
**Louisville Metro Air Quality Task Force Report
to Mayor Abramson
and Air Pollution Control Board**

January 18, 2006

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Executive Summary

In January of 2004, Mayor Jerry Abramson and the Air Pollution Control Board of Jefferson County (Board) embarked on a new, broad-based approach to addressing federal clean air standards in Louisville Metro. Mayor Abramson brought together a diverse cross-section of people with backgrounds in the fields of health, business, industry, environmental advocacy, neighborhood involvement, and local government. Because the protection of air quality is very much a regional issue, the Mayor also invited representatives from Oldham and Bullitt counties in Kentucky and Clark and Floyd counties in Southern Indiana. This group – the Air Quality Task Force – was charged with studying the wide spectrum of issues pertaining to ozone and fine particulate clean air standards for the Louisville area.

This report makes recommendations to Mayor Abramson and the Board about ways local government, businesses, and individuals can work together to meet not only federal ozone standards, but also broader community expectations regarding clean air.

Specifically, the Mayor asked the Air Quality Task Force to identify feasible, practical, and acceptable approaches to help Louisville improve air quality and meet stricter clean-air mandates from the federal government. Chaired by the Cabinet for Community Development Secretary Bruce Traughber, the Air Quality Task Force reviewed the history and structure of the Clean Air Act, studied both ozone and fine particulate standards to understand how they have been established and monitored, explored health problems associ-

ated with these pollutants as well as the economic impact of pollutants and regulations, reviewed the history of Louisville's compliance with federal clean air standards and the local emissions inventory, and examined emission reduction options for Louisville Metro. The Air Quality Task Force specifically focused its work on attainment of the ozone standard in the Louisville area.

In the early 1970's, the United States Environmental Protection Agency (EPA) implemented the first 1-hour ambient ozone standard. The Louisville area was designated at nonattainment. Significant progress has been achieved in improving air quality in the Louisville area since that time. A combination of regulatory mandates and cooperative partnerships with business and the community have already caused reductions that allowed the area to achieve the federal 1-hour ozone standard in the fall of 2001. In the same year, however, the EPA implemented a new, and more restrictive, 8-hour ozone standard based on evidence

that the old standard did not do enough to protect public health. The Louisville area was once again designated as nonattainment. The Air Quality Task Force examined the impact of this community remaining in nonattainment on public health and economic health. It also explored ways the Louisville area could meet the current standard and prepare for any reductions required by future standards.

Air quality monitoring for the period of 2003—2005 has confirmed that the Louisville area is now in attainment of the 8-hour ozone standard. Appropriate government agencies are currently preparing the required documentation to formally redesignate the Louisville area as an attainment area. In fact, information presented to the Air Quality Task Force (as set forth in Appendix IV of the report) demonstrates that Louisville's current ozone level is better than all but one of eight cities against which Louisville competes for attracting new businesses. This is a major accomplishment—and one of which this community should be proud.

Declines in area ozone levels are projected to continue in the coming years. Government modeling projections indicate area ozone levels will remain below the new, more restrictive 8-hour standard with a margin of safety. The Air Quality Task Force is recommending that cooperative partnerships with business and the community continue to bolster the general reduction in ozone levels already occurring. Louisville has a demonstrated formula for successfully achieving significant air quality improvements that must be continued.

The Air Quality Task Force is recommending that cooperative partnerships with business and the community continue to bolster the general reduction in ozone levels already occurring.

Because of this community's concern about air quality and health, the Air Quality Task Force formed the Health Effects Committee to examine the available scientific information on ozone levels and associated adverse health effects. The Committee reviewed the findings of the EPA's Clean Air Scientific Advisory Committee's Ozone Review Panel as well as the *Review of the California Ambient Air Quality Standards for Ozone*, the resolution approved by the California Air Resources Board (CARB) when it adopted a new, more stringent, 8-hour ozone standard for the state of California. The scientific literature reviewed by

the EPA and CARB indicates that ozone exposure – even at the level currently allowed by the EPA -- is associated with a number of adverse health effects. The Air Quality Task Force reviewed the findings and recommendations of the Health Effects Committee and makes the following recommendations:

- 1) The Air Quality Task Force recognizes that the Louisville 8-hour nonattainment area is eligible for redesignation as being in attainment with the 8-hour ozone standard.
- 2) The Air Quality Task Force further recognizes that additional reductions below the current regulatory standard are advisable to provide a margin of safety that allows and compensates for scientific uncertainty, as well as the lack of precise predictions regarding the health impacts of air pollutants on a multiplicity of potentially susceptible subpopulations.
- 3) For these reasons, and to protect public health with an adequate margin of safety, the Air Quality Task Force recommends that the Air Pollution Control Board establish an ongoing and continuous process of review of all sources and categories of ozone precursor emissions, and develop and implement strategies to continue progress towards reduction in ambient concentrations of ozone and precursor pollutants. Strategies that also achieve lower emissions of fine particulates, fine particulate precursors, or hazardous air pollutants should be prioritized.
- 4) Recognizing the regional nature of air quality in the Louisville area, the Air Quality Task Force recommends that the Air Pollution Control Board encourage the Kentucky Division for Air Quality and the Indiana Department of Environmental Management to take congruent and complementary actions to reduce ambient concentrations of ozone and precursor pollutants.

The Air Quality Task Force encourages a rigorous and evolving local effort — both public and private — to address transportation, energy and land use, demographics, economics, and public health on an ongoing basis in the years ahead.

The Health Effects Committee Report is attached as Appendix V to this report.

The Air Quality Task Force also reviewed the economic impacts of being designated nonattainment of the federal ozone air quality standard. These include an adverse effect on economic development from the tighter restrictions and reviews required by a nonattainment designation. Furthermore, there are certainly a number of companies which will not consider locating (or relocating) to an area designated nonattainment.

Based on the discussion and evaluation undertaken by the Air Quality Task Force, this

report makes recommendations to Mayor Abramson and the Board about ways local government, businesses, and individuals can work together to continue to achieve not only federal ozone standards, but also broader community expectations regarding clean air. Strategy recommendations from the Air Quality Task Force include 1) the continuation of current programs, both regulatory and non-regulatory, to maintain compliance with the 8-hour ozone standard, 2) the identification and development of non-regulatory, community-based partnerships to implement the strategies recommended in the sections below, and 3) where regulatory action is deemed necessary by the Board or other agencies to implement these strategies, the Air Quality Task Force recommends soliciting broad stakeholder input early in the development of the regulatory strategy. The use of community-based partnerships will allow the Louisville area to “get ahead of the curve” and control its own destiny.

Continue Current Policies, Voluntary Programs and Regulatory Programs to Limit Ozone Emissions.

1. All new major volatile organic compound (VOC) or nitrogen oxide (NO_x) sources locating in Kentucky are subject to the reasonably available control technology requirement as well as the best available control technology requirement of the Kentucky Division for Air Quality and the Louisville Metro Air Pollution Control District (APCD) Prevention of Significant Deterioration regulations.
2. All major modifications to existing major VOC or NO_x sources are subject to the reasonably available control technology requirement as well as the best available control technology requirement of the Kentucky Division for Air Quality and the Louisville Metro Air Pollution Control District (APCD) Prevention of Significant Deterioration regulations.
3. All new affected facilities with the potential to emit more than 5 tons per year of VOC are required to have best available control technology (Jefferson County - Regulation 7.25 *Standard of Performance for New Sources Using Volatile Organic Compounds.*)
4. Continuation of the rule effectiveness programs to enhance inspection of stationary sources to ensure emission control equipment is functioning properly and compliance is maintained (Jefferson County).
5. Requirement for Stage II Vapor Recovery, although the program could be modified to increase effectiveness. (Jefferson County).
6. Federal Motor Vehicle Control standards apply in Kentucky.
7. Reformulated Gasoline Phase II in effect since January 1, 2000.
8. Federal controls on the VOC content for architectural and maintenance

- paints, auto body shops, and consumer products.
9. Open burning restrictions during summer ozone season for Bullitt and Oldham Counties, as well as the year-round open burning restrictions in Jefferson County.
 10. Kentuckiana Air Education (KAIRE) Program public education activities.
 11. Lawn mower/small gasoline engine lawn equipment rebate program.

New Public Policy, Voluntary Programs and Regulatory Actions to Reduce Ozone Emissions.

In addition to current programs and policies, the Air Quality Task Force recognizes that there are significant voluntary steps that businesses, local government, and individuals can take to reduce ozone precursor emissions. It is the desire of the Air Quality Task Force that these partnerships fully involve all segments of our community in trying to maintain an adequate margin of safety to protect public health and the economic strength of the region. Furthermore, the Air Quality Task Force focused on efforts that not only reduce ozone precursors, but help in efforts to limit air toxics and fine particulate matter in the air.

Land use/ transportation policies

1. Increase infill development.
2. Develop strategies to promote more compact development patterns.
3. Encourage increased public transit opportunities as part of review of housing development.
4. In addition to reviewing transportation projects for carbon monoxide impacts, review for effects on ozone and fine particles.
5. State, regional and local transportation and air quality officials should continue to consider the air quality impacts of proposed transportation policies.
6. Develop strategies to reduce vehicle miles traveled (VMT) from all sectors of mobile source trips.

Mobile Source strategies

1. Encourage local businesses to upgrade fleet vehicles to hybrid vehicles or other vehicles using cleaner fuel.
2. Idling restrictions, especially diesel engine idling.
3. Increase number of truck docking facilities for powering electric compressors to replace use of diesel engines.
4. Diesel retrofit.

5. Speed limit enforcement.
6. Improved mass transit; increase ridership.
7. Increased outreach on preferential mobility choices - more fuel efficient vehicles, vehicle maintenance, biking.
8. Improve TRIMARC, incident management, roadside assistance.
9. Traffic light signalization improvements.
10. Free tire pressure station, free air, free on-board diagnostics checks, gas caps.

Area Sources

1. Railroads/railyards - cleaner switch engines; idling restrictions.
2. Airport measures—ground support equipment, gate electrification, single engine taxi.

Nonroad Sources

1. Diesel retrofit (construction equipment).

Stationary Sources

1. Offset lithography printing controls, process modifications, reformulated materials.
2. Plastic part coating controls, reformulated materials.

Other Strategies

1. Develop a “green star” program to recognize voluntary efforts by companies, agencies, organizations, and citizens to reduce ozone precursor emissions.
2. Increase opportunities for public outreach and education activities. Such activities should be undertaken by businesses and private organizations as well as by government agencies, and include information on available technologies and opportunities, such as building weatherization and energy audits.
3. Public outreach and education activities should be developed to target specific sectors (large businesses, small businesses, organizations, and citizens), addressing the role that each sector could play in implementing changes.
4. Government-provided incentives for business-, organization-, and citizen-implemented actions to reduce ozone precursor emissions, including tax credits and low-cost loans.

The Air Quality Task Force brought together diverse stakeholders from across the region. Together, they exhibited a strong, cohesive and continuous commitment to ensuring a safe and healthy community with opportunities for future economic growth. This broad-based, cooperative approach can be useful to the Board and the APCD as they work to create programs, implement limited regulations, and broaden public policies that will ensure clean air in this community.

In its work, the Air Quality Task Force learned that federal standards — while effective — encourage local jurisdictions to address air quality problems only on time scales that range from a few hours (e.g., smog alerts) to a few years (e.g., State Implementation Plans). Metropolitan areas, however, evolve on time scales of decades to centuries as roads and infrastructure are developed and as new technologies emerge. The Air Quality Task Force encourages a rigorous and evolving local effort — both public and private — to address transportation, energy and land use, demographics, economics, and public health on an ongoing basis in the years ahead.

Ozone and Health

The discussion of air quality and air pollution is a relatively modern one. Although there have been harmful substances in the air throughout history, the industrial revolution and the introduction of such modern technologies as coal-fired residential furnaces, industrial boilers, and steam locomotives caused significant changes in the air people breathed. The presence of fumes, odors, and dust in the air increased human illness and mortality. For about 100 years, modern societies have sought an appropriate relationship between human reliance on pollution-causing technologies and activities and the effects of that pollution on human health.

Louisville began addressing citizen concerns about air quality as early as the 1940s with the creation of the Louisville Smoke Commission. The federal government established the United States Environmental Protection Agency (EPA) in 1970 to regulate and control harmful substances in the nation's air. The federal Clean Air Act of 1970 required the EPA to establish National Ambient Air Quality Standards (NAAQS). Since that time, state and local governments across the country have been responding both to those federal standards and to their local communities' demands for cleaner air.

Long-term exposure to high levels of ozone in the air can very seriously damage the respiratory system – especially for the elderly, for children, and for those who are ill.

For 60 years, the Louisville Metro Air Pollution Control District (APCD), the successor agency to the Louisville Smoke Commission, has worked to improve air quality for the residents of Louisville. The APCD regulates the emissions of air pollutants into the outside (ambient) air. The APCD's charge is to monitor air quality in Jefferson County, track trends in the surrounding metropolitan area, ensure healthy air for breathing and help local industries and businesses meet local, state and national air emission standards.

When people in the Louisville area talk about "smog," they are generally referring to ground-level ozone, a main component of smog. Ground-level ozone arises from atmospheric reactions of NO_x and VOCs in the presence of solar ultraviolet radiation. In other words, on hot, sunny days the emissions and interaction of these two substances (VOCs and NO_x) create ozone.

For most people in Louisville, however, it is not the chemistry of ozone that is of interest. It is the way the presence of ground-level ozone in the air they breathe affects their health and the health of their children, parents, neighbors and friends.

Breathing air containing certain levels of ozone can damage the lungs. On days when the ozone level in the air is high, some people experience general irritation, coughing, or tightening in the chest. Some may find it less comfortable to breathe deeply. Many healthy people may find it more difficult to engage in vigorous activities. They may run through Louisville's parks on a sunny afternoon – but they may find it much harder to enjoy that activity.

There is evidence that high ozone exposure in active children – who generally breathe at a higher rate for their size relative to adults – may be related to the induction of asthma.

According to the health literature, ozone can inflame and damage the lining of the lungs in much the same way a sunburn inflames and damages human skin. Within a few days, the cells damaged by ozone are shed and replaced, like sunburned skin. If this happens repeatedly over months and years, the tissue of the lungs can become permanently scarred. Long-term exposure to high levels of ozone in the air can very seriously damage the respiratory system – especially for the elderly, for children and for those who are ill.

There is debate over the seriousness of the direct, adverse health effects of exposure to ground level ozone at levels that comply with the current EPA standard. Because of this community's concern about air quality and health, the Air Quality Task Force formed the Health Effects Committee to examine the available scientific information on ozone levels and associated illnesses. The Committee reviewed the findings of the EPA's Clean Air Scientific Advisory Committee's Ozone Review Panel as well as the California Air Resource Board's (CARB) *Review of the California Ambient Air Quality Standard for Ozone*.

The scientific literature reviewed by the EPA and CARB indicates that ozone exposure – even at the level currently allowed by the EPA — is associated with a number of adverse health effects. These include reduced lung function, increased respiratory symptoms, airway inflammation, increased hospital and emergency room use and increased school absences. There is evidence that high ozone exposure in active children – who generally breathe at a higher rate for their size relative to adults – may be related to the induction of asthma. Finally, the scientific literature shows increasing evidence that ozone is associated with premature death.

Economic Impact of Ozone Nonattainment Designation

The Air Quality Task Force was strongly encouraged that monitoring demonstrated that Louisville is now in attainment of the 8-hour ozone standard and that the Louisville area may now take the necessary steps to formally request the EPA redesignate the area as in attainment. The Air Quality Task Force also found that Louisville’s ozone level is better than all but one of the competitor cities recently evaluated (see Appendix IV Competitor City Evaluation). However, during most of its work, the Louisville area was still in nonattainment and the Air Quality Task Force spent considerable time discussing ways the Louisville area’s current nonattainment designation may affect the area’s ability to attract new businesses. In a report on the impact of the new 8-hour ozone standard implemented in 2001, Lloyd Cress—who is now the Commissioner for the Kentucky Department of Environmental Protection— noted “the designation of areas as nonattainment under the Clean Air Act has historically discouraged future economic growth in such areas.”

The Air Quality Task Force focused on the financial burden placed on local government and on business by the nonattainment designation. It also discussed the ways the designation may discourage new industry from locating to an area that may be required to enforce stricter regulations. The new source review requirements for areas which are designated nonattainment with ozone standards are stringent and expensive—and may discourage both modifications at existing industry and the introduction of new industry.

The Air Quality Task Force concluded that the Louisville area’s ozone nonattainment designation affects its ability to remain economically competitive.

The Air Quality Task Force concluded that the Louisville area’s ozone nonattainment designation affects its ability to remain economically competitive. Appendix IV provides information on the 8-hour ozone and fine particulate matter designations of Louisville and eight cities against which Louisville competes for attracting new businesses. The general consensus was that achieving attainment of the ozone standard – or better – was good for business in Louisville.

The Clean Air Act

The Clean Air Act is the federal law requiring the EPA to protect human health with an adequate margin of safety by setting National Ambient Air Quality Standards (NAAQS) . The EPA has promulgated NAAQS for particulate matter, ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead.

The Clean Air Act itself was significantly amended in 1970, 1977, and 1990 as scientific data about air pollution and human health grew and it became clear that previous approaches did not abate more pervasive air quality problems. The Air Quality Task Force studied the history and accomplishments of the Clean Air Act and of local government's efforts to meet federal air quality standards.

In 1997, in response to evidence that elevated levels of ground-level ozone in the air exposed people to potential respiratory illness and increased the vulnerability of the very young and elderly, the EPA revised the ozone standard. In 2001, the more stringent 8-hour ozone standard went into effect.

Before 1997, the EPA set standards for ozone averaged over one hour. That 1-hour standard allowed 124 parts of ozone per billion (or 0.12 ppm). The new standard is 84 parts per billion (or 0.08 ppm), averaged over eight hours. Compliance with the new standard is determined by monitoring data taken for three consecutive years. The design value, which is the average ozone concentration, over three consecutive years, of the fourth highest monitored daily 8-hour value for each year, is compared to the federal air quality standard.

Although the Clean Air Act is federal legislation, much of the work required by the Act falls to states and local governments. State and local authorities measure ambient ozone concentrations and submit the ozone measurements to the EPA. States and the EPA work together to then designate an area as attainment or nonattainment. All states develop a State Implementation Plan (SIP) to explain how the state will attain and maintain compliance with all of the air quality standards.

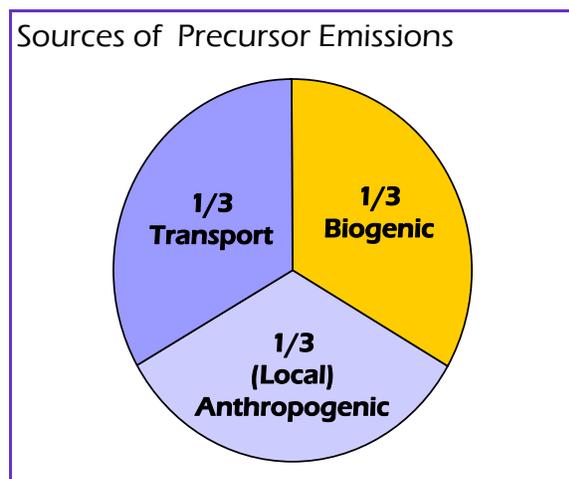
The Clean Air Act is the federal law requiring the EPA to protect human health with an adequate margin of safety by setting National Ambient Air Quality Standards.

Jefferson County formed the SIP Advisory Panel in early 1991 to broaden the community's understanding of the requirements of the Clean Air Act, build a consensus among the various segments of the community, provide input and advice during the SIP development process and foster a spirit of cooperation and willingness to work together to accomplish the requirements of the Clean Air Act. The SIP Advisory Panel also explored the prospect of balancing the need for economic development with the need to improve air quality to insure that the burden of control was spread equally across the community, that all parties had opportunity for comment and that the plan met the requirements of the Clean Air Act in the fairest possible manner for all interests in Jefferson County.

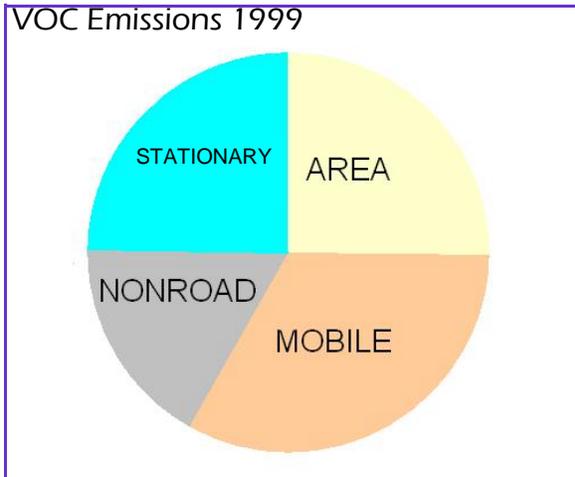
The recommendations from the Air Quality Task Force contained in this Report should be used to build on the work of the first SIP Advisory Panel and inform the Board of the community's current desire as the Board submits a State Implementation Plan demonstrating attainment.

Ozone and Air Quality in Louisville

Ozone is created when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) interact in the air on hot, sunny days. The Air Quality Task Force reviewed the four general ways that the ozone precursor emissions of NO_x and VOCs enter the atmosphere from human activity. Additionally, information was presented indicating that approximately one-third of the ozone precursor emissions in the Louisville area are from biogenic sources (trees, plants, grasses, etc.), one-third are transported from outside the area, and one-third are from local activity. The APCD provided the Air Quality Task Force with a detailed assessment of the Louisville area ozone precursor emission inventories, presenting the past (1990), present (1999), and future (2012). See Appendix II for 1999 emissions inventories. The 2003 emissions inventories are currently being prepared by the APCD, Kentucky Division for Air Quality, and the Indiana Department of Environmental Management.



Power plants, chemical plants, auto factories, appliance manufacturers, surface coating operations and fiberglass product manufacturers are examples of *stationary sources* of NO_x and VOCs. The Louisville Gas & Electric Mill Creek Generating Station, for example, is a stationary source that has recently achieved significant reductions in NO_x emissions (see Appendix II.)

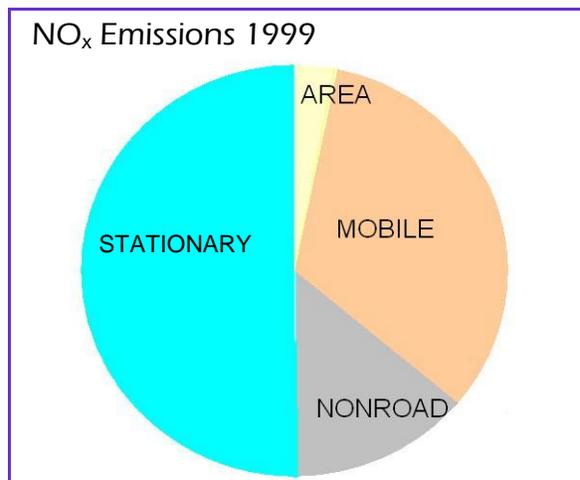


Cars, light duty trucks, sport utility vehicles (SUVs), motorcycles, heavy-duty trucks, and buses are *mobile sources* emitting NO_x and VOCs. The number of vehicle miles traveled (VMT) in any community contributes to mobile source emissions. The composition of gasoline used and the manufacturing of “cleaner” cars also directly influence the contribution of mobile source pollution.

There are *non-road sources* of these ozone precursor emissions, including industrial and agricultural equipment, construction equipment, off-road vehicles, airplanes, boats, trains, and lawn mowers. *Area sources* of emissions include gas stations, auto body repair shops, printers, the use of architectural coatings and paints, the use of commercial/consumer products, open burning, back yard barbecues and cigarette smoke.

Ground-level ozone is not only produced by human activities, however. Trees, grasses, and other plants are biogenic sources of VOCs. The concentration of ozone in the air in and around Louisville is very much a regional issue. Although NO_x and VOCs may be emitted more significantly in urban areas, winds can carry these air pollutants and the ozone they create on hot, sunny days hundreds of miles.

In fact, the presence of ozone in Louisville is affected by sources far from Louisville as well as sources located in the Louisville area. Although prevailing winds are from the south and west, on any given day the Louisville area may re-



ceive transported pollution from any direction. The Tennessee Valley Authority Paradise Plant, for example, lies to the southwest of Louisville and has been a significant source of transported NO_x. The emissions from the Louisville Gas & Electric power plants in Louisville, by the same token, affect the Louisville area as well as downwind areas.

The quest for clean air cannot be geographically confined. One-third of the emissions—the biogenic emissions— are not regulated, and one third of the emis-

The Health Effects Committee of the Air Quality Task Force found that available scientific research shows reductions of ozone below the current regulations may be advisable in order to provide a margin of safety that allows, and compensates for, scientific uncertainty, as well as the lack of precise predictions regarding the health impacts for air pollutants on many vulnerable populations

sions— those transported from outside the Louisville area— are addressed at the regional or national levels. Because we lack the ability to control transported and biogenic emissions, the Air Quality Task Force found that much of the work of protecting air quality in the Louisville area by the government is necessarily confined to the actions individuals, businesses and government can take to address the locally produced ozone precursor emissions.

Mayor Abramson formed the Air Quality Task force in 2003, when a

general expectation existed that the Louisville area may not meet the more stringent 8-hour ozone standard set by the EPA. The EPA designates an area as *nonattainment* if it has violated, or has contributed to a violation of, the national 8-hour ozone standard over a three-year period.

The new 8-hour ozone standard was established in 1997, but did not go into effect until 2001, when the Louisville area was designated as nonattainment. This designation required the APCD to work in cooperation with the states of Kentucky and Indiana to develop and implement control plans to reduce ozone-forming pollution.

Kentucky bases its recommendations for the Louisville area on air quality data collected by a regional network of monitors in Jefferson, Bullitt, and Oldham Counties in Kentucky and Clark and Floyd Counties in Indiana. The monitors in the Kentucky counties are operated from March 1 to October 31 each year; the monitors in the Indiana counties are operated from March 1 to September 30 each year.

The Air Quality Task Force met with John Lyons, Director of the Kentucky Division for Air Quality, to understand the implementation of the new 8-hour ozone standard and the recommended boundaries for the Louisville nonattainment area. It also heard from Janet McCabe, Assistant Commissioner of the Office of Air Quality, Indiana Department of Environmental Management, who discussed the 8-hour ozone and fine particulate matter monitoring data, emissions inventory and recommended designations for Indiana counties in the Louisville area.

The Air Quality Task Force focused on the health effects of ozone levels at and below the 8-hour standard. The Health Effects Committee of the Air Quality Task Force found that available scientific research shows that reductions of ozone below the current standards may be advisable to provide a margin of safety that allows, and compensates for, scientific uncertainty, as well as the lack of precise predictions regarding the health impacts for air pollutants on many vulnerable populations. Furthermore, the Air Quality Task Force concluded that there are real economic costs to a nonattainment designation.

In light of this, the Air Quality Task Force adopted the following recommendations:

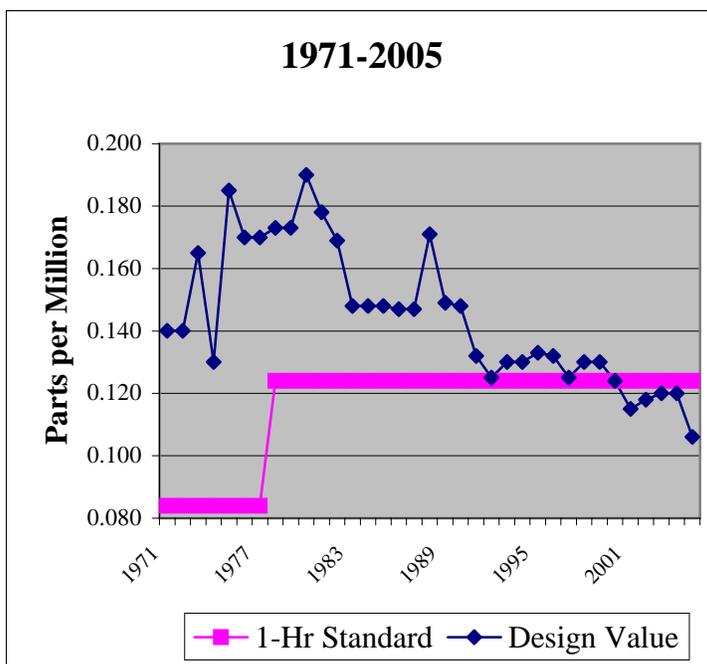
- 1) The Air Quality Task Force recognizes that the Louisville 8-hour nonattainment area is eligible for redesignation as being in attainment with the 8-hour ozone standard.
- 2) The Air Quality Task Force further recognizes that additional reductions below the current regulatory standard are advisable to provide a margin of safety that allows and compensates for scientific uncertainty, as well as the lack of precise predictions regarding the health impacts of air pollutants on a multiplicity of potentially susceptible subpopulations.
- 3) For these reasons, and to protect public health with an adequate margin of safety, the Air Quality Task Force recommends that the Air Pollution Control Board establish an ongoing and continuous process of review of all sources and categories of ozone precursor emissions, and develop and implement strategies to continue progress towards reduction in ambient concentrations of ozone and precursor pollutants. Strategies that also achieve lower emissions of fine particulates, fine particulate precursors or hazardous air pollutants should be prioritized.
- 4) Recognizing the regional nature of air quality in the Louisville area, the Air Quality Task Force recommends that the Air Pollution Control Board encourage the Kentucky Division for Air Quality and the Indiana Department of Environmental Management to take congruent and complimentary actions to reduce ambient concentrations of ozone and precursor pollutants.

Efforts to Limit Ozone Precursor Emissions in Louisville

For the last 30 years, the APCD has inspected, and enforced regulations applicable to, the stationary sources of air pollutants. These sources include the very large sources of air emissions such as utilities, chemical plants, refineries, and manufacturing industries. These also include area sources that are smaller businesses such as gas stations, dry cleaners and automotive body repair facilities. The APCD also oversaw the Vehicle Emissions Testing (VET) program which effected compliance with the carbon monoxide air quality standards and contributed to compliance of the 1-hour ozone standard. Local companies have also adopted new processes and employed new technologies to ensure that they emit less pollution

To increase its effectiveness in meeting air pollution standards – including

Historical 1-hour Ozone Design Values



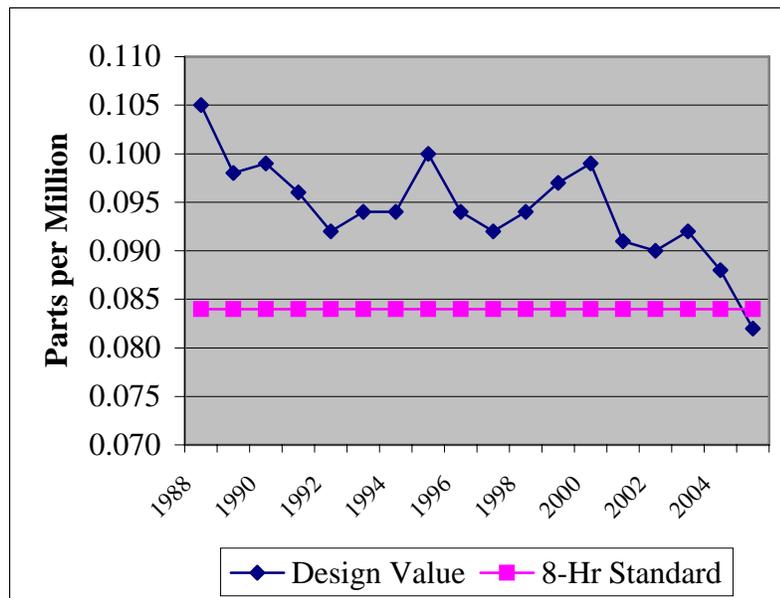
ozone — the APCD created the Environmental Programs unit in 1998 to focus on the very important and related areas of energy policies, transportation and mobile sources, land use, sustainable development, education and outreach and pollution prevention. These innovative programs have called on the broader community to engage in the work of limiting pollution and protecting the quality of life in the city.

The APCD has developed specific strategies and programs to address the relationship

between energy and air quality. These programs address energy efficiency, energy conservation, demand-side management and the promotion of renewable energy. Efforts over the past several years have included intervening in a Federal Energy Regulatory Commission (FERC) proceeding to support LG&E's efforts to re-license its hydroelectric facilities and to encourage further development of that capacity, sponsoring energy efficiency and lifestyle workshops, engaging in Energy Star promotions and ensuring energy-efficient design at the Clarksdale HOPE VI redevelopment project.

Because the community's transportation infrastructure and the vehicles that use it have a substantial impact on air quality, the APCD has focused on these areas as a core function of the agency. The APCD works with the regional metropolitan planning organization, Kentuckiana Regional Planning and Development Agency (KIPDA), to plan for the development of roads and transit, and to direct the ways federal and state funds are spent on this infrastructure. The APCD promotes the use of Intelligent Transportation Systems and advises local government on parking issues, congestion mitigation strategies and the transport of goods by freight and rail.

Historical 8-hour Ozone Design Values 1971–2005



Through its KAIRE network, the APCD advocates a range of transportation opportunities for Louisvillians, including non-motorized options such as bicycling and walking, more mass transit opportunities including carpooling and van pooling; the use of alternative fuels such as ethanol, propane and compressed natural gas; and alternative-

design vehicles such as hybrid gas/electric vehicles. The APCD has obtained several federal grants to develop education and outreach programs to encourage fuel efficiency, regular maintenance, adequate tire pressure, efficient trip planning and the avoidance of excessive idling. Involving citizens in these simple, voluntary measures has a real and positive impact on air quality in Louisville.

The way in which Louisville develops and uses its land resources has a substantial impact on the community's air quality. The APCD has expanded its focus to evaluate how the community's land use decisions affect a much broader range of air pollutants, including ozone, particulates, toxic air pollutants, odors and similar nuisances, and how land use policies interact with energy use, transportation infrastructure and mobile sources and sustainable development strategies.

For many years, the APCD has actively participated in the local land use planning and zoning process by evaluating more than 200 proposed developments annually for the potential impacts on carbon monoxide (CO) levels. The APCD

actively participated in the Cornerstone 2020 process to revise the Comprehensive Plan and in drafting the Land Development Code which most new development must follow. The District's Development Plan Review incorporates preliminary screening assessments, recommendations, mitigation measures and air quality analysis review for determining air quality impact with proposed planning and zoning development projects in the metropolitan area.

However, because many of the local sources of ozone precursor emissions have already been controlled, and because as much as one-third of ozone in the air in Louisville is actually transported here by winds, generally from the south and

In order to increase its effectiveness in meeting air pollution standards, the APCD created the Environmental Programs unit in 1998 to focus on the very important and related areas of energy policies, transportation and mobile sources, land use, sustainable development, education and outreach, and pollution prevention. These innovative programs have called on the broader community to engage in the work of limiting pollution and protecting the quality of life in the city.

west, much of the recent progress in reducing regional ozone has been the result of federal measures. In 1998, the EPA issued a rule that significantly reduced regional NO_x levels by reducing NO_x emissions from power plants and industrial combustion sources, introducing low-emission cars and trucks and using "cleaner" gasoline.

These initiatives have yielded significant results locally. For example, emissions from both of the LG&E power plants in Louisville and the Tennessee Valley Authority Paradise Power Plant have been substantially reduced.

In July 2004, APCD Director Art Williams announced to the Air Quality Task Force that there had been no exceedance of the 8-hour ozone standard, nor had the District called an Air Quality Alert (formerly Ozone Action Day), in 2004. In 2005, there were eight days on which at least one of the seven monitors in the Louisville area registered an exceedance of the 8-hour ozone standard. However, monitoring data indicate that the Louisville area met the 8-hour ozone standard for the 2002—2005 three-year period. This represents a significant accomplishment for the area and affords the opportunity to apply to the EPA for redesignation to attainment for the Louisville area.

Modeling performed by two regional organizations has corroborated the results of Louisville's ozone monitoring and indicates that the Louisville area will be in attainment of the 8-hour ozone standard by the 2009 deadline established by the

EPA. Following presentations made to the Air Quality Task Force by agency modeling experts, the Task Force appointing a Modeling Committee to review the reported modeling results.

In July, 2004, APCD Director Art Williams announced to the Air Quality Task Force that there had been no exceedance of the 8-hour ozone standard, nor had the District called an ozone-related Air Quality Alert, in 2004. This represents a significant accomplishment for the area and affords the opportunity to apply for redesignation as an attainment area.

Mark Derf, of the Indiana Department of Environmental Management (IDEM), made two presentations to the Air Quality Task Force. The first presentation, *Ozone Modeling for Southern Indiana/Louisville Area*, provided an overview of photochemical modeling of ozone emissions. The second presentation, *8-Hour Ozone Modeling Analyses Summary for Southern Indiana/Louisville Kentucky*, described the results of the photochemical modeling performed by the Lake Michigan Air Directors Consortium (LADCO).

The regional ozone modeling being performed by both the Association for Southeastern Integrated Planning

(ASIP) and LADCO takes into account reductions from various control measures, some required by the EPA and some required by the various State and local air pollution control agencies. Thus, "credit" for these measures, some with future compliance dates, is taken when modeling for future year ozone concentrations throughout the region. Both regional modeling groups are continuing to explore the effect of control measures beyond those already adopted and implemented, or those that have been adopted but not yet implemented. Appendix III shows a list of control measures identified and accounted for in the ASIP and LADCO modeling.

The Modeling Committee reviewed preliminary results from the LADCO regional modeling project and concluded that the continuation of current ozone reduction programs in the Louisville area and the implementation of the measures included in the regional modeling will result in an ozone design value below the EPA standard by 2009. Preliminary LADCO modeling results are attached to this report as Appendix VI.

Some members of the Air Quality Task Force urged a measure of caution when reviewing modeling projections. Nevertheless, while these modeling projects have not yet finalized model runs for formal SIP submittal, the preliminary modeling from both regional groups show that the Louisville area would attain

the 8-hour ozone standard by the 2009 deadline without implementation of any additional local strategies. These modeled results are corroborated by the monitored data showing that the Louisville area has attained compliance with the 8-hour ozone standard based on 2003-2005 data.

In addition to these measures, it is likely that implementation and compliance with the APCD's Strategic Toxic Air Reduction (STAR) Program will result in additional reductions of VOC emissions, which will potentially further reduce ozone in the Louisville area. However, the amount of reduction is not known at this time. The STAR program also requires a review of non-stationary sources of toxic air contaminants, with a report on recommendations due by June 30, 2006. Any additional strategies developed as a result of that review may further reduce ozone precursor emissions.

There are ozone reduction strategies already in the pipeline that may result in cleaner air in Louisville. Louisville Metro is engaged in ongoing, regional efforts to limit pollution – and benefits from the cooperation of neighboring counties. Oldham County, for example, recently withstood an effort to weaken the open burning laws in that county, thereby helping to protect regional air quality. NO_x emission reductions at power plants in Southern Indiana—Cinergy-Gibson (Gibson County), AEP-Rockport (Warrick County) and IPEL-Petersburg (Pike County) -- have contributed to reduced ozone levels in the Louisville area.

New Strategies to Reduce Ozone Emissions

The Air Quality Task Force represents the regional Louisville community and takes a broad perspective on protecting air quality in the region. Throughout their work, members expressed aspirations that went beyond simply attaining federal standards to control air quality in the short term. Instead, the Air Quality Task Force takes a long-range perspective and encourages efforts to harness the public will to improve air quality, protect the health of people in the region, and make Louisville an even better place to live and work.

The Air Quality Task Force recognizes that there are significant voluntary steps business, local government, and individuals can take to reduce ozone emissions.

The Air Quality Task Force recommends that the Air Pollution Control Board immediately apply for redesignation as an attainment area for the 8-hour ozone standard. All monitoring and modeling evidence indicates that the Louisville area is, and will remain, in attainment. At the same time, the Air Quality Task Force recognizes that maintaining air pollution levels below federal standards may prove to be the most prudent way to protect public health, especially since current research currently being analyzed by the EPA, and acted upon by CARB, justifies that peak and average exposure values below the current 8-hour standard (0.084 ppm) should be achieved and not exceeded.

The EPA recently urged states to consider scientific information on the photochemical reactivity of VOCs in the development of plans to meet the air quality standards for ozone. There are thousands of individual chemical species of VOCs that can react to form ozone. It is generally understood that not all VOCs contribute equally to ozone formation and accumulation.

Some VOCs react slowly and changes in their emissions have limited effect on local or regional ozone pollution episodes. Some VOCs form ozone more quickly, or they may degrade through a series of reactions that generate more ozone than the reaction pathways of other VOCs. Others not only form ozone themselves, but also enhance ozone formation from other VOCs. The photochemical reactivity of a compound is a measure of its potential to form ozone. By distinguishing between more reactive and less reactive VOCs, it should be possible to decrease ozone concentrations further or more efficiently than by controlling all VOCs equally.

However, the EPA cautions that discriminating between VOCs on the basis of their contributions to ozone formation, or reactivities, is not straightforward. Reactivity is not simply a property of the compound itself; it is a property of both the compound and the environment in which the compound is found. The meteorological conditions of any given day can direct the reactivity of any compound. On the other hand, there are several scientifically valid methods that can be used to develop reactivity scales, or weighting approaches, based on the relative reactivity of different VOCs, and there is a high correlation between these different methods.

To this end, the Air Quality Task Force reviewed the EPA's suggestions in developing control strategies to reduce ozone which include prioritizing control measures using reactivity metrics, targeting emissions of highly reactive VOC compounds with specific control measures, and encouraging VOC substitution and composition changes using reactivity weighted emission limits.

The Air Quality Task Force recognizes that there are significant voluntary steps that businesses, local government and individuals can take to reduce ozone emissions. The Air Quality Task Force was charged with reviewing mechanisms for reducing ozone levels, including vehicle buybacks, polluter hotlines, trip reductions, additional industrial efforts, idling controls, clean fleets, cleaner fuels, and bus retrofitting, among others. Furthermore, the Air Quality Task Force advises that efforts that affect two or more pollutants—for example, ozone, fine particles, and toxics — in a single strategy will be more effective over time.

The Air Quality Task Force proposes new strategies in two broad areas: continuation of current programs, policies and regulations; and implementation of new voluntary programs, public policies and appropriate regulations, if needed, in the areas of land use and transportation policies, mobile source reductions, area source reductions, non-road source reductions, and stationary source reductions. The implementation of additional emission reduction strategies requires some entity to be responsible for initiating necessary actions. The Air Quality Task Force recognizes that many, but not all, of the recommended strategies would be implemented by the APCD. As these recommended strategies are reviewed, express consideration should be given to the entity responsible for implementation.

The Air Quality Task Force takes a long-range perspective and encourages efforts to harness the public will to improve air quality, protect the health of people in the region and make Louisville an even better place to live and work.

As part of the review of the recommended strategies, the Air Quality Task Force suggests that the strategies be grouped by the most-likely implementing entity, and also separated into groups of short-term, medium-term, and long-term implementation measures.

Continuation of Current Programs

Many ongoing and successful programs to limit ozone and other pollutants have allowed the Louisville area to attain compliance with the 8-hour ozone standard. The Air Quality Task Force also recognizes the value of current programs including the rule effectiveness programs to enhance inspection of stationary sources to ensure emission control equipment is functioning properly and compliance is maintained, the federal Motor Vehicle Control standards which apply in Kentucky, the Reformulated Gasoline Phase II which has been in effect since January 1, 2000, and the federal controls on the VOC content for architectural and maintenance paints, auto body shops and consumer products. The current requirement for Stage II Vapor Recovery from stationary sources is valuable, but could be modified in the future to increase its effectiveness at reducing emissions. Regional, cooperative efforts, including the open burning restrictions during summer ozone season for Bullitt and Oldham Counties as well as the year-round open burning restrictions in Jefferson County should continue. Finally, current APCD programs, including the KAIRE Program public education activities and the lawn mower/small gasoline engine lawn equipment rebate program, should continue.

Another program worthy of note is the *Partnership for a Green City*, a joint program of Louisville Metro Government, Jefferson County Public Schools (JCPS), and the University of Louisville (UofL) designed to find ways to save resources and better protect the environment by working together. This program, based on the report, *The Partnership Project: The Partnership for a Green City*, produced by the three partners, lays out several goals for Louisville Metro Government, JCPS, and UofL to work together to save energy, better use the community's resources, and increase environmental education and awareness. The Air Quality Task Force recognizes that *The Partnership for A Green City* has potential to contribute strategies to reduce ozone precursor emissions as Louisville Metro government explores an expansion of the current recycling programs and the identification of cost savings through retrofitting of Metro Government buildings with energy-reducing materials.

The Air Quality Task Force also recommends consideration of the following new strategies to achieve an additional margin of safety for the health of all citizens of the Louisville area and provide opportunities for economic growth.

Land Use/ Transportation Policies

The Air Quality Task Force met with Dr. Michael Chang, Georgia Institute of Technology, Earth and Atmospheric Sciences Department, to understand more about how land use and transportation policies affect air quality. Dr. Chang's presentation, *Air Quality Strategies for the Future: Managing Complex Systems*, offered a provocative assessment of the difficulties of continuing to make progress in reducing ozone concentrations and the need for long-range planning, especially relating to land use and infrastructure.

Sprawling use of land encourages an increase in vehicle miles traveled and discourages non-polluting forms of travel (walking, bicycling).

Efforts of local government and the Planning Commission to encourage infill residential and commercial development and discourage sprawl are essential to addressing air quality. Sprawling use of land encourages an increase in vehicle miles traveled and discourages non-polluting forms of travel (walking, bicycling). Dr. Chang suggested that if new residential growth were designed as villages instead of the typical suburban

subdivisions, then residents would be able to change their transportation choices for work, shopping, and recreation. This would not only reduce air pollution but also encourage a healthier lifestyle. Air Quality Task Force members agreed that smaller communities could plan growth in a manner that would allow these communities to grow without becoming big cities with big transportation problems.

The use of public transportation and transportation funding also has a significant role in air quality control. Transportation planning which focuses solely on increasing roadways, rather than increasing public transportation, encourages vehicle use and vehicle pollution. Efforts to increase public transportation are essential – as are efforts to encourage individuals to use public transportation and to share transportation.

Dr. Chang shared information with the Air Quality Task Force about a program in Atlanta last year that paid \$3 per day for individuals to car-pool or take mass transit. In a follow up study, researchers found that

75% of people continued to take alternative transportation six months after they were no longer paid to do so. An additional study will track that rate after nine months. Dr. Chang suggested that another approach to increasing citizen actions is to create incentives for people to put in writing ways they will work to reduce pollution on ozone action days. Additionally, he noted that some companies found that their employees were more productive when the companies funded alternatives to their employees driving to work individually on ozone action days.

Strategies to use land more efficiently, reduce sprawl, gear new development toward the “village” model (currently underway at the new Norton Commons, for example), and strengthen and encourage use of public transportation must be developed to effectively reduce ozone and ozone precursor emissions in Louisville’s air. In addition to reviewing transportation projects for carbon monoxide impacts, local government should review these projects for effects on ozone and fine particles. Finally, it is important to have state, regional and local transportation and air quality officials consider the impact on air quality of all proposed transportation projects.

Mobile Source Strategies

The Air Quality Task Force encourages strategies to reduce mobile source emissions. Efforts as simple as speed limit enforcement and improvements to traffic signal systems by local government can be effective and inexpensive means of reducing not only ozone precursor emissions but also carbon monoxide emissions. The APCD should undertake an educational campaign to help individuals take very simple vehicle-related steps, such as maintaining tire pressure, checking the seal on gas caps, and withstanding the urge to “top off” when filling the gasoline tank. Local government may explore incentive programs to encourage regular vehicle maintenance.

Businesses and local government need to address the impact of fleet vehicles as well. Certainly, strategies that encourage fleet vehicle maintenance, that restrict idling, and that provide support for diesel retrofitting of fleet vehicles should be explored. Businesses and local government should work together to increase the number of docking facilities for powering electric compressors to replace the use of diesel engines. Local government also may develop incentives to encourage new fleet vehicles that burn cleaner fuel or use hybrid technology to reduce emissions.

Finally, there should be an ongoing education/incentive campaign to encourage the use of public transportation. The partnership between Louisville Metro government and the Transit Authority of River City (TARC) is a successful example of this effort. Louisville Metro employees are able to ride TARC at no cost when they show their Metro identification card. Louisville Metro subsidizes this cost because it furthers the clean air goals of this community. Major employers along main transportation corridors and in the Central Business District should be encouraged to implement similar programs.

Area Source Strategies

The APCD has explored specific strategies to reduce area sources of pollution. The Air Quality Task Force encourages increased efforts to work with railways and the Louisville International Airport to limit ozone precursor emissions. These strategies may include working with railroads to encourage or create incentives for the use of cleaner switch engines and to enforce idling restrictions. The Louisville International Airport has been successful at developing a comprehensive emissions inventory in its efforts to identify opportunities to reduce emissions, and in this way provides a best practice for other businesses to follow. For several years, the APCD has encouraged the airport to require single-engine taxi of aircraft. This measure, in combination with gate electrification and ground support equipment that burns cleaner fuel could have a real impact on emissions.

Non-Road Source Strategies

Ozone precursor emissions from industrial and agricultural equipment, construction equipment, off-road vehicles, boats, trains, and lawn mowers might be addressed by both education and innovation. Businesses should be encouraged to retrofit diesel-powered construction equipment. Through the KAIRE program, the APCD should continue to offer incentives to individuals who switch from gas-powered lawn mowers and other landscape maintenance equipment to manual or electric lawn mowers and equipment.

Stationary Source Strategies

Recent federal measures have had a significant impact on stationary sources of ozone precursor emissions. LG&E, for example, has shown significant reduction in emissions – as has the Tennessee Valley Authority Paradise power plant. The APCD Board should work with industry,

Greater Louisville, Inc., business associations and other stakeholders to consider requiring the use of available offset lithography printing controls, process modifications, and the use of reformulated materials in order to reduce emissions in the printing industry and VOC emission standards from plastic part coating operations.

Other Strategies

The Air Quality Task Force strongly advises a continuing program of education targeted to individuals as well as specific business sectors addressing their contributions to ozone-forming emissions and their roles in addressing the problem. The APCD and government should investigate the development of incentives, including tax credits, loans, and access to available technologies, that will encourage individuals and businesses to take responsibility for reducing emissions. These incentives also might include a “green star” program to recognize voluntary efforts by companies, agencies, organizations, and citizens to reduce ozone precursor emissions.

The Air Quality Task Force recommends that, in identifying and developing these regulatory programs and partnerships, the Board continue to solicit community input regarding which strategies may result in improvements to air quality. The Air Quality Task Force is confident that by continuing the current programs, which have allowed Louisville to attain compliance with the 8-hour ozone standard, and by working together to identify and develop additional ozone reductions, this community will be able to control its own destiny. This approach will allow us to create an additional adequate margin of safety, taking into account the health of all citizens and providing opportunities for economic growth.

In its work, the Air Quality Task Force learned that federal standards — while effective — encourage local jurisdictions to address air quality problems only on time scales that range from a few hours (e.g., smog alerts) to a few years (e.g., State Implementation Plans). Metropolitan areas, however, evolve on time scales of decades to centuries as roads and infrastructure are developed and as new technologies emerge. The Air Quality Task Force encourages a rigorous and evolving local effort — both public and private — to address transportation, energy and land use, demographics, economics, and public health on an ongoing basis in the years ahead.

Appendix I – Members of the Air Quality Task Force

We gratefully acknowledge the members of the Air Quality Task Force, whose work resulted in this report to Mayor Abramson and the Air Pollution Control District Board. We also thank the staff of the Air Pollution Control District, and the many professionals and field experts who provide presentations and information to the Air Quality Task Force. Finally, we thank Jane Walsh who worked with the Air Quality Task Force to write this report.

Chair - C. Bruce Traugher, Cabinet for Community Development

Leslie Barras, River Fields

Graham Baughman, Thornton Oil

Christy Brown, Louisville Stoneware

Bill Conway, Louisville Coalition of Neighborhoods

Tim Corrigan, Greater Louisville, Inc.

Tom FitzGerald, Kentucky Resources Council

Arnita Gadson, West Jeff. Co. Community Task Force

Charles Garmon, Wooded Glen Retreat and Conference Center

Tim Hagerty, Frost Brown Todd

Dennis Karl, Ford Motor Company

Judge Mary Ellen Kinser, Oldham County Judge-Executive

Dewey McClearn, Representing Bullitt Co. Judge-Executive

Reginald Meeks, KY State Representative

Pat Moran, Stites & Harbison

Larry Palmer, University of Louisville

Suzy Post, Metropolitan Housing Coalition

Dr. Robert Powell, Norton Healthcare

Jack Ragland, Southern Indiana Economic Development

Bill Samuels, Maker's Mark

George Siemens, Louisville Gas & Electric

Councilwoman Mary Woolridge, 3rd District

Appendix II
1999 Emissions Inventories for the Kentucky portion of the
Louisville 1-hour ozone area

Area	Source Category	VOC tpsd	NO _x tpsd	CO tpsd
Jefferson County	Point – Actual	31.32	116.74	13.13
	Point – ERCs	9.78	0.00	0.00
	Area	17.18	0.75	1.25
	Mobile	38.12	69.15	238.11
	Nonroad	13.03	18.40	65.21
	Total		109.43	205.04
Nonattainment portion of Bullitt County	Point	0.17	0.01	0.00
	Area	0.93	0.03	0.34
	Mobile	1.66	2.48	10.15
	Nonroad	1.06	0.78	5.71
	Total	3.82	3.30	16.20
Nonattainment portion of Oldham County	Point	0.03	0.11	0.05
	Area	0.83	0.03	0.38
	Mobile	1.35	1.97	8.44
	Nonroad	0.98	0.77	5.24
	Total	3.19	2.88	14.11
Total for KY portion of Louisville 1-hr O ₃ nonattainment area	Point	41.30	116.86	13.18
	Area	18.94	0.81	1.97
	Mobile	41.13	73.60	256.70
	Nonroad	15.07	19.95	76.16
	Total	116.44	211.22	348.01

Appendix III – Modeling Control Measures

Below is a list of the control measures identified and accounted for in the ASIP modeling:

VISTAS Base Case(s) Defined

2009/2018 Projection Year Cut-off of July 1, 2004 for Adoption

- Atlanta / Northern Kentucky / Birmingham 1-hr SIPs
- Gulf Power (Crist 7) SCR application
- Heavy Duty Diesel (2007) Engine Standard
- Industrial Boiler/Process Heater/RICE MACT
- Large Spark Ignition and Recreational Vehicle Rule
- NC Clean Smokestacks Act
- Nonroad Diesel Rule
- NO_x RACT in 1-hr NAA SIPs
- NO_x SIP Call (Phase I- except where states have adopted II already e.g. NC)
- Petroleum Refinery Initiative (October 1, 2003 notice; MS & WV)
- RFP 3% Plans where in place for one hour plans
- TECO & VEPCO Consent Agreements
- Tier 2 Tailpipe
- Title IV for Phase I and II EGUs
- VOC 2-, 4-, 7-, and 10-year MACT Standards
- Combustion Turbine MACT
- NO_x SIP Call (Phase II – remaining States & IC engines)
- Clean Air Interstate Rule (CAIR)
- Clean Air Mercury Rule (CAMR)

LADCO modeling identified and accounted for the following control measures:

Off-Highway Mobile Sources

- Tier II/Low sulfur fuel
- Inspection/maintenance programs (nonattainment areas)
- Reformulated gasoline

Off Highway Mobile Sources

- Federal control programs incorporated into NONROAD model (e.g. non-road diesel rule), plus evaporative Large Spark Ignition and Recreational Vehicle Standards

- Federal railroad/locomotive standards
- Federal commercial marine vessel engine standards

Power Plants

- Title IV (Phases I and II)
- NO_x SIP Call
- Clean Air Interstate Rule

Other Point Sources

- VOC 2-, 4-, 7-, and 10-year MACT standards
- *Combustion turbine MACT*
- *Industrial boiler/process heater/RICE MACT*

Appendix IV – Competitor City Evaluation

The following provides information on the 8-hour ozone and PM_{2.5} designations of Louisville and eight cities against which Louisville competes for attracting new businesses. In addition to the original designations, the current status with respect to compliance with these federal standards is listed along with the approximate design value for the 2003-2005 three-year period. The design value is a calculated number, based on monitoring data, that can be used to compare the area's air quality to a federal standard. The 8-hour ozone standard is 0.084 parts per million. The annual PM_{2.5} standard is 15.0 micrograms per cubic meter.

CITY (MSA)	2000 Population	8-hr Ozone Designation Status (Effective 06/15/2004)	Design Value (2003-2005)	Request for Redesignation	PM _{2.5} Designation Status (Effective 04/15/2005)	Design Value (2003-2005)
Birmingham	805,340	Non-attainment (Basic)	0.084	Draft filed	Non-attainment	~16.8
Cincinnati	1,891,518	Non-attainment (Basic)	0.089	No	Non-attainment	~16.1
Columbus	1,541,930	Non-attainment (Basic)	0.088	No	Non-attainment	~17.8
Indianapolis	1,607,486	Non-attainment (Basic)	0.092	No	Non-attainment	~16.6
Jacksonville	~1,056,000	Attainment	-	-	Attainment	-
Louisville	968,313	Non-attainment (Basic)	0.081	To be filed	Non-attainment	~15.8
Memphis	948,338	Non-attainment Marginal	0.086	No	Attainment	-
Milwaukee	1,839,149	Non-attainment Moderate	0.088	No	Attainment	-
Nashville	1,097,810	Non-attainment Subpart 1 - EAC*	0.082	EAC	Attainment	-

*EAC – Early Action Compact, effective date deferral 09/30/2000

Appendix V

Health Effects at the Federal 8-Hour Ozone Standard Report and Recommendation

Whereas, the Health Effects Committee of the Air Quality Task Force has received and reviewed a substantial body of evidence relating to the adverse health effects of ozone, and finds as follows:

1. The potential adverse health impacts of exposure to ozone air pollution are significant and include reduced pulmonary function, increased respiratory symptoms, airway hyperreactivity and airway inflammation, in addition to premature mortality, increased hospital admissions for cardio-pulmonary causes, and exacerbation of bronchitis, asthma, and respiratory symptoms. The groups most at risk of experiencing adverse responses include children and adults who are active outdoors, and outdoor workers.
2. Controlled human exposure studies demonstrating decrements in pulmonary function, increased respiratory symptoms, increased airway reactivity and induction of airways inflammation in healthy and asthmatic adults exposed for 6.6 to 8 hours to 0.08 parts per million (ppm) ozone, suggest that the current U.S. Environmental Protection Agency 8-hour standard for ozone is not protective of human health with an adequate margin of safety, and that peak and average exposure values below the current 8-hour standard (0.084 ppm) should be achieved and not be exceeded.
3. The health benefits of reducing ozone from current levels to the adopted California standards for ozone (0.070 ppm 8-hour, 0.09 1-hour) are substantial, including reductions in premature deaths; reduced hospitalizations related to chronic obstructive pulmonary disease, cardiovascular disease, and other respiratory diseases, including bronchitis, and asthma; and reduction in statewide school absenteeism.

Therefore, it is recommended that the full Air Quality Task Force make this recommendation to the Air Pollution Control Board and to the legislative and executive branches of Metro Government:

1. The Air Quality Task Force recognizes that the Louisville 8-hour ozone nonattainment area is eligible for redesignation as being in attainment with the 8-hour ozone standard.
2. The Air Quality Task Force further recognizes that additional reductions below the current regulatory standard are both necessary and advisable

to provide a margin of safety that allows for, and compensates for, scientific uncertainty, as well as the lack of precise predictions regarding the health impacts of air pollutants on a multiplicity of potentially susceptible subpopulations.

3. For these reasons, and to protect public health with an adequate margin of safety, the Air Quality Task Force recommends that the Air Pollution Control Board establish an ongoing and continuous process of review of all sources and categories of ozone precursor emissions, and develop and implement policies, practices, and standards to continue progress towards reduction in ambient concentrations of ozone and precursor pollutants. In the development of such policies, practices, and standards, strategies that also achieve lower emissions of fine particulates, fine particulate precursors, or hazardous air pollutants should be prioritized.
4. Recognizing the regional nature of air quality in the Louisville area, the Air Quality Task Force recommends that the Air Pollution Control Board encourage the Kentucky Division for Air Quality and the Indiana Department of Environmental Management to take congruent and complementary actions to reduce ambient concentrations of ozone and precursor pollutants.
5. The Air Quality Task Force further advises that it has begun a process of reviewing and refining a list of strategies to achieve such additional reductions or to moderate growth in precursor emissions and to identify those areas in which reductions achieving multiple public health and air quality improvement endpoints are possible.

Appendix VI Preliminary LADCO Modeling Results

Attainment Test: 8hr Ozone (ppb)
 Base:basel2c_02summer and Future: 12009R2S 02summer
 Summer 2002: June 10 to Aug 30
 CAMx4.11s_mods: upmw grid at 12km

								sen1	sen2	sen3	sen4	sen5	sen6		
								2009	2009	25%	50%	25%	25%	50%	50%
								base	CAIR	VOC	VOC	VOC/ NOx	NOx	NOx	VOC/ NOx
Monitor	ST	County	00_02	01_03	02_04	AVGD V	FY_D V	FY_D V	FY_D V	FY_D V	FY_D V	FY_D V	FY_D V	FY_D V	
2101500031	KY	Boone	86	85	80	83.7	75.6	75.4	75	74.6	73.1	73.5	70.7	70.2	
2101900171	KY	Boyd	0	86	86	86	71.2	70.9	70.8	70.7	69.2	69.3	67.4	67.2	
2102900061	KY	Bullitt	85	81	76	80.7	72.9	72.7	72.4	72.1	71.5	71.8	70.6	70.1	
2103700031	KY	Campbell	94	91	87	90.7	85.5	84.9	84.3	83.6	82.6	83.2	80	79.1	
2104305001	KY	Carter	80	78	73	77	63.5	63.2	63.1	63	61.7	61.8	60.2	60.1	
2105900051	KY	Daviess	77	76	73	75.3	64.3	64.1	64.1	64	62.4	62.5	60.6	60.5	
2106105011	KY	Edmon- son	84	80	77	80.3	70.2	70	70	69.9	69.4	69.5	68.8	68.7	
2106700011	KY	Fayette	69	73	72	71.3	64.2	64	63.9	63.7	63.1	63.2	62.3	62.2	
2106700121	KY	Fayette	78	76	71	75	67.5	67.2	67.1	67	66.4	66.5	65.5	65.4	
2108900071	KY	Greenup	83	83	78	81.3	67.7	67.4	67.3	67.2	65.6	65.7	63.7	63.6	
2109100121	KY	Hancock	83	82	80	81.7	69.5	69.3	69.2	69.2	67	67	64.5	64.4	
2109300061	KY	Hardin	81	79	75	78.3	68.5	68.3	68.2	68.1	67.1	67.2	66	65.8	
2110100141	KY	Hender- son	79	79	78	78.7	67	66.9	66.8	66.7	64.8	64.9	62.5	62.4	
2111100271	KY	Jefferson	85	79	75	79.7	73.5	73.2	72.8	72.4	72.2	72.6	71.5	70.8	
2111100511	KY	Jefferson	84	84	80	82.7	75.1	74.9	74.5	74.2	73.6	73.9	72.6	72	
2111110211	KY	Jefferson	83	79	76	79.3	72.6	72.3	71.9	71.5	70.9	71.3	69.9	69.2	
2111300011	KY	Jessa- mine	79	77	73	76.3	69	68.7	68.6	68.4	67.7	67.8	66.8	66.7	
2111700071	KY	Kenton	88	85	82	85	80	79.5	78.8	78.2	77.7	78.2	75.8	74.9	
2113900031	KY	Livingsto	84	84	80	82.7	70.3	70.2	70.1	70	68.6	68.6	66.9	66.8	
2114510241	KY	McCrack- en	82	79	76	79	68.7	68.5	68.5	68.4	67	67.1	65.3	65.2	
2114900011	KY	McLean	84	82	80	82	70.1	69.8	69.7	69.6	68.2	68.3	66.6	66.5	
2118500041	KY	Oldham	87	86	83	85.3	76.9	76.6	76.3	76	74.8	75.1	73.2	72.7	
2119300031	KY	Perry	0	76	75	75.5	66.3	66.1	66	66	65.6	65.6	65.1	65	
2119500021	KY	Pike	78	73	69	73.3	61.6	61.5	61.4	61.3	60.4	60.5	59.4	59.3	
2119900031	KY	Pulaski	81	77	74	77.3	69.1	68.5	68.5	68.4	67.8	67.8	67	66.9	
2120900011	KY	Scott	70	69	66	68.3	60.2	60	59.9	59.8	58.8	58.8	57.5	57.3	
2122700081	KY	Warren	86	82	78	82	71.3	71.1	71.1	71	70.6	70.6	70.1	70.1	