Air Management Services
Annual Report for Calendar Year 2020

Kassahun Sellassie, Ph.D, PE
Director

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Introduction

Air Management Services (AMS), a division of the Philadelphia Department of Public Health and the air pollution control agency for the City of Philadelphia, has made great strides over the past few years in protecting the people of our City from the adverse effects of air pollution. This report details our unit's goals, a summary of activities and revenues collected, and our progress in calendar year 2018 toward meeting our objectives set under the Clean Air Act.

Mission and Vision

Mission Statement: Air Management Services, a division of the Philadelphia Department of Public Health, is committed to protecting the health, well-being, and quality of life of the people who live, work and visit Philadelphia from the adverse effects of air pollution.

Vision Statement: To ensure all Philadelphia residents have access to safe, clean air.

Goals

Achieve and maintain the National Ambient Air Quality Standards (NAAQS) in Philadelphia by implementing all relevant federal, state, and local air regulations. These air quality standards may be further reduced based on updated scientific information. Among these are:

- Achieve the 2015 standard of 0.070 parts per million of ozone over eight hours by December 31, 2022.

Other agency goals include:

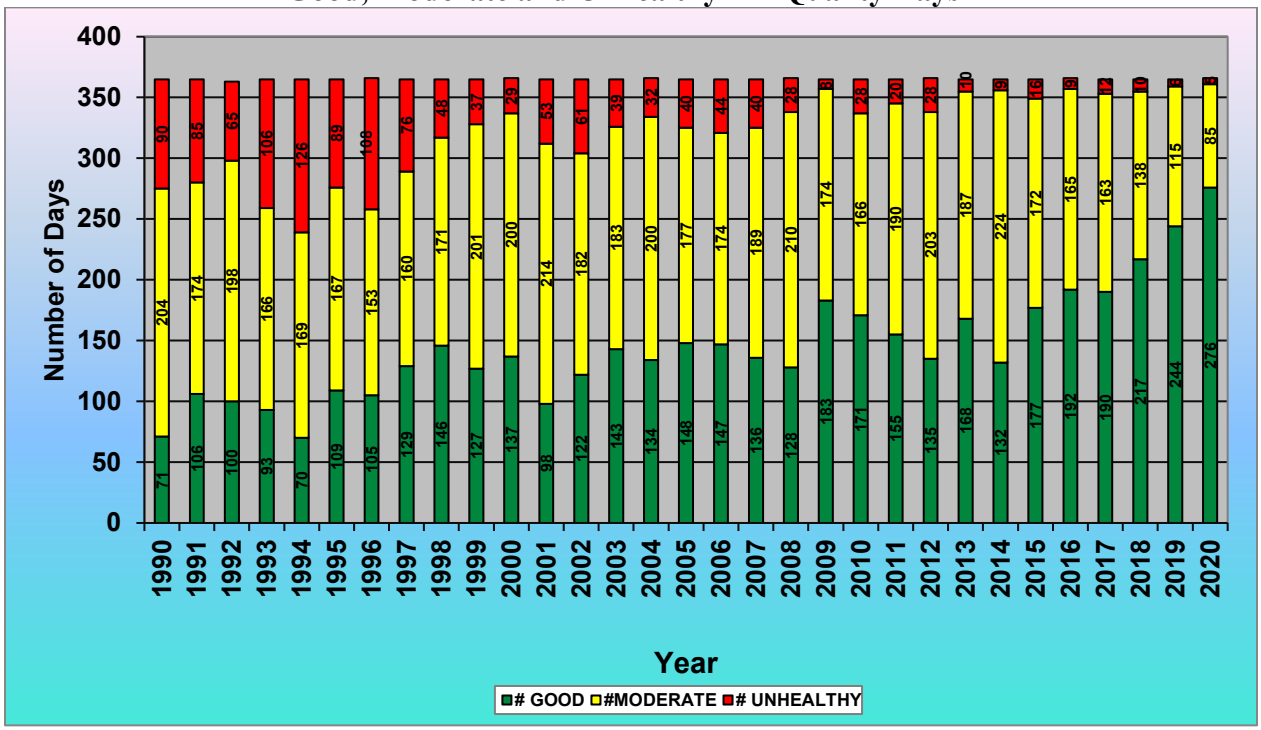
- The City should minimize risk to all residents from air toxics to less than one in a million risk of cancer (above what would normally be seen in the general population).
- AMS will also work with EPA and other stakeholders to seek alternative funding sources for the air program from the transportation sector such as emission fees for mobile sources and/or vehicle registration fees.
- Gather the best information available to appropriately address the many factors involved in the regulation of air quality, including health, quality of life, equity, and economic impacts.
- Improve AMS' profile and its community services to Philadelphians and operate in accordance with the Pennsylvania Department of Environmental Protection's *Environmental Justice Public Participation Policy*.
- To streamline communication within the agency and with outside groups such as researchers and educators in order to improve the profile and public perception of the agency and to raise awareness about the importance of clean air to public health and welfare.
- Educate the public about energy efficiency and sustainability.
- Plan and coordinate with other authorities to reduce the impact of air pollution from the transportation sector.

- Assist businesses to help them comply with environmental regulations while being sensitive to the economic implications of these regulations.
- Coordinate with the Mayor's Office of Sustainability to support their goal of making Philadelphia the greenest city in America.
- Maintain existing resources at AMS, particularly our high-caliber knowledge and skill base, by continuing to educate and train employees.
- Coordinate with the Philadelphia Port Authority to establish a detailed and robust annual emission inventory and establish an air toxics and particulate matter monitor near the Delaware River.
- Assist business owners by establishing a web-based system that allows the online submission of permit and license applications and fees.
- Work with the Air Pollution Control Board, the regulated community, and other stakeholders to develop or modify regulations to reduce or control emissions of criteria pollutants to help meet the NAAQS.
- Work with Other stakeholders and PADEP on VW NOx reductions calculations and cost effective analysis for the City of Philadelphia.
- Submit background document and propose update of regulation (draft AMR IX) for on road (diesel trucks and buses to use Tier four or above or use emission control devices; retrofitting) and non road sources (construction equipment, diesel cranes at port) to APCB by December 31, 2021/2022.
- Measure air toxics and carbonyls around PES refinery area (Grant award from EPA).
- Risk assessment for cancer and non-cancer risk implementation including methyl bromide at the Port by December 2021.
- Generate air quality data from 50 locations in the Philadelphia Air Quality Survey, make analysis for all four seasons and annual, and produce written summary report by December 2021.
- Reduce and resolve all backlogs (NOVs, conformance checking, and permits), targeting 90% by December 2021.
- Develop and implement plan for enhanced monitoring of air quality at Hilco. Redevelopment, issuing asbestos permit (revenue close to $1 million) and inspect the site, issuing dust permits and inspect the site (revenue not yet determined for permits).
- Start working on the 2015 RACT for ozone.
- Promulgate regulations to protect the public health and the environment, discuss about mobile sources and updating non road emission reductions from construction equipment Executive order 1-07.
- Issue installation permits and operating licenses for 500 unpermitted facilities/month or 2000 sources by December 31, 2021.
- Issue installation permits for minor sources and start analysis for emission controls for major sources (greater or equal to 10 tons of methyl bromide/year) of fumigation at the port by December 2021.
- Reduce and resolve all backlogs (NOVs, conformance checking, and permits), targeting 90% by December 2021.
- Reduce GHG emissions from major sources by 10% by December 2021.

Air Quality Index

Air quality in Philadelphia has dramatically improved over the past few decades, as evidenced by the relatively fewer number of unhealthy air quality days (adjusted to the current standard) during the past several years, as shown in the graphic below. It is important to note that air pollution, especially ozone which forms in the presence of heat and sunlight, is weather dependent and varies significantly from year to year depending on meteorological trends. The decrease in the number of good days and the increase in the number of moderate days can be attributed to changes in the AQI breakpoints due to strengthening of the NAAQS for ozone and $PM_{2.5}$. In addition, changes to $PM_{2.5}$ sampling from a filter-based to a continuous monitor also affected the number of good and moderate days.

Good, Moderate and Unhealthy Air Quality Days[1]



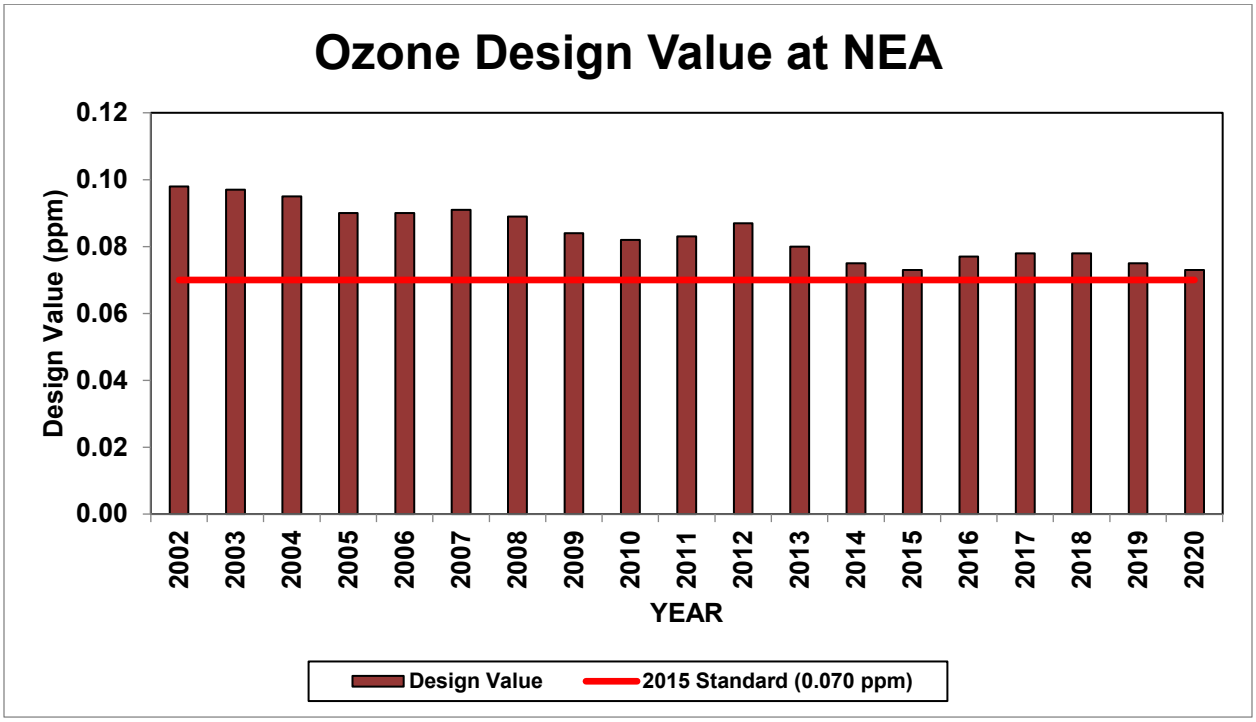
Air quality in Philadelphia has been steadily improving even for ozone and fine particulates – the region is in nonattainment only for ozone. Philadelphia is now designated as being in attainment for fine particulate matter, or $PM_{2.5}$ (particles less than 2.5 micrometers in diameter) for the 2006 24-hour and 1997 annual standards. EPA changed the annual standard for $PM_{2.5}$ from 15 micrograms per cubic meter to 12 micrograms per cubic meter in 2012. Philadelphia currently meets the 2012 annual standard for $PM_{2.5}$.

For 2020, Philadelphia experienced 5 unhealthy AQI days, 4 from ozone and 1 from $PM_{2.5}$. For 2021, AMS expects the number of unhealthy days from ozone to increase slightly or stay the same due to the more stringent 2015 standard of 70 parts per billion of ozone over eight hours.

[1] Data from 2020 Q4 were taken from AMS' AirVision data and NOT EPA's Air Quality System.

AMS expects long term trends for ozone to decrease due to regulations that will reduce ozone precursors

Philadelphia is currently in nonattainment for the 2015 8-hour ozone NAAQS. Ozone is a pollutant that is not emitted directly by combustion sources, but forms in the atmosphere in the presence of heat and sunlight as part of a chemical reaction between other pollutants – specifically, oxides of nitrogen and volatile organic compounds. Ozone is very irritating to the lungs and contributes to heart and lung diseases such as asthma.



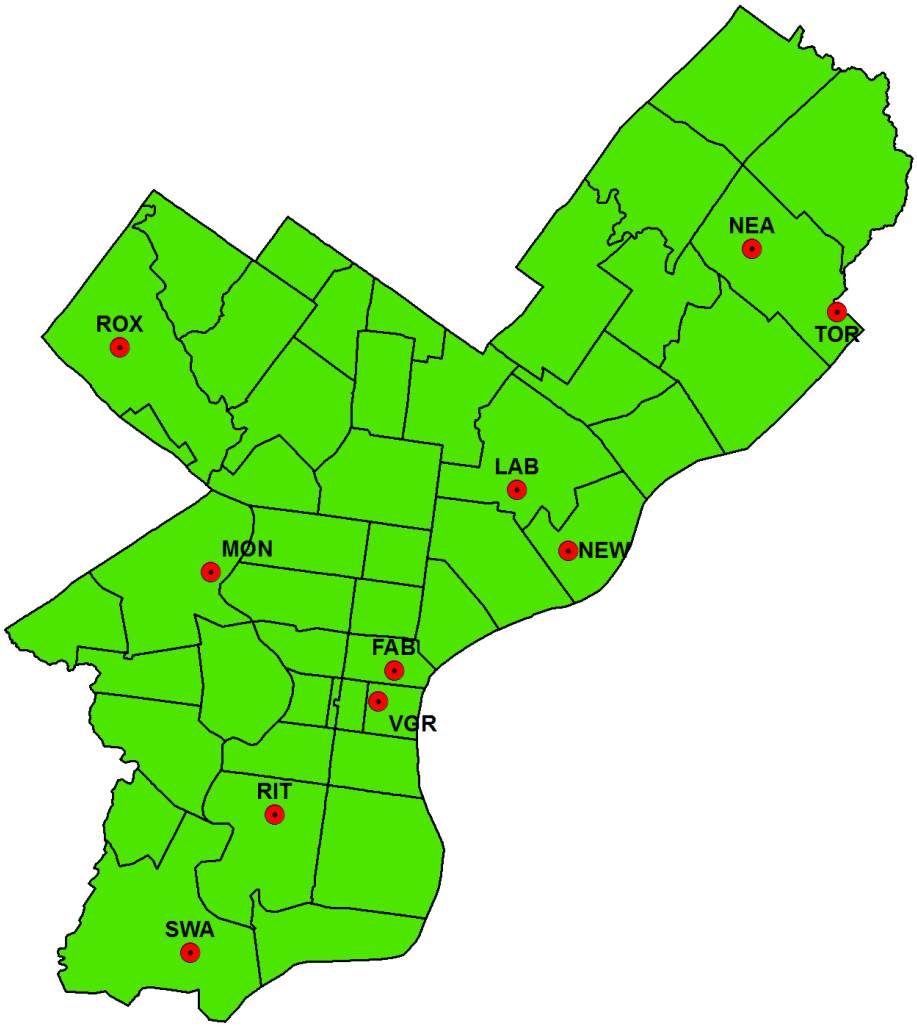
Monitoring Programs

In 2020, AMS operated a network of ten air monitoring sites located throughout the City that measure such parameters as criteria pollutants and air toxics. Eight sites (LAB, NEA, NEW, RIT, FAB, TOR, MON, and VGR) measured a number of criteria pollutants, depending on the site: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$). These measurements are made in "real time", meaning that the measurements show pollution levels as they occur, instead of after the fact. Four sites (ROX, RIT, SWA, and NEW) also measured toxics through canisters, such as 1,3-butadiene, benzene, and carbon tetrachloride. One site, VGR, measured O_3 and $PM_{2.5}$ as part of a pilot study for research and development, utilizing solar and wind turbine power. The following map shows the location of air monitors and the parameters measured at each monitoring location. AMS measures air quality for several reasons:

- To ensure that long-term goals and targets to reduce levels of air pollution are being met.

- To provide information to the public as to how good or bad the air quality is in Philadelphia.
- To ensure attainment with standards set forth by the United States Environmental Protection Agency.

2020 PHILADELPHIA AIR MONITORING NETWORK



AMS strives to achieve a 75% or greater data quality capture rate each quarter for each criteria pollutant monitor, per federal requirements in each Appendix in 40 CFR Part 50.

The 2020-2021 Air Monitoring Network Plan for Philadelphia is available at: https://www.phila.gov/media/20200618161411/2020-2021_AMNP_FINAL_20200630.pdf.

AMS completed its sixth year of monitoring with the Village Green Park Bench Air Pollution Monitoring System at 6th and Arch Streets across from the Constitution Center, measuring $PM_{2.5}$ and ozone, as well as local wind speed, wind direction, temperature, and humidity, utilizing solar

and wind turbine power, to increase community awareness of environmental conditions. Additional information about Village Green can be found here: http://www.epa.gov/air-research/village-green-project.

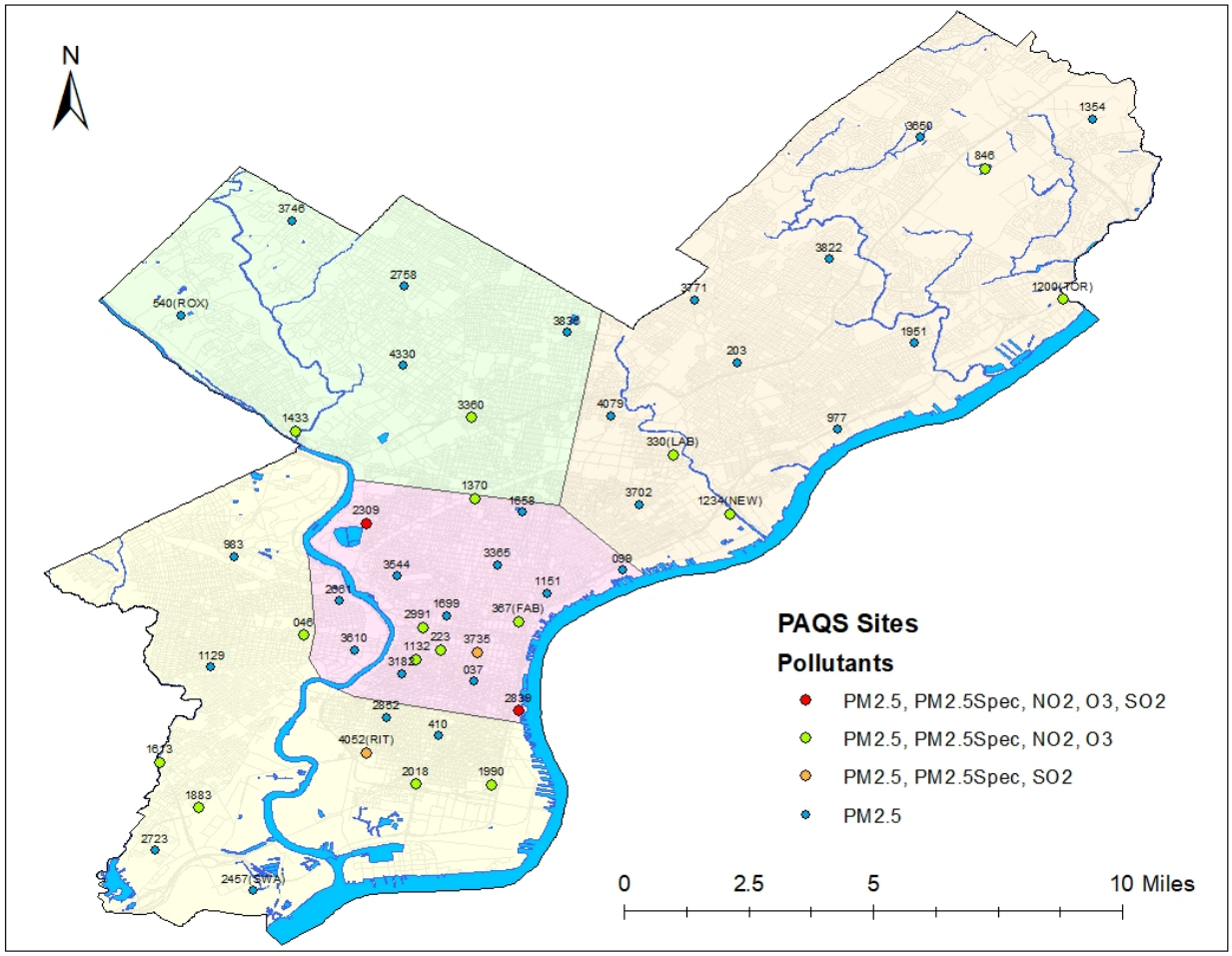
In 2020, AMS planned to install air monitoring devices similar to Village Green to measure particulate at the Port and test sensors from SCAQMD's AQ-SPEC Air Quality Sensor Performance Evaluation Center: http://www.aqmd.gov/aq-spec/evaluations. The EPA Office of Research and Development through an EPA Grant (Regional Sustainability and Environmental Sciences Regional Sensor Loan Program) would like to assess the river port. Due to COVID-19 this project was put on hold. AMS hopes to hear from EPA in 2021 on the possible re-start of the program.

In 2020, AMS continued preparing its Photochemical Assessment Monitoring Station (PAMS) for the enhanced monitoring of ozone, oxides of nitrogen (NOx), and volatile organic compounds (VOC) to obtain more comprehensive and representative data on ozone air pollution, for the June 1, 2021 start. AMS continued testing its Auto GC, added its Mixing Layer Height to the Unified Ceilometer Network (UCN) found here: https://alg.umbc.edu/realtime-update-phil/, and ran True NO_2, NOy, Carbonyls, Temperature, Relative Humidity, Barometric Pressure, UV Radiation, Solar Radiation, Precipitation, Wind Speed, and Wind Direction.

In 2020, the EPA announced it selected 11 out of 23 air toxics monitoring projects to receive funding under the Agency's Community-Scale Air Toxics Ambient Monitoring grants. AMS was one of the winners and one of two selected in EPA Region 3. More information can be found here: https://www.epa.gov/amtic/community-scale-air-toxics-ambient-monitoring-csatam. AMS plans to start the project in 2021.

In 2018, AMS began a new project called the Philadelphia Air Quality Survey (PAQS). This project aims to set up 50 street level, neighborhood-oriented air sampling sites throughout the City to sample the ambient air for $PM_{2.5}$, NO_2, SO_2, and O_3. The sites also contain meteorological sensors as well. PAQS captures the seasonal changes and neighborhood-to-neighborhood spatial variances in air quality. At the end of 2020, the PAQS project finished 41 sessions of field operation with each session being a 2-week air sampling period. Each of the 50 sites was monitored once or more during each season (3-month period). Data have been processed and analyzed with the assistance of an expert consultant. For the period from June 2019 through May 2020, the highest 12-month average $PM_{2.5}$ concentration, 9.4 $\mu g/m^3$, occurred at a site in Center City; and the lowest, 6.2 $\mu g/m^3$, at a site in northwest Philly (Roxborough). When comparing 2-week average values, the PAQS data of $PM_{2.5}$, NO_2, and O_3 concentrations track closely with those of FRM/FEM based on collocated samples. AMS is completing a PAQS project report based on the data collected in the first two years of sampling operation, planned to be published in 2021.

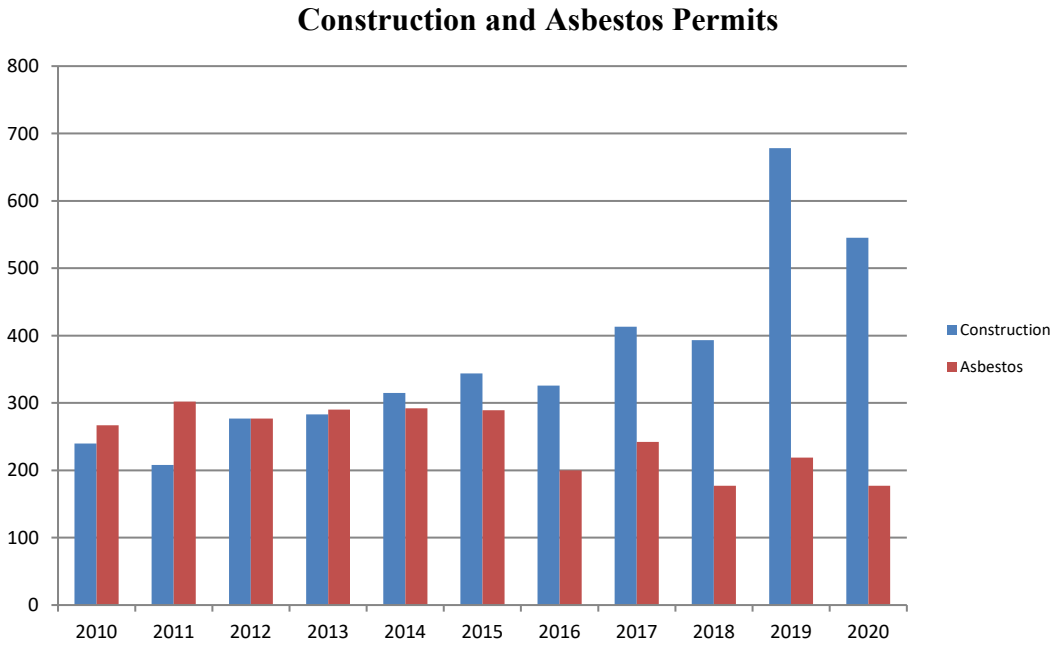
More details about the PAQS project can be found in the 2020-2021 Air Monitoring Network Plan for Philadelphia available at https://www.phila.gov/media/20200618161411/2020-2021_AMNP_FINAL_20200630.pdf.



Permitting Activities

In 2020, AMS issued 545 construction permits and approximately 177 asbestos permits. This is lower than 2019, likely due to companies having fewer projects due to COVID-19, a large increase in 2019 due to the discovery of many unpermitted sources, and the permanent shut down of refining operations at the PES Refinery. AMS expects an increase in 2021 due to ongoing projects to find unpermitted sources and the expected decrease in COVID-19 cases over the course of the year.

The chart below lists the number of construction permits (installation permits, plan approvals, and general permits) to install or modify sources of air pollution and the number of asbestos abatement permits issued from 2010 to 2020.



Enforcement Activities

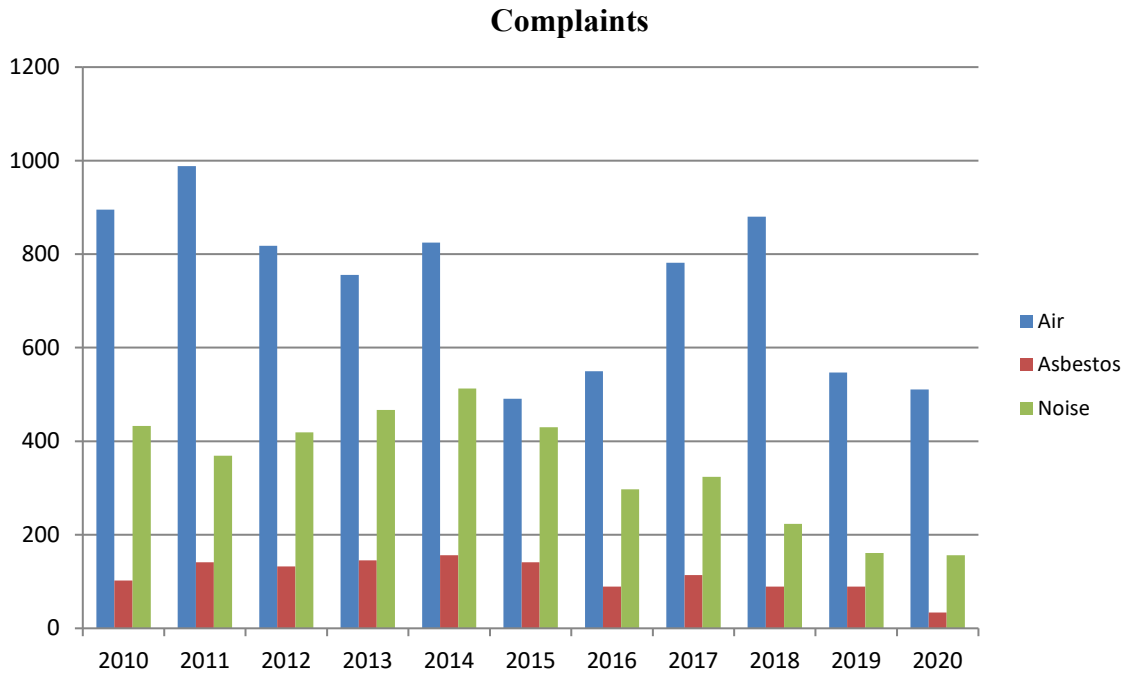
AMS handles citizen complaints, periodic inspections of regulated facilities, and enforces state, local and federal laws related to air quality in City of Philadelphia. In 2020, the enforcement of violations continued to be distributed amongst AMS enforcement engineers. Having additional staff trained in the enforcement process will help improve efficiency of enforcement. On average, violations issued in 2020 are being resolved within our goal of 180 days from the date of issuance. Enforcement is severely strained since the Chief, two supervisors, and four enforcement engineers left AMS in 2020. Violations issued prior to 2020 are being addressed on a priority to clear up the backlog.

AMS fully implemented the online cloud based Citizenserve system to monitor and track inspections and enforcement activities for the Asbestos and Facility Compliance and Enforcement units. In 2020, AMS continued to use the enforcement timeline and routing system within Citizenserve to assign and track enforcement activities. In 2021, AMS will continue to make changes to the system to tailor it to specific needs.

In 2021, AMS anticipates the number of inspections and number of violations to increase as a direct result of a staff increase of air pollution control inspectors and filling vacant enforcement engineer positions. The staff increase is needed to inspect new air pollution sources for the newly adopted dust control and parking garage regulations and to increase inspections of unpermitted facilities.

Complaint Response

AMS responds to complaints from the public regarding various nuisance and air pollution issues, such as noise, vibration, odor, smoke, idling vehicles, dust, asbestos, and carbon monoxide. Below is a summary of recent activities:



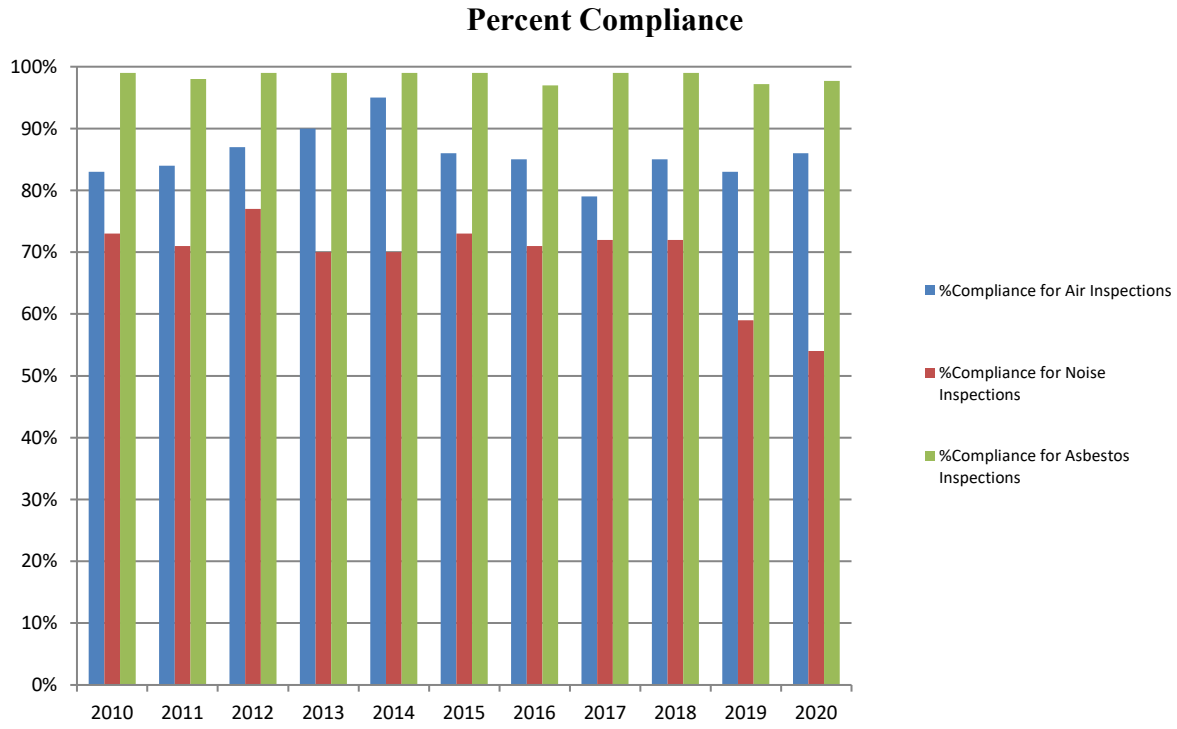
In 2020, there were 34 asbestos complaints, 511 air complaints and 156 noise complaints. As illustrated above, asbestos has tended to stay consistent over time. It is anticipated the total number of asbestos complaints received and serviced will remain consistent on an annual basis. Air and Noise complaints tend to be more variable, and depend on weather and other factors. Complaints are sometimes clustered when there is a significant issue in a particular community, and may decline once that problem is resolved. The decrease in noise complaints in 2020 was due to more monitoring and new violations being corrected in a timely manner. When violations are unresolved, AMS would receive multiple complaints until the case is closed.

Inspection Activities

AMS is supported by a team of well-trained engineers and inspectors who enforce state, local and federal laws related to air quality and noise. They respond to citizen complaints and conduct periodic inspections of regulated facilities. When necessary, they issue Notices of Violation (NOVs) when regulation or permit deviations are observed.

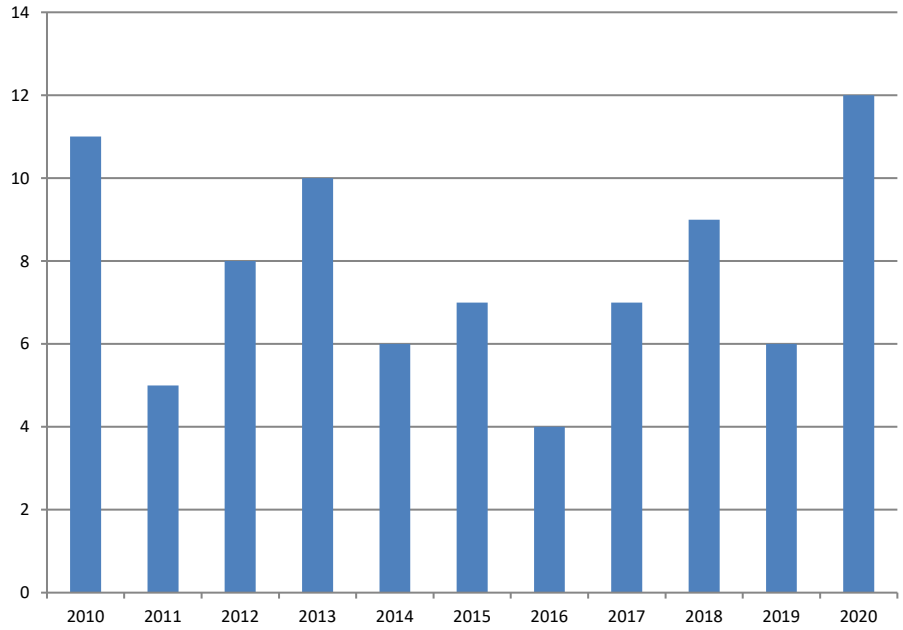
In 2020, 2426 air inspections were conducted resulting in 336 air violations, and 201 noise inspections conducted resulting in 92 violations. The number of air inspections should continue to increase in 2021 due to new sources needing permits to comply with the new dust control, parking garage regulations and more inspections of unpermitted sources. AMS is planning to hire two more inspectors to address the increased workload. The compliance rate in 2020 for air

inspections was 86%, which is the average over the past nine years. The noise compliance rate decreased from around 59% to 54% in 2020 even with the amount of noise complaints decreasing probably due to less complaints about nuisance type of noise. As for noise inspections, the compliance rate is generally lower than air inspections due to the longer time frame to resolve violations, which often involves installing and/or repairing equipment to come into compliance with the restrictions of the Code.



AMS issued 33 asbestos violations as a result of inspecting 1,321 total projects in 2020. The compliance rate is 97.7 %, which is relatively consistent with previous years in Philadelphia. The decrease in the number of asbestos violations issued from 2019 to 2020 may be attributed to continued air pollution control inspector staffing issues as well as the pandemic administrative directives. The asbestos inspectors continued to inspect properly notified asbestos projects as much as possible in order to bring increased awareness of project compliance oversight. The Asbestos Unit has functioned in much of 2020 with one inspector and one inspector supervisor but has recently selected a new APC I candidate to fill the vacant position. For 2021, it is anticipated that the total number of asbestos violations resulting from inspections will increase.

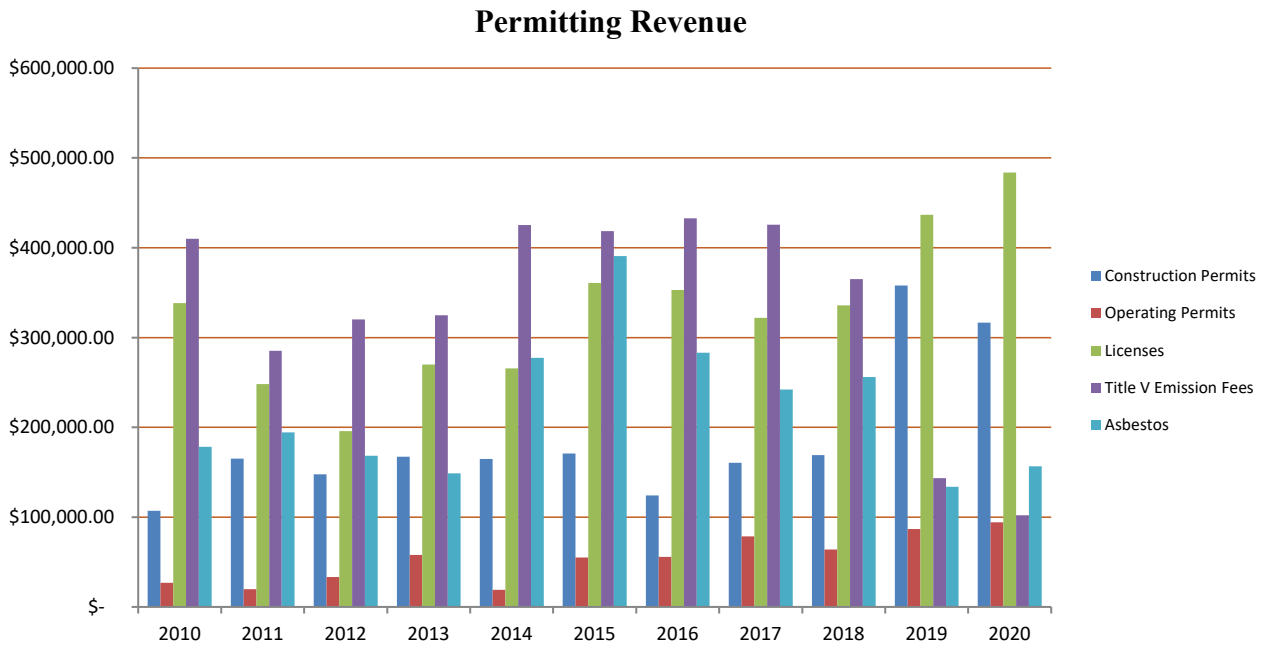
Title V Facilities with Emissions Related Violations



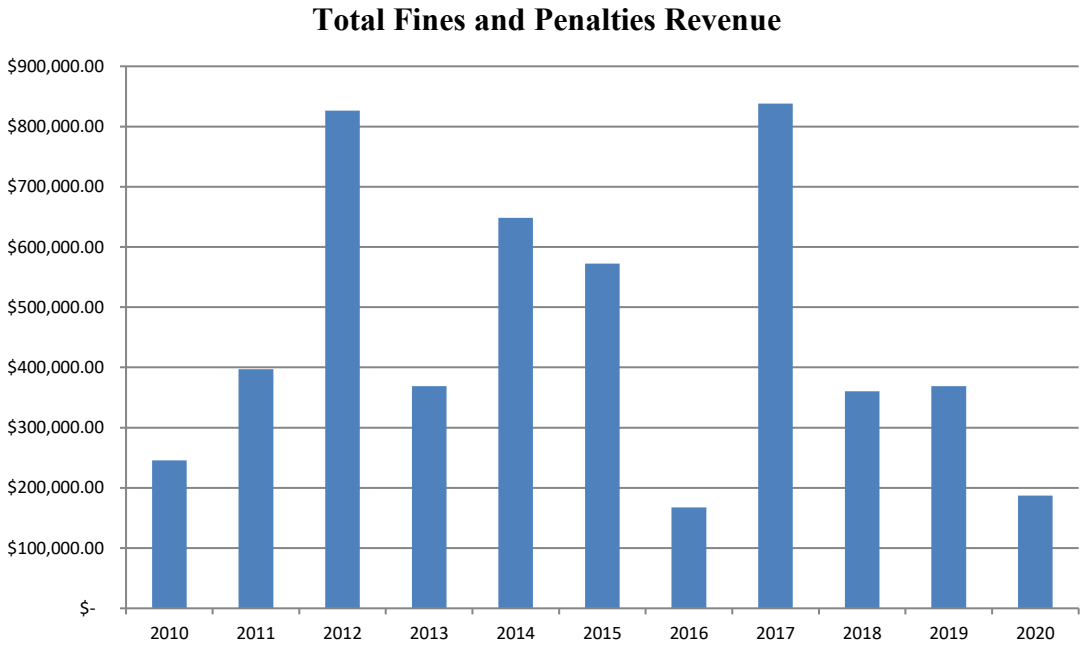
A Title V facility is a major source of pollution that is required to have air quality permits to operate under Title V of the 1990 Federal Clean Air Act Amendments. In 2020, AMS issued emission-related violations to twelve Title V facilities. The variation from year to year is is due to an increase in compliance awareness resulting from thorough inspections.

Revenue Generation

The chart below shows the fees received from construction permits (application fees), operating permits (application and annual administration fees), licenses including asbestos (application and renewal fees, $156,657), and Title V permits (emission fees) in the years 2010-2020. Construction permit fees are lower than 2019 due to the lower number of applications described in a previous section. AMS expects a potentially large increase in 2021 due to an expected increase in applications and a large increase in plan approval application (a type of construction permit) fees under Pennsylvania regulations expected in January 2021. Operating permit fees increased a little over 2019. A large increase is expected in 2021 due to a large increase in operating permit fees under Pennsylvania regulations expected in January 2021. License fees increased some over 2019, likely due to unpermitted air pollution sources discovered in the past getting a license for the first time. Another increase is expected in 2021 due to projects to find more unpermitted sources. Title V emission fees decreased significantly from 2019. This is largely due to the shut down of refining operations at the PES Refinery in June 2019 (2020 emission fees are based on 2019 emissions). A further decrease is expected in 2021 since refining operations at the refinery were down for all of 2020.



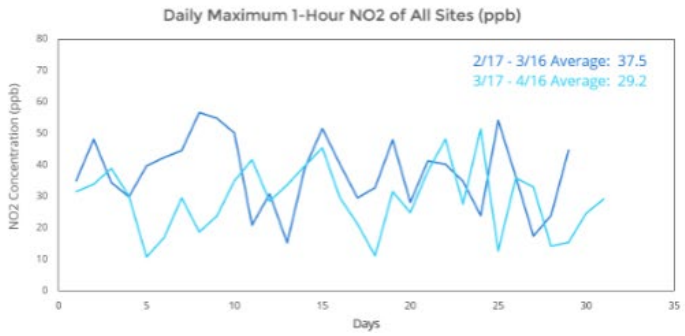
Below is the sum of fines and penalties revenue collected from 2010 to 2020. In 2020, AMS collected $187,303 in penalties. Asbestos penalty revenue has been trending lower and more inline with routine asbestos related violations and fewer NESHAP related violations. Other penalties were lower in 2020 due to the PES Refinery shut down. The enforcement of violations are currently distributed amongst enforcement engineers and the Asbestos Program Manager.

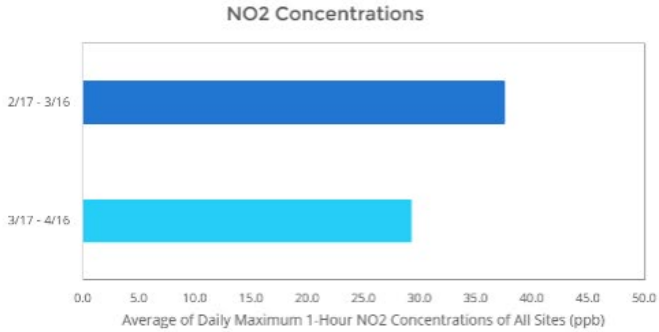


COVID-19 and Air Quality

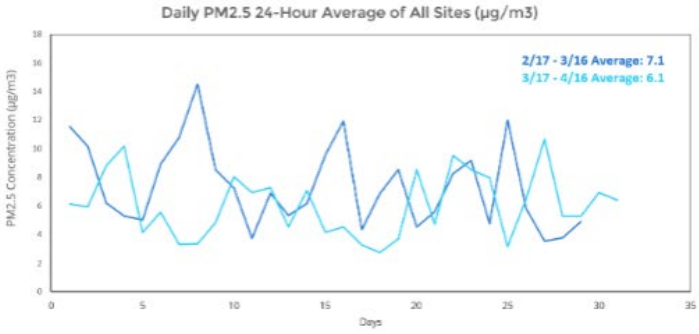
On March 16, 2020, Governor Tom Wolf announced statewide COVID-19 mitigation efforts (shutdown order to close schools and non-essential businesses and offices) that took effect on March 17, 2020 (Statewide mitigation efforts). The Governor also issued Stay-at-Home order for Philadelphia and other counties taking effect March 23, 2020 (Stay-at-Home Order). Air pollutant emissions decreased due to decreased levels of road traffic and other transportation, industrial and commercial activities. The following figures show ambient air concentrations of NO_2, $PM_{2.5}$, and CO in Philadelphia, respectively. They compare pollutant concentrations (from multiple monitoring stations across the City) one month after the COVID-19 shutdown versus one month before the shutdown.

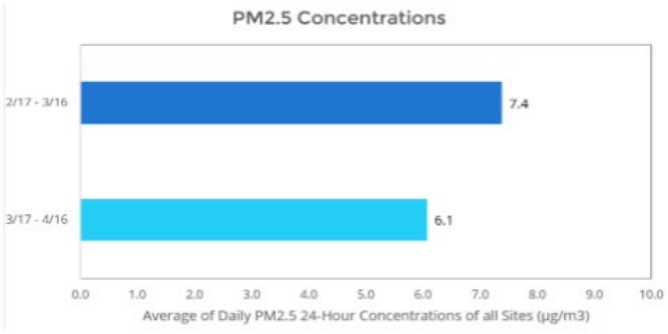
Daily Maximum 1-Hour NO_2 (ppb) One Month After Shutdown vs. One Month Before Shutdown



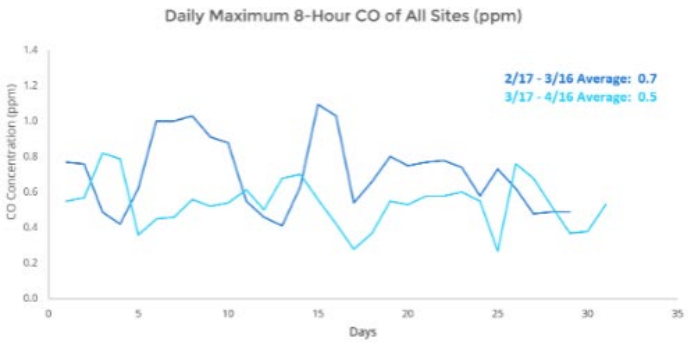


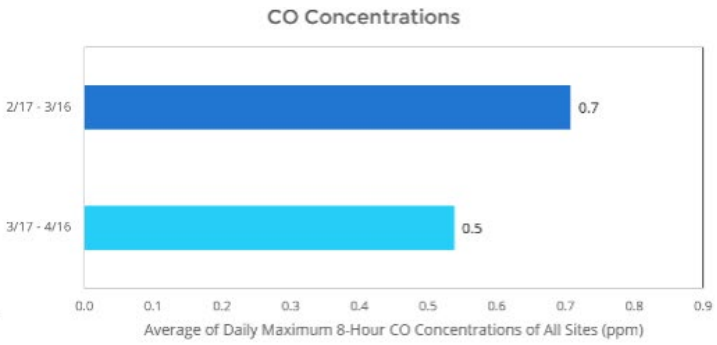
Daily 24-Hour $PM_{2.5}$ (µg/m3) One Month After Shutdown vs. One Month Before Shutdown





Daily Maximum 8-Hour CO (ppm) One Month After Shutdown vs. One Month Before Shutdown





The data indicate an average 22% decrease in NO_2 ambient concentrations, an average 18% decrease in $PM_{2.5}$ concentrations, and an average 24% decrease in CO concentrations.

The following table shows the average daily Air Quality Index (AQI) value during the period of March 17 – April 16, 2020 compared with the average AQI values in the same time period of the previous 5 years (2015 – 2019).

Average Daily AQI: March 17 - April 16	
2015	46
2016	43
2017	56
2018	46
2019	46
5-Year Average (2015-2019)	**47**
2020	**41**

Conclusion

AMS has implemented its agency-wide Strategic Plan to review its operations for improving air quality and reducing the impact of nuisances while promoting sustainability and job creation as well as outreach and education on air quality issues. It has been focused on finding ways to allow permit and license applicants to submit forms and pay fees online, investigating ways to improve staff training and exploring ways to connect more closely to the public as well as partners such as universities and nonprofits. In addition, AMS has been working to educate the public about the importance of air quality. These are the major AMS accomplishments in 2020:

- The Asbestos, Source Registration, and Facilities Compliances & Enforcement sections continue to utilize a cloud based permit, license, and enforcement system. The system allows the online submission of asbestos notifications, license applications, and fees. It also allowed inspectors to use tablet computers in the field to document their inspections.
- AMS completed the first round of air monitoring data collection at 50 locations for the PAQS project and finalized a report. AMS is preparing to publish it in a scientific journal

and make it available for the public to review. We have started the second year measurement and analysis for all 50 locations. AMS is also in the process of buying new monitors that will measure the ambient air for the next 5-10 years. AMS will also focus on EJ communities to measure air pollutants.

- Banning of heavy fuel oils were effective on December 4, 2019. Starting April 1, 2020, no person may deliver, exchange in trade, or sell heavy fuel oil to be burned or used in Philadelphia (AMC 3-207). The next step will be to amend and propose AMR III to the Air Pollution Control Board in April 2021.
- AMS received additional money from the General Fund to hire three engineers and two inspectors.
- AMS sent letters to a minimum of 200 garages and plans to issue licenses and inspect these garages that cause the emission of carbon monoxide, nitrogen dioxide, and other toxics to protect the public health.
- AMS has found more than 7000 emission sources that generate revenue to the city and reduce emission by permitting sources, inspections, conduction maintences, and limiting emissions.
- Issued temporary installation permits for minor sources and started analysis for emission controls for major sources (greater or equal to 10 tons of methyl bromide/year) of fumigation at the port.
- AMS received a grant from EPA to purchase equipment to measure toxics that includes benzene, toluene, and others. AMS will located those passive toxic instruments at five locations around the former PES refinery area and the measurement will start in spring 2021.

AMS will continue to gear its work in the future providing outreach to affected populations that may experience adverse human health effects from air emissions. This will include building relationships with the University of Pennsylvania, Drexel University, and community groups.