

**Commonwealth of Pennsylvania
Department of Environmental Protection**



**Proposed Recommendations to EPA
for
8-Hour Ozone
Attainment/Nonattainment Areas**

July 2003

Bureau of Air Quality
Pennsylvania Department of Environmental Protection
PO Box 8468
Harrisburg, PA 17105-8468
717-787-9495

www.dep.state.pa.us

Edward G. Rendell
Governor
Commonwealth of Pennsylvania

Kathleen A. McGinty
Secretary
Department of Environmental Protection

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What is this document?

The federal Clean Air Act provides a mechanism for states to make recommendations to the U.S. Environmental Protection Agency (EPA) on the designation of areas not meeting the health-based National Ambient Air Quality Standards (NAAQS). In this document, the Department of Environmental Protection makes preliminary recommendations to EPA concerning attainment/nonattainment designations in the Commonwealth of Pennsylvania for the 8-hour ozone NAAQS adopted by EPA in 1997. The designation recommendations are based on air quality monitoring data for 2000-2002 and other available information including ozone-forming emissions, meteorology and demographics. Because the implications of designations have not been fully established by EPA, DEP intends to continue to work with EPA to revise these recommendations, as appropriate, prior to the promulgation of final designations. EPA will make final designations in April 2004 based on air quality monitoring data for 2001-2003.

What is ozone?

Ground-level ozone continues to be a significant air pollution problem in Pennsylvania. Reducing concentrations of ground-level ozone is important because ozone levels above the health-based standard are a serious human health threat, and also can cause damage to important food crops, forests, and wildlife. Ozone in the troposphere, also called ground-level ozone, should not be confused with stratospheric ozone – located in the upper atmosphere – which protects the earth by blocking out damaging solar radiation.

Health Effects. Repeated exposure to ozone pollution may cause permanent damage to the lungs. Even when ozone is present in low levels, inhaling it triggers a variety of health problems including chest pains, coughing, nausea, throat irritation, and congestion. It can also worsen bronchitis, heart disease, emphysema, and asthma, and reduce lung capacity. Asthma is a significant and growing threat to children and adults. Ozone can aggravate asthma, causing more asthma attacks, increased use of medication, more medical treatment and more frequent visits to hospital emergency clinics.

Healthy people also experience difficulty in breathing when exposed to ozone pollution. Because ozone pollution usually forms in hot weather, anyone who spends time outdoors in the summer may be affected, particularly children, the elderly, outdoor workers and people exercising. Children are most at risk from exposure to ozone because they are active outside, playing and exercising, during the summertime when ozone levels are at their highest. Millions of Pennsylvanians live in areas where the ozone health-based standards are exceeded.

Environmental Effects. Ground-level ozone damages plant life and is responsible for 500 million dollars in reduced crop production in the United States each year. Ozone interferes with the ability of plants to produce and store food, making them

more susceptible to disease, insects, other pollutants, and harsh weather. It damages the foliage of trees and other plants, ruining the landscape of cities, parks and forests, and recreation areas. One of the key components of ozone, nitrogen oxides, contributes to fish kills and algae blooms in sensitive waterways, such as the Chesapeake Bay.

Where does ground-level ozone come from? Ozone is not emitted directly to the atmosphere, but is formed by photochemical reactions between volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in the presence of sunlight. The long, hot, humid days of summer are particularly conducive to ozone formation, so ozone levels are of concern primarily during the months of May through September.

The primary sources of man-made VOCs and NO_x, the ozone precursors, are the evaporation of fuels and solvents (gasoline and consumer products), combustion of fuels (motor vehicles, power plants and non-road engines), and industrial processes.

What is the NAAQS for ozone? The ozone standard, when it was last revised in 1979, was set at 0.12 parts per million (ppm) for one hour. This means that an exceedance of the standard occurred when the concentration, averaged over a rolling one-hour period, was more than this value (established by EPA to be rounded to 124 parts per billion (ppb)). EPA also established that a violation of the 1-hour standard occurred at any monitor if four exceedances occurred during a rolling three-year period.

Many new health studies show that health effects occur at levels lower than the 1-hour standard and that exposure times longer than one hour are of concern. EPA concluded that the 1-hour primary standard did not adequately protect the public from adverse health effects. Consequently, on July 18, 1997, EPA promulgated an 8-hour standard set at 0.08 ppm (rounded to 84 ppb), which is more stringent than the 1-hour ozone standard, and therefore, more protective of public health. The 8-hour ozone standard is exceeded when the concentration, averaged over a rolling eight hour period, is more than 84 ppb.

EPA's new 8-hour ozone standards will provide significantly increased health and environmental protection nationally beyond that provided by the 1-hour standard. EPA also has changed the form of the standard from number of exceedances to one that takes concentration into account. The new form more directly relates to ozone concentrations associated with health effects; it avoids exceedances, regardless of size, from being counted equally in the attainment tests. An area does not attain the standard if the 3-year average of the annual 4th-highest daily maximum 8-hour concentrations is more than 0.08 ppm (84 ppb).

What is the process for designating areas that do not attain a NAAQS?

The federal Clean Air Act requires EPA to review public health standards for major air pollutants every five years and update National Ambient Air Quality Standards, if necessary, to “protect public health with an adequate margin of safety” based on the latest, best-available science. Section 107(d)(1)(B) of the Clean Air Act Amendments of 1990 (CAAA) requires EPA to designate areas after promulgating a new national

ambient air quality standard. Following promulgation of new or revised air standards, Governors are given the opportunity to submit recommendations for attainment/nonattainment areas, supported by most recent quality-assured monitoring data. EPA provides criteria for states' recommendations for designating areas. After opportunity for public comment, EPA may make modifications and promulgate all or part of the Governor's recommendations. If EPA determines that a modification to the recommendation is necessary, EPA will notify the state no later than 120 days prior to promulgating the designation. This will provide an opportunity for the state to work with EPA if the state believes EPA's decisions are not appropriate.

During a prior review of the ground-level ozone standard, EPA concluded that the existing standard did not adequately protect the public from adverse health effects. Therefore, on July 18, 1997, EPA promulgated a new standard, which averages ozone concentrations over eight hours, rather than over one hour. The standard was challenged in court. On May 14, 1999, the U.S. Court of Appeals for the District of Columbia issued a decision remanding to EPA, but not vacating, the 8-hour ozone standard. In February 2001, however, the U.S. Supreme Court upheld the standard and in March 2002, the U.S. Court of Appeals upheld the remaining issues. Subsequently, EPA signed a consent agreement with environmental groups requiring the agency to complete the designation process by April 15, 2004.

With the resolution of these issues in court, EPA began developing new strategies for implementation of the 8-hour standard. A proposal for implementation of the 8-hour standard was published in the Federal Register on June 2, 2003. The final implementation regulation is not expected until December 2003.

What would be the effects of designation as nonattainment?

States have the primary responsibility for determining how the NAAQS will be achieved and maintained. Section 110 of the Clean Air Act requires states to submit State Implementation Plans (SIPs) within three years after promulgation of a new standard to demonstrate how the standard would be attained in each nonattainment area. Therefore, Pennsylvania will be required to submit 8-hour ozone attainment SIPs by April 2007, three years after EPA is expected to make final designations. Additional SIP revisions will be required to describe incremental progress towards attainment prior to and after that date, depending on the area and final EPA regulations.

The Clean Air Act Amendments of 1990 established a series of classifications (marginal, moderate, serious, severe and extreme) for designated 1-hour nonattainment areas, each with its own attainment date, demonstration requirements and measures that must be implemented. EPA is in the process of seeking public comment on their proposed implementation regulation that addresses these issues and, because of this uncertainty, is suggesting that states do not submit proposed classifications for areas at the same time they submit recommendations for nonattainment areas.

Measures adopted by states under the 1-hour ozone standard cannot and should not be repealed. Therefore, Pennsylvania would continue provisions pertaining to the 1-hour ozone standard including vehicle emission inspection/maintenance, the regional NOx SIP Call and New Source Review (emission offset program) for new or modified sources.

Pennsylvania is also part of the northeast Ozone Transport Region, established by operation of law under Section 184 of the Clean Air Act to address regional ozone issues. The region includes Maine, New Hampshire, Rhode Island, Connecticut, Massachusetts, Vermont, New York, New Jersey, Delaware, Maryland, Pennsylvania, the District of Columbia and northern Virginia, and is governed by a Commission, the composition of which was also determined by Congress. The Clean Air Act contains provisions for the OTR that, in order to reduce contributions downwind, treated these states as if all areas were nonattainment, requiring statewide Reasonably Available Control Technology and New Source Review for major industries and vehicle emission inspection programs in 25 counties based on population. These 8-hour designations thus may have less practical effect in a state like Pennsylvania that is within the Northeast OTR than outside the OTR, because these programs have already been established within the OTR.

Dates for attainment, rate of progress requirements, mandatory measures, how transport will be considered, technical demonstration requirements, transportation conformity and many other important issues will not be known until EPA finalizes their implementation regulations. Interested parties are encouraged to review EPA's proposals. Written comments are due to EPA by August 1, 2003. EPA's proposed regulation was published in the Federal Register on June 2 (68 FR 32802) and can be found at: www.epa.gov/fedrgstr/EPA-AIR/2003/June/Day-02/a13240.pdf

EPA's proposed implementation regulation provides various schedules for attaining the standards depending on the significance of the pollution. For the 8-hour ozone standard, these dates may range from three to 20 years after the designations are made with most areas probably being give three years to attain.

Transport of ozone and multistate/national control measures. Air crossing Pennsylvania's borders is often already above the 8-hour federal health-based standard, as demonstrated by those monitors located in higher altitudes at Pennsylvania's southern and western borders to measure ozone transport (These include the Florence, Hookstown, Holbrook, Methodist Hill monitors). Many areas of Pennsylvania will not be able to achieve the 8-hour standard without Midwestern and Southern state compliance with broad regional measures to reduce NOx. EPA regulations require areas to the west and south to comply with regional NOx control measures by May 2004.

Pennsylvania will also derive additional significant emission reduction benefits from nationwide mobile measures such as cleaner new cars, cleaner new diesel vehicles and cleaner fuels. Local measures and statewide measures, including reduced VOC emissions from consumer products, solvent cleaning, and the like, will also assist in attaining the standard and reducing downwind contributions. With the successful and

timely implementation of regional NO_x controls and these other measures, we expect most areas of the state will attain the 8-hour standard within the timeframe contemplated by EPA.

However, Pennsylvania remains concerned that EPA's transported air pollution requirements, designed for the 1-hour ozone standard, will not be sufficient for all areas of the Commonwealth to achieve the 8-hour health-based ozone standard even with additional local measures.

Proposal for Recommendations to EPA for Designations

The Commonwealth is proposing to recommend establishment of 8-hour ozone designations based primarily on the June 6, 2003 issued definitions of Core Based Statistical Area (CBSA) boundaries and Combined Statistical Area boundaries (see descriptions below). EPA in the past has recommended a similar strategy with the old versions of Metropolitan Statistical Areas and Consolidated Metropolitan Statistical Areas. CBSAs would be similar to the areas that were designated for the 1-hour ozone standard, and preserve existing working relationships and political boundaries. The current 1-hour ozone nonattainment planning areas were set by EPA as a result of the 1990 Clean Air Act Amendments and are shown in Figure I, along with current 8-hour ozone design values for monitored counties.

An entire CBSA with one or more ozone monitors measuring a violation of the 8-hour ozone standard would generally be designated as a nonattainment area for all counties. Counties not in a CBSA with an ozone monitor measuring a violation of the 8-hour standard would also be designated nonattainment.

EPA issued general guidance, which describes criteria that states can examine when considering combining with adjacent or nearby areas. Some of the critical factors recommended include population density similarities, emission levels, air quality, and meteorology. This document, *Boundary Guidance on Air Quality Designations for the 8-Hour Ozone National Ambient Air Quality Standards*, can be found at <http://www.epa.gov/airlinks/boundary1.pdf>

Available Data. Appendix I includes maps and tables that describe ozone planning areas. Appendix II includes documenting material that addresses EPA's designation criteria, pertaining to air pollution emissions and population densities. These include manmade emission densities of volatile organic compounds and oxides of nitrogen by county, volatile organic compound emission densities from natural sources by county and estimated emissions of VOC and NO_x for 1999 and 2007 by emission source category.

Discussion about Statistical Areas (SAs). The Office of Management and Budget defines Micropolitan, Metropolitan, and Combined Statistical Areas. See the following for the criteria on which statistical areas are based:

www.access.gpo.gov/su_docs/fedreg/a001227c.html. The updated list of Statistical Areas is available at: www.census.gov/population/www/estimates/metrodef.html. They are all based on a population center known as a core and its associated Core Based Statistical Area (CBSA). A CBSA is a central county or group of counties that has at least one population core and may have a high degree of social and economic integration measured by commuting ties with outlying counties – the so-called employment interchange measure. Counties are considered to be outlying counties if at least 25% of the employed residents work in the central county or counties or if 25% of the employment in an outlying county is accounted for by workers who reside in the central county.

A CBSA that has an urban area with a population of at least 50,000 can form a Metropolitan Statistical Area with or without outlying counties. A CBSA formed by an urban area with a population of at least 10,000, but less than 50,000 can form a Micropolitan Statistical Area with or without outlying counties. Combined Statistical Areas are formed automatically if two or more adjacent CBSAs have an employment interchange of 25%. If the employment interchange is between 15% and 25% between two or more adjacent CBSAs, a Combined Statistical Area could be formed if local opinion favors the idea. Counties or groups of counties form Metropolitan Divisions if they have a core population of at least 2.5 million and have commuting ties to adjacent counties.

A county may appear in only one CBSA. If a county is a central county in one CBSA and an outlying county in another, it falls within the CBSA where it is a central county. If a county is an outlying county in two or more CBSAs, the county falls in the CBSA where it has the greatest employment interchange measure.

Two Examples of Pennsylvania Statistical Areas. The Harrisburg-Carlisle-Lebanon Combined Statistical Area is comprised of two Metropolitan Statistical Areas. Dauphin, Cumberland, and Perry counties comprise the one Metropolitan Statistical Area. All three counties have very strong economic and commuting links with each other so that the area comprises both a core and a CBSA. Lebanon County is also a Metropolitan Statistical Area. It is more of a stand-alone adjacent county that has a core and a separate CBSA. Although Lebanon County is not as closely associated with the first three counties, Lebanon County still has commuting patterns that allow the two Metropolitan Statistical Areas to be added into one Combined Statistical Area.

The five-county Philadelphia area has a core population of more than 2.5 million making it a Metropolitan Division and a CBSA. The three county Camden and three-county Wilmington cores are also Metropolitan Divisions, and CBSAs. The three divisions comprise the very large Philadelphia-Camden-Wilmington Metropolitan Statistical Area, due to the strong commuting ties established between all three Metropolitan Divisions. In addition, the one-county Vineland Metropolitan Statistical Area is included in the Metropolitan Statistical Area to form the Combined Metropolitan Statistical Area.

Proposed Planning Areas. A county-by-county list of designation recommendations is included in Appendix I as Table 1. The 1-hour ozone standard planning areas are shown in Figure 1. The 2003 Metropolitan Areas for Pennsylvania and adjacent non-Pennsylvania counties are shown in Figure 2. A map of Pennsylvania's proposed boundaries for nonattainment areas is shown in Figure 3. Discussion of the basis for DEP's proposed recommendation for specific areas is included below.

Philadelphia Area: The existing 1-hour interstate ozone nonattainment area includes Bucks, Chester, Delaware, Montgomery and Philadelphia Counties in Pennsylvania. In New Jersey, it includes Burlington, Gloucester, Salem, Cumberland and Mercer counties. In Maryland, it includes Cecil County. And in Delaware, it includes New Castle and Kent Counties. Kent County was not in the MSA but was recommended by the State of Delaware as an addition. Pennsylvania is recommending that this area be retained as the 8-hour ozone nonattainment planning area.

Questions have been raised concerning the addition of adjacent counties in Pennsylvania to the area including the Lancaster, Allentown-Bethlehem-Easton, York and Harrisburg areas. Pennsylvania believes that these areas have established land use and transportation planning processes that currently function well as independent areas. Examination of commuting patterns indicates that these areas are not particularly linked to the Philadelphia area. In addition, Pennsylvania's ozone stakeholder programs in these areas created local interest in air quality and air quality planning in these areas. Including these areas in the Philadelphia area would be unnecessarily disruptive. The stakeholder process developed an excellent awareness of transport into these areas and their contribution to downwind areas such as Philadelphia and New York City (NYC).

The State of New Jersey has also expressed interest in what might be the appropriate boundary between the Philadelphia and NYC areas. Mercer County, New Jersey was added to the New York area by the 2003 MSA Census. Pennsylvania believes it is more appropriate to continue to include it with Philadelphia as has been done historically.

Ocean County, New Jersey, which is part of the NYC MSA, has recently measured some of the highest 8-hour ozone values in the Northeast over the last several years. Pennsylvania believes it is more appropriate for this county to remain part of the NYC area for planning purposes. Philadelphia's downwind contribution to Ocean County and the entire NYC area will need to be addressed in the attainment plans developed by all parties in conjunction with the Ozone Transport Commission.

Allentown-Bethlehem-Easton Area: The current planning area includes Carbon, Lehigh and Northampton Counties in Pennsylvania and Warren County in New Jersey. This planning area is recommended to be retained.

Reading Area: Retain the current Berks County planning area.

Lancaster Area: Retain the current Lancaster County Planning area.

York Area: The current area includes only York County. However, the 2003 Census data now adds Adams County to the MSA. It is recommended that the planning area include both York and Adams Counties.

Harrisburg Area: The current planning area includes Cumberland, Dauphin, Perry and Lebanon Counties. It is recommended that this planning area be retained.

Scranton/Wilkes-Barre Area: The current area includes Luzerne, Lackawanna, Wyoming and Columbia Counties. The 2003 Census has now removed Columbia County from the MSA and it is recommended to no longer include this county as part of the nonattainment planning area. Columbia County does not have an ozone monitor and so should be designated as attainment.

State College Area: Retain Centre County as the planning area.

Williamsport-Lock Haven Area: While the current planning area is only Lycoming County, the 2003 Census now adds Clinton County as part of the newly defined area. Since this area is currently monitoring attainment, no nonattainment designation is necessary.

Altoona Area: Retain the current Blair County planning area. Since this area is currently attainment, no nonattainment designation is necessary.

Johnstown Area: The current planning area includes both Cambria and Somerset Counties. However, the 2003 Census now includes only Cambria County. It is recommended to follow the new MSA boundary and limit the planning area to only Cambria County. Somerset County does not have an ozone monitor and so should be designated as attainment.

Erie Area: Retain Erie County as the planning area.

Youngstown-Warren-Mercer Area: The 2003 Census MSA now includes Trumbull and Mahoning Counties in Ohio and Mercer County in PA. The ozone monitor operated by Pennsylvania in Farrell (Mercer County) is, in fact, upwind of the Sharon-Farrell area and is a downwind monitor for the Youngstown area. Therefore, it is recommended that all three counties be one 8-hour ozone nonattainment planning area.

Pittsburgh Area: The current planning area includes Beaver, Butler, Armstrong, Allegheny, Westmoreland, Washington and Fayette counties. The 2003 Census added Lawrence County to the Combined Metropolitan Area. Because this county has traditionally been a stand-alone planning area, it is recommended to retain Lawrence County as the New Castle planning area, rather than including it with the Pittsburgh nonattainment area. Since the New Castle area is currently monitoring attainment, no nonattainment designation is necessary.

Pike County: The 2003 Census added Pike County to the NYC CMSA. In reviewing the population density and emission density data, it is unlikely that this county will have any significant impact on the NYC area now or in the near future. It is recommended that this county not be included in the NYC area but that emissions growth be monitored to assure that Pike County's contribution remains minimal. Because of the OTR requirements, emissions growth should be well controlled.

Franklin, Clearfield and Greene: Because these counties contain high elevation monitors that track the movement of ozone and ozone related pollutants, Pennsylvania is recommending that they be designated as "overwhelming transport areas". These counties have little impact from sources in their respective areas and have no ability to achieve the ozone standard by local measures.