AN INTRODUCTION TO AIR TOXICS

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Introduction and Contents

This document was created to provide a brief introduction to the issues of air toxics within Allegheny County, and what work is currently being done to reduce levels throughout the region. The following are seven questions intended to cover the most important issues regarding air toxics. They are answered in detail in the following pages:

Left: An air toxics monitor at Clairton Center. Right: A similar air toxics monitor at Sto Rox Elementary. Both monitors were installed by ACHD and EPA in response to a story published in USA Today *on air toxics near schools. Both sites reported no harmful levels of air toxics.*

What are Air Toxics?

Toxic air pollutants, also known as hazardous air pollutants (HAPS), or air toxics, are pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Examples of toxic air pollutants include benzene, which is found in gasoline; perchlorethlyene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

EPA has designated 187 hazardous air pollutants. They can be found at the following URL: www.epa.gov/ttn/atw/188polls.html

Most air toxics originate from human-made sources, including mobile sources (e.g., cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Some air toxics are also released from natural sources such as volcanic eruptions and forest fires.

There are two types of stationary sources that generate routine emissions of air toxics:

- "Major" sources are defined as sources that emit 10 tons per year of any of the listed toxic air pollutants, or 25 tons per year of a mixture of air toxics. These sources may release air toxics from equipment leaks, when materials are transferred from one location to another, or during discharge through emission stacks or vents.

- "Area" sources consist of smaller-size facilities that release lesser quantities of toxic pollutants into the air. Area sources are defined as sources that emit less than 10 tons per year of a single air toxic, or less than 25 tons per year of a combination of air toxics. Though emissions from individual area sources are often relatively small, collectively their emissions can be of concern - particularly where large numbers of sources are located in heavily populated areas.

National Emission Standards for Hazardous Air Pollutants (NESHAPs) are US Environmental Protection Agency (EPA) set emission limits for air toxics. The standards for a particular type of source (such as dry cleaners or gasoline stations) are known as the Maximum Achievable Control Technology (MACT). Standards for air toxics are authorized under the Clean Air Act, section 112.

ACHD Article XXI §2104.08 incorporates by reference all EPA rules on air toxics including any additions or changes on the date on which they become effective for EPA.

In addition, ACHD has programs in place to help regulate and control these toxic air pollutants, and responds to new data concerning air toxic “hotspots” and areas of interest. New projects, such as adding new monitoring sites, are taken on as needed. The Air Toxic Guidelines, which are followed by ACHD permit engineers when issuing air permits for new and existing air toxics sources, were originally developed in 1988.

How are Air Toxics Regulated?

The first attempt by EPA to regulate air toxics was based on the health effects and risks associated with different levels of exposure to each HAP. With 187 defined HAPS, this approach lacked efficiency. Realizing the limitations of a chemical-by-chemical decision framework based solely on risk, and acknowledging the gaps in scientific and analytical information, Congress adopted a new strategy in 1990, when the Clean Air Act was amended. Specifically, Congress revised Section 112 of the Clean Air Act to mandate a more practical approach to reducing emissions of toxic air pollutants.

This approach has two components. In the first phase, EPA develops regulations— Maximum Available Control Technology (MACT) standards—requiring sources to meet specific emissions limits that are based on emissions levels already being achieved by many similar sources in the country. Even in its earliest stages, this new "technology-based" approach clearly produced real, measurable reductions. In the second phase, EPA applies a risk-based approach to assess how these technology-based emissions limits are reducing health and environmental risks. Based on this assessment, EPA may implement additional standards to address any significant remaining, or residual, health or environmental risks. EPA completed development of its strategy for addressing residual risks from air toxics in March of 1999. EPA's MACT standards are based on the emissions levels already achieved by the best-performing similar facilities. This straightforward, performance-based approach yields standards that are both reasonable and effective in reducing toxic emissions. This approach also provides a level economic playing field by ensuring that facilities with good controls are not disadvantaged relative to competitors with poorer controls.

When developing a MACT standard for a particular source category, EPA looks at the level of emissions currently being achieved by the best-performing similar sources through clean processes, control devices, work practices, or other methods. These emissions levels set a baseline (often referred to as the "MACT floor") for the new standard. At a minimum, a MACT standard must achieve, throughout the industry, a level of emissions control that is at least equivalent to the MACT floor. EPA can establish a more stringent standard when this makes economic, environmental, and public health sense.
The MACT floor is established differently for existing sources and new sources:

- For **existing sources**, the MACT floor must equal the average emissions limitations currently achieved by the best-performing 12 percent of sources in that source category, if there are 30 or more existing sources. If there are fewer than 30 existing sources, then the MACT floor must equal the average emissions limitation achieved by the best-performing five sources in the category.

- For **new sources**, the MACT floor must equal the level of emissions control currently achieved by the best-controlled similar source.

Wherever feasible, EPA writes the final MACT standard as an emissions limit (i.e., as a percent reduction in emissions or a concentration limit that regulated sources must achieve). Emissions limits provide flexibility for industry to determine the most effective way to comply with the standard.

All EPA rules concerning hazardous air pollutants and MACT standards are automatically incorporated into ACHD regulations by Article XXI §2104.08.

How are Sources of Air Toxics Permitted in Allegheny County?

The ACHD Permitting Program exists to ensure that all new and existing major and minor sources of air pollution within Allegheny County follow all local, state, and federal air pollution regulations, and that new sources will not endanger the health, safety, or welfare of the public.

If a new source of air pollution is to be built and/or operated within Allegheny County, the Permitting Program reviews the required Installation Permit, which covers what type of operations will be occurring at the source, what possible air pollutants they will produce, and what equipment and controls they will have installed, to ensure that the source will not endanger the public's health, safety, or welfare. This rule, found in ACHD Article XXI 2102.04b, also states that all new sources must have applied the Best Available Control Technology (BACT) in order for the Installation Permit to be approved.

BACT is an emission limitation based on the maximum degree of reduction of each air contaminant regulated by ACHD, which the Department determines on a case-by-case basis to be achievable taking into account the energy, environment, and economic impacts and other costs. BACT is required to control for all air pollutants, including HAPS.

The ACHD Air Toxics Guidelines, originally developed in 1988, before the 1990 Clean Air Act amendments, are risk value-based guidelines to determine the impact potential emissions will have on the public and the environment. The guidelines are not a regulation, rather they are used by the Permitting Program when issuing Installation Permits to evaluate potential emissions. Under ACHD Article XXI, stated above, the Permitting Program cannot issue an Installation Permit if the emissions from the proposed source will harm the public health, safety, or welfare.

Because the guidelines were developed in 1988, the risk values used to determine the public health and environmental impacts of the emissions of air pollutants, including air toxics, are now outdated. New guidelines will incorporate the latest risk values and information on the health effects of air toxics.

In addition to BACT rules and the Air Toxics Guidelines, there are state regulations for two HAP compounds. Beryllium and Hydrogen Fluoride are EPA-defined HAPs, but are controlled through MACT standards and have no federal ambient air quality standard. Pennsylvania has defined ambient air quality standards for these two HAPS, which ACHD incorporates into Article XXI and enforces.

How are Air Toxics Monitored in Allegheny County?

ACHD's air toxics monitoring network is constantly evolving in order to assess the current status of air pollution in Allegheny County. New monitoring sites are considered as needed with the arrival of new data on air toxics. Consistent throughout the changes is our primary air toxics monitoring site, located in downtown Pittsburgh, named Flag Plaza.

SUMA canisters, air-evacuated stainless steel monitors, are in continual operation at Flag Plaza. Concentrations represent 24-hour samples, collected every six days, which are analyzed at an out-of-County lab (Maryland). Cartridge (carbonyl) monitoring is conducted at the site as well, at every-six-day intervals, and samples are analyzed at an out-of-County lab (Philadelphia). Canister and cartridge toxics monitoring at Flag Plaza has been in operation for several years. Summaries of the Flag Plaza data are included in every ACHD Air Quality Annual Report, accessible online at www.achd.net/air/.

Monitoring at sites in Avalon, Stowe, and South Fayette occurred temporarily during 2006 and 2007 as part of an ACHD in-house air toxics study completed with Carnegie Mellon University. The study, "Air Toxics in Allegheny County: Sources, Airborne Concentrations, and Human Exposure" by Robinson et al., 2009, was carried out due to concerns over air toxics within Neville Island. These temporary monitors helped to assess the state of air toxic levels in Allegheny County and led to work to reduce specific toxics. The study can be found online at the University of Pittsburgh's Center for Healthy Environments & Communities, http://www.chec.pitt.edu/, under "Publications."

Additional monitors were also installed in response to a story published in USA Today in late 2008 titled "The Smokestack Effect: Toxic Air and America's Schools," which contained data suggesting elevated levels of air toxics around certain schools, including some in Allegheny County.

In response to the story, ACHD and EPA placed monitors at three schools of interest to determine the source of the potential air toxics and what exposure levels might be seen at the sites. Sampling started on 07/24/09 and proceeded until 09/28/09. The monitored data is available online at http://www.epa.gov/schoolair/. The data from the study did not show air toxics at or near a level in which there is a risk from short-term exposure, however ACHD has plans to continue to monitor for the compound benzo(a)pyrene at Liberty, North Braddock, Avalon and South Fayette air monitoring sites and to continue to continuously measure ambient benzene concentrations at South Allegheny High School based on the results of the project.

ACHD also measures the HAP compound benzene continuously at Liberty.

What is Allegheny County Doing to Reduce Air Toxics?

In addition to maintaining and updating the air toxics monitoring network and regulating air toxics from area and major sources, the Allegheny County Health Department funds and participates in detailed studies to define air toxic issues, encourages voluntary work to reduce air toxics, takes on large-scale projects to reduce air toxics, and maintains an Air Toxics Strategic Plan.

The goals of the Air Toxics Strategic Plan are to assess and identify the areas within Allegheny County that pose the highest risk to human health due to the exposure to air toxics, identify the specific air toxics and the sources contributing to the increased risks, and implement regulatory and voluntary activities to reduce the air toxic exposure in high-risk areas. The plan investigates the many different aspects of achieving these three major goals and covers what ACHD is currently doing, and what can be done in the future to accomplish them.

The strategic plan is a way for ACHD staff to plan necessary actions to improve areas of interest for air toxics. ACHD reviews data on air toxics from internal and external studies and reports, and responds appropriately, either with increased monitoring to adequately identify sources and exposure levels of HAPs, or by undertaking various HAP reduction projects.

For example, in the "Air Toxics in Allegheny County" Carnegie Mellon University study on air toxics, diesel particulate pollution was identified as a major concern for downtown Pittsburgh and Neville Island. In response, ACHD along with several other groups began work to reduce the amount of diesel particulate pollution from the region. A $3.4 million fund from the 2009 American Recovery and Reinvestment Act was awarded to ACHD to provide diesel retrofits and other diesel particulate pollution-reducing equipment to various sources of diesel pollution within the County. Port Authority of Allegheny County transit buses, construction equipment operated by members of the Constructors Association of Southwestern Pennsylvania, trucks owned by MultiServ, Inc. and operated at the US Steel Irvine and Edgar Thomson Works Plants, and CSX rail yard operations in McKeesport were provided with partial funding to reduce diesel particulate pollution from their various pieces of equipment. An additional $300,000 was provided through a similar fund to reduce the diesel particulate pollution from City of Pittsburgh-owned waste haulers. This large HAP-reduction plan followed up several other similar projects, including a fund to provide school bus retrofits, and a fund to reduce diesel pollution from municipally-owned vehicles in the Liberty-Clairton area.

ACHD continues to look for and take on opportunities to reduce diesel particulate pollution within the County through voluntary opportunities and by providing funding to offset the costs of upgrading equipment.

ACHD also has an Asbestos Abatement Program which specifically manages the HAP commonly found in older building materials and insulation. The program permits asbestos abatement procedures, provides licensing for asbestos abatement contractors, and provides guidance for the demolition of asbestos-containing building materials. The program's goal is to minimize the risk of public exposure to asbestos by assuring the containment of asbestos during removal and demolition activities by means of a permitting program.

What is the National-Scale Air Toxics Assessment?

The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing comprehensive evaluation of air toxics in the U.S. EPA developed the NATA as a state-of-the-science screening tool for State, Local and Tribal Agencies to prioritize pollutants, emission sources, and locations of interest for further study in order to gain a better understanding of risks. NATA assessments do not incorporate refined information about emission sources, but rather use general information about sources to develop estimates of risks which are more likely to overestimate impacts than underestimate them.

NATA provides estimates of the risk of cancer and other serious health effects from breathing (inhaling) air toxics in order to inform both national and more localized efforts to identify and prioritize air toxics, emission source types and locations which are of greatest potential concern in terms of contributing to population risk. This in turn helps air pollution experts focus limited analytical resources on areas and/or populations where the potential for health risks are highest. Assessments include estimates of cancer and non-cancer health effects based on chronic exposure from outdoor sources, including assessments of non-cancer health effects for Diesel Particulate Matter (PM). Assessments provide a snapshot of the outdoor air quality and the risks to human health that would result if air toxic emissions levels remained unchanged.

NATA is a prioritization tool. Its purpose is to identify geographic areas, pollutants and emission sources that should be evaluated further to gain a better understanding of risks. EPA uses NATA in many ways, including:

- To set priorities for improving data in emissions inventories,
- To work with communities in designing their own local-scale assessments, and
- To help direct priorities for expanding and improving air toxics monitoring.

NATA helps state, local and tribal air agencies focus resources on geographic areas, pollutants and types of emission sources for closer investigation. Once risks are further characterized, agencies can determine steps to reduce air toxics emissions where necessary. NATA provides broad estimates of risk over geographic areas of the country and not definitive risks to specific individuals. This is because NATA uses models to estimate risks; it is not designed to determine actual risks. NATA is designed to prioritize pollutants and areas for further study, not to compare one area of the country's risk to another. This is because the emissions data underlying the assessment can vary in level of detail from state to state. The latest NATA report was released in early 2011 and is based on 2005 air data. The report can be found on EPA's website at http://www.epa.gov/nata/.

What Can Citizens Do to Reduce Air Toxics?

By reviewing the data made available in publications such as EPA's NATA, and following studies done by ACHD and other agencies and air quality groups, citizens can stay informed of the issues and of the areas that may be of concern for air toxics.

Citizen advocacy for tightened air quality standards, at both the local and federal level, is perhaps the biggest way an individual can have a direct impact on reducing levels of air toxics. Having access to data from studies such as NATA help to inform and empower citizens to make local decisions concerning the health of their communities. Stay informed and help educate others on the issues.

- Stay up to date on the air quality within Allegheny County with the ACHD Annual Air Quality Report. www.achd.net/air/
- Utilize resources such as the EPA's Toxic Release Inventory website, www.epa.gov/tri/ to stay informed of what is going on in your community.
- Get involved with local environmental groups and local government.
- Report air quality related industrial issues to ACHD by calling the complaint hotline at 412-687-ACHD.
- Utilize data from EPA's NATA to determine where a community-driven project to work with industry and reduce air toxics can be useful. www.epa.gov/nata/