Appendix A
Controlling Sources of Toxic Air Pollutants

This appendix provides a summary of Federal and State programs to limit releases of pollutants from stationary sources (large industrial facilities and some specific small sources) and from mobile sources (such as cars, trucks, airplanes and locomotives and lawn, farming and construction equipment). The summary focuses on strategies addressing the releases of toxic air pollutants since these pollutants are the focus of the Community Air Screen Program.

The summary is intended to provide the reader with a general understanding of the history and types of programs implemented to control these pollutants. This overview is not comprehensive. Readers are encouraged to review "Taking Toxics Out of the Air" at EPA's web page http://www.epa.gov/airquality/takingtoxics/.

In 1957, the New York State Legislature enacted one of the nation's first comprehensive air pollution control laws by passing the Air Pollution Control Act, Article 12-A of the Public Health Law. The Law recognized the need "to safeguard the air resources of the state from pollution" by controlling or abating air pollutant releases from existing sources and preventing new source releases for the public good. The State's policy was then and remains: "to maintain a reasonable degree of purity of the air resources of the state, which shall be consistent with public health and welfare and the public enjoyment thereof, the industrial development of the state…"

By 1962 this policy provided the foundation for an air pollution control program to control emissions from industrial processes and the combustion of fuels in NYS.

The state and federal programs to protect the public from adverse effects of air contamination are presented in the next sections.

Addressing Stationary Source Pollution

The Development of the State Program

In 1968, New York enacted regulations (Part 212, General Process Emission Sources) to address the control of toxic air pollutant emissions from industrial processes[1] and burning of waste fuels. A handbook was developed (Process Source Handbook) to assist DEC staff in determining the degree of air pollution control that would be required to reduce emissions for each process source.[2] Additionally, in the early 1970s, the State enacted a regulation setting air quality standards (Part 257) for nine toxic air pollutants.

The state program evolved over the decades as our knowledge about the adverse public health and environmental impacts of air pollution grew, coupled with advances to assess the ambient air concentrations of air pollution (through dispersion modeling) and technological advances in air pollution

[1] A process is any activity at a stationary source that results in an emission of a regulated air pollutant. Many large stationary sources (e.g., industrial facilities) have multiple processes.

[2] A process source is a term used to separate out the different areas at a stationary source that could lead to releases of air pollutants. For example, a facility which paints metal parts could have two process sources: (1) metal cleaning area with a degreasing process could release pollutants and (2) an area where the metal parts are painted would be considered a second process emission source.

control.[3,4] These advances have resulted in the implementation of stronger air pollution abatement strategies over the years to improve air quality and better ensure the protection of public health and the environment.

The current State air toxics program[5] applies to numerous stationary sources and requires these sources to undergo a screening risk assessment to determine the public health impacts from inhalation exposures. For the initial review of each source, DEC requires the use of a specific air dispersion model to estimate the maximum short-term (1-hour) and annual ambient air concentrations for each toxic air pollutant released. These modeled concentrations are compared to Short-term (SGC) and Annual Guideline Concentrations (AGC) developed by DEC. These guideline concentrations for toxic air pollutants, along with other factors, are used to determine the degree of air pollution control. The guideline concentrations are updated every three years.[6]

SGCs are derived to protect the general public from adverse exposure to toxic air contaminants for short-term exposures of 1-hour. Examples of health outcomes from short-term exposures may include headaches, nausea, allergic reactions, asthma exacerbation, and irritation to the eyes, nose and throat. SGCs are compared with samples obtained for short periods of time (1-hour) or dispersion modeling estimates for 1-hour impacts.

There are two health outcomes from long-term exposures, cancer and non-cancer endpoints such as reproductive, development, respiratory and cardiovascular effects. AGCs are developed for both types of health outcomes. AGCs are compared with samples obtained from a full year of monitoring or dispersion modeling estimates for annual averages.

The non-cancer AGC is derived from an air concentration that is not expected to cause serious health effects during a lifetime of continuous exposure. The AGC air concentration is often modified – to be very conservative - from the experimental value to account for uncertainties such as whether the effects in animals can be used to estimate the likelihood of effects in humans and whether the effects of high exposure concentrations in humans or animals can be used to estimate the effects of low exposure levels. The non-cancer health endpoints generally require higher exposures to elicit a response when compared to cancer health endpoints. Therefore, for the CAS program sample results above the non-cancer AGC will be considered for follow-up sampling.

The other health outcome possible from long-term exposure is cancer. Similar to the derivation for non-cancer AGCs, there is a lot of uncertainty in deriving AGCs based on cancer health outcomes. Cancer AGCs are defined as chemical concentrations in air that are associated with an estimated excess lifetime human cancer risk of 1-in-a-million (1×10^{-6}). Under the 1990 Clean Air Act, the acceptable cancer risk used by the EPA to make regulatory decisions regarding the need for further air pollution reductions from sources or to identify significant concerns from ambient monitoring data is 100-in-a-million (1×10^{-4}). The acceptable cancer risk used by the DEC's Division of Air Resources to make regulatory permitting decisions about the need to consider further air pollution controls for sources ranges from 1-in-a-million to 10-in-a-million (1×10^{-5}). This is more conservative than EPA's acceptable level of concern. The

[3] New York State Department of Environmental Conservation (NYSDEC) 1981. Air Guide-1: Application of 6NYCRR Part 212 – Toxic Air Contaminants.
[4] Cashman, T.J. 1982. Establishment of DEC's Toxic Air Contaminant Guideline Air Guide-1. New York State Department of Environmental Conservation. Division of Air Resources. New York State Public Health Association Annual Conference, Rochester NY. June 7, 1982.
[5] New York State Department of Environmental Conservation (NYSDEC) 1997. Guidelines for The Control of Toxic Ambient Air Contaminants. Division of Air Resources. Albany, NY. November 12, 1997.
[6] The most recent values developed in 2010 are available online at: http://www.dec.ny.gov/docs/air_pdf/agcsgc10.pdf

selection of an acceptable level of concern is a risk management decision. For the CAS program sample results above the 10-in-a-million risk level (which is 10 times the cancer AGC) will be considered for follow-up sampling.

Specific stationary sources are required to use a dispersion model to predict short-term (1-hour) and long-term (annual average) concentrations from facility emissions. These modeled short-term and annual maximum ambient concentrations are compared to DEC's SGCs and AGCs to evaluate whether the facility's emissions and associated air pollution control measures are acceptable. If the guideline concentrations are not met, a refined, site-specific analysis, using EPA recommended air dispersion models, is required. The New York air toxics program is referred to as a risk-based program. This means that the risks to public health and environmental are evaluated in order to determine the degree of air pollution control necessary for each toxic air pollutant from each process source at a stationary source.

The degree of air pollution control is documented through the permitting process. DEC has three distinct levels of permits for stationary sources based on the potential level of emissions that could be released by the facility. The first permit type is the Title V[7] facility permit which is required at "major" facilities that have the potential to release pollutants above specific thresholds for criteria pollutants or hazardous air pollutants (HAPs). All requirements for controlling toxic air pollutants are written into the Title V permit including emission limitations, monitoring requirements, recordkeeping and reporting requirements and requirements to periodically (at least semi-annually and annually) certify that the facility complies with all requirements. DEC is required by EPA to conduct evaluations of Title V facilities at least every two years, but the majority of these facilities in the State are evaluated every year. DEC receives an annual emission statement from all facilities with Title V permits. These statements list all criteria pollutants and HAPs and the annual amount released for each.

The second level of air permits are State Facility Permits.[8] Facilities that have emission releases below the specific threshold for criteria pollutants or HAPs are given this permit. This permit would include requirements such as emissions limits, recordkeeping and reporting requirements, and emissions monitoring and testing requirements. Sources with permit conditions that require emissions be kept below Title V thresholds are required to have an evaluation every five years to ensure compliance with the permit conditions.

The third level of air permits is called a minor facility registration and, generally, applies to smaller facilities such as dry cleaners or gas stations. The registrations for these facilities include a list of HAPs for which releases may be of concern. Facilities with registrations are still required to comply with all applicable state and federal requirements, including emissions limitations or enforceable operational conditions, but these requirements are not included in the registration itself. Lastly, some facilities are exempt from the permitting process because they are engaged in activities associated with very small releases of air pollutants. These facilities do not need to obtain a permit or registration, but are required to comply with all applicable state and federal requirements, including emissions limitations or enforceable operational conditions.

[7] Title V is a national air permitting program.
[8] Some facilities are considered small emission sources and are specifically exempt from a State Facility Permit as detailed in State regulation.

The Development of the Federal Programs

In 1970, the Clean Air Act (CAA) distinguished between two categories of pollutants: criteria pollutants[9] and hazardous air pollutants (HAPs).[10] This early version of the Act listed only eight HAPs[11] and regulated only seven.

Major amendments to the CAA in 1990 (CAAA) established a number of milestones or regulatory deadlines to improve air quality. One was that the HAPs list was expanded to 187 with a greater effort to control HAP releases from mobile sources.

For large stationary sources the CAAA authorized the federal government to develop National Emission Standards for Hazardous Air Pollutants (NESHAPs) for 174 source categories which emitted HAPs and established a national air permitting program called Title V. The purpose was to ensure that the requirements to reduce HAPs were national, ensuring no Title V facility had a competitive edge by having to meet less stringent pollution control requirements.

The goal of the NESHAP program was to reduce toxic air pollutant emissions by over 75% from large stationary sources (i.e., industrial facilities) within 10 years by enacting a two-stage regulatory process. First, technology-based standards (NESHAPS) would be developed and implemented for 174 categories of large stationary sources. Second, risk to public health and the environment would be assessed within eight years after promulgation of the stationary source-specific NESHAP. This program is referred to as the Risk and Technology program and is currently being implemented.

Other goals established by EPA to measure progress in the reduction of air pollution under the CAAA are briefly discussed below.

Addressing Mobile Source Pollution

The control of air pollution from motor vehicles is extremely important in order to improve air quality and protect public health. Unlike stationary sources, regulation of mobile sources has been primarily dominated by two programs: EPA's national program and California's state program. The 1970 Clean Air Act divides mobile sources into three categories: on-road motor vehicles, like cars, trucks, and buses; airplanes; and nonroad vehicles and engines (which includes the following: construction equipment, lawn and farm equipment, ships, locomotives, motorboats, tractors, mining trucks). The authority to set federal standards began with the 1965 Motor Vehicle Air Pollution Control Act and the first emission standards were promulgated in 1966. The 1965 Act also prohibited the sale of nonconforming vehicles and the rendering inoperable any pollution control devices. The 1970 CAA required further reductions and established a framework for motor vehicle emissions regulations that has been preserved in later amendments. These earlier emission reductions primarily focused on criteria pollutants (carbon monoxide and nitrogen oxides) and hydrocarbons.[12,13]

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[9] Criteria pollutants are: carbon monoxide, sulfur oxides, nitrogen oxides, ozone, lead and particulate matter.
[10] Most of the toxic air pollutants evaluated in the Community Air Screen are among the list of 187 hazardous air pollutants. Sometimes the terms toxic air pollutants and hazardous air pollutants are used interchangeably.
[11] The eight HAPs are: asbestos, beryllium, mercury, vinyl chloride, radionuclides, inorganic arsenic, benzene and coke oven emissions.
[12] The term hydrocarbon refers to organic compounds consisting entirely of hydrogen and carbon atoms. The majority of hydrocarbons found naturally occur in crude oil.
[13] Robert J. Martineau, Jr. and David P. Novello. The Clean Air Act Handbook, Second Edition. American Bar Association Publishing. 2004.

The 1990 CAAA empowered EPA to develop regulations that would require the development of fuels that would burn cleaner and would mandate new technology to reduce emissions of criteria air pollutants and HAPs from all motor vehicles (cars, trucks and buses). This two-fold approach has significantly reduced air pollution from motor vehicles, even as the number of vehicles and vehicle miles traveled has increased over the past twenty-two years. The Amendments also authorized the promulgation of emission standards for nonroad engines, included provisions to increase the regulatory life of vehicles, and required onboard emission monitoring equipment.

There are three general areas of regulatory focus in the national strategy to reduce air pollution from motor vehicles; clean cars and fuels, clean trucks and buses and diesel fuels, and the establishment of certification and compliance programs.[14] More stringent emission standards and cleaner fuel began with the Tier 2 vehicle standards and gasoline sulfur program which were phased in beginning in 2004 and fully implemented by 2009. Nationally, these two components have resulted in cleaner gasoline powered vehicles, as much as 77% to 95% cleaner compared to the 2003 model-year. Since the mid-1990s though, New York State has adopted the Low Emission Vehicle (LEV) program promulgated by the California Air Resources Board. The LEV emission standards achieve roughly the same reductions as Tier 2, but were phased in several years sooner.

The Department has also adopted regulations that require environmental performance labels be affixed to new vehicles delivered for sale in New York. The label contains quantitative information on emissions of criteria pollutants and greenhouse gases for new vehicles relative to the average new vehicle for the same year. This regulation furthers the goals of reducing air pollution from motor vehicles by providing consumers with clear information on the emissions of criteria pollutants and greenhouse gases for specific vehicles.[15]

The latest heavy-duty engine and vehicle standards and highway diesel fuel sulfur control requirements were phased in between 2007 and 2010. This program will result in each new truck and bus being more than 90% cleaner than pre-2007 models. By 2030, this regulation will provide annual emission reductions equivalent to removing the pollution from more than 90% of today's trucks and buses, or about 13 million trucks and buses. The motor vehicle certification and compliance programs will ensure that all vehicles are designed to meet new emission standards and will continue to meet those standards throughout their useful life.

The adoption of reformulated gasoline (RFG) in 1995 has resulted in significant decreases in ambient benzene concentrations for those areas where this program has been implemented. Section 211(k) of the CAA deemed that RFG must be sold in certain ozone non-attainment areas.[16] Federal rules limit the amount of benzene by volume in RFG gasoline. RFG is required in New York Metropolitan area (NYMA),[17] Orange County and Dutchess County. A reduction in the content of benzene in gasoline translates into reduced tailpipe and evaporative emissions of benzene. The use of reformulated gasoline in the NYMA has resulted in significant reductions of ambient air benzene concentrations.

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[14] United States Environmental Protection Agency (USEPA). 2005. Toward a Cleaner Future: Office of Transportation and Air Quality Progress Report 2005. Available On-Line: http://www.epa.gov/otaq/about/420r05011.pdf

[15] All passenger vehicle and light-duty trucks, model-year 2010 and newer.

[16] Ozone is a criteria pollutant. There are national ambient air quality standards (NAAQS) for each of the criteria pollutants. These standards apply to the concentration of a pollutant in outdoor air. If the air quality in a geographic area meets or does better than the national standard, it is called an attainment area; areas that don't meet the national standard are called nonattainment areas.

[17] NYMA consists of the following nine counties: Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk and Westchester.

In 2007, EPA issued a more stringent rule to address releases of toxic air pollutants from motor vehicles and nonroad sources. The final standard will significantly lower emissions of benzene and other toxic air pollutants in three ways: (1) by further lowering the benzene content in gasoline (lower than 1995 RFG levels); (2) by reducing exhaust emission from passenger vehicles operated at cold temperatures (under 75 degrees Fahrenheit); and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

The New York State Diesel Emissions Reduction Act (DERA) was passed by the legislature and signed by the Governor in 2006 with the goal of reducing emissions of fine particulate matter from diesel vehicles being operated by or on behalf of the State and to help New York meet its air quality and public health objectives. DEC adopted regulations that require these heavy duty vehicles to comply with specific emission standards for particulate matter and requires them to use ultra-low sulfur diesel.

Because EPA's new heavy-duty highway and non-road diesel engine standards apply to engines manufactured after the year 2007, EPA launched the National Clean Diesel Campaign to address diesel pollutant releases from older existing vehicles.[18] As part of this campaign the federal government instituted a grant program, also known as DERA, to address diesel pollutant releases from older existing vehicles. In October 2008, EPA and DEC announced funding of over $1 million for projects such as retrofitting school buses with new equipment to reduce pollutant releases. Additionally, EPA provided funds to DEC to purchase hybrid diesel electric marine engines for a new Hudson River patrol boat. The DERA grant program has been reauthorized for 2012 through 2016, with almost $30 million appropriated for 2012.

As required under Federal regulations, DEC jointly administers with the New York State Department of Motor Vehicles, a state-run Inspection/Maintenance (I/M) program for the control and abatement of motor vehicle emissions. I/M programs are required in both ozone and carbon monoxide (CO) nonattainment areas, depending upon population and other specific criteria. All light duty[19] vehicles (ages 2 to 25) operating in the State are required to pass both a safety inspection and emission test. Those from model year 1996 or newer must pass an onboard diagnostic emission test. Older vehicles are subject to a visual check of emission control devices. All heavy duty diesel vehicles (HDDV)[20] operating in New York State with a few exemptions are subject to random roadside emissions inspections including smoke opacity tests. HDDV registered in the nine-county NYMA are subject to emissions inspections on an annual basis.

Finally, in addition to regulating emissions and fuels, the State has many policies to address idling vehicles and school bus emissions. The current laws are listed below:

- **School Bus Idling:** NYS Department of Education (NYSED) promulgated a law to address idling of buses and other vehicles at schools. The NYS Education Law 3637, promulgated on July 1, 2008, requires school districts to minimize the idling of school buses and other vehicles owned or leased by the school district on or in front of school grounds. It is the policy of NYSED that this law applies to all school districts.[21]
- **State and City Idling Laws:** NYS and New York City (NYC) have laws addressing idling. The State law applies to all on-road heavy duty vehicles (gross vehicle weight exceeding 8,500 pounds) and prohibits idling for more than five consecutive minutes,

[18] USEPA's National Clean Diesel Campaign. Available: http://epa.gov/cleandiesel/index.htm#voluntary [accessed 10/14/08].

[19] Vehicles with a gross vehicle weight rating of 8,500 pounds and less.

[20] Vehicles with a gross vehicle weight rating exceeding 8,500 pounds.

[21] Reducing School Bus Idling - Requirements and Notice Materials for School Districts. Available: http://www.emsc.nysed.gov/schoolbus/anti-idling/ [accessed 10/14/08].

providing exceptions for safety and other considerations.[22] The City law prohibits idling for longer than three minutes while parking, standing or stopping, with specific exceptions for safety and operation of buses.[23]

- In February 2009, the NYC Council passed legislation to limit the idling in all **NYC public or private school zones** to one minute.[24] The school zone created by the law encompasses all streets that immediately border public and private schools. The law also requires city agencies to submit idling violation reports to the City Council. Additionally, the City Council voted to extend enforcement authority for NYC idling laws to the Department of Parks and Recreation and Department of Sanitation.

In summary, the goals of the federal and state air pollution control programs are consistent with each other and promote the economic and social well-being of the community in NYS.

New York State Air Quality

The strategies discussed previously to reduce toxic air pollutants from stationary and mobile sources have resulted in significant improvements in air quality. An historical perspective that reflects the success of these efforts can be seen in DEC's Bureau of Air Quality Surveillance (BAQS) report titled: NYS Ambient Air Monitoring Program Network Assessment (May 2010).[25] The Network Assessment report shows historical trends for criteria pollutants and some toxic air pollutants. Historical trends for common toxic air pollutants frequently detected in DEC's monitoring network can be found in Trends for Specific VOC Compounds [26] or in Volatile Organics Data Summaries.[27]

[22] New York State Department of Environmental Conservation Regulations. Available: http://www.dec.ny.gov/regs/4256.html [accessed 10/14/08].

[23] Laws of New York State http://public.leginfo.state.ny.us/menugetf.cgi

[24] Local Law to amend the administrative code of the city of New York, in relation to engine idling. Available online at: http://webdocs.nyccouncil.info/textfiles/Int%200631-2007.htm?CFID=45987&CFTOKEN=43880504 [accessed 2/18/09].

[25] Available online at: http://www.dec.ny.gov/chemical/65574.html

[26] Available online at: http://www.dec.ny.gov/chemical/66472.html

[27] Available online at: http://www.dec.ny.gov/chemical/29680.html