



Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

May 14, 2020

Brenda K. Weis, MSPH, PhD
Health Administrator
Montgomery County Department of Health and Human Services
Office of Public Health
P.O. Box 311
Norristown, Pennsylvania 19403-0311

Dear Dr. Weis:

Thank you for your December 16, 2019 letter to Agency for Toxic Substances and Disease Registry (ATSDR) and the Pennsylvania Department of Health (PADOH). In your letter you request that ATSDR and PADOH conduct a public health assessment of the Covanta Plymouth Renewal Energy, LLC, located on 1155 Conshohocken Road, Conshohocken, Pennsylvania. We have completed our review of your request. Unfortunately, the available environmental sampling information is not sufficient for ATSDR to provide you and the Conshohocken community with a meaningful public health evaluation. Hence, we have decided not to conduct any additional public health assessment activities at this time.

ATSDR staff reviewed the readily available information regarding environmental contamination associated with the Covanta Plymouth Renewal Energy, LLC, facility (a.k.a., Covanta Plymouth facility). Below and in the enclosure to this letter, we provide a detailed explanation of the available information, the limitations of that information, and the reasons why ATSDR will not, at this time, conduct any additional public health assessment activities related to your request.

Based upon the information available, ATSDR makes the following observations, conclusions, and recommendations:

- There are no community-based air monitoring results that ATSDR could use to evaluate whether people are exposed to Covanta Plymouth facility emissions at levels of health concern over an extended period-of-time. Further, it would be highly difficult to obtain this information, given the contaminants involved, the sporadic nature of upset events, and the fact that health-based screening levels for the chemicals of concern emitted from this type of facility are for the most part below minimum detection limits of available ambient air sampling methods. **Hence, ATSDR cannot specifically address the local community concerns that the Covanta Plymouth facility air emissions might be impacting the health of people living near the facility.**

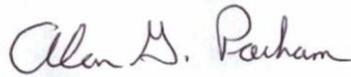
- Annual stack testing at the Covanta Plymouth facility indicates the facility's emissions are below the facility's annual air discharge permit limits. **ATSDR recommends that the number of upset events be estimated each year and the estimated emissions from these events be included in the facility's annual air discharge calculations.**
- Short-term operational failures and a number of opacity, hydrogen chloride, carbon monoxide, odor, and temperature violations have occurred at the Covanta Plymouth facility. During some of these operational failures, the local community has complained about odors and noise, and the Pennsylvania Department of Environmental Protection (PADEP) has confirmed these odors in the community. **Hence, ATSDR concludes that exposures to emissions, particularly during the confirmed odor events, have occurred.** However, there is insufficient information available for ATSDR to determine whether exposure concentrations in the impacted community are above health-based screening levels. ATSDR acknowledges that substances that produce odors can sometimes trigger physical symptoms. Symptoms usually occur when the substance is present at "irritation levels." In addition, people can sometimes have symptoms when the substance in air is below levels of irritation. The most common symptoms from environmental odors are headache and nausea (https://www.atsdr.cdc.gov/odors/docs/Are_Environmental_Odors_Toxic_508.pdf). **ATSDR recommends that community members and agency officials work with industry to reduce problematic odors, and that residents reduce their individual exposure to problematic odors by exercising indoors during days with more environmental odors, staying indoors when allergies, asthma, and/or chronic lung problems are acting up, and leaving the area for a few hours if possible.**
- Conducting community-based ambient air monitoring to assess waste incinerator emissions impacts on fence line communities is technically challenging. This is particularly true in trying to assess exposures due to short-term operational failures. Previous sampling investigations at other incinerator facilities have tried to determine whether nearby community members are exposed to hazardous chemical emissions from these types of facilities. The hazardous persistent chemicals of concern emitted to air from these facilities include dioxins/furans, heavy metals, polychlorinated biphenyls [PCBs], and polycyclic aromatic hydrocarbons [PAHs]. However, past investigation results have been inconclusive because the predicted air concentrations (based on emissions modeling) for these chemicals are typically below the ability of air sampling analytical methods to measure. ATSDR health-based screening levels are also typically below the air sampling detection limits for many of these chemicals. **Therefore, ATSDR does not recommend air sampling for hazardous chemicals in the nearby community to assess potential health impacts at this time, because the sampling results would likely not provide meaningful information. Instead, ATSDR recommends using all viable approaches to control stack and fugitive emissions from this facility.**

Page 3 - Brenda K. Weis, MSPH, PhD

Upon request, ATSDR is available to provide additional technical assistance to the Montgomery County Department of Health and Human Services, PADOH, and PADEP as they continue their effort to address the community's concerns regarding the Covanta Plymouth facility.

Thank you for bringing your and the community's concerns about the environmental contamination associated with the Covanta Plymouth Renewal Energy, LLC facility to our attention. If you have any questions on how your request was reviewed, please contact either Mr. Robert H. Helverson, Environmental Health Scientist, ATSDR Region 3 Office at (215-814-3139 or by email at gfu6@cdc.gov) or Dr. Sven E. Rodenbeck, Petition Coordinator (770-488-3660 or by email at SRodenbeck@cdc.gov).

Sincerely,



Alan Parham
Captain, U.S. Public Health Service
Acting Director
Division of Community Health Investigations
Agency for Toxic Substances and Disease Registry

Enclosure

Cc:
Lora Werner, ATSDR Region 3 Regional Director
Robert Helverson, ATSDR Region 3
Dr. Sven Rodenbeck, ATSDR
Dr. Anil Nair, PADOH

Enclosure for the Petition Decision Letter Regarding the Covanta Plymouth Renewal Energy LLC, Conshohocken, Pennsylvania

Background

In December 2019, the Agency for Toxic Substances and Disease Registry (ATSDR) and the Pennsylvania Department of Health (PADOH) received a petition from the Montgomery County Health Administrator. The Health Administrator requested that ATSDR and PADOH conduct a public health assessment of the emissions from Covanta Plymouth Renewal Energy, LLC (a.k.a., Covanta Plymouth facility), Conshohocken, Pennsylvania.

The county stated that local officials have received numerous complaints from nearby residents and stakeholders about health concerns related to odors and air emissions from the facility. The county noted in their petition letter that since 2015, the facility has incurred numerous air emission violations. Beginning in December 2018 through October 2019, several operational failures at the Covanta Plymouth facility resulted in unusual noise and fugitive air emissions. Local community members complained about short-term loud noises and “burning plastic” odors emanating from the facility and the community demanded to know whether the facility emissions were impacting their health. At that time, the Pennsylvania Department of Environmental Protection (PADEP) found that the continuous stack monitors at the facility did not detect any emission elevations. Ambient air monitoring is not available in the community near the Covanta Plymouth facility when the operational failures occurred. A review of the 5-year compliance history by the Montgomery County Health Department, however, found that most penalties issued to the facility by the PADEP have been due to excursions/exceedances determined by the continuous stack air monitors. In 2019, violations were related to increased opacity, exceedances of hydrogen chloride and carbon monoxide, and temperature excursions.

The Covanta Plymouth facility is a municipal waste incinerator that converts raw municipal solid waste (approximately 1,216 tons per day) into steam used to create electric power (32 megawatts per day) and is located at 1155 Conshohocken Road, Conshohocken, Pennsylvania (see Figure 1). The Covanta Plymouth facility has been operational since the late 1980s and is regulated by PADEP.

The Covanta Plymouth facility has two incinerator-boiler trains and a common generator turbine unit. Each incinerator-boiler train is capable of incinerating 600-tons of solid municipal waste per day at 1,700-1,900° Fahrenheit. Exhaust gases from each of the incinerator-boilers are routed to one of the two cyclone air pollution control devices where large diameter particles are removed and lime and activated carbon are injected to control acid gases and remove mercury. The exhaust gases are then routed to one of the two reverse baghouses where more refined (i.e., smaller diameter) particulate matter is removed. The emissions are then vented through separate flues housed in a common 305-foot stack.

As required by the PADEP air discharge permit, the Covanta Plymouth facility continuously monitors its stack emissions for hydrochloric acid (HCl), nitrous oxide (NO_x), carbon monoxide (CO), particulate matter (PM), sulfur dioxide (SO₂), and temperature. The facility provides quarterly continuous stack monitoring results to PADEP. In addition, the PADEP permit requires

that annual stack testing be conducted on both incinerators. Each annual stack test must consist of a minimum of three test runs conducted under representative full load operating conditions and check for the following air pollutants using specific U.S. Environmental Protection Agency (EPA) or PADEP approved methods:

- Total particulates and particulate matter less than 10 microns in diameter (PM10),
- SO₂,
- CO,
- Visible emissions,
- NO_x,
- HCl,
- Polycyclic aromatic hydrocarbon compounds, including benzo(a)pyrene,
- Volatile organic compounds, expressed as total hydrocarbons,
- Arsenic and arsenic compounds,
- Cadmium and cadmium compounds,
- Hexavalent chromium and hexavalent chromium compounds,
- Lead and lead compounds,
- Beryllium and beryllium compounds,
- Mercury and mercury compounds,
- Zinc and zinc compounds,
- Total dioxin and furans,
- Ammonia, and
- Fugitive ash emissions.

Over the past five-years, the Covanta Plymouth facility has been cited at least seven-times for exceeding continuous air monitoring thresholds. As a result of these exceedances, the company has paid a total of \$71,445 in fines. PADEP and county officials indicate that the Covanta Plymouth facility managers are cooperative and that the facility is generally in regulatory compliance. Without sufficient environmental sampling data to assess exposures, ATSDR cannot determine whether these exceedances result in unhealthy exposures that can result in adverse health effects.

Over the last 20 years, the facility has implemented a number of major upgrades/improvements, including installing the following: a new urea system (2001); a carbon system (2005); a continuous emission monitoring system replacement and control room computer system upgrade (2008); new air compressor systems (2015); a turbine and controls system upgrade and new water treatment system (2016); a new metals recycling system addition (2017); replacement air heaters and combustion air duct to boilers, major boiler tube replacements with upgraded material, and SPG boiler cleaning system addition (2018); and replacement burners/control systems, stoker (grates) electrohydraulic systems, fly ash conveyor systems and ash dischargers (2019).

Starting in 2018, the plastic content of the municipal solid waste incinerated at the Covanta Plymouth facility and other U.S. municipal solid waste incinerators likely increased because China and other countries have stopped importing recycled plastic from the United States and other developed countries. This has led the local community to voice concerns that the

dioxin/furan emissions from the Covanta Plymouth facility might be increasing and, thereby, adversely impacting their health.

Summary of Information Reviewed for this Petition Request

When evaluating environmental sampling data, ATSDR compares the site-related environmental sampling results to both human health-based comparison screening values that ATSDR and other agencies have established and natural background levels. If the sampling result screening shows that the level of a particular contaminant is less than an established human health-based comparison value or natural background levels, ATSDR does not conduct any in-depth evaluation of that particular contaminant. If multiple environmental sampling results indicate there might be the potential for people to be exposed to chemical contamination greater than the human health-based comparison screening value and natural background level, then ATSDR conducts a more in-depth evaluation to determine if human health effects are possible.

To determine whether ATSDR could provide the petitioner and the local Conshohocken community with a meaningful response to their concerns, ATSDR technical staff reviewed the Covanta Plymouth facility annual stack sampling results and the various Covanta Plymouth facility after action reports/investigations that were done in response to the 2018-2019 operational failures at the Covanta Plymouth facility. ATSDR technical staff also reviewed the recent scientific literature concerning the formation of dioxin/furans during the incineration of solid municipal waste and the odor evaluation conducted on behalf of the facility by Odor Science & Engineering in July 2019.

Available Covanta Plymouth Renewable Energy LLC Emissions Information

There are no community-based air monitoring results that ATSDR could use to evaluate whether people are exposed to Covanta Plymouth facility emissions at levels of health concern over an extended period-of-time. Hence, ATSDR cannot specifically address the Montgomery County Health Administrator's and the local community concerns that the Covanta Plymouth facility air emissions might be impacting the health of people near the facility. However, the available information can help provide some context to help better understand the extent of exposures to Covanta Plymouth facility-related emissions.

The 2014-2018 annual stack sampling results indicate that the Covanta Plymouth facility stack emissions are below the facility's air discharge permit limits. Because the Covanta Plymouth facility stack emissions are below permit limits, the facility has not been required to conduct any new air pollution dispersion modeling since the facility's original permit application in the 1980s.

To determine areas of the community that might have been impacted by the June 11, 2019 facility restart after the June 10 operational failure, the Covanta Plymouth facility conducted a restart of one incinerator-boiler in July 2019 and at the same time monitored for odors in the surrounding areas. The engineering firm hired by the Covanta Plymouth facility, Odor Science & Engineering, conducted a series of systematic odor surveys in the community. The firm was tasked to assess the relative contributions of various sources of odors in the area, and to

characterize the concentration, intensity, character, and likely source of any odor detected during the surveys. The consultant canvassed an area of ~2-mile radius around the facility for five days at various times of the day and night over the period July 24-28, 2019. Some of the prior community odor complaints had occurred on days when the facility experienced a shutdown of one or both boiler units. In order to simulate conditions that occurred during these prior shutdowns, Covanta scheduled a shutdown of Boiler Unit # 2 on July 25, 2019. Odor monitoring was then conducted before, during and after the scheduled shutdown in areas downwind from the facility. The consultant determined that very little odor was detected in any of the areas surrounding the facility throughout the 5-day period, which was consistent with the fact that no odor complaints were received by PADEP during the monitoring period either.¹

The engineering firm hired by the Covanta Plymouth facility also conducted air pollution dispersion modeling based upon the conditions during the June 11, 2019 restart of the plant after the previous day shutdown (e.g., wind speed, wind direction, incinerator-boiler parameters at the time of the operational failure). The air dispersion modeling results indicate that the people most likely impacted by the restart emissions from the incinerator-boiler live towards the southeast of the facility just across Interstate 476. The modeled location is generally consistent with the residential locations where most of odor complaints have originated. However, the consultant's theoretical modeling results indicate that people at that location were not exposed to NO_x, SO₂, HCl, or particulate matter at levels above the EPA National Ambient Air Quality Standards. The predicted theoretical modeling results for SO₂ and HCl were also below ATSDR health-based comparison values (26 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$], for acute/short term exposures, and 20 $\mu\text{g}/\text{m}^3$, for chronic/long term exposures, respectively) and the World Health Organization 24-hour (acute) health guideline for particulate matter (25 $\mu\text{g}/\text{m}^3$). One primary limitation is noted in the modeling performed by the facility's contractor: primary toxic risk drivers, including polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), dioxins and furans, were not modeled for the specific events of concern for this incinerator.

While ATSDR typically prefers community-based monitoring data or robust modeling of stack and fugitive emissions before making definitive conclusions about who and to what extent people might be exposed to emitted contaminants, we recognize there are specific challenges that limit the usefulness of air sampling data in communities adjacent to municipal waste incinerators. These challenges include

- the high detection limits for the most toxic risk drivers (PAHs, PCBs, dioxins and furans), where health-based screening values are below the laboratory's lower detection limits;
- the level of effort and resources required to successfully conduct technically advanced field sampling procedures; and,
- the spatial and temporal limitations inherent to a facility of this magnitude, including its stack height and the fugitive emissions expected during these short-term, unscheduled and uncontrolled events.

¹ Odor Science & Engineering, Inc. Odor Evaluation in the Area Surrounding the Covanta Plymouth Renewable Energy Facility, Conshohocken PA. Final Report. August 28, 2019.

PADEP has verified some of the community odor events near this facility, including in July 2019 (when 87 community odor complaints were reported) and October 2019 (when 85 community odor complaints were reported). This would tend to indicate that Covanta Plymouth related emissions have likely been released and migrated into nearby communities.

ATSDR acknowledges that substances that produce odors can sometimes trigger physical symptoms at concentrations lower than where specific health *effects* may occur. Symptoms usually occur when the substance is present at “irritation levels.” However, people can sometime have symptoms when the substance in air is below levels of irritation. The most common symptoms from environmental odors are headache and nausea (https://www.atsdr.cdc.gov/odors/docs/Are_Environmental_Odors_Toxic_508.pdf). It is important to note here, however, that there is insufficient information available for ATSDR to determine exposure concentrations in the impacted/exposed community.

Summary of Information About Dioxin/Furan Emissions from Municipal Waste Incinerators

According the scientific literature, dioxins/furans are formed as a result of incomplete combustion. Better combustion practices (i.e., proper temperature, residence time, and turbulence) have been shown to significantly reduced dioxin/furan emissions from municipal waste incinerators.^{2,3} In addition, the proper operation of air pollution control systems has further resulted in reducing the amount of dioxins/furans emitted from municipal waste incinerators.

One of the key municipal waste combustion practices that inhibit the formation of dioxins/furans is keeping the primary combustion chamber temperature between 1560 and 1830 degrees Fahrenheit.⁴ These combustion practices have been shown to be effective across a vast range of municipal waste content and has become standard operating procedures for most municipal waste incinerators. As a result, it has been estimated that municipal waste incinerators as a group have reduced their dioxin/furan emissions by over 95 percent since 1987, so that their dioxin/furan emissions are well below the EPA Maximum Achievable Control Technology regulatory limit of 13 nanograms per dry standard cubic meter.⁵ The Covanta Plymouth facility appears to utilize many of the operation practices and air pollution control systems that have been shown to prevent/reduce formation of dioxins/furans from municipal waste incineration. However, several of the permit violations the facility has been cited for over the years have been related to temperature (e.g., August 2009, twice in October 2011, November 2011, June 2013, March 2014, October 2014, February 2016, November 2016, and October 2019).

² Liu H, Kong S, Liu Y, and Zeng H. Pollution Control Technologies of Dioxins in Municipal Solid Waste incinerator. *Procedia Environmental Sciences* 2012;16:661-668.

³ McKay G. Dioxin Characterization, Formation and Minimization During Municipal Solid Waste (MSW) Incineration: Review. *Chem Eng J* 2002;41:40-9.

⁴ U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Locating and Estimating Air Emissions from Sources of Dioxins and Furans. Research Triangle Park, North Carolina, 1997.

⁵ Dwyer H and Themelis NJ. Inventory of U.S. 2012 dioxin emissions to atmosphere. *Waste Management*; August 2015.

Typically, when there is insufficient exposure pathway data to assess community exposures where a completed exposure pathway exists, ATSDR would recommend environmental characterization activities to federal or state regulatory and health agencies. If no additional sampling is performed, ATSDR sometimes considers conducting an ATSDR Exposure Investigation to fill a critical data gap to allow for an assessment of community exposures. However, assessing the connection between municipal waste incinerator emissions and community health effects is challenging. Although attempts at other facilities have been made to determine exposure concentrations to the most toxic emissions (e.g., dioxins/furans, heavy metals, polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons [PAHs]), the results of these investigations have been inconclusive because the predicted concentrations (based on emissions modeling) are typically below the ability of air sampling analytical methods to measure (i.e., below detection limits).⁶ Given that ATSDR health-based screening levels are also typically below air sampling detection limits for the most toxic incinerator emissions, ATSDR would not recommend sampling in the nearby community to assess potential health impacts because the sampling results would not provide meaningful information. Instead, ATSDR recommends the following be adopted by stakeholders in the community:

- Covanta should use all viable approaches to control stack and fugitive emissions from this facility;
- Covanta should provide immediate notification to the community and public health officials at the Montgomery County Department of Health of short-term mechanical failures which have been shown to lead to fugitive gas/fume/particulate matter emissions. This should be adopted as a fundamental component of the facility's response plan;
- The Montgomery County Department of Health, with assistance from the PADOH Division of Environmental Epidemiology, can develop outreach material for the community suggesting best practices to employ to minimize risk to health or well-being in the event of an unplanned fugitive emission event.

Overall Summary of Findings

Based upon the available information, ATSDR makes the following observations, concludes, and recommendations:

- There are no community-based air monitoring results that ATSDR could use to evaluate whether people are exposed to Covanta Plymouth facility emissions at levels of health concern over an extended period-of-time. Further, it would be highly difficult to obtain this information, given the contaminants involved, the sporadic nature of upset events, and the fact that health-based screening levels for the chemicals of concern emitted from this type of facility are for the most part below minimum detection limits of available ambient air sampling methods. **Hence, ATSDR cannot specifically address the local community concerns that the Covanta Plymouth facility air emissions might be impacting the health of people living near the facility.**

⁶ Valberg PA, Drivas PJ, McCarthy S, and Watson AY. Evaluating the Health Impacts of Incinerator Emissions. Journal of Hazardous Materials 47 (1996) 205-227.

- Annual stack testing at the Covanta Plymouth facility indicates the facility's emissions are below the facility's annual air discharge permit limits. **ATSDR recommends that the number of upset events be estimated each year and the estimated emissions from these events be included in the facility's annual air discharge calculations.**
- Short-term operational failures and a number of opacity, hydrogen chloride, carbon monoxide, odor, and temperature violations have occurred at the Covanta Plymouth facility. During some of these operational failures, the local community has complained about odors and noise, and the Pennsylvania Department of Environmental Protection (PADEP) has confirmed these odors in the community. **Hence, ATSDR concludes that exposures to emissions, particularly during the confirmed odor events, have occurred.** However, there is insufficient information available for ATSDR to determine whether exposure concentrations in the impacted community are above health-based screening levels. ATSDR acknowledges that substances that produce odors can sometimes trigger physical symptoms. Symptoms usually occur when the substance is present at "irritation levels." In addition, people can sometimes have symptoms when the substance in air is below levels of irritation. The most common symptoms from environmental odors are headache and nausea https://www.atsdr.cdc.gov/odors/docs/Are_Environmental_Odors_Toxic_508.pdf. **ATSDR recommends that community members and agency officials work with industry to reduce problematic odors, and that residents reduce their individual exposure to problematic odors by exercising indoors during days with more environmental odors, staying indoors when allergies, asthma, and/or chronic lung problems are acting up, and leaving the area for a few hours if possible.**
- Conducting community-based ambient air monitoring to assess waste incinerator emissions impacts on fence line communities is technically challenging. This is particularly true in trying to assess exposures due to short-term operational failures. Previous sampling investigations at other incinerator facilities have tried to determine whether nearby community members are exposed to hazardous chemical emissions from these types of facilities. The hazardous persistent chemicals of concern emitted to air from these facilities include dioxins/furans, heavy metals, polychlorinated biphenyls [PCBs], and polycyclic aromatic hydrocarbons [PAHs]. However, past investigation results have been inconclusive because the predicted air concentrations (based on emissions modeling) for these chemicals are typically below the ability of air sampling analytical methods to measure. ATSDR health-based screening levels are also typically below the air sampling detection limits for many of these chemicals. **Therefore, ATSDR does not recommend air sampling for hazardous chemicals in the nearby community to assess potential health impacts at this time, because the sampling results would likely not provide meaningful information. Instead, ATSDR recommends using all viable approaches to control stack and fugitive emissions from this facility.**

Upon request, ATSDR is available to provide additional technical assistance to the Montgomery County Department of Health and Human Services, PADOH, and PADEP as they continue their effort to address the community's concerns regarding the Covanta Plymouth facility.

Figure 1: Vicinity Satellite Map of the Covanta Plymouth Renewable Energy, LLC, 1155 Conshohocken Road, Conshohocken, Pennsylvania
(Not to Scale)

