS analyzers during this RATA campaign. A total of 12 RATA runs

were tested including inlet, outlet, and backup systems installed on Unit 1 and 10 RATA runs were tested on Unit 2. Additionally, COMS installed on the stacks of Units 1-2 were also tested. All tests were performed in accordance with applicable EPA methods. The results of the RATA indicate that the CEM system was operating properly and in compliance with PADEP's Continuous Source Monitoring Manual (CSMM).

Therefore, the RATA results indicate the CEM system is effective in measuring valid air pollutant emissions discharged from the Covanta stacks.

3.2 ANNUAL VOLATILE ORGANIC COMPOUND (VOC) COMPLIANCE EMISSION TEST PROGRAM (JUNE 2019)

TRC Environmental Corporation conducted compliance emission testing of volatile organic compounds (VOC) for Covanta on June 12 and 14, 2019. All tests were performed in accordance with applicable EPA methods. The results of the VOC emission test indicated that Units 1 and 2 emitted total hydrocarbons (THC) at 0.45 and 0.9 lb/hr which was well below the permit emission limit of 2.68lb/hr. THC can be used as a measure of the destruction efficiency of the combustion process.

Therefore, the VOC emission test results indicate the air pollutant control system was operating properly for VOC emissions and was effective in controlling the THC emissions from the Covanta stacks.

3.3 ANNUAL COMPLIANCE TEST PROGRAM (NOVEMBER 2019)

TESTAR Engineering, PC conducted a compliance emission test of Units 1 and 2 on November 18 through 26, 2019. The emission testing program included ammonia, benzo a-pyrene, dioxins/furans, hexavalent chromium, arsenic, beryllium, cadmium, chromium, lead, mercury, nickel zinc, PAHs, and particulates. The results of the testing indicated that all of the pollutants tested were discharged from the stack at level below the permit emission limits.

Therefore, the annual compliance emission test results indicate the air pollutant control system was operating properly for PAHS, dioxin/furans and metal emissions and was effective in controlling the these emissions from the Covanta stacks.

3.4 AIR DISPERSION MODELING REPORT (JULY 2019)

An air quality modeling analysis was performed by Trinity Consultants in July 2019. The objective of the modeling analysis was to determine the predicted ground level air quality impact of the Covanta Facility during startup and normal operating conditions. The startup condition was the use of a fuel oil-fired auxiliary burner. The air quality modeling procedures followed those established by the USEPA. The results of the air quality modeling indicates that both the startup and normal operating conditions produced ground level air quality concentrations in the Plymouth Township area that were below the NAAQS and other health risk thresholds for NO₂, SO₂, CO, PM and HCl.

Therefore, the air quality modeling results indicate that both startup and normal operating conditions are not expected to produce adverse ground level air quality impacts for these pollutants.

3.5 ODOR EVALUATION IN THE AREA SURROUNDING THE COVANTA PLYMOUTH RENEWABLE ENERGY FACILITY (AUGUST 2019)

An odor evaluation study was performed by Odor Science & Engineering, Inc. on July 24-28, 2019. The purpose of the odor study was to attempt to determine the source of the odor complaints related to shut down events at the Covanta Facility. Odor monitoring was performed before, during and after a planned shutdown to determine the impact of the shutdown on detectable odors downwind of the Covanta Facility.

Odors were detected downwind of the Covanta Facility before and after the planned shutdown, but they were attributed to other local source in the area and not the Covanta Facility. During the planned shutdown a light “garbage” odor was detected and was attributed to truck traffic entering the Covanta Facility. A light “bleach-like” odor was also detected but was not attributed to stack emissions from the Covanta Facility. A “rubber/tire” odor was also detected during the planned shutdown but was attributed to the tire shredding operation as Emanuel Tire Co.

4. CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSIONS

The Facility has suffered numerous unplanned controlled shutdowns resulting from electrical/mechanical failures since June of 2019. These shutdowns appear to have resulted in off-site odors and noise. Although Covanta has attempted numerous actions to prevent and control the shutdowns, odors and noise, the Facility suffered two uncontrolled shutdowns as the result of an electrical failure as recently as June 15, 2020. PADEP has issued numerous Notices of Violation, but it does not appear that PADEP has taken elevated enforcement action to require mitigation of these events.

Based on the results of the various emission testing, air quality modeling analysis and odor study, when the Covanta Facility is operating normally, there does not appear to be an adverse air quality impacts for either air pollutants or odors. During upset, power outage, startup/shut down and other abnormal conditions, however, there is evidence that the Facility is producing nuisance odorous conditions in the area surrounding the Facility. This is based on the limited odor study but more importantly on the documented shut down/start up events (June 10-12, July 14, 18, October 15, 19, 2019, November and December 15, 2019) when numerous community complaints have been recorded by the Township and PADEP.

4.2 RECOMMENDATIONS

There appears to be a direct correlation in time between the odors that residents smell and when the Facility experiences an unplanned shutdown based on mechanical/electrical failure. Odor complaints have also been received when the Facility is operating without incident.

In separate letters dated November 25, 2019 and January 7, 2020 to PADEP, Covanta outlined a number of actions including mechanical, building, and equipment fixes and repairs it intended to take to address the concerns of residents regarding the odors and noise emitted from the Facility. It would be advisable for the Township to follow up with the Covanta and PADEP to determine if Covanta has taken any further steps to accomplish the items listed in its letters, as well as to request any underlying documentation that supports the claim that these action items will actually address the odor and noise emissions. The Township may also want to authorize a further comprehensive

overview of the Facility, its operations and its equipment, to evaluate if Covanta's fixes will minimize the odor and noise emissions.

In addition, Covanta proposed two additional mitigation measures to address odors resulting from uncontrolled Facility upset: 1) the use of suppression foam to smother the waste and terminate combustion and 2) a permanent backup power supply to operate an existing baghouse fan that would evacuate fugitive emissions during plant trips. Although Covanta is pursuing the use of suppression foam, Covanta has stated that the installation of backup power poses technical and operational feasibility challenges. Given the continued electrical/mechanical issues at the Facility, and the apparent lack of use history of suppression foam at other waste to energy plants, we recommend that Covanta continue to evaluate and pursue the use of backup power.

To assist in tracking the number, type and potential source of future odor incidents, the Township may want to have Covanta implement or fund a web based odor complaint tracking system so citizens can record the date, time, location and type of odors with the ability to map the locations and weather conditions during the odor complaints. As an example, one such service is ODOR TRACK'R (<http://odortrackr.com/>). The recorded complaints can be used to develop a history of the frequency, location and type of complaint and help correlate the complaints with operations at the Facility.

Finally, as a stakeholder and representative of its citizens, the Township should request to be included in the conversations and copied on correspondence and documentation between Covanta and PADEP regarding the Facility.