

# Fine Particle Air Quality Task Force Report and Plan of Action

January 16, 2008



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# Fine Particle Air Quality Task Force Report and Plan of Action

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## Executive Summary

Fine particulate matter (PM<sub>2.5</sub>), a subset of inhalable particulate matter, is a mixture of solid particles and liquid droplets with diameters of 2.5 micrometers (µm) or less (for reference, the average human hair is about 70 µm in diameter – 30 times larger than the largest fine particle). PM<sub>2.5</sub> is regulated as a criteria pollutant under the Clean Air Act. The federal primary annual standard for PM<sub>2.5</sub> is 15 micrograms per cubic meter (µg/m<sup>3</sup>).

In April 2005, Jefferson and Bullitt Counties in Kentucky, and Clark, Floyd and portions of Jefferson County in Indiana, were designated nonattainment for the annual PM<sub>2.5</sub> standard. Under federal law, Indiana and Kentucky are required to develop State Implementation Plan revisions (SIPs) due in April 2008, that outline how the Louisville nonattainment area will meet the annual PM<sub>2.5</sub> standard by April 2010. There are many requirements for SIPs, such as identifying reasonably available control technologies and measures (RACT/RACM) for major sources and performing air quality modeling to demonstrate attainment of the annual standard. In addition to targeting PM<sub>2.5</sub> control measures, states are also required to address controls for PM<sub>2.5</sub> precursor emissions, such as sulfur dioxide and oxides of nitrogen that, under certain conditions, can lead to the formation of PM<sub>2.5</sub> in the air.

In April 2007, the Fine Particle Air Quality Task Force (Task Force) was created by Mayor Jerry Abramson to identify, evaluate and recommend strategies for reducing PM<sub>2.5</sub> to achieve the annual PM<sub>2.5</sub> standard. The Louisville Metro Air Pollution Control District (District) invited business leaders, environmental and health advocates, health professionals, neighborhood representatives and regional and local government representatives to participate in the Task Force.

The Task Force formed working committees to perform central tasks such as: the characterization of PM<sub>2.5</sub> pollution and its related health effects, collection and analysis of historical and projected air quality data, identification of major sources of PM<sub>2.5</sub> and precursor emissions and strategies to reduce these emissions. As part of the development of such strategies, the committees of the Task Force compiled and synthesized information that may be used by the District in development of the SIP, such as an assessment of control measures to support the RACT/RACM analysis and modeling data to be included in the attainment demonstration.

Committee reports and recommendations are included in Section 4 (Health Committee), Section 5 (Emissions Inventory and Modeling Data Committee), Section 6 (Stationary and Area Source Committee), Section 7 (Mobile and Nonroad Mobile Source Committee) and Section 8 (Report and Plan of Action Committee). These efforts served as the basis for building consensus on final Task Force recommendations.

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Section 9 (Plan of Action) includes 63 Task Force recommendations aimed at reducing PM<sub>2.5</sub> and precursor pollution from a variety of sources. These recommendations cover a broad combination of strategies that can be accomplished through local, state and regional efforts. Eight of the 63 were selected as leading recommendations, or strategies, that the Task Force deemed as implementation priorities. Leading strategies include aggressive retrofit and replacement of onroad and nonroad diesel fleets, local adoption of onroad and nonroad idling regulations and enactment of local ordinances to prohibit open burning. Other leading strategies will require collaborative efforts, such as the District working with Kentucky and Indiana to reduce PM<sub>2.5</sub> precursor emissions from major regional sources within 150 miles and working with local and regional planning agencies to expand the evaluation of development plan and subdivision proposals for air quality impacts.

This *Report and Plan of Action* is the result of the collaborative efforts of Task Force members. The Task Force recognized that regional modeling groups project the Louisville nonattainment area to achieve the annual PM<sub>2.5</sub> standard by the 2010 attainment deadline with existing and planned controls from various programs, such as the Clean Air Interstate Rule (CAIR). The Task Force also recognized the need to reduce levels of PM<sub>2.5</sub> below the annual standard to protect public health with an adequate margin of safety. This will require ongoing and continuous review of all sources of PM<sub>2.5</sub> and precursor emissions. Considering the potential for significant reductions to ambient concentrations of PM<sub>2.5</sub> from CAIR and other federal programs, the Task Force agreed to reconvene in 2010, after implementation of Phase I of CAIR, to review available monitoring data, modeling results and health studies and determine whether additional actions are advisable for the continuous improvement of air quality.

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## Section 1 Introduction

### 1.1 Definition of Fine Particulate Matter and its Precursors

According to the United States Environmental Protection Agency (EPA)<sup>1</sup>, particle pollution, also called particulate matter (PM), is a mixture of solid particles and liquid droplets found in the air. PM comes in many sizes and shapes and may contain many different chemicals. Particles are generally classified by their diameter, which is measured in micrometers ( $\mu\text{m}$ ). The categories of PM are provided in Table 1-1. EPA monitors and regulates ambient concentrations of inhalable particles ( $\text{PM}_{10}$ ) and fine particles ( $\text{PM}_{2.5}$ ).

**Table 1-1. Categories of Particulate Matter**

Particle Category	Diameter ( $\mu\text{m}$ )
Inhalable ( $\text{PM}_{10}$ )	$\leq 10$
Coarse ( $\text{PM}_{10-2.5}$ )	10 to 2.5
Fine ( $\text{PM}_{2.5}$ )	$\leq 2.5$
Ultrafine ( $\text{PM}_{0.1}$ )	$\leq 0.1$

Fine particles can be emitted directly by a source and may include organic carbon (OC), elemental carbon (EC) and crustal material (e.g. dust, sea salt, metals and other trace elements). This pollution is referred to in this Report and Plan of Action (Report) as *direct PM<sub>2.5</sub>*. Fine particles can also be formed through chemical reactions of gaseous precursors in the atmosphere (e.g. ammonium nitrate and ammonium sulfate). Precursors include sulfur dioxide ( $\text{SO}_2$ ), oxides of nitrogen ( $\text{NO}_x$ ), volatile organic compounds (VOCs) and ammonia ( $\text{NH}_3$ ). In the Louisville nonattainment area, EPA has identified  $\text{SO}_2$  and  $\text{NO}_x$  as significant precursors contributing to the monitored ambient concentration of  $\text{PM}_{2.5}$ . These two pollutants are collectively referred to as *precursors* in this Report. VOCs and  $\text{NH}_3$  do not significantly contribute to the formation of  $\text{PM}_{2.5}$  in this area.

The health effects associated with exposure to  $\text{PM}_{2.5}$  can be considerable. Particles less than or equal to 2.5  $\mu\text{m}$  in diameter can be inhaled deep into the lungs and some may enter the bloodstream. Long-term exposure to  $\text{PM}_{2.5}$  has been associated with adverse health effects such as decreased lung function, development of chronic bronchitis and premature death. Short-term exposure (i.e. hours or days) to  $\text{PM}_{2.5}$  has been associated with a range of effects, including decreased lung function, increased respiratory symptoms, cardiac arrhythmias, heart attacks, emergency room visits for heart or lung disease and premature death. Although fine particles affect the general population to some degree, older adults, individuals with heart or lung disease and children are particularly sensitive to  $\text{PM}_{2.5}$  exposure.

<sup>1</sup> A list of acronyms and abbreviations is included in Appendix 1.

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## 1.2 History of National Ambient Air Quality Standards for PM

On July 18, 1997, EPA announced new National Ambient Air Quality Standards (NAAQS) for PM. EPA revised the primary, or health-based, PM standards by setting a new annual standard for PM<sub>2.5</sub> of 15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and a new 24-hour PM<sub>2.5</sub> standard of 65  $\mu\text{g}/\text{m}^3$ . The PM<sub>10</sub> standards were also revised and monitoring requirements were issued using new federal reference methods.

A number of events delayed the implementation of the 1997 PM NAAQS:

- In 1998, the Transportation Equity Act for the 21<sup>st</sup> Century revised the deadline for publishing nonattainment designations to provide additional time to collect three years of air quality monitoring data.
- In 1999, the 1997 PM NAAQS were challenged in court by the American Trucking Association, the U.S. Chamber of Commerce and other state and business groups.
- In 2001, the Supreme Court upheld EPA's authority under the Clean Air Act (CAA) to set NAAQS that protect the American public from harmful effects of air pollution. The Supreme Court also sent the case back to the D.C. Circuit Court of Appeals to resolve several additional issues.
- In 2002, the D.C. Circuit Court rejected all remaining legal challenges to EPA's 1997 PM NAAQS.

Early in 2003, EPA provided guidance to states<sup>2</sup> for recommending nonattainment area boundaries for the annual PM<sub>2.5</sub> standard. Consistent with the CAA, the guidance gave states the following instruction:

- Begin analysis of attainment and nonattainment area boundaries based on the boundaries of metropolitan areas.
- Include nearby counties with sources of direct PM<sub>2.5</sub> and precursor emissions in a metropolitan area's nonattainment area.
- Give consideration to the use of common boundaries for areas to be designated nonattainment for PM<sub>2.5</sub> and 8-hour ozone to help coordinate future planning and implementation activities.
- Give consideration to population density, traffic and commuting patterns, commercial development and area growth when areas are recommended for attainment and nonattainment designation.

In mid-February 2004, states recommended areas to be designated nonattainment for the annual PM<sub>2.5</sub> standard by EPA. After assessing three years of monitoring data from 2001 to 2003, EPA designated areas not meeting the annual PM<sub>2.5</sub> standard. The nonattainment designations became effective on April 5, 2005 for 39 metropolitan areas, affecting a population of approximately 88 million across 208 counties in the United States. The area that includes Jefferson and Bullitt Counties in Kentucky, and Clark, Floyd and portions

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<sup>2</sup> Throughout this Report, "states" is used to reference any jurisdiction with appropriate authority.

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of Jefferson County in Indiana, was designated nonattainment (Louisville nonattainment area). This designation plays an important role in letting the public know whether air quality in their area is healthy and becomes an important component of state, local and tribal governments' efforts to reduce fine particle pollution.

On October 17, 2006, EPA published revised PM NAAQS that significantly strengthened the 24-hour PM<sub>2.5</sub> standard from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> while retaining the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup>. In EPA's judgment, the revised 24-hour standard provided adequate protection from short-term exposure to PM<sub>2.5</sub>.

The federal government has made the reduction of PM<sub>2.5</sub> a critical element of a comprehensive national clean air strategy. This strategy includes EPA's recent National Clean Diesel Campaign to reduce pollution from diesel engines and the Clean Air Visibility Rule and Clean Air Interstate Rule (CAIR) to reduce pollution from power plants in the eastern U.S. These initiatives are important components of EPA's efforts to help states and localities meet the more protective PM<sub>2.5</sub> NAAQS through a largely regional approach.

### 1.3 Overview of SIP Requirements

By law, Indiana and Kentucky are subject to a number of requirements to reduce PM<sub>2.5</sub>, including submittal of State Implementation Plan revisions (SIPs), which outline how nonattainment areas, including the Louisville nonattainment area, will meet the annual PM<sub>2.5</sub> standard. The SIP submission deadline is April 5, 2008, three years from the date of designation, as required by the CAA.

On April 25, 2007, EPA published the [Clean Air Fine Particle Implementation Rule](#)<sup>3</sup> (Implementation Rule), which describes the CAA framework and requirements that state, local and tribal governments must meet in developing their PM<sub>2.5</sub> SIPs. For areas designated as nonattainment, states are required to attain the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup> by April 2010, five years from the date of designation. As part of the SIP, states may propose an attainment date extension of up to five years. Those areas for which EPA approves an extension must achieve compliance as soon as possible, but no later than 2015. The [Implementation Rule](#) does not specifically address implementation of the 24-hour standard, revised in 2006.

In compliance with [40 CFR 51](#) (sections numbers included below for reference), PM<sub>2.5</sub> SIPs must include the following components:

**Attainment demonstration and modeling requirements (§51.1007)** – States are required to submit attainment demonstrations consisting of:

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<sup>3</sup> Throughout this Report, underlined text indicates a link to related websites or documents. Links can be accessed in an electronic version of this Report available at <http://www.louisvilleky.gov/APCD/TaskForce/>. A detailed list of links to documents reviewed by the Task Force and committees can also be found there.

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- Technical analyses that locate, identify and quantify sources of emissions contributing to nonattainment of the standard.
- Analyses of future year emission reductions and air quality improvement resulting from already-adopted national and local programs, and from potential new local measures to meet RACT/RACM and RFP requirements (defined below).
- Adopted emission reduction measures with schedules for implementation.
- Contingency measures required under the CAA.

**Emissions inventory requirements (§51.1008)** – States must include a complete emissions inventory for all sources of PM<sub>2.5</sub> and precursor emissions in the nonattainment area. The inventory should include all source categories including stationary, onroad mobile, nonroad mobile and area sources.

**Reasonable further progress (RFP) requirements (§51.1009)** – States demonstrating attainment by April 2010 will be considered to have satisfied RFP requirements. However, states requesting an extended attainment deadline must submit an RFP plan and supporting emissions inventory information, which describes incremental emission reductions needed to ensure progress towards attainment by the extended deadline.

**Reasonably available control technology (RACT) and reasonably available control measures (RACM) requirements (§51.1010)** – RACT and RACM include emission reduction measures that are necessary to obtain the annual PM<sub>2.5</sub> standard as expeditiously as practicable or that would advance attainment of the standard by at least one year. States define measures as “reasonably available” through an analysis including considerations for economic and technical feasibility. In the [Implementation Rule](#), EPA presumes that implementation of CAIR control measures are reasonably available and would satisfy, with certain restrictions, RACT/RACM for SO<sub>2</sub> and NO<sub>x</sub> emissions from power plants. However, states may impose additional requirements on a specific source, large or small, if it determines that these requirements are both necessary and reasonable to expeditiously attain the standard.

**Transportation conformity requirement (§51.390)** – States are required to determine appropriate motor vehicle emissions budgets for PM<sub>2.5</sub> and precursors to satisfy transportation conformity requirements. Transportation conformity, required under the CAA, ensures that federally supported highway and transit project activities reflect consideration for air quality issues. Conformity means that transportation activities will not cause new air quality violations, worsen existing violations or delay timely attainment of the relevant NAAQS ([40 CFR 93](#)). On March 10, 2006, EPA published a final rule that established transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in PM nonattainment areas ([71 FR 12468](#)).

**Contingency measures requirement (§51.1012)** – States are required to include contingency measures, which are additional control measures to be implemented in the event that an area fails to meet RFP or fails to attain the standard by its attainment date.

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States must show that contingency measures can be implemented without significant further action by the state or EPA.

In addition, throughout [40 CFR 51](#) the basic requirements to receive federal approval of emission reduction measures in the SIP are defined as:

- *Surplus* – Emission reductions are considered surplus as long as they are not otherwise relied on in air quality-related programs already included in the SIP.
- *Enforceable* – Emission reductions and other required actions must be enforceable against the source of emissions. State or local agencies are responsible for ensuring that voluntary emission reductions are achieved, making voluntary emission reductions enforceable against the agency.
- *Quantifiable* – Emissions and emission reductions attributed to the measure are quantifiable if someone can reliably and replicably measure or determine them.
- *Permanent* – An emission reduction measure is considered permanent if it continues throughout the term that the credit is granted, unless it is replaced by another measure or the state demonstrates in a subsequent SIP revision that the emission reductions from the measure are no longer needed to attain and maintain compliance with the annual PM<sub>2.5</sub> standard.

### 1.4 Pollutants to be Evaluated

There are five main types of pollutants that may be addressed in the SIP: direct PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, VOCs and NH<sub>3</sub>. The effect of reducing emissions varies depending on particle composition, emission levels and other area-specific factors. Therefore, EPA requires the following evaluation:

- Direct PM<sub>2.5</sub> must be evaluated for emission reduction measures in all nonattainment areas, but allows some flexibility after the initial evaluation.
- SO<sub>2</sub> must be evaluated for emission reduction measures in all nonattainment areas.
- NO<sub>x</sub> must be evaluated for emission reduction measures in each area unless the state and EPA demonstrate that NO<sub>x</sub> is not a significant contributor to PM<sub>2.5</sub> concentrations in a specific area.
- VOCs are not required to be evaluated for emission reduction measures in each area unless the state or EPA demonstrates that VOCs significantly contribute to PM<sub>2.5</sub> concentrations in a specific area.
- NH<sub>3</sub> is not required to be evaluated for emission reduction measures in each area unless the state or EPA demonstrates that NH<sub>3</sub> significantly contributes to PM<sub>2.5</sub> concentrations in a specific area.

Demonstrations to show significance of VOCs and NH<sub>3</sub> or insignificance of NO<sub>x</sub> must represent available information including speciation data analyses, air quality modeling studies, chemical tracer studies, emissions inventories or special atmospheric chemistry studies. Only direct PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are considered significant for the Louisville nonattainment area.

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## Section 2 Related Federal, Regional, State and Local Actions

### 2.1 Federal Actions

There are a number of national initiatives that are expected to reduce ambient PM<sub>2.5</sub> concentrations. These regulatory and voluntary programs, promulgated by EPA, will reduce emissions of direct PM<sub>2.5</sub> as well as precursor emissions. The following are among those expected to have the greatest effect.

#### 2.1.1 Regulatory Programs

**Clean Air Interstate Rule (CAIR)** – CAIR is a two-phased program that dramatically reduces and permanently caps emissions of SO<sub>2</sub> and NO<sub>x</sub> from coal-fired power plants in the eastern United States. Based on an assessment of the emissions contributing to interstate transport of air pollution and available control measures, EPA has determined that achieving required reductions in the identified states by controlling emissions from power plants is highly cost-effective. When fully implemented, CAIR will reduce SO<sub>2</sub> emissions from power plants in 28 eastern states and the District of Columbia by more than 70% and NO<sub>x</sub> emissions by more than 60% from 2003 levels. For more information, please visit <http://www.epa.gov/CAIR/basic.html>.

**Clean Air Visibility Rule** – On June 15, 2005, EPA finalized amendments to the July 1999 regional haze rule. These amendments apply to the provisions of the regional haze rule that require emission controls known as best available retrofit technology (BART) for industrial facilities emitting air pollutants that reduce visibility by causing or contributing to regional haze. The pollutants include PM<sub>2.5</sub> and compounds that contribute to PM<sub>2.5</sub> formation, such as NO<sub>x</sub>, SO<sub>2</sub>, and under certain conditions, VOCs and NH<sub>3</sub>. EPA evaluated three possible scenarios of actions states may take to comply with this rule. Under the medium stringency scenario EPA estimates that implementation of BART controls will reduce annual emissions of NO<sub>x</sub> and SO<sub>2</sub> by approximately 600,000 and 400,000 tons, respectively. For more information, please visit <http://www.epa.gov/air/visibility/index.html>.

**Heavy-Duty Highway Diesel Rule** – EPA established a comprehensive national control program that regulates a heavy-duty vehicle and its fuel as a single system. As part of this program, new emission standards took effect in model year 2007 and apply to heavy-duty highway engines and vehicles. These standards are based on the use of high-efficiency catalytic exhaust emission control devices or comparably effective advanced technologies. Because these devices are damaged by sulfur, EPA also mandated the reduction in the level of sulfur in highway diesel fuel by 97% in 2006.

EPA projects a 2.6 million ton reduction of NO<sub>x</sub> emissions in 2030 when the current heavy-duty vehicle fleet is substantially replaced with newer heavy-duty vehicles that comply with these emission standards. By 2030, this program will reduce annual

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emissions of non-methane hydrocarbons by 115,000 tons and PM by 109,000 tons. For more information, please visit <http://www.epa.gov/otaq/diesel/index.htm>.

**Clean Air Nonroad Diesel Rule** – EPA's Clean Air Nonroad Diesel Rule requires stringent pollution controls on diesel engines used in industries such as construction, agriculture and mining, and will slash sulfur content of diesel fuel. This nonroad diesel program combines cleaner engine technologies with cleaner fuel, similar to the on-highway diesel program. The new standards will cut emissions from nonroad diesel engines by over 90%. Sulfur levels will be reduced in nonroad diesel fuel by 99% from 2006 levels (from approximately 3,000 parts per million [ppm] in 2006 to 500 ppm in 2007 to 15 ppm in 2010). The lower sulfur fuel will provide immediate public health benefits by reducing PM from engines in existing nonroad equipment. It also makes it possible for engine manufacturers to use advanced clean technologies, similar to catalytic technologies used in passenger cars. New engine standards take effect, based on engine horsepower, starting in 2008. EPA anticipates annual reductions of 738,000 tons of NO<sub>x</sub> and 129,000 tons of PM. For more information, please visit <http://www.epa.gov/otaq/diesel/index.htm>.

**Tier 2 Vehicle and Gasoline Sulfur Program** – Compared to Model Year 2003 and earlier, vehicles meeting the Tier 2 emission standards are much cleaner. For the first time, under this rule all passenger cars and light trucks are covered by the same emission standards. The key to meeting the stringent Tier 2 emission standards has been the large reduction of sulfur levels in gasoline. Sulfur in the fuel impairs the effectiveness of vehicle emission control systems. Vehicles meeting the Tier 2 emission standards are 77 to 95% cleaner, depending on vehicle size, compared with model year 2003 and earlier. EPA expects this program to reduce emissions of NO<sub>x</sub> from vehicles by approximately 74% (nearly 3 million tons) by 2030. For more information, please visit <http://www.epa.gov/tier2/>.

**Proposed Emissions Standards for Locomotives and Marine Compression-Ignition Engines** – This EPA proposed rule is another aspect of its clean diesel program that already has established rules for highway and other nonroad diesel equipment. In its regulatory announcement, EPA estimates that by 2030 this comprehensive emission control program will reduce annual emissions of NO<sub>x</sub> and PM by 765,000 and 28,000 tons, respectively, and the magnitude of these reductions could continue to grow well beyond 2030. For more information, please visit <http://www.epa.gov/otaq/locomotv.htm>.

### **2.1.2 Voluntary Programs**

**National Clean Diesel Campaign (NCDC)** – Building on EPA's regulatory and voluntary efforts to reduce emissions from diesel engines, EPA created NCDC. Participants are committed to reducing diesel emissions and finding innovative ways to protect human health and the environment. To address the challenges of reducing diesel emissions, NCDC is using a multi-pronged approach that includes regulations for clean diesel engines and fuels, EPA regional collaboratives and partnerships and voluntary programs for the existing diesel fleet. In addition to providing a framework for

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partnerships and information for outreach and education, some of these programs also include grant money to support their goals. For more information, please visit <http://www.epa.gov/cleandiesel/index.htm>.

**Southeast Diesel Collaborative (SEDC)** – SEDC is a voluntary, public/private partnership involving federal, state and local government, the private sector and other stakeholders in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina and Tennessee. SEDC is part of EPA’s National Clean Diesel Campaign. The goal of SEDC is to improve air quality and public health by encouraging the use of clean, renewable energy and technology and by reducing diesel emissions from existing engines and equipment from the agriculture, heavy construction and onroad sectors. For more information, please visit <http://www.southeastdiesel.org>.

**Clean School Bus USA** – Clean School Bus USA brings together partners from business, education, transportation and public health organizations to work toward these goals:

1. Encouraging policies and practices to eliminate unnecessary public school bus idling.
2. Upgrading (i.e. retrofitting) buses that will remain in the fleet with better emission control technologies and/or fueling them with cleaner fuels.
3. Replacing the oldest buses in the fleet with new, less polluting buses.

For more information, please visit <http://www.epa.gov/cleanschoolbus/>.

**Clean Ports USA** – Clean Ports USA is an incentive-based, voluntary program designed to reduce emissions from existing diesel engines and non-road equipment at ports with comprehensive strategies and information for the diverse range of ports and their staff. For more information, please visit <http://www.epa.gov/cleandiesel/ports/>.

**Clean Construction USA** – Clean Construction USA is a voluntary program designed to promote the reduction of diesel emissions from construction equipment and vehicles. Clean Construction USA encourages contractors, owners and operators of construction equipment to properly maintain their equipment, reduce idling, retrofit diesel engines with verified technologies, replace older equipment, use cleaner fuels and repower equipment (i.e. replace older engines with newer, cleaner engines). For more information, please visit <http://www.epa.gov/cleandiesel/construction/>.

**SmartWay Transport** – The SmartWay Transport Partnership is a voluntary collaboration between EPA and the freight industry designed to increase energy efficiency while significantly reducing greenhouse gases and air pollution. There are three primary components of the program: creating partnerships, reducing all unnecessary engine idling and increasing the efficiency and use of rail and intermodal operations. Several members of the freight industry that operate locally are already partners in the SmartWay program. For example, UPS, which has a significant presence in Louisville Metro, is a charter member of the SmartWay program. For more information, please visit <http://www.epa.gov/smartway/index.htm>.

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**Voluntary Diesel Retrofit Technology Verification Program** – This program offers information and technical support on retrofitting diesel engines to reduce toxic emissions. The objective of the voluntary Diesel Retrofit Technical Verification Program is to introduce verified technologies to the market as cost-effectively as possible, while providing customers with confidence that verified technologies will provide emission reductions as advertised. For more information, please visit <http://www.epa.gov/otaq/retrofit>.

**Best Workplaces for Commuters (BWC)** – This is a voluntary business/government program that distinguishes and provides national recognition to employers offering outstanding commuter benefits such as free or low-cost bus passes, strong telework programs, carpool matching and vanpool subsidies. EPA and the United States Department of Transportation (DOT) assist participating employers by offering public recognition and promotion, technical assistance, training, web-based tools and forums for information exchange.

Employers that meet EPA's National Standard of Excellence in commuter benefits are included on the BWC list, a fast-growing mark of excellence in environmental leadership. Sometimes outstanding commuter benefits are provided not by the employers themselves, but by another organization such as a business park, downtown district, developer or property manager. To recognize these areas for their leadership, EPA designates them a BWC District.

**Smart Growth Program** – Through research, tools, partnerships, case studies, grants and technical assistance, EPA is helping America's communities turn their visions of the future into reality. Smart growth practices can lessen the environmental impacts of development with techniques that include compact development, reduced impervious surfaces and improved water detention, safeguarding of environmentally sensitive areas, mixing of land uses (e.g., homes, offices and shops), transit accessibility and improved pedestrian and bicycle amenities. For more information, please visit <http://www.epa.gov/smartgrowth/index.htm>.

### **2.2 Regional Actions**

Draft guidance from EPA indicated that a significant requirement of PM<sub>2.5</sub> SIPs would be attainment demonstrations using, at least in part, modeling analyses to define effective emissions control strategies and confirm that attainment can be achieved after implementation of the strategies. The following organizations conducted large scale regional modeling projects to help member states demonstrate projected attainment of the annual PM<sub>2.5</sub> standard in their SIPs.

#### **2.2.1 Association for Southeastern Integrated Planning Modeling**

The Association for Southeastern Integrated Planning (ASIP) is a collaborative effort to develop information upon which to base the PM<sub>2.5</sub> and 8-hour ozone attainment demonstrations. Collaborating states include Alabama, Florida, Georgia, Kentucky,

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Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia. Several local air regulatory agencies, including the Louisville Metro Air Pollution Control District (District), have also become signatory parties to this collaborative effort. ASIP operated regional scale, three-dimensional air quality models for ozone and PM<sub>2.5</sub> that simulate the emissions, chemical transformations and transport of PM and gaseous precursors in the eastern United States. A key element of this work includes the integration of emissions inventories and models with regional transport models. Through regional modeling, ASIP worked with member states to demonstrate attainment of the annual PM<sub>2.5</sub> standard. The ASIP regional ozone and PM<sub>2.5</sub> modeling builds off of the Visibility Improvement State and Tribal Association of Southeast (VISTAS) Phase II 2002 annual modeling.

### **2.2.2 Lake Michigan Air Directors Consortium Modeling**

The Lake Michigan Air Directors Consortium (LADCO) was established in 1990 by the states of Illinois, Indiana, Michigan and Wisconsin. In March 2004, the states signed a new Memorandum of Agreement which added the state of Ohio as a member. The main purpose of LADCO is to provide technical assistance to its member states on problems of air quality; and to provide a forum for its member states to discuss air quality issues. LADCO's major pollutants of concern are ozone, fine particles and regional haze and their precursors; however, problems related to other pollutants (e.g. air toxics and greenhouse gases) may be assessed at the direction of the member states. LADCO's primary geographic focus is the area encompassed by its member states and any areas which affect air quality in its member states. For more information, please visit <http://www.ladco.org/about.html>.

### **2.3 State and Local Actions**

In addition to the myriad of programs being administered at the federal level, there are regulatory and voluntary programs at the state and local level that have the potential to affect direct PM<sub>2.5</sub> and precursor emissions in the Louisville nonattainment area.

#### **2.3.1 Kentucky Division for Air Quality**

**Open Burning** – The Kentucky Division for Air Quality's (KY DAQ) open burning rules allow for some materials to be burned; however, many materials, including garbage, construction materials and tires, are illegal to burn. The state open burning rules impose limits on when and where burning can occur. It is illegal to conduct open burning in those counties that are designated as nonattainment for the 1-hour ozone, 8-hour ozone, PM<sub>10</sub> or PM<sub>2.5</sub> NAAQS during the months of May through September. Illegal burns are subject to a fine of up to \$25,000. For more information, please visit [http://www.air.ky.gov/homepage\\_repository/Open+Burning.htm](http://www.air.ky.gov/homepage_repository/Open+Burning.htm).

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### 2.3.2 Indiana Department of Environmental Management

**Open Burning** – Open burning is generally prohibited in Indiana. However, there are exceptions, which are described in the rules on open burning, found in [326 IAC 4](#). In addition to the listed exceptions, permits may be obtained from the Indiana Department of Environmental Management (IDEM) to engage in open burning. Approval of an open burning permit is subject to evaluation based on several criteria including whether or not the burning site is located in a county that is designated nonattainment for PM<sub>10</sub> or ozone. Residential open burning (i.e. household or yard waste) is totally banned in Lake, Porter, Clark and Floyd Counties, and no permits are granted for burning in those counties. For more information, please visit [http://www.state.in.us/idem/your\\_environment/air\\_quality/openburning/](http://www.state.in.us/idem/your_environment/air_quality/openburning/).

**DieselWise Web Resource** – As part of IDEM’s continuing education and outreach program associated with ozone and fine particles, the DieselWise web page provides a reference point for various diesel and alternative fuel topics. These topics include: health issues, idling issues, Indiana diesel reduction initiatives and projects, school-related programs, alternative fuels and diesel retrofit technologies. For more information, please visit <http://www.state.in.us/idem/programs/air/dieselwise/index.html>.

**State-Sponsored Retrofit Projects** – In partnership with the Indiana Department of Transportation (INDOT), IDEM helped develop and implement a program to retrofit over 500 INDOT heavy-duty diesel trucks, many of which operate out of the Seymour District in Southern Indiana. The emission reductions from this “lead by example” program will be realized on a regional, as well as local, level.

**School Bus Idle Reduction** – In cooperation with the School Transportation Association of Indiana (STAI), IDEM introduced a voluntary reduced-idling program across Indiana. This policy was unanimously adopted by STAI members at its annual conference in 2004 and is being implemented by the greater majority of Indiana schools, including those in Southern Indiana. Benefits of implementing this policy include: protecting the health of student passengers and school bus drivers, reducing air pollutants that contribute to high ozone and fine particles in a community, and saving money by lowering fuel consumption and maintenance costs. For more information, please visit <http://www.state.in.us/idem/programs/air/dieselwise/schoolbuses.html>.

**Rail and Port Projects** – In partnership with The Ports of Indiana-Jeffersonville and MG Rail, Inc., IDEM received an EPA grant award to improve air quality and the quality of life in and around this Ohio River port. Four locomotives operate nearly 24 hours per day, 7 days per week at The Ports of Indiana-Jeffersonville facility. This project will add auxiliary power units to two of the locomotives to dramatically reduce unnecessary idling. In addition, two slug-units (i.e. non-powered locomotives with active electromotive drive) will be mated to existing locomotives allowing these mated pairs to move twice the number of rail cars per diesel powered locomotive, thereby making significant reductions in fuel consumption as well as harmful diesel emissions.

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### 2.3.3 Louisville Metro Air Pollution Control District

**Open Burning** – Open burning is generally prohibited in Louisville Metro. There are exceptions, however, including a broad acceptance of noncommercial cooking (e.g. backyard grilling), as well as specially permitted fires, such as bon fires, fire-training exercises and agricultural fires. For more information, please visit <http://www.louisvilleky.gov/APCD/EE/OpenBurning.htm>.

**Ozone Air Quality Task Force** – The Ozone Air Quality Task Force was created in 2003 to help develop a long-term strategy to improve Louisville Metro's air quality. The group's responsibility was to identify, evaluate and recommend strategies to the Air Pollution Control Board (Board) to be included in a new SIP for the 8-hour ozone standard. The task force presented the Board with a report in January 2006, which included recommendations for increased diesel retrofits, an idling regulation and reduction measures at airports, among others. Several of the task force's recommendations could also help reduce emissions of PM<sub>2.5</sub> throughout the Louisville nonattainment area. For more information, please visit <http://www.louisvilleky.gov/APCD/Board/AirQualityTaskForce.htm>.

**Strategic Toxic Air Reduction (STAR) Program** – The District's STAR program, designed to reduce toxic air contaminants, was created in response to several studies which demonstrated that Louisville Metro had unacceptably high levels of toxic chemicals in the air. There are three key components of the STAR program. The first component establishes the framework and methodologies for determining risk associated with toxic air pollution. The second regulates toxic emissions from large and moderate industrial and commercial operations. The third component addresses smaller sources (e.g., dry cleaners, diesel trucks, marine vessels) through the creation of a plan of action, including stakeholder involvement. The STAR 5.30 Stakeholder Group recommended strategies for reducing toxic emissions from these sources. Several of the group's recommendations could also reduce emissions of PM<sub>2.5</sub>. For more information, please visit <http://www.louisvilleky.gov/APCD/STAR>.

**Partnership for a Green City (PGC)** – The PGC began in August 2004, as a major step toward overcoming challenges to Louisville Metro's environmental practices. The PGC represents a collaborative effort to improve environmental education, health and management by three of Louisville Metro's largest public entities: Louisville Metro Government, the University of Louisville (U of L) and the Jefferson County Public Schools (JCPS). Together, these agencies own more than 500 buildings, 7,000 vehicles and 25,000 acres of land in Louisville Metro. Through the coordination of efforts and cooperation, the PGC has been able to realize results that will have long-term impacts on the health, education and well-being of Louisville Metro citizens. The PGC's Climate Change Committee is preparing a community-wide plan for reducing greenhouse gases in the Louisville Metro area. Other PGC committees are working on improving energy efficiency, increasing green purchasing and decreasing fleet emissions among the partner entities. PGC efforts could also help reduce emissions of PM<sub>2.5</sub>. For more information, please visit <http://www.jefferson.k12.ky.us/Departments/EnvironmentalEd/GreenCity/>.

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## Section 3 Fine Particle Air Quality Task Force

### 3.1 Development of the Task Force

The Fine Particle Air Quality Task Force (Task Force) was created by Mayor Jerry Abramson in April 2007 to identify, evaluate and recommend strategies for reducing  $PM_{2.5}$  to achieve the annual  $PM_{2.5}$  standard. The District invited business leaders, environmental and health advocates, health professionals, neighborhood representatives and regional and local government representatives to participate in the Task Force. Dr. Robert Powell and Mr. Patrick Moran co-chaired the Task Force. A full list of Task Force members is included as Appendix 2.

After initial meetings to review background information and establish goals and expectations, the Task Force formed working committees to perform central tasks such as: the characterization of  $PM_{2.5}$  pollution and its related health effects, collection and analysis of historical and projected air quality data, identification of major sources of direct  $PM_{2.5}$  and precursor emissions in the Louisville nonattainment area and the recommendation of strategies to reduce these emissions. As part of the development of such strategies, the committees compiled and synthesized information that may be used by the District in development of the SIP, such as an assessment of control measures to support the RACT/RACM analysis and modeling data to be included in the attainment demonstration.

Throughout the process, the Task Force and its committees heard presentations on federal  $PM_{2.5}$  standards and implementation guidance, air quality monitoring, federal emission and fuel requirements, the co-benefits of local ozone and toxics programs,  $PM_{2.5}$  speciation data and regional modeling results.

Committee reports and recommendations are included as Section 4 (Health Committee), Section 5 (Emissions Inventory and Modeling Data Committee), Section 6 (Stationary and Area Source Committee), Section 7 (Mobile and Nonroad Mobile Source Committee) and Section 8 (Report and Plan of Action Committee) of this Report. The members of each committee are listed in Appendix 3.

As committee work concluded, committee reports and recommendations were submitted to the full Task Force for consideration. The Task Force members then began discussions on the plan of action that was recommended to the Board at its January 2008 meeting.

### 3.2 Committees of the Task Force

#### 3.2.1 Health Committee

The Health Committee was formed to focus on issues related to the health effects of  $PM_{2.5}$  exposure. The primary task of the Health Committee was to determine whether there is a theoretically “safe” level of ambient  $PM_{2.5}$  and whether public health concerns

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related to PM<sub>2.5</sub> exposure could be further addressed by setting a goal to reduce ambient PM<sub>2.5</sub> to levels more stringent than the annual standard of 15 µg/m<sup>3</sup>.

### **3.2.2 Emissions Inventory and Modeling Data Committee**

The Emissions Inventory and Modeling Data Committee was formed to support the Task Force and its committees with the collection, distribution and understanding of technical information related to PM<sub>2.5</sub>.

### **3.2.3 Stationary and Area Source Committee**

The Stationary and Area Source Committee was formed to identify stationary and area sources of direct PM<sub>2.5</sub> and precursor emissions and the control measures being implemented throughout the Louisville nonattainment area. The committee considered various educational, voluntary and regulatory strategies for reducing direct PM<sub>2.5</sub> and precursor emissions.

Stationary sources are generally industrial or commercial operations subject to the District's permit requirements and include those companies with Title V, Federally Enforceable District Origin Operating Permits (FEDOOPs) and minor source permits. Area sources include anthropogenic sources of emissions that are not considered stationary, onroad mobile or nonroad mobile. Examples of area sources include backyard charcoal grilling, wood burning and commercial charbroiling.

### **3.2.4 Mobile and Nonroad Mobile Source Committee**

The Mobile and Nonroad Mobile Source Committee was formed to identify onroad and nonroad mobile sources of direct PM<sub>2.5</sub> and precursor emissions and the control measures being implemented throughout the Louisville nonattainment area. The committee considered various educational, voluntary and regulatory strategies for reducing direct PM<sub>2.5</sub> and precursor emissions.

Onroad mobile sources are motorized vehicles that are registered for use on public roads and highways, including automobiles, light- and heavy-duty trucks, buses and motorcycles. Nonroad mobile sources are motorized vehicles that are not registered for use on public roads and highways or any other equipment with a fossil fuel-fired engine that is not a point source. Examples include aircraft, boats, railroad engines, construction equipment and nonroad recreational equipment.

### **3.2.5 Report and Plan of Action Committee**

The Report and Plan of Action Committee was formed to oversee documentation of the issues reviewed and the process undertaken by the Task Force to determine recommendations for reducing ambient concentrations of PM<sub>2.5</sub>. The work product of this Committee was this *Fine Particle Air Quality Task Force Report and Plan of Action* which was submitted to the Board at its January 2008 meeting.

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## Section 4 Report of the Health Committee

### 4.1 Background

The task of the Health Committee (Committee) was to determine whether the community should address public health concerns related to ambient concentrations of PM<sub>2.5</sub> by establishing a goal more stringent than the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup>. The Committee met and reviewed background information on PM<sub>2.5</sub>, peer-reviewed scientific literature regarding the health effects of PM and the actions of states and concerned organizations to address more stringent health-based goals and standards. A record of attendance at each meeting is included as Appendix 4.

Several organizations (e.g. the Clean Air Scientific Advisory Committee [CASAC], the American Medical Association and the American Public Health Association) have determined that the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup> is not adequate for protecting public health and have recommended that more stringent standards are necessary. Other organizations (e.g. the Utility Air Regulatory Group, the National Association of Manufacturers and the U.S. Chamber of Commerce) believe the annual PM<sub>2.5</sub> standard to be sufficiently protective of public health and have opposed any further reduction in the annual standard without adequate supporting scientific evidence.

In the 2006 [Review of the National Ambient Air Quality Standard for Particulate Matter](#), EPA technical staff recommended a primary annual standard between 15 and 12 µg/m<sup>3</sup>. CASAC also advised EPA to adopt a stricter annual PM<sub>2.5</sub> standard, in the range of 14 to 13 µg/m<sup>3</sup>. In a [September 2006 letter to EPA Administrator Steven Johnson](#), CASAC cited:

*...clear and convincing scientific evidence that significant adverse human-health effects occur in response to short-term and chronic particulate matter exposures at and below 15 µg/m<sup>3</sup>, the level of the current annual PM<sub>2.5</sub> standard.*

The letter also stated that:

*It is the CASAC's consensus scientific opinion that the decision to retain without change the annual PM<sub>2.5</sub> standard does not provide an "adequate margin of safety ... requisite to protect the public health" (as required by the Clean Air Act), leaving parts of the population of this country at significant risk of adverse health effects from exposure to fine PM. Significantly, we wish to point out that the CASAC's recommendations were consistent with the mainstream scientific advice... [T]o our knowledge there is no science, medical or public health group that disagrees with this very important aspect of the CASAC's recommendations.*

After reviewing information and recommendations received from internal technical staff, CASAC and extensive public comments, EPA determined that the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup> was sufficient and met the requirement of the CAA to protect public health with an adequate margin of safety. This conclusion has been challenged and will be subject to judicial review.

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Some states have implemented strategies to set forth more stringent health goals and standards. California has an annual PM<sub>2.5</sub> standard of 12 µg/m<sup>3</sup>, Vermont is in the process of adopting an annual PM<sub>2.5</sub> standard in the range of 14 to 13 µg/m<sup>3</sup> and New Jersey is in the process of adopting 12 µg/m<sup>3</sup> as an annual health-based goal for their SIP, citing no safe level of PM<sub>2.5</sub>. Additionally, the [World Health Organization's \(WHO\) guideline value for PM<sub>2.5</sub>](#) is 10 µg/m<sup>3</sup>.

### **4.2 Committee Actions**

#### **4.2.1 Scientific Literature Review**

To determine the advisability of a more stringent goal for the local area, the Committee reviewed available information on ambient PM<sub>2.5</sub> concentrations, emission levels and related health effects. The Committee also performed a preliminary review of health-based, peer-reviewed scientific literature. The Committee reviewed literature which stated that chronic and acute exposure to ambient PM<sub>2.5</sub> concentrations below the current EPA regulatory standards correlated to increases in cardiovascular and lung cancer mortality, as well as increased incidence of: asthma, cough, pneumonia, chronic bronchitis, change in lung function, change in heart rhythm, doctor visits and hospitalization.

#### **4.2.2 Goal or Standard**

The Committee initially discussed the implications of setting a health-based goal rather than adopting a more stringent annual PM<sub>2.5</sub> standard. The Committee decided that a health-based goal should be adopted and that the strategies recommended by the Task Force could give adequate consideration to what is achievable, or attainable, through implementation of control strategies on local and regional scales.

Consistent with the structure and principles of the CAA, the adoption of health-based goals should not be confused with economic or technological considerations in achievement of regulatory standards, but should instead establish the goal based solely on protection of public health (including the health of sensitive subpopulations) with an adequate margin of safety to account for the uncertainties in scientific knowledge of low-dose exposure. Questions of implementation of measures to achieve those goals, and particularly of whether regulatory control measures are appropriate to achieve ambient PM<sub>2.5</sub> concentrations below regulatory standards, are properly distinct from the health-based goal, as has been reaffirmed by Congress and the courts.

#### **4.2.3 Regional and Local Contributions to PM<sub>2.5</sub> Pollution**

The local contribution to the total ambient PM<sub>2.5</sub> concentration in Jefferson County, Kentucky is estimated to vary between 10 and 20% (1.6 to 3.3 µg/m<sup>3</sup>). The remaining contribution is generally attributed to regional transport. Therefore, lowering ambient PM<sub>2.5</sub> concentrations to levels needed to protect public health will require coordinated efforts locally and throughout the regional airshed. Successful models exist for regulating

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pollution to protect public health through a coordinated regional approach, such as the Ozone Transport Commission and the Ohio River Valley Water Sanitation Commission. The Committee recommends the Board develop such a strategy within and among the states to coordinate meaningful reductions in direct PM<sub>2.5</sub>, precursor emissions and other regional pollutants.

### 4.2.4 Health-based Goal

There is no theoretically “safe” level of exposure to PM<sub>2.5</sub> in the ambient air. Epidemiologic evidence suggests adverse health effects of PM<sub>2.5</sub> exposure at annual averages less than 15 µg/m<sup>3</sup>, while EPA has identified significant uncertainties in modeled risk values for ambient PM<sub>2.5</sub> concentrations below 13 µg/m<sup>3</sup> ([EPA/600/R-06/063](#) and [EPA/600/P-99/002aF-bF](#)).

The Committee was presented the most recent regional modeling results. A detailed explanation of the following results is included in Section 5 of this Report. ASIP projected that annual PM<sub>2.5</sub> design values for monitors in the Louisville nonattainment area will decrease from the 2002 base-year design values of 16.8 to 14.9 µg/m<sup>3</sup>, to 15.0 to 13.1 µg/m<sup>3</sup> as early as 2009, and 14.1 to 12.2 µg/m<sup>3</sup> by 2018. LADCO reported that, due in part to implementation of CAIR, projected annual PM<sub>2.5</sub> design values for monitors in the Louisville nonattainment area will decrease from the 2005 base-year design values of 16.5 to 14.7 µg/m<sup>3</sup>, to 13.6 to 12.1 µg/m<sup>3</sup> as early as 2009, and 13.2 to 11.5 µg/m<sup>3</sup> by 2018. These results were considered by the Committee during discussion regarding the attainability of a goal lower than the annual standard.

Independent of air quality concerns, the Louisville Metro population continues to have higher reported incidence of asthma and other respiratory illnesses, cardiovascular illnesses and infant mortality, in addition to higher rates of tobacco use than other communities in the U.S., which has been historically documented for the local population<sup>4</sup>. Furthermore, Louisville Metro aspires to be a world-class city, necessitating a healthy ambient environment to attract and maintain business and a productive workforce. Numerous opportunities for improved efficiencies and efficacies have yet to be fully employed throughout the airshed. In light of these findings, the Committee achieved consensus in support of a recommendation for establishing an ongoing and continuous process of review of all sources and categories of PM<sub>2.5</sub> emissions, and developing and implementing strategies to continue progress towards reducing ambient PM<sub>2.5</sub> concentrations, so as to protect public health with an adequate margin of safety.

The Committee members also recognize that additional reductions below the annual PM<sub>2.5</sub> standard may be advisable to provide an additional margin of safety that allows and compensates for scientific uncertainty, as well as the lack of precise predictions regarding the health impacts of air pollution on a multiplicity of potentially susceptible subpopulations. A majority of the Committee additionally decided to recommend an

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<sup>4</sup> As noted in the [Louisville MSA Community Assessment Factbook](#) produced by The Lewin Group on behalf of the UAW/Ford Motor Company.

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interim health-based annual goal of 12 to 10  $\mu\text{g}/\text{m}^3$ , to be achieved by 2018, while the minority did not support establishing specific numeric goals or deadlines beyond the federally prescribed annual  $\text{PM}_{2.5}$  standard.

### 4.3 Committee Recommendations

The Committee met on October 25, 2007 and, except as noted below, reached consensus on the following recommendations to be presented to the full Task Force for its consideration.

#### **Recommendation 1:**

*The District should reiterate the principle that ambient concentrations of fine particulate matter, expressed as  $\text{PM}_{2.5}$ , should be reduced to levels sufficient to protect public health with an adequate margin of safety. Additional reductions below the federal primary annual standard of 15  $\mu\text{g}/\text{m}^3$  are advisable to provide an additional 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 populations. The process and strategies set forth in Recommendation 2 below should be utilized to achieve this goal. In implementing these strategies, a strong emphasis should be placed on educational programs for the public.*

#### **Recommendation 2:**

*The District should establish an ongoing and continuous process of review of all sources of  $\text{PM}_{2.5}$  emissions from all sectors of the economy (including mobile sources, area sources, stationary sources, etc.), and develop and implement policies, practices and standards to continue progress towards reducing ambient concentrations of  $\text{PM}_{2.5}$  and precursors. In the development of such policies, practices and standards, those strategies that achieve lower emissions of hazardous air pollutants (HAPs) and ozone precursors in conjunction with reducing  $\text{PM}_{2.5}$  should be a priority. Stakeholder involvement in the development of such programs and processes should be an integral part of the process.*

#### **Recommendation 3:**

*In furtherance of achievement of reductions in  $\text{PM}_{2.5}$  and other regional pollutants, the District should initiate efforts to create an interstate commission to effectively reduce ambient  $\text{PM}_{2.5}$  through coordinated efforts within the Commonwealth and among states whose sources of  $\text{PM}_{2.5}$  are identified as contributing to the boundary pollution levels in Kentucky.*

#### **Recommendation 4:**

*The District should evaluate and, as appropriate, employ existing mechanisms under the Clean Air Act (CAA) to address identifiable contributing sources of fine particulates and particulate precursors that interfere with attainment and maintenance of healthful air quality in the Louisville Metro community.*

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### **Recommendation 5:**

*The District should create a regionally based stakeholder advisory committee to continue to focus and advise on issues of air pollution and public health and to strategize on policies, practices and programs to reduce PM<sub>2.5</sub> emissions.*

### **Recommendation 6:**

*A majority of the Committee recommends adoption of an interim health-based annual goal of 12 to 10  $\mu\text{g}/\text{m}^3$ , to be achieved by 2018, while the minority did not support establishing specific numeric goals or deadlines beyond the federally prescribed annual standard.*

# Fine Particle Air Quality Task Force Report and Plan of Action

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## Section 5 Report of the Emissions Inventory and Modeling Data Committee

### 5.1 Background

The Emissions Inventory and Modeling Data Committee (Committee) was formed to support the Task Force and its committees with the collection, distribution and understanding of technical information related to PM<sub>2.5</sub>. The District, with cooperation from state and regional entities, compiled and disseminated available information at the request of the Committee for these purposes.

### 5.2 Committee Actions

The Committee reviewed available data related to direct PM<sub>2.5</sub> and precursor emissions, SO<sub>2</sub> and NO<sub>x</sub>. EPA determined other known PM<sub>2.5</sub> precursors, including NH<sub>3</sub> and VOCs, to be insignificant contributors to the ambient concentration of PM<sub>2.5</sub> in this region. Therefore, the Committee did not review data concerning emissions of these precursors.

Information was gathered from a variety of sources to provide insight into the spatial and temporal distribution of the target pollutants. Historical and projected data were obtained at local, state and regional levels. The Committee collected information including: ambient monitoring data and design values, speciated monitoring data, emissions inventories and source apportionment data. While a thorough technical review of all data collection methods was not included in this report, the Committee has noted limitations and uncertainties associated with these reviewed methods as appropriate.

To demonstrate attainment, each SIP will require modeling to show that nonattainment areas will meet the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup> by the attainment deadline of 2010. Fine particulate matter, by nature, has a large regional component such that an area's attainment could be influenced by sources outside the designated nonattainment area. Realizing this, EPA funded regional modeling groups to support states with their regional haze, ozone and PM<sub>2.5</sub> SIPs. Two of these groups have modeling domains that include the Louisville nonattainment area: ASIP, which supports Kentucky and other southeastern states, and LADCO, which supports Indiana and other midwestern states.

To provide further technical analysis of the information, the Committee invited regional experts to speak to the Committee and other members of the Task Force. On September 19, 2007, Pat Brewer, ASIP Technical Coordinator, presented ASIP's regional modeling results and related work products. On September 28, 2007, Joel Huey, PM<sub>2.5</sub> Expert for EPA Region 4, presented an overview of PM<sub>2.5</sub> SIP requirements, current and proposed federal regulations impacting state attainment demonstrations and examples of other state and local actions to address control strategies for reducing PM. On October 11, 2007, Michael Koerber, Executive Director of LADCO, presented the most recent regional modeling results from LADCO. These presentations are available at <http://www.louisvilleky.gov/APCD/TaskForce/AQTFPMDocuments.htm>.

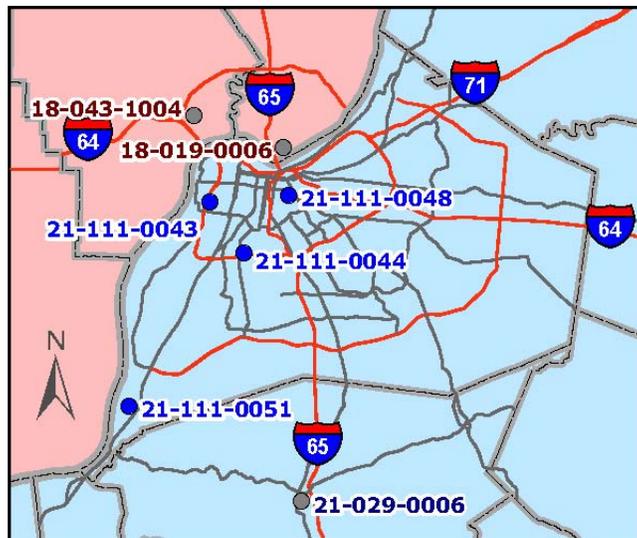
## Fine Particle Air Quality Task Force Report and Plan of Action

The following sections provide a summary of the information collected and reviewed by this committee.

### 5.2.1 Historical Data

#### 5.2.1.1 Monitoring Data

The Committee collected historical monitoring data from local ambient PM<sub>2.5</sub> monitors in the area, including those used for the Federal Reference Method (FRM) and for speciation (similar to monitors in the Speciation Trends Network). The locations of local monitors are shown in Figure 5-1. The PM<sub>2.5</sub> FRM is a gravimetric method that measures total PM<sub>2.5</sub> mass on daily, three- or six-day schedules. Historical annual averages from local FRM monitors are provided in Table 5-1.



**Figure 5-1. Map of Area PM<sub>2.5</sub> Monitors.**

**Table 5-1. Annual PM<sub>2.5</sub> Means in  $\mu\text{g}/\text{m}^3$  for Area FRM Monitors.**

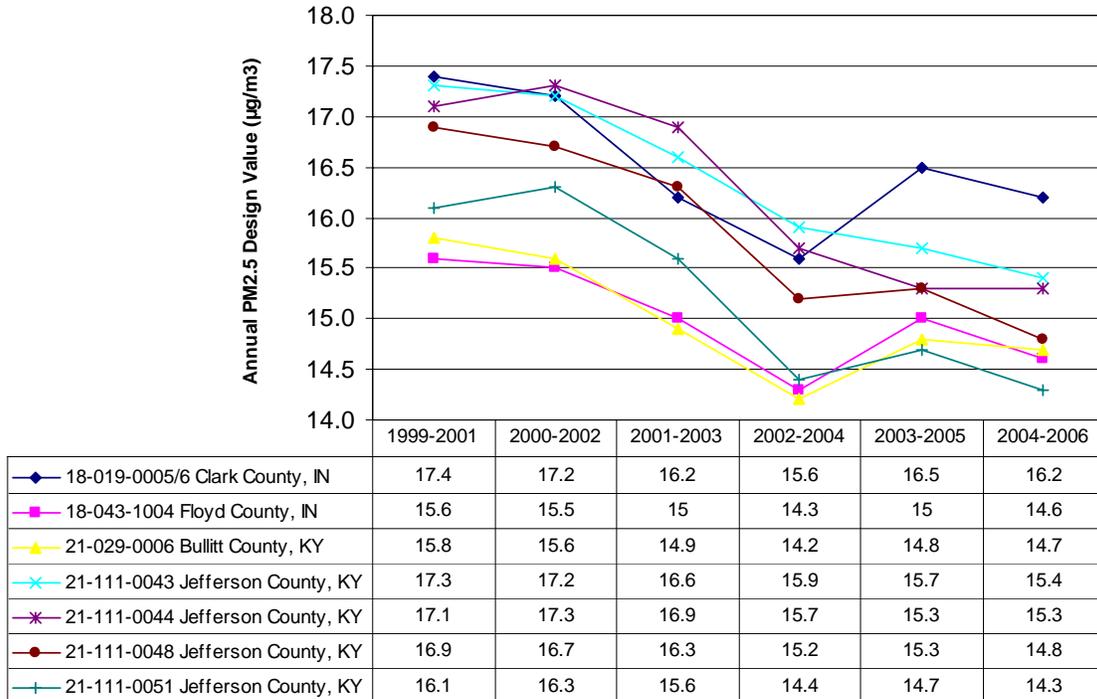
Monitor Site	1999	2000	2001	2002	2003	2004	2005	2006
18-019-0005/6 Clark County, IN	16.6	18.6	16.9	16.0	15.8	15.1	18.5	15.0
18-043-1004 Floyd County, IN	15.0	16.0	15.8	14.6	14.5	13.7	16.8	13.3
21-029-0006 Bullitt County, KY	15.4	16.4	15.6	14.7	14.4	13.6	16.3	14.1
21-111-0043 Jefferson County, KY	17.5	17.3	17.1*	17.2	16.0	14.5	16.7	15.0
21-111-0044 Jefferson County, KY	16.9	16.7	17.7	17.5	15.4	14.1	16.5	15.2
21-111-0048 Jefferson County, KY	17.2	16.7	16.9	16.4	15.5	13.7	16.8	14.0
21-111-0051 Jefferson County, KY	15.2	16.8	16.3	15.7	14.9	12.6	16.5	13.7

\* Recovery below 75% due to renovation at the Southwick site in 2001

Valid data from FRM monitors for a given year are averaged on a quarterly basis to determine a monitor's annual average. The design value (DV) is the mean of three

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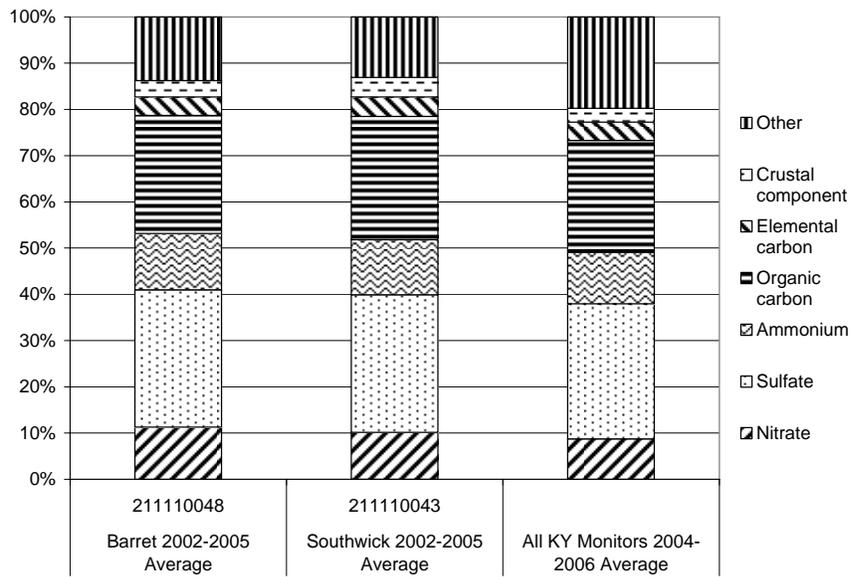
consecutive annual averages for each monitoring site. The highest design value in an area becomes the design value site from which attainment designations are made. Historical design values from local FRM monitors are provided in Figure 5-2.



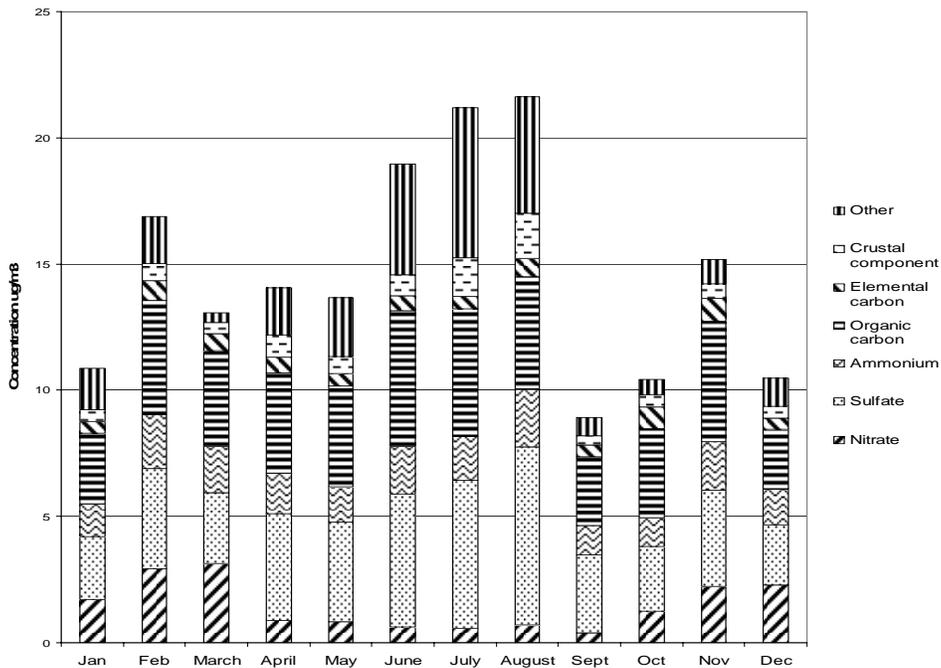
**Figure 5-2. PM<sub>2.5</sub> Design Values in µg/m<sup>3</sup> for Area FRM Monitors.**

The Committee used data collected from speciation monitors to identify individual components of PM<sub>2.5</sub> measured at monitor sites. Annual data compiled from speciation monitors in Louisville Metro are compared to those in Kentucky in Figure 5-3. Analytical methods for PM<sub>2.5</sub> speciation allow for quantification of the following components: sulfate (SO<sub>4</sub>), nitrate (NO<sub>3</sub>), ammonium (NH<sub>4</sub>), OC, EC and crustal (e.g. fine soil and trace elements). A simple mass balance is used to determine the portion of PM<sub>2.5</sub> that is not accounted for by analytical methods. This portion is characterized as “other” and is unknown. Figure 5-4 shows the monthly variation in PM<sub>2.5</sub> speciation for the monitor 21-111-0043 in 2006.

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**Figure 5-3. Speciation Data for Louisville Metro and Kentucky, 2002 to 2006.**



**Figure 5-4. Monthly Speciation Data from Monitor 21-111-0043 in 2006.**

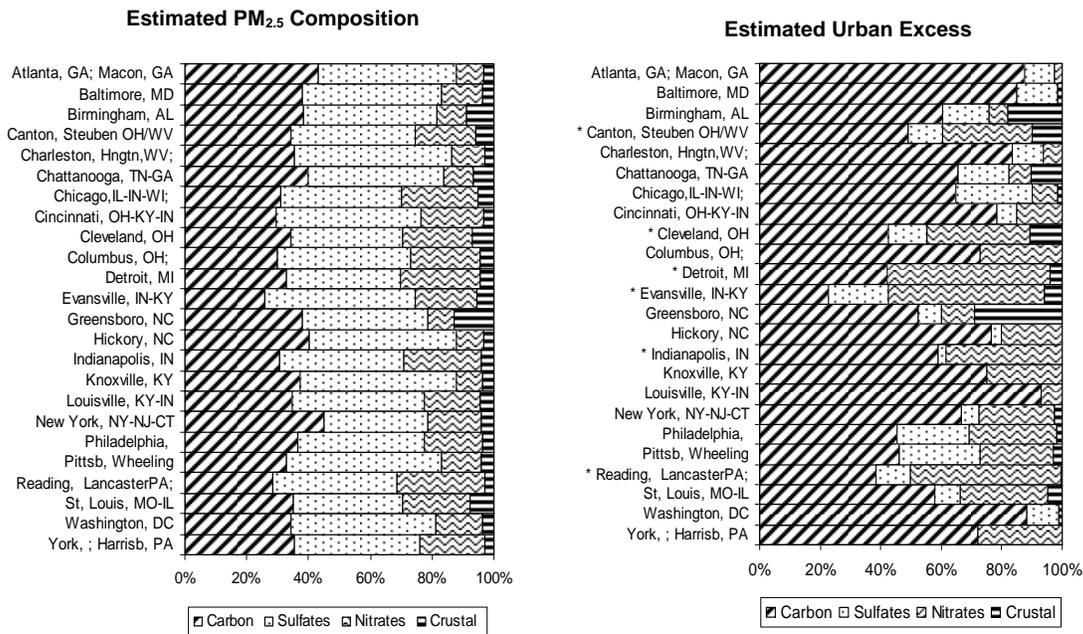
Local and regional sources contribute to monitored PM<sub>2.5</sub> pollution. The contribution from local sources is usually greater in urban areas than in rural. PM<sub>2.5</sub> in rural areas is generally attributed to regional transport. For instance, of the three major PM<sub>2.5</sub>

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components (sulfate, carbon and nitrate), greater levels of carbon and nitrate are typically monitored in urban areas and are generally attributed to local sources.

The range of local contribution to total ambient PM<sub>2.5</sub> concentrations was determined by subtracting background levels of PM<sub>2.5</sub> from monitored concentrations within the Louisville nonattainment area. The background site for Kentucky is located at Camp Webb at Grayson Lake State Park in Carter County. The 2004-2006 design value for this site was 12.1 µg/m<sup>3</sup>. The background site for Indiana is located in Knox County. The 2004-2006 design value for this site was 13.8 µg/m<sup>3</sup>. When subtracted from the Louisville nonattainment area's 2004-2006 design value of 15.4 µg/m<sup>3</sup>, the local contribution, or urban excess component, ranges from 1.6 to 3.3 µg/m<sup>3</sup> for the Louisville nonattainment area.

The relative contribution of PM<sub>2.5</sub> from regional and local sources has been extrapolated from monitoring data made available by EPA. Figure 5-5 shows that the local, or urban, component of PM<sub>2.5</sub> in Louisville is primarily organic carbon. A more refined understanding of the relative contribution of local and regional sources and the impact of various emission sources would require more detailed computer modeling of the area than currently available.



**Figure 5-5. PM<sub>2.5</sub> Composition and Estimated Urban Excess for U.S. Cities.**

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### **5.2.1.2 Emissions Inventory Data**

Stationary sources with Title V and FEDOOP permits are required to submit a report of their actual emissions of PM, SO<sub>2</sub>, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone precursor emissions of VOCs and NO<sub>x</sub>, lead (Pb), NH<sub>3</sub> and all hazardous air pollutants (HAPs) each year. Minor sources are required to submit these reports every three years. The most recent required emissions inventory for all three categories of stationary sources was for calendar year 2005.

Estimates of NO<sub>x</sub> and SO<sub>2</sub> emissions are generally well understood, have standardized EPA emission factors and are therefore considered to be relatively accurate. Additionally, some sources utilize site-specific emission data such as stack tests and continuous emissions monitoring systems to directly quantify their emissions of these pollutants.

Direct PM<sub>2.5</sub> emissions are generated from fuel combustion, material handling, surface coating, vehicle travel across unpaved worksites and numerous other activities. Total particulate matter, and in some cases PM<sub>10</sub>, emission factors have been developed for a number of processes, but very little information exists for PM<sub>2.5</sub>. The lack of standardized emission factors along with the multitude of different PM<sub>2.5</sub> sources requires a significant amount of engineering judgment to estimate stationary source emissions. Thus, the Committee noted significant variation in reported emissions estimates; whereas values reported by the District, in some cases, were two to three times higher than those reported by sources. Estimates of direct PM<sub>2.5</sub> emissions from stationary sources were derived from District recalculations of the sources' certified 2005 Emissions Inventory Statement using process rates provided by the individual sources and related emissions factors. While the District's estimated values provide an understanding of where emissions are generated and a relative ranking of the various sources, direct PM<sub>2.5</sub> data should be reviewed with the knowledge that uncertainties exist in emissions estimates.

The most recent emissions inventory for area sources was generated for calendar year 2005 using various source emissions factors and related activity levels. Emissions factors were obtained directly from EPA AP-42 or, in some cases, from well-documented methods, typically developed by public agencies. Emissions for area sources are generally estimated using activity levels, which are most commonly calculated using population data or the actual number of sources. Emissions were calculated for NO<sub>x</sub>, PM<sub>2.5</sub> and SO<sub>2</sub>.

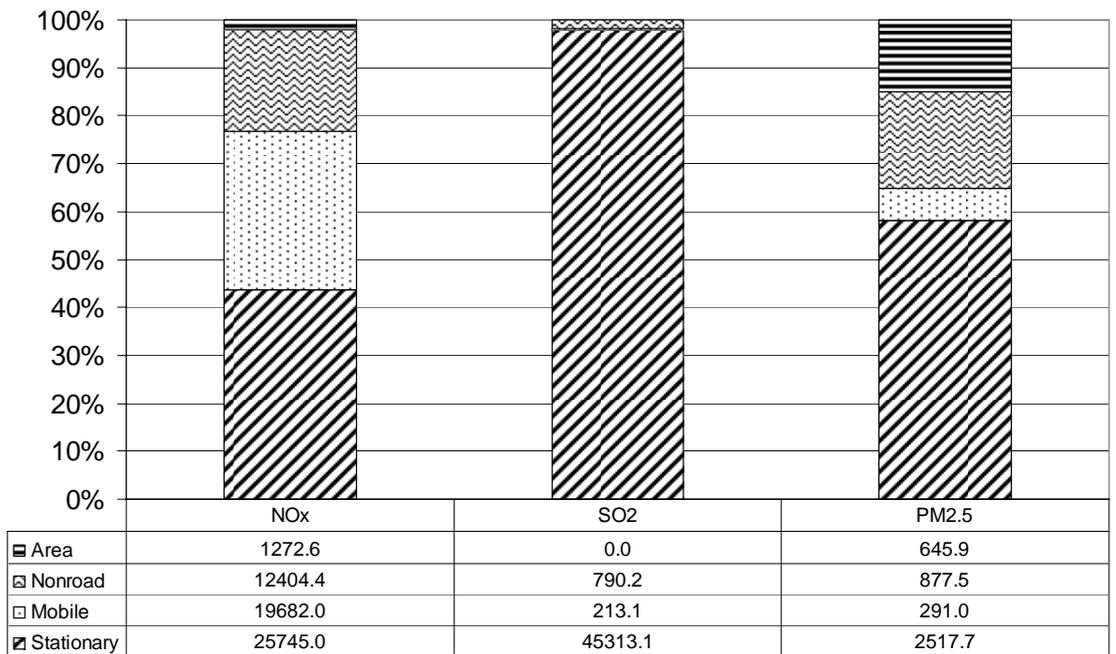
The emissions inventory for onroad mobile sources was generated for calendar year 2005 by using EPA's MOBILE6.2 modeling software. Emission factors for NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>2.5</sub> – including OC, EC, SO<sub>4</sub> as speciates – were calculated for this process. MOBILE6 calculates emission factors for twenty-eight individual vehicle types. These emission factor estimates depend on various conditions, such as ambient temperatures, travel speeds, operating modes, fuel volatility and mileage accrual rates. The emission factors derived from the MOBILE6 runs were multiplied by the vehicle miles traveled (VMT) for each county in the Louisville nonattainment area, supplied by the Kentuckiana Regional Planning and Development Agency (KIPDA), to obtain emission tonnage per

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year for each pollutant of interest. MOBILE6 is the best attempt to date by EPA and the Federal Highway Administration to aid transportation planning and air quality conformity concerns. MOVES is the next generation of software to be available for use in the near future, which will more accurately account for PM, greenhouse gases and new vehicle technology. Tests have been underway to finalize the program's ability to account for gasoline PM, which has been especially difficult to rank as to contributing factors.

The most recent emissions inventory for nonroad mobile sources was generated for calendar year 2005 by using EPA's National Mobile Inventory Model (NMIM). Emissions were calculated for NO<sub>x</sub>, PM<sub>2.5</sub> and SO<sub>2</sub>. NMIM incorporated all the relevant variables developed by EPA which affect the emission factor outcome for the various emission sources, including engine characteristics, fuel formulation and a temperature and humidity database.

The District provided the most recent emissions inventory for Jefferson County, Kentucky, from 2005. Separate inventories were combined for stationary sources, area sources, onroad mobile sources and nonroad mobile sources. Emissions inventories for other stationary sources in the Louisville nonattainment area were also provided by IDEM for the Indiana counties of Clark, Floyd and Jefferson, and by KY DAQ for Bullitt County. KY DAQ also provided the 2005 stationary source emissions inventory for the entire state of Kentucky. All 2005 emissions inventories for Jefferson County, Kentucky were combined and are shown in Figure 5-6.



\*Data in table reported as tons per year (tpy)

**Figure 5-6. Source Apportionment, by Percent, of Total Emissions in Jefferson County, KY, Based on APCD 2005 Emissions Inventory Data.**

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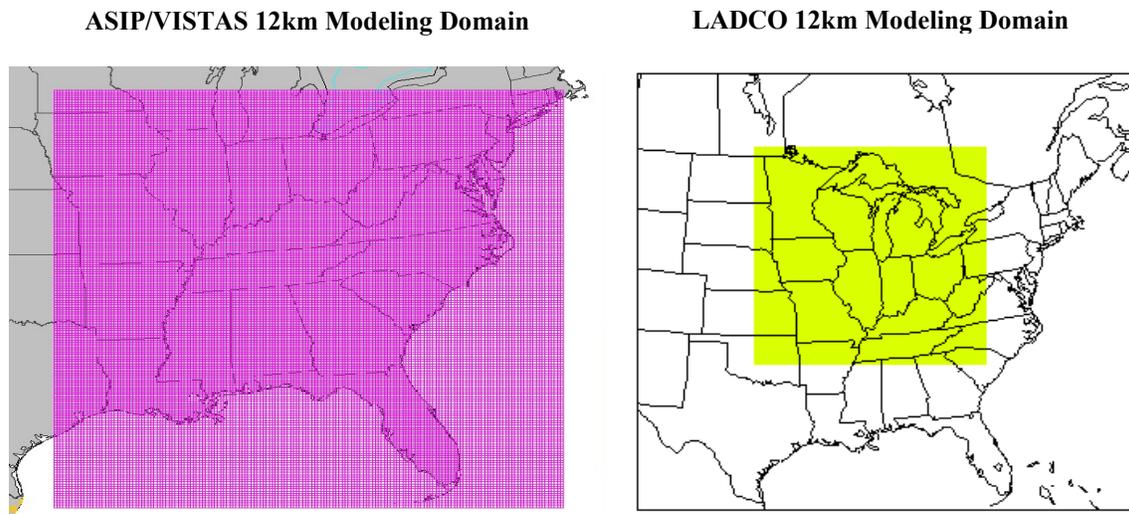
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Additional historical emissions inventory data are presented in Figures 5-8 and 5-9 below. In these figures emissions for all counties in the ten ASIP member states, reflecting a base year of 2002, are compared to projected emissions inventories for 2009 and 2018.

### 5.2.2 Projected Data

#### 5.2.2.1 Boundaries and Assumptions

The ASIP and LADCO regional models calculated projected annual design values and emissions inventories based on inputs to the model within a set boundary. The Louisville nonattainment area was included within the boundaries of both regional models. Maps of the model boundaries for ASIP and LADCO can be found in Figures 5-7.



**Figure 5-7. Maps of ASIP and LADCO Regional Modeling Domains.**

The base-years used for ASIP and LADCO regional modeling were 2002 and 2005, respectively. At the time of this report, the LADCO modeling results for base-year 2005 were only recently made available for public review. While much of the information presented in this report involves results from ASIP modeling, the Committee would like to encourage full consideration of the limited outputs from LADCO's base-year 2005 model. The use of a more recent base-year allows for more accurate representation of projected data. It was the Committee's view that the LADCO 2005 modeling reflected more recent monitoring data and more inclusive emissions inventories, utilized a more recent growth projection model and better accounts for the impacts of federal programs than ASIP's 2002 model run.

Imbedded in the ASIP and LADCO regional modeling outputs are many assumptions derived from planned reductions of direct PM<sub>2.5</sub> and precursor emissions. These include reductions from federal rules and other regulations that are thought to have an impact on

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ambient concentrations of PM<sub>2.5</sub>. The following assumptions were used in the ASIP and LADCO regional models.

**ASIP Assumptions** – CAIR; Clean Air Mercury Rule; NO<sub>x</sub> SIP Call; NC Clean Smokestacks Act; Consent Agreements (TECO, VEPCO, Gulf Power Crist7); 1-hr ozone SIPs (Atlanta / Birmingham / Northern Kentucky); NO<sub>x</sub> RACT; Heavy-Duty Diesel (2007) Engine Standard; Tier 2 Tailpipe; Large Spark Ignition and Recreational Vehicle Rule; Nonroad Diesel Rule; Industrial Boiler/Process Heater/RICE MACT; Combustion Turbine MACT; VOC 2-, 4-, 7- and 10-year MACT Standards.

**LADCO Assumptions** – Tier II/Low sulfur fuel; Inspection/Maintenance programs (nonattainment areas); Reformulated gasoline (nonattainment areas); Federal control programs incorporated into NONROAD model (e.g. Nonroad Diesel Rule) and evaporative Large Spark Ignition and Recreational Vehicle standards; Heavy-Duty Diesel (2007) Engine Standard/Low sulfur fuel; Federal railroad/locomotive standards; Federal commercial marine vessel engine standards; Title IV (Phases I and II); NO<sub>x</sub> SIP Call; CAIR; VOC 2-, 4-, 7- and 10-year MACT standards; Combustion turbine MACT; Industrial boiler/process heater/RICE MACT; Miscellaneous consent decrees and settlement agreements; Aerosol coatings (new rule); Architectural and industrial maintenance (AIM) coatings (amendments); Household and institutional consumer products (amendments); Portable fuel containers (Mobile Source Air Toxics Rule).

The model protocols for ASIP and LADCO can be viewed on the District’s website at, <http://www.louisvilleky.gov/APCD/TaskForce/AQTFPMDocuments.htm>.

### 5.2.2.2 Projected PM<sub>2.5</sub> Design Values

Future design values (DVF) were modeled for those monitors in the ASIP and LADCO regional modeling domains, which include the Louisville nonattainment area. Table 5-2 shows projected PM<sub>2.5</sub> design values from ASIP and LADCO modeling for local monitors.

**Table 5-2. Future Design Values for Local Monitors.**

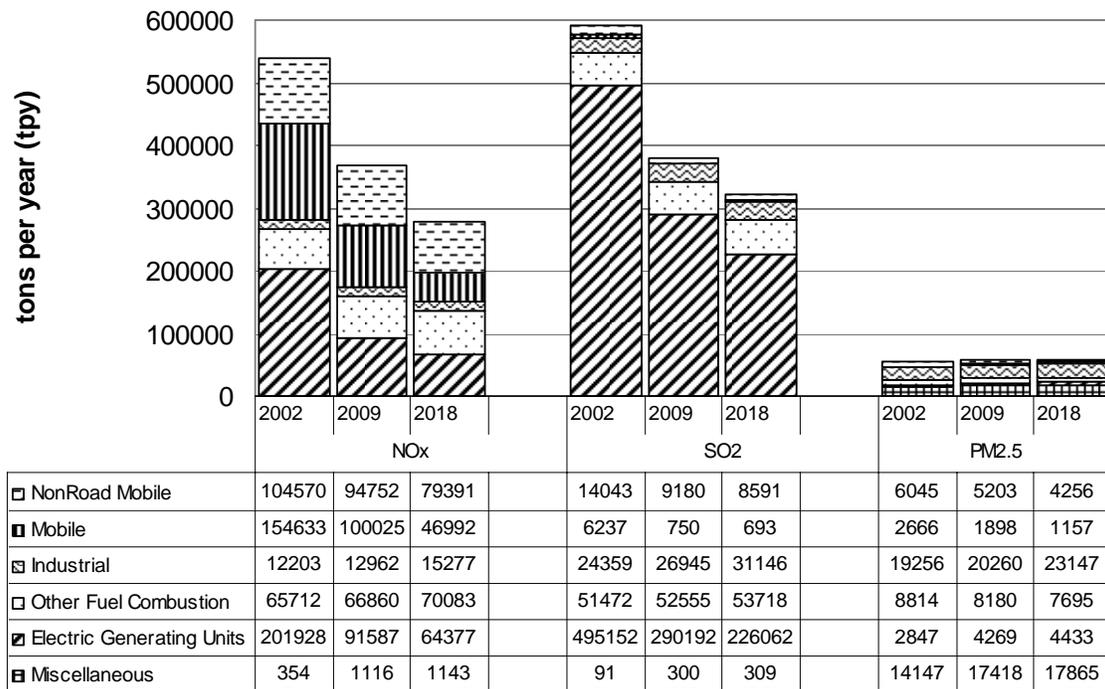
Monitor	LADCO Base DV	LADCO 2009 DVF	LADCO 2018 DVF	ASIP Base DV	ASIP 2009 DVF	ASIP 2018 DVF
18-019-0005/6 Clark County, IN	16.5	13.6	13.2	16.8	15.0	14.1
18-043-1004 Floyd County, IN	14.9	12.1	11.5	14.9	13.1	12.3
21-029-0006 Bullitt County, KY	14.9	12.4	12.0	14.9	13.2	12.2
21-111-0043 Jefferson County, KY	15.7	12.8	12.1	---	---	---
21-111-0044 Jefferson County, KY	15.4	12.8	12.4	16.6	14.9	14.1
21-111-0048 Jefferson County, KY	15.2	12.5	12.1	16.1	14.3	13.5
21-111-0051 Jefferson County, KY	14.7	12.1	11.7	15.4	13.8	12.9
18-083-0004 Knox County, IN*	14.1	11.6	11.1	---	---	---
21-043-0500 Carter County, KY*	12.2	9.9	9.5	12.2	10.3	8.9

\* Background Monitors for Indiana and Kentucky

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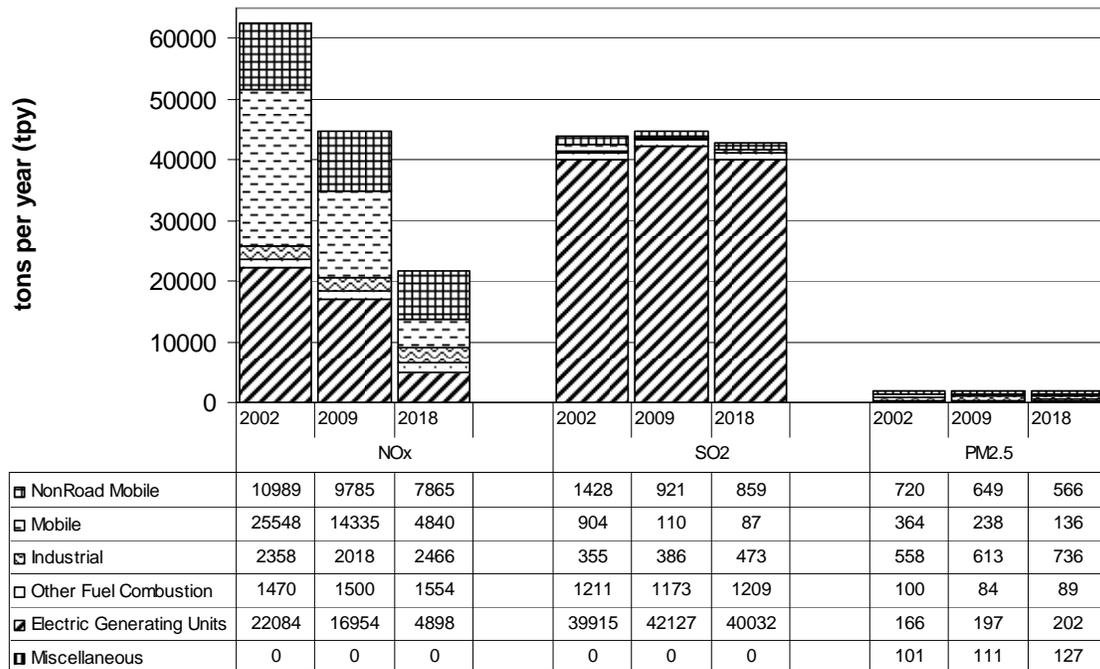
### 5.2.2.3 Emissions Inventory Data

ASIP projected 2009 and 2018 emissions summaries for all counties in the ten ASIP member states. Figures 5-8 and 5-9 compare these projected emissions summaries with actual inventory data from base year 2002 for the state of Kentucky and Jefferson County, Kentucky respectively. The Committee noted the similarity in state and county level trends in NO<sub>x</sub> and PM<sub>2.5</sub> reductions. The Committee also noted the difference in reduction trends between state and county emissions of SO<sub>2</sub>. Controls for SO<sub>2</sub> emissions are being added at many utilities around the state in compliance with Phase I of CAIR. For utilities in Jefferson County, SO<sub>2</sub> controls were added to all units prior to base year 2002, which explains the different trends shown in these figures.



**Figure 5-8. ASIP 2002, 2009 and 2018 Emissions for the state of Kentucky.**

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**Figure 5-9. ASIP 2002, 2009 and 2018 Emissions for Jefferson County, KY.**

### 5.3 Committee Recommendations

The Committee met on October 11, 2007 and reached consensus on the following recommendations to be presented to the full Task Force for its consideration.

The results presented to this committee from the ASIP and LADCO regional modeling groups project that the Louisville nonattainment area will achieve the annual PM<sub>2.5</sub> standard by the 2010 federal attainment deadline with existing and planned controls. Implementation of planned controls over the next decade will continue to decrease VOC, NO<sub>x</sub> and SO<sub>2</sub> emissions in the region and local PM<sub>2.5</sub> levels.

#### 5.3.1 Information Needs

The scientific and regulatory communities' understanding of PM<sub>2.5</sub> emissions, atmospheric reactions and modeling capabilities is not as mature as other criteria pollutants such as ozone. The ability to accurately and precisely estimate direct PM<sub>2.5</sub> emissions has improved since 2002, but more work is needed. The following recommendations address improvements necessary in modeling and monitoring of PM<sub>2.5</sub> to more accurately reflect an area's issues and to identify appropriate control strategies.

#### Recommendation 1:

*The District should work with EPA, the states of Kentucky and Indiana and local sources to improve methods to estimate local sources of PM<sub>2.5</sub> emissions.*

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### **Recommendation 2:**

*The District should work with EPA and the states of Kentucky and Indiana to continue to fund existing, as well as increase the number of, PM<sub>2.5</sub> speciation monitors in the area so as to better understand the local and regional contributors of PM<sub>2.5</sub>.*

### **Recommendation 3:**

*The District should work with EPA, the regional modeling groups and local sources to conduct updated and more detailed regional and local modeling studies to gain a better understanding of the relative impact and timing of regional and local emission reductions, beyond planned controls, on local PM<sub>2.5</sub> concentrations after 2009.*

### **5.3.2 Data Collection Process**

The Committee did not have sufficient time during this process to collect, analyze and synthesize all the data that it would have liked in an effort to gain a full understanding of the relative contributors of PM<sub>2.5</sub> levels in the region. The Committee did not have time to investigate any projected emissions or modeling data beyond annual information for the Louisville nonattainment area.

### **Recommendation 4:**

*In future Task Force planning groups, the Emissions Inventory and Modeling Data Committee should start its deliberations months before other committees to have sufficient time to collect, analyze and synthesize needed information.*

### **5.3.3 Interpretation of Data**

Regional modeling predicts that the Louisville nonattainment area will reach attainment of the annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup> by the 2010 deadline. While the area is predicted to be in attainment, the Health Committee recommended that a goal more stringent than the annual PM<sub>2.5</sub> standard is necessary to protect public health in our community. A majority of the Health Committee suggested a range of 12 to 10 µg/m<sup>3</sup> as an appropriate health-based goal to be reached by 2018.

Additionally, source apportionment and urban excess data presented to the Committee suggests that by 2009, OC and SO<sub>4</sub> will be the two largest chemical constituents found in annual monitored PM<sub>2.5</sub> locally.

Based on this information, the Committee recommended the following starting points that may help the Louisville Metro area reach a more stringent health-based goal with the acknowledgement that multiple data gaps existed because of time and data availability constraints.

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### **Recommendation 5:**

*Based on the data reviewed, and the Health Committee recommendations, the District should pursue strategies to reduce the PM<sub>2.5</sub> precursor emissions from major regional sources within a range of 150 miles, so as to reach a design value below 12 µg/m<sup>3</sup> by 2018.*

### **Recommendation 6:**

*Based on current monitoring and modeling data from local and regional sources, the data suggest that an important component of PM<sub>2.5</sub> is local organic carbon. This suggests that pursuing local measures to reduce emissions of organic carbon may be worthwhile. The data also suggest that local SO<sub>2</sub> precursor emissions have less effect on the local PM<sub>2.5</sub> contribution in the area; therefore, measures for reducing sulfate contributions from sources outside the local area may be worthwhile.*

### **Recommendation 7:**

*The Lake Michigan Air Directors Consortium (LADCO) projected design values should be given as much, or more, weight as the Association for Southeastern Integrated Planning (ASIP) projections, because the LADCO modeling is based on 2005 inventory data, vs. 2002 for ASIP, and for the other reasons listed in Section 5.2.2.1.*

### **Recommendation 8:**

*The District should continue to monitor the progress of the regional modeling groups and other sources of PM<sub>2.5</sub> data utilized by Task Force to look for additional information that will assist the community in improving its understanding of PM<sub>2.5</sub> emissions and health impacts.*

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## Section 6 Report of the Stationary and Area Source Committee

### 6.1 Background

The Stationary and Area Source Committee (Committee) was formed to identify control measures in place in the community to reduce direct PM<sub>2.5</sub> and precursor emissions and determine whether additional control strategies could be implemented throughout the region to achieve early attainment of the annual PM<sub>2.5</sub> standard. The Committee met to review emissions data and interview representatives of several local stationary sources regarding current and future controls for direct PM<sub>2.5</sub> and precursor emissions. The Committee also completed an informal RACT/RACM assessment for stationary and area sources in the Louisville nonattainment area in accordance with the [Implementation Rule](#).

### 6.2 Committee Actions

The Committee reviewed data collected by the Emissions Inventory and Modeling Data Committee. Emissions inventories for Jefferson County, the state of Kentucky and the three nonattainment counties in southern Indiana were used to determine the top 90% of emitters for direct PM<sub>2.5</sub>, NO<sub>x</sub> and SO<sub>2</sub>. The Committee then developed a telephone questionnaire to learn more about current and planned future control strategies for these major sources of direct PM<sub>2.5</sub> and precursor emissions. The following questions were included in the control measures questionnaire administered by District staff:

1. What are the sources of PM<sub>2.5</sub>, NO<sub>x</sub> and SO<sub>2</sub> at your facility?
2. What assumptions are used in the calculation of emissions from these sources?
3. What control measures are currently in place for these sources?
4. Are there any plans for further reduction measures, mandatory or voluntary?
5. What are the costs associated with any future control measures?
6. What reductions are anticipated from the 2005 baseline emissions inventory?

District staff received responses to the questionnaire from several companies including Duke Energy, General Electric (GE) and Süd-Chemie Inc. Other companies, including E.ON U.S., Kosmos Cement Company (Kosmos) and OxyVinyls, presented information on emissions and control strategies directly to the Committee. The Committee considered this information during its RACT/RACM assessment.

The Committee used language from the [Implementation Rule](#) as a starting point for completing its RACT/RACM assessment of stationary and area sources for the Louisville nonattainment area. A copy of this language from the Implementation Rule is included as Appendix 5. The EPA starting point list was used in conjunction with EPA's [List of Potential Control Measures for PM<sub>2.5</sub> and Precursors](#), the National Association of Clean Air Agencies' (NACAA) [Controlling Fine Particulate Under the Clean Air Act: A Menu of Options](#) and responses to the control measures questionnaire to complete the assessment. Additionally, the Committee developed an evaluation matrix to aid in

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quantifying and prioritizing control strategies necessary to reach attainment of the annual standard. The matrix is included as Appendix 6.

### 6.3 Committee Recommendations

The Committee met on October 24, 2007 and reached consensus on the following recommendations to be presented to the full Task Force for its consideration.

#### 6.3.1 Stationary Diesel Engines

There are large numbers of stationary diesel engines throughout Jefferson County. These engines mainly serve as emergency generators which run less than 500 hours per year. The particulate emissions from stationary diesel engines are regulated under the District's Strategic Toxic Air Reduction program and controlling this source for toxics emissions will satisfactorily control for direct PM<sub>2.5</sub> emissions.

The Committee also discussed emission reductions from switching to ultra low sulfur diesel (ULSD) fuel, which could significantly reduce SO<sub>2</sub> emissions from stationary engines. There are federal regulations in place that require the phase-in of ULSD in nonroad sources. However, the Committee was reluctant to recommend that ULSD be used in all stationary diesel engines because of concerns about increased cost and the reliability of supply.

##### **Recommendation 1:**

*The District should continue to address pollution from stationary diesel engine sources through compliance with Strategic Toxic Air Reduction (STAR) regulations ([DR 5.21](#) and [DR 5.22](#)).*

#### 6.3.2 Emission Controls for Direct PM<sub>2.5</sub>

##### 6.3.2.1 Direct PM<sub>2.5</sub> Controls for Electric Generating Units

The Committee received responses to the control measures questionnaire from Kentucky and Indiana utilities regarding current controls for direct PM<sub>2.5</sub> and definitive plans for future control measures. E.ON U.S, which operates several local utilities across Kentucky, has electrostatic precipitators (ESPs) on all units operating across the state of Kentucky including Mill Creek and Cane Run Stations, located in Jefferson County. Duke Energy, which operates the Gallagher Station in Floyd County, Indiana, is in the process of installing baghouse controls on all four units which should be completed by May 2008.

The Committee also considered contributions of PM<sub>2.5</sub> from regional sources including the Paradise Station in Muhlenberg County, Kentucky, which is operated by the Tennessee Valley Authority (TVA). TVA Paradise has three units, one of which has ESP controls. TVA removed ESPs from the other two units to make room for flue gas

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desulfurization (FGD) controls. The FGDs are used primarily to remove SO<sub>2</sub> from stack emissions. TVA reports that the FGDs may also reduce PM<sub>2.5</sub> emissions.

### **Recommendation 2:**

*Louisville Metro Government should encourage the Tennessee Valley Authority's (TVA's) Paradise Station to look at cost-effective controls for direct PM<sub>2.5</sub> in the future.*

### **6.3.2.2 Direct PM<sub>2.5</sub> Controls for Other Stationary Sources**

The Committee received responses to the control measures questionnaire from GE, OxyVinyls, Süd-Chemie and Kosmos. The following responses were considered by the Committee.

GE operates a landfill/natural gas boiler with a backup coal-fired boiler. It is GE's intent to eventually eliminate the use of coal in generating building heat and process steam. GE has obtained a permit from the District for the construction of an additional landfill/natural gas boiler, which will serve as a backup to the existing landfill/natural gas boiler.

OxyVinyls operates one natural gas boiler and two coal-fired boilers, which provide steam to OxyVinyls and three other companies. One coal-fired boiler, built in the 1980's, is controlled with a baghouse. The other coal-fired boiler, built in the 1960's is controlled with a multicyclone. The company estimates that the 1960's boiler is responsible for 80-85% of its total suspended particulate (TSP) emissions, which is equal to 50 tons per year (tpy). OxyVinyls researched adding controls to the 1960's boiler, including baghouse technology. Unfortunately, because of the proximity of this boiler to other structures, baghouse controls are cost prohibitive.

Süd-Chemie's direct PM<sub>2.5</sub> emissions come from the production of catalysts which is regulated under the District's STAR program. Unlike many industrial sources, a majority of Süd-Chemie's direct PM<sub>2.5</sub> emissions is valuable product. Süd-Chemie uses baghouses to reduce direct PM<sub>2.5</sub> emissions and is in the process of installing high efficiency particulate air (HEPA) filters after the baghouses, where needed, to improve its capture efficiency. This improvement is being made to comply with STAR.

Kosmos has made several improvements to its Louisville Metro facility since 2005, which the company reports has reduced emission of direct PM<sub>2.5</sub>. In 2005, baghouse dust collectors were replaced, a clinker storage facility was added and a truck wash was installed. In 2006, the company paved and curbed portions of the property and purchased a new sweeper to control dust from its outdoor operations. Finally, in 2007, Kosmos installed a wheel wash for trucks exiting the facility and submitted plans to convert from shaker to pulse jet dust collectors. Kosmos has permission from its corporate headquarters to purchase four pulse jet dust collectors and has begun the process to receive necessary permits from the District. Kosmos has over 100 dust collectors throughout its plant. These control devices are fitted with ten foot pleated dust collection

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bags. In February of 2008, the company plans to upgrade to twelve foot pleated bags, which will increase the efficiency of the controls. Additionally, most transfer operations are controlled with covers and/or wet jets.

### **Recommendation 3:**

*The District should prescreen permit applications and give review priority to pollution prevention projects, especially those that could reduce direct PM<sub>2.5</sub> and precursor emissions.*

### **Recommendation 4:**

*The District should review the current backlog of construction permit applications for pollution prevention projects that could reduce direct PM<sub>2.5</sub> and precursor emissions. If any construction permit applications that meet this criteria are identified, the District should prioritize review of these applications so that a decision is made before the end of 2007 so that, if approved, these projects can be installed in early 2008.*

### **Recommendation 5:**

*The District should consider working in voluntary partnership with the owners of non-utility coal-fired boilers to research the cost-effectiveness of converting these boilers to alternative fuels and/or installing additional direct PM<sub>2.5</sub> control devices.*

## **6.3.3 Improved Capture of Particulate Emissions**

EPA intended this category of the RACT/RACM analysis to consider the improved containment of pollutants by ductwork that delivers the gas stream to the control device. The Committee agreed that the District should continue to be mindful, in inspection and permitting processes, of situations where greater capture efficiency to control devices can be achieved; however, it believed that sufficient control measures are in place where necessary and did not wish to set forth any recommendations at this time.

## **6.3.4 Emissions Controls for PM<sub>2.5</sub> Precursors**

### **6.3.4.1 PM<sub>2.5</sub> Precursor Controls for Electric Generating Units**

As noted above, the Committee received responses to the control measures questionnaire from Kentucky and Indiana utilities. The following responses from E.ON U.S. and Duke Energy were considered by the Committee.

All E.ON U.S. units operating in Jefferson County, KY are controlled for SO<sub>2</sub> and NO<sub>x</sub> emissions. At the Mill Creek and Cane Run Stations, all units are controlled with an FGD system, which reduces the company's SO<sub>2</sub> emissions. E.ON U.S. controls NO<sub>x</sub> emissions at its Cane Run Station with low NO<sub>x</sub> burners on all units. At the Mill Creek Station, two units are controlled with low NO<sub>x</sub> burners and two units are controlled with selective catalytic reduction (SCR). These SCRs are only operated from May through September.

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E.ON U.S. plans to operate the SCRs year round, beginning in 2009, to comply with CAIR requirements. Additionally, E.ON U.S. plans to voluntarily operate the SCRs approximately one extra month per unit in 2008. The District suggested that an extra month at the end of its scheduled operation would be more beneficial than an extra month at the beginning of the schedule. A complete list of E.ON U.S.'s current and planned control measures is included as Appendix 7.

Duke Energy's Gallagher Station does not have SO<sub>2</sub> controls or plans for future controls. All units at the Gallagher Station operate with low NO<sub>x</sub> burners and there are no plans to upgrade these controls in the foreseeable future. A detailed list of current and planned control measures for Indiana utilities is included as Appendix 8.

The majority of the Committee agreed that current and planned measures required to meet federal CAIR reductions sufficiently address RACT/RACM for electric generating unit (EGU) sources and that additional controls were not necessary in light of significant regional reductions to be observed with CAIR implementation. Two Committee members noted that local EGUs account for the majority of precursor emissions in the Louisville nonattainment area, and believed that local EGUs, such as Cane Run and Gallagher Stations, should be urged to make further emission reductions through increased control efficiencies or installation of modern controls to pursue attaining cleaner air than that achieved by meeting the minimum required by federal standards.

### **Recommendation 6:**

*E.ON U.S. and Duke Energy should continue to install control devices according to their current schedules, set forth to comply with Clean Air Interstate Rule (CAIR) requirements.*

### **Recommendation 7:**

*The District should encourage electric generating units (EGUs) to achieve as many early reduction credits as possible for 2007 and/or 2008.*

### **6.3.4.2 PM<sub>2.5</sub> Precursor Controls for Other Stationary Sources**

As noted above, the Committee received several responses to the control measures questionnaire. The following responses from GE, OxyVinyls and Kosmos were considered by the Committee.

GE operates one coal-fired boiler as a backup heat and energy source. The company plans to eventually eliminate the use of coal in its operation completely. Along with reduction of direct PM<sub>2.5</sub> emissions, conversion from coal-fired to landfill/natural gas boilers should also reduce PM<sub>2.5</sub> precursor emissions.

OxyVinyls considered replacing its 1960's coal-fired boiler with a natural gas boiler. The company estimated reductions of 75 tpy of NO<sub>x</sub> and 261 tpy of SO<sub>2</sub>. Based on a cost analysis, the company concluded that it can not afford to replace the 1960's coal-fired boiler.

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Kosmos installed a water sprayer in its cement kiln, which reduces thermal NO<sub>x</sub> coming from the main front burner. The company is interested in using selective non-catalytic recovery (SNCR) units to reduce NO<sub>x</sub> emissions an additional 30 to 40%. Kosmos has begun the process to receive the necessary permits from the District to install these controls. Additionally, in May 2008 Kosmos plans to test used tires as a fuel source for the cement kiln. The trial will measure the possible reduction of NO<sub>x</sub> emissions. If successful, tires could replace coal in the cement kiln permanently.

### **Recommendation 8:**

*The District should consider working in voluntary partnership with the owners of non-utility coal-fired boilers to research the cost-effectiveness of converting to alternative fuels and/or installing additional NO<sub>x</sub> and SO<sub>2</sub> control devices.*

#### **6.3.4.3 Reduced Sulfur Content of Fuels**

The Committee determined that all coal-fired boilers in Jefferson County, Kentucky that are operating without FGD controls are required to burn low-sulfur coal. Those boilers in Jefferson County, Kentucky operating with FGD controls, including two E.ON U.S. facilities and a unit at American Synthetic Rubber Corporation (ASRC) are not required to burn low-sulfur coal. The E.ON U.S. facilities operate using coal with varying higher-sulfur contents. ASRC uses low-sulfur coal. The Committee agreed that low-sulfur coal is utilized where necessary and did not wish to set forth any recommendations at this time.

#### **6.3.5 Energy Efficiency Measures**

The Committee recognized that increasing energy efficiency can indirectly reduce direct PM<sub>2.5</sub> and precursor emissions. A decrease in energy use leads to a decrease in energy production, which reduces direct PM<sub>2.5</sub> and precursor emissions from the burning of fossil fuels. The Committee discussed the evolution of energy efficiency measures in the Louisville nonattainment area over time. It was noted that historically, industrial operations have been implementing energy efficiency measures mainly because these measures translate into direct cost savings for the companies. Committee members also agreed that a general move toward energy efficiency in the commercial sector is underway but there is still room for improvement in the residential sector.

[A study by the Kentucky Pollution Prevention Center \(KPPC\) and the American Council for an Energy Efficient Economy](#) was presented to the Committee indicating substantial untapped potential for more cost-effective energy efficiency measures to be implemented in the commercial and industrial sectors. Specifically, it lists 11 measures in the industrial sector which could cut Kentucky's industrial electricity usage by 15.5% at a cost of 3 cents per kilowatt hour (KWh) or less. According to the study, similar opportunities for more efficiency are possible in the commercial and residential sectors.

The Committee heard presentations from E.ON U.S. and Duke Energy on the implementation of demand side management (DSM) programs to capture the largely untapped energy efficiency possibilities in the residential sector. E.ON U.S.'s DSM

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program includes programs, offerings and activities to reduce residential, business and industrial energy use. In addition, E.ON U.S. continues to increase its program and is working on several new DSM offerings. Duke Energy's DSM program incorporates services, products, rebates, educational tools and other programs tailored to its residential, business and industrial customers. Complete listings of DSM programs for E.ON U.S. and Duke Energy are included as Appendix 9.

The Committee also discussed other large scale energy efficiency initiatives throughout the community. PGC, which includes representatives from U of L, JCPS and Louisville Metro Government, is promoting energy efficiency measures throughout the partnering entities. The Energy Use Partnership (EUP), a committee of the PGC, has the goal of reducing energy usage in all three institutions by seeking out new technologies, practices and other opportunities for energy savings and by sharing this information among the participants. All of the partners have already undertaken projects to reduce their energy usage and are continuing to incorporate energy efficiency technologies and policies into their institutions' practices. Several examples of these projects are discussed below.

Louisville Metro Government has nearly completed a citywide project to convert all Metro-owned traffic lights from incandescent bulbs to light-emitting diodes (LEDs). These LEDs are energy efficient and reduce consumption by an average of 80%. Additionally, they save time and money by lowering maintenance costs significantly. LEDs last six or more years instead of an incandescent bulb's lifespan of eight to twelve months. This retrofit project is expected to save 7.5 million kilowatt hours, enough to power 750 homes for a year. Additionally, Louisville Metro Government recently became an Energy Star Partner organization and committed to measure, track and improve the city's energy performance.

KPPC has performed energy audits on 17 PGC buildings. The purpose of these audits is to identify building conditions that are not optimal for energy efficiency and to prioritize the correction of these conditions based on cost and payback.

U of L has installed Vending Misers on several beverage machines around campus. The Vending Miser is a device that can be added to any cold beverage vending machine to conserve electricity. By sensing the ambient temperature around the machine, as well as whether there is anyone in the vicinity of the machine, the Vending Miser will power the machine down when it is not necessary to cool the product or illuminate the sign. U of L will potentially save thousands of dollars a year from reduced electric consumption by these machines, without affecting the quality of the product delivered.

JCPS has been exploring ways to take advantage of available solar resources. JCPS conducted pilot projects to test daylight harvesting ballasts and solar reflectors that throw sunlight from windows further into a classroom. After the results of these pilot projects were analyzed, JCPS decided that these technologies could be incorporated into new building construction and possibly even building renovations. JCPS has already installed and is operating a solar water heater at its Churchill Park Rehabilitation Center and plans are underway to include this technology in two new buildings. An early adopter in the

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area of energy efficiency, JCPS has been investigating ways to incorporate energy saving technologies into buildings as they are built, a much more cost-effective alternative to retrofitting. This includes improvements to the building's thermal envelope, more efficient HVAC technologies and lighting upgrades. A list of many of the projects planned for JCPS is included in Appendix 9.

**Recommendation 9:**

*In the funding decisions of the Partnership for a Green City (PGC) entities, priority should be given to energy efficiency projects as specified by the committees of the PGC.*

**Recommendation 10:**

*The Partnership for a Green City (PGC) entities should increase funding for facility audits to determine where energy efficiency projects are needed most.*

**Recommendation 11:**

*The Board should encourage existing funding entities to increase funding of Project Warm.*

**Recommendation 12:**

*A partnership should be created, among state and local agencies and chambers of commerce, to increase awareness of and participation in electric utilities' demand side management (DSM) programs.*

**Recommendation 13:**

*The District should explore partnership opportunities with companies specializing in energy efficient products and services to increase awareness of the benefits of energy efficiency for industrial, commercial and residential customers.*

**Recommendation 14:**

*The District should work with Louisville, Kentucky and Indiana Home Builders Associations to educate members on the economic and environmental benefits of incorporating energy efficiency measures into building projects.*

**Recommendation 15:**

*The District should develop and implement a recognition program to reward energy efficiency initiatives and achievements throughout the community on a variety of scales.*

### **6.3.6 Measures to Reduce Fugitive Dust**

The Committee reviewed the District's regulation to control fugitive particulate emissions. While this regulation is not specific to emissions of PM<sub>2.5</sub>, enforcement of the regulation will help to reduce direct PM<sub>2.5</sub> emissions. The regulation outlines preventative measures that must be taken to control fugitive dust from materials handling activities, unpaved roads and parking areas and other activities as specified.

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### **Recommendation 16:**

*The District should continue enforcement of its regulation to control fugitive particulate emissions ([DR 1.14](#)).*

### **6.3.7 Open Burning**

The Committee reviewed regulations regarding open burning throughout the Louisville nonattainment area. Jefferson County, Kentucky bans open burning without a permit from the District. The state of Kentucky allows for open burning in certain instances but restricts most open burning in PM<sub>2.5</sub> nonattainment areas from May to September. Open burning is totally banned in Clark and Floyd Counties in Indiana and no variances for residential open burning are granted in these counties. The state of Indiana allows for open burning in certain instances but restricts burning on air pollution alert days.

### **Recommendation 17:**

*The District should continue enforcement of its regulation on control of open burning ([DR 1.11](#)).*

### **Recommendation 18:**

*The Kentucky Division for Air Quality (KY DAQ) should continue to enforce its regulation regarding open burning and should amend that regulation to prohibit all open burning of household waste and debris. ([401 KAR 63:005](#)).*

### **Recommendation 19:**

*The Kentucky Division for Air Quality (KY DAQ) should consider amending its regulation to ban open burning in areas in nonattainment of the federal primary annual standard for PM<sub>2.5</sub>.*

### **Recommendation 20:**

*In the interim, when authorizing open burning in areas in nonattainment of the federal primary annual standard for PM<sub>2.5</sub>, the Kentucky Division for Air Quality (KY DAQ) should consider the local projected ambient concentration of PM<sub>2.5</sub> in its decision making.*

### **6.3.8 Woodstoves, Fireplaces and Wood Boilers**

The Committee discussed the impact of woodstoves, fireplaces and wood boilers on the nonattainment of this area. Collectively, the impact from all these sources appears to be relatively low. However based on information from EPA, replacing twenty non-certified, older woodstoves with twenty EPA-certified woodstoves can prevent the emissions of one ton of fine particulate matter per year. The Committee determined that the potential for significant emission reductions from this source category exists and steps should be taken to reduce these emissions where possible.

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**Recommendation 21:**

*The District should increase public awareness of the effects of the use of fireplaces and woodstoves on ambient concentrations of PM<sub>2.5</sub> and NO<sub>x</sub>*

**Recommendation 22:**

*The District should promote EPA's Great American Woodstove Changeout program.*

**Recommendation 23:**

*The District should increase outreach on the benefits of switching from woodstoves, fireplaces and wood boilers to more efficient sources of heat.*

### **6.3.9 Charbroiling and Other Commercial Cooking Operations**

The Committee determined that commercial charbroiling and cooking operations account for approximately 10% of total area source PM<sub>2.5</sub> emissions within Jefferson County, Kentucky. However, the Committee believed strongly that they could not determine the feasibility of control measures for this source category without speaking to representatives from local restaurant associations.

**Recommendation 24:**

*The District should meet with local restaurant associations to discuss potentially feasible and cost-effective PM<sub>2.5</sub> control measures that that could reduce PM<sub>2.5</sub> emissions from restaurants in Louisville Metro and southern Indiana, particularly those with commercial charbroilers.*

### **6.3.10 Use of Consumer Products**

The Committee determined that the use of solvents containing organic compounds such as toluene, xylene and trimethyl benzene in commercial and household applications did not appear to contribute significantly to total area source PM<sub>2.5</sub> and precursor emissions in Jefferson County, Kentucky. However, the Committee believed that through education and outreach reductions may be achieved.

**Recommendation 25:**

*Through outreach, the District should increase public awareness of alternatives to residential solvent usage and the benefits of avoiding household products containing organic compounds such as toluene, xylene and trimethyl benzene.*

### **6.3.11 Charcoal Grilling**

Although not included in the EPA starting point list, the Committee found that backyard charcoal grilling accounted for as much as 63% of direct PM<sub>2.5</sub> and 11% of NO<sub>x</sub> emissions from area sources in Jefferson County, Kentucky. Methods for estimating area source emissions are included in Section 5.2.1.2 of this Report.

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### **Recommendation 26:**

*The District should increase public awareness of the effects of charcoal grilling on ambient concentrations of PM<sub>2.5</sub> and NO<sub>x</sub>.*

### **Recommendation 27:**

*The District should develop and implement a program to encourage replacement of charcoal grills in Jefferson County with gas and/or electric units through a rebate system similar to the Lawn Care for Cleaner Air program.*

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## Section 7 Report of the Mobile and Nonroad Mobile Source Committee

### 7.1 Background

The Mobile and Nonroad Mobile Source Committee (Committee) was formed to identify control measures in place in the community to reduce direct PM<sub>2.5</sub> and precursor emissions and determine whether additional control strategies could be implemented throughout the region to achieve early attainment of the annual standard. The Committee met to review emissions data and interview representatives of several large local fleets regarding current and future controls for direct PM<sub>2.5</sub> and precursor emissions. The Committee also completed an informal RACT/RACM assessment for mobile and nonroad mobile sources in the Louisville nonattainment area in accordance with the [Implementation Rule](#).

### 7.2 Committee Actions

The Committee reviewed PM<sub>2.5</sub> and precursor source apportionment data, collected by the Emissions Inventory and Modeling Data Committee, for mobile and nonroad mobile sources to determine the source categories of greatest concern in Jefferson County, Kentucky. Onroad mobile<sup>5</sup> sources were easily broken into four major vehicle categories including light- and heavy-duty diesel and light- and heavy-duty gasoline. For nonroad mobile<sup>6</sup> sources, the top 90% of source categories were identified with the remaining considered as “other”. The Committee determined that Jefferson County, Kentucky nonroad mobile sources emit more direct PM<sub>2.5</sub> and SO<sub>2</sub> than mobile sources, while mobile sources are responsible for a majority of NO<sub>x</sub> emissions. The Committee also identified diesel vehicles and equipment, both onroad and nonroad, as the major sources of concern.

The Committee also reviewed the work of previous air quality task forces, stakeholder groups and committees. In 2006, the Board adopted a set of recommendations for reducing ozone precursor emissions to lower ambient ozone concentrations in the Louisville Metro area. In 2007, the STAR Regulation 5.30 Stakeholder Group produced a Report and Plan of Action to reduce emissions of and exposure to toxic air contaminants. Finally, PGC’s Climate Change Committee is working to reduce greenhouse gas emissions. The Committee noted that these efforts involve similar pollutants, issues and sources. The Committee determined that many of the recommendations developed through these processes may also reduce direct PM<sub>2.5</sub> and precursor emissions.

Representatives of several large local fleets gave presentations to the Committee on current and future planned efforts to reduce direct PM<sub>2.5</sub> and precursor emissions. The

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<sup>5</sup> Onroad mobile sources are motorized vehicles that are registered for use on public roads and highways, including automobiles, light- and heavy-duty trucks, buses and motorcycles.

<sup>6</sup> Nonroad mobile sources are motorized vehicles that are not registered for use on the public roads and highways or any other equipment with a fossil fuel-fired engine that is not a point source. Examples include aircraft, boats, railroad engines, construction equipment, and nonroad recreational equipment.

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representatives also helped the Committee to understand the investment and maintenance costs associated with certain control measures and technologies. The Committee heard presentations from the Transit Authority of the River City (TARC), JCPS, the Regional Airport Authority (RAA), the Kentucky Motor Transport Association (KMTA) and United Parcel Service (UPS). The Committee considered this information during its RACT/RACM assessment.

TARC has an active fleet of 255 vehicles (e.g. diesel and hybrid diesel-electric buses and trolleys) and contracts the operation of 90 paratransit vehicles. TARC operates nine hybrid diesel buses, which use approximately 20% less fuel than a traditional transit bus. As new hybrids are purchased, TARC replaces the oldest, dirtiest buses in the fleet. TARC reports that the use of hybrids in its fleet has significantly reduced its total emissions. The transit authority also began using ULSD two full years before mandated by the federal government and retrofitted its entire fleet with diesel oxidation catalysts (DOCs) in the late 1990's. TARC recently ordered six new buses that will be the first in the fleet to be fitted with diesel particulate filters (DPFs). TARC recognizes the pollutant reduction benefits of control technologies and continues to utilize these technologies in its fleet; however, TARC foresees the largest emission reductions coming from an increase in the use of public transit with a corresponding decrease in the use of single occupant vehicles.

JCPS has a large school bus fleet, with more than 1,150 diesel buses running more than 850 routes per day. JCPS reported that 648 of its buses are model year 2000 or newer and many of the older buses are used less frequently as a part of large spare fleet. The school system also operates a vehicle fleet of 471 cars and trucks, 246 of which are powered by diesel engines. Over its entire fleet, JCPS burns approximately 2.5 million gallons of fuel annually. In December 2006, JCPS began using a 2% biodiesel blend to fuel its entire diesel fleet. JCPS also has an idling policy that restricts idling at schools and limits idling at depots to that which is necessary for proper start up in cold weather. Through its maintenance program, JCPS ensures that all its buses have no more than a five pound variance in tire pressure, which helps to increase the fleet's fuel economy. Average turnover for the fleet is fifteen years and JCPS is considering purchasing hybrid school buses in the future to reduce total fleet emissions.

RAA is an independent, public agency that owns and operates Louisville International Airport and Bowman Field, both located in Louisville Metro. The larger of the two airports, Louisville International, has three active runways, 62,000 feet of taxiways and 325 acres of concrete apron. RAA leases space to commercial airlines and other major tenants. According to Airports Council International statistics (2006), Louisville International is the 68<sup>th</sup> busiest airport for passenger travel and the 4<sup>th</sup> busiest cargo airport, largely because of UPS's Worldport operation. Mobile emission sources at Louisville International include vehicles (e.g. taxis, buses, cars) while nonroad mobile sources include aircraft, ground support equipment (GSE), auxiliary power units (APU) and landscape maintenance equipment. In 2006, RAA published an emissions baseline for Louisville International, which outlines its contribution of criteria pollutants and HAPs to ambient concentrations. The inventory showed that the largest sources of direct

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PM<sub>2.5</sub> and NO<sub>x</sub> are the aircraft. The inventory also showed emissions from APUs and GSE. RAA is in the process of establishing an emissions baseline for Bowman Field. It anticipates using these baselines to apply for the Federal Aviation Administration's (FAA) Voluntary Airport Low Emissions (VALE) program, which offers grants toward capital expenditures aimed at reducing emissions from airport activities. RAA is also implementing a clean fuels program to use biodiesel in appropriate airport vehicles.

With approximately 450 members, KMTA supports the trucking industry through education, advocacy and career development. KMTA reported that the average local trucking company has a fleet of ten vehicles or less. There are 7,000 fleets in Kentucky with a combined gross weight of greater than 59,999 pounds per fleet. KMTA recognized a trend in the freight movement industry toward combining trucking and rail operations around the country. KMTA also noted that EPA's SmartWay program is not being used effectively in Jefferson County or the state of Kentucky. In its opinion, most carriers in this area are too small to take advantage of the program and there is a general lack of awareness of the benefits of programs like these. KMTA also reported on the use of emission reduction technologies throughout the industry. While effective, DOCs and DPFs are slow in being accepted industry wide. The use of APUs, which provide power to a truck when the main engine is shut off to reduce emissions, is increasing but is more common in over-the-road trucks than local fleets. Another popular upgrade is to replace the traditional double wide-base tires with single wide-base tires, which reduces the weight of the vehicle and increases fuel economy. Retrofitting a truck with single wide-base tires can be cost prohibitive and this upgrade is usually found on new trucks.

UPS operates its Worldport global distribution hub out of Louisville International Airport. The system of distribution at this hub has transitioned in recent years from a labor and equipment intensive operation to a totally automated system of loading and unloading. The Worldport expansion will eliminate the use of 38 diesel loaders and 38 diesel ground power units. As of December 2007, UPS is using a 5% biodiesel blend to fuel over 300 pieces of GSE. Additionally, UPS is considering alternative technologies available for nonroad equipment including fuel injection, 4-cylinder engines and nonroad vehicles certified to California Air Resources Board (CARB) standards.

The Committee used language from the [Implementation Rule](#) as a starting point for completing its RACT/RACM assessment of mobile and nonroad mobile sources for the Louisville nonattainment area. A copy of this language from the Implementation Rule is included as Appendix 5. The EPA starting point list was used in conjunction with EPA's [List of Potential Control Measures for PM<sub>2.5</sub> and Precursors](#) and NACAA's [Controlling Fine Particulate Under the Clean Air Act: A Menu of Options](#) to complete the assessment.

### **7.3 Committee Recommendations**

The Committee met on October 22, 2007 and reached consensus on the following recommendations to be presented to the full Task Force for its consideration.

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### 7.3.1 Onroad and Nonroad Diesel Retrofit, Rebuild or Replacement

**Recommendation 1:**

*Local government and quasi-governmental agencies should adopt a plan for retrofit or replacement of all diesel fleet vehicles and equipment with state-of-the-art technology and the use of alternative fuels.*

**Recommendation 2:**

*Louisville Metro Government's General Services Administration (GSA) should analyze the Metro fleet and create a plan to improve fleet emissions through diesel retrofit or replacement along with the use of alternative fuels.*

**Recommendation 3:**

*The Partnership for a Green City (PGC) entities should continue to move toward the use of alternative fuels and technologies, including retrofit and replacement options.*

**Recommendation 4:**

*The District should work with public and private fleet owners operating in Louisville Metro through education, incentives and grants to aggressively retrofit or replace both onroad and nonroad diesel fleets with state-of-the-art technology.*

**Recommendation 5:**

*State and local governments should create tax incentives, low interest loans and other financial incentives for the retrofit or replacement of onroad and nonroad diesel fleets.*

**Recommendation 6:**

*Louisville Metro Government should explore the creation of a Louisville Metro Environmental Grant Partnership to aggressively coordinate, apply for and receive federal and state grants to reduce direct PM<sub>2.5</sub> and precursor emissions from mobile and nonroad mobile sources. Federal political partnerships should be utilized to increase success.*

The Committee determined that marine and railroad operations are significant contributors of direct PM<sub>2.5</sub> and precursor emissions in Jefferson County, Kentucky. However, the federal Clean Air Act does not provide regulatory authority for local jurisdictions, like the District, to further restrict or regulate these transportation sectors. The Committee believes that meaningful reductions of direct PM<sub>2.5</sub> and precursor emissions from these sectors are possible and encourages reasonably available control measures be voluntarily taken at ports and switchyards throughout the Louisville nonattainment area.

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### **Recommendation 7:**

*The District should work in partnership with marine and railroad operations in the Louisville nonattainment area to identify and reduce direct PM<sub>2.5</sub> and precursor emissions.*

### **7.3.2 Diesel Idling Programs**

Louisville Metro and the states of Kentucky and Indiana do not have idling restrictions or regulations. The Committee discussed the connection between idling reduction, especially of diesel vehicles, and reductions of direct PM<sub>2.5</sub> and precursor emissions. The Committee agreed with the conclusion of the STAR 5.30 Stakeholder Group that an idling regulation is needed in this community. The Committee further addresses idling reduction in Section 7.3.3 of this Report.

### **Recommendation 8:**

*The District should initiate a stakeholder process for local adoption of an idling regulation with the proposed Draft Idle Reduction Regulation (included as Appendix 10) used as a starting point for discussion.*

### **7.3.3 Long-range Land Use and Transportation Planning Solutions**

The Committee discussed long-range land use and transportation planning solutions. Transportation control measures (TCMs), economic incentive packages (EIPs) and land use measures (LUMs) were all recognized by the Committee as tools that influence development patterns. The Committee considered that Louisville Metro could be eligible for SIP credits in these areas, but more information needs to be gathered from local agencies to make that determination. EPA endorses the creation of alternative growth scenarios that, when compared to business-as-usual scenarios, allow for quantification of TCMs, EIPs and LUMs for SIP credits. The Committee noted the importance of these data components for future task force committees charged with balancing emissions controls for stationary and mobile sources. Data on these topics and the framework necessary for cooperation between local agencies to obtain the requisite data does not currently exist.

### **Recommendation 9:**

*The District should cooperate with local and regional agencies to determine if any transportation control measures (TCMs), economic incentive packages (EIPs) and land use measures (LUMs) are currently being implemented that have not been included in the existing emissions budget and could be credited in the State Implementation Plan (SIP).*

### **Recommendation 10:**

*The District should cooperate with local and regional planning agencies to evaluate major subdivision proposals and development plan proposals for all emission components, projected changes in vehicle miles traveled (VMT),*

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*projected changes in average daily trips (ADT) and their corresponding impacts on the emissions budget.*

**Recommendation 11:**

*The District should cooperate with local and regional planning agencies to quantify the difference between emissions budgets that result from business-as-usual and alternative growth scenarios using comparison guidelines provided by EPA.*

**Recommendation 12:**

*Louisville Metro Government should cooperate with regional transportation and planning agencies to identify opportunities to spur transit-oriented development through the implementation of economic incentive packages (EIPs) and land use measures (LUMs).*

**Recommendation 13:**

*District staff, as part of its development review, should review and comment on a project's emissions related to PM<sub>2.5</sub> and precursors, ozone, air toxics, greenhouse gases and vehicle miles traveled (VMT).*

**Recommendation 14:**

*The District should recognize those businesses that have implemented Best Workplaces for Commuters (BWC) practices to reduce the total vehicle miles traveled (VMT) by employees.*

**Recommendation 15:**

*Continue strict enforcement of current speed limits throughout the Louisville nonattainment area to reduce emissions of direct PM<sub>2.5</sub> and precursors.*

The Committee also agreed with the following recommendations of the STAR 5.30 Stakeholder Group that address transportation planning measures to reduce vehicle idling and average commute duration.

**Recommendation 16:**

*Improve and expand traffic light signalization synchronization throughout Louisville Metro to reduce average commute length and idling.*

**Recommendation 17:**

*Improve Traffic Response and Incident Management Assisting the River Cities (TRIMARC) incident management and roadside assistance to reduce idling on the highways.*

**Recommendation 18:**

*Encourage significant coordination among the Kentucky Transportation Cabinet (KTC), local transportation officials and private fleets during major highway repair or construction, including the Louisville-Southern Indiana Ohio River*

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*Bridges project, to develop plans to minimize traffic backups and delays to reduce idling and toxic emissions.*

### **7.3.4 Emission Reductions or Accelerated Retirement of High Emitting Lawn and Garden Equipment**

The Committee recognized the efforts of the District's Lawn Care for Cleaner Air program, which offers vouchers for the recycling of gasoline powered lawn care equipment and rebates toward the purchase of electric or battery powered mowers and string trimmers, reel mowers, electric blower/vacs and replacement batteries. The District also offers a manufacturer-sponsored rebate aimed at commercial users for purchase of Stihl's 4-stroke gasoline powered engine line of products.

#### **Recommendation 19:**

*The District should continue providing rebates, through the Lawn Care for Cleaner Air program, for the retirement of gasoline powered lawn and garden equipment and the purchase of low emissions equipment.*

#### **Recommendation 20:**

*The District should expand corporate sponsorship of the Lawn Care for Cleaner Air program to increase brands and products that are rebate eligible.*

### **7.3.5 Emissions Testing and Repair/Maintenance Programs**

The Committee discussed the effectiveness of vehicle emissions testing programs at reducing direct PM<sub>2.5</sub> and precursor emissions. However, in light of state law restricting mandatory vehicle emissions testing, the Committee did not consider this measure to be a viable recommendation. Other maintenance programs including on-board diagnostic and tire pressure checks were also discussed.

#### **Recommendation 21:**

*The District should consider including as contingency measures in the State Implementation Plan (SIP) for the annual PM<sub>2.5</sub> standard those onroad and nonroad mobile contingency measures from the 8-hour Ozone SIP that will also reduce direct PM<sub>2.5</sub> and precursor emissions.*

#### **Recommendation 22:**

*Provide free tire pressure stations, free air, free on-board diagnostics checks and free gas caps to promote increased fuel economy and reduce emissions of direct PM<sub>2.5</sub> and precursors.*

### **7.3.6 Clean Burning Fuel Programs**

The Committee also agreed with the following recommendations of the STAR 5.30 Stakeholder Group that address the use of alternative fuels and technologies to reduce direct PM<sub>2.5</sub> and precursor emissions.

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**Recommendation 23:**

*Expand the use of alternative fuels and technologies by all municipal and transit fleets, both onroad and nonroad, in Louisville Metro within one year.*

**Recommendation 24:**

*Work in partnership with the Kentucky Petroleum Marketers Association, retailers, distributors and other stakeholders to evaluate, develop and achieve goals to provide biodiesel (ASTM standard) blends at retail stations throughout Louisville Metro.*

**Recommendation 25:**

*Develop a partnership, between rental car agencies and public and private entities utilizing rental fleets, to increase the use of biodiesel (ASTM standard) and/or alternative fuels and technologies in rental fleets.*

**Recommendation 26:**

*Create partnerships, tax incentives and other financial incentives to encourage the use of biodiesel (ASTM standard) and/or alternative fuels and technologies by private fleets.*

### 7.3.7 Contracting for Low Emissions Specifications

In light of the rapid development of Louisville Metro and the surrounding areas, the Committee discussed opportunities for emission reductions through the incorporation of preference in contracts for lower project emission profiles. Louisville Metro Government uses a request for proposal system to evaluate purchasing and/or contracting options. The Committee noted that this system allows for adequate consideration of preferences beyond price.

**Recommendation 27:**

*Louisville Metro Government should give preference to contractors that provide the best project emission profile through the use of diesel retrofits or newer equipment and alternative fuels.*

**Recommendation 28:**

*Encourage members of the Associated General Contractors (AGC) of Kentucky, The Association of Union Constructors (TAUC) and other trade associations to retrofit or replace both onroad and nonroad diesel equipment.*

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## Section 8 Report of the Report and Plan of Action Committee

### 8.1 Background

The Report and Plan of Action Committee (Committee) was formed to oversee documentation of the issues reviewed and the process undertaken by the Task Force to determine recommendations for reducing ambient concentrations of PM<sub>2.5</sub>. The work product of this Committee was this *Fine Particle Air Quality Task Force Report and Plan of Action*. District staff, with input from Task Force committees, drafted the majority of the language contained in the Report. The Report reflects the information presented to the Task Force and committees throughout the process. The committee report sections and the Plan of Action reflect specific discussions that led to consensus on recommendations by the respective committees and the Task Force as a whole.

### 8.2 Committee Actions

During initial meetings, the Committee discussed its role in the Task Force process and the operating timeline for the Task Force and committees. It also discussed and agreed upon the structure and content to be used in the Report. The Committee developed an outline for all sections of the Report, including background sections, committee reports, and the plan of action. The outline served as a reference for the District to begin drafting language to be included in the Report.

At subsequent meetings, the Committee reviewed and commented on sections of the Report, as they became available, to ensure consistent language and proper flow throughout the Report. The final Report was adopted by all Task Force members on December 20, 2007.

### 8.3 Committee Recommendations

On December 13, 2007, the Committee reached consensus on the following recommendations to be presented to the full Task Force for its consideration.

#### **Recommendation 1:**

*The Task Force should include the language included as Appendix 11 in Section 9.1 of the Report and Plan of Action.*

#### **Recommendation 2:**

*All recommendations included in Section 9 of the Report and Plan of Action should be prioritized by the Task Force.*

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## Section 9 Plan of Action

The preceding committee reports and recommendations were presented to the full Task Force for its consideration. Each committee recommendation was discussed thoroughly and modifications were made where necessary to reach consensus. During this process, numerous changes were made to committee recommendations, including consolidation, revision, broadening/narrowing of scope and elimination of recommendations. This Plan of Action reflects the consensus of the full Task Force. It includes recommended strategies for regional, state and local level implementation to reduce direct PM<sub>2.5</sub> and precursor emissions.

### 9.1 Leading Recommendations

In Section 8.3, the Report and Plan of Action Committee proposed eight leading recommendations (included as Appendix 11) to be given priority during the implementation process and recommended that the Task Force consider assigning priority to all consensus recommendations. While time did not allow for the prioritization of all consensus recommendations, the Task Force adopted the proposed leading recommendations with one exception, a substitution for Leading Recommendation 6.

The following recommendations include strategies that should be given priority for implementation. These recommendations represent a diverse group of strategies addressing the full breadth of issues considered by the Task Force and its committees. It should be noted that the following eight recommendations were selected from the full list of 63 recommendations which are presented, without exclusion, in Sections 9.2 and 9.3 below.

#### **Leading Recommendation 1:**

*Building upon the Clean Air Act (CAA) principle that ambient concentrations of PM<sub>2.5</sub> should be reduced to levels sufficient to protect public health with an adequate margin of safety, reductions below the federal primary annual standard of 15 µg/m<sup>3</sup> are advisable to provide an additional margin of safety that allows and compensates for scientific uncertainty, including the potential health impacts on sensitive populations. To achieve these reductions, the District should establish an ongoing and continuous process of review of all sources of PM<sub>2.5</sub> emissions (including onroad and nonroad mobile sources, area sources, stationary sources, etc.) and develop and implement policies, practices and standards to continue progress towards reducing ambient concentrations of PM<sub>2.5</sub> and precursors. In the development of such policies, practices and standards, stakeholder involvement should be an integral part of the process. Those strategies that achieve lower emissions of hazardous air pollutants (HAPs) and ozone precursors in conjunction with reducing PM<sub>2.5</sub> should be a priority and a strong emphasis should be placed on educational programs for the public.*

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### **Leading Recommendation 2:**

*The District should create a diverse stakeholder advisory committee to continue to focus and advise the Board on issues of air pollution, public health and environmental justice related to PM<sub>2.5</sub> and to strategize on policies, practices and programs to reduce PM<sub>2.5</sub> ambient concentrations, as outlined in Leading Recommendation 1.*

### **Leading Recommendation 3:**

*As a part of the ongoing process, a stakeholder group should be convened in 2010 to review peer-reviewed health literature, ambient monitoring data and modeling results to determine whether interim numeric goals are advisable to achieve continued progress towards the reduction of ambient PM<sub>2.5</sub> concentrations sufficient to protect public health with an adequate margin of safety. Six months prior to convening the 2010 review, committees responsible for synthesizing data shall be convened to have sufficient time to collect, analyze and synthesize needed information.*

### **Leading Recommendation 4:**

*The District should work with the states of Kentucky and Indiana to pursue and develop strategies to reduce the PM<sub>2.5</sub> precursor emissions from major regional sources within a range of 150 miles to achieve additional reductions in ambient PM<sub>2.5</sub> concentrations to protect public health.*

### **Leading Recommendation 5:**

*The District should work with public and private fleet owners operating in Louisville Metro through education, incentives and grants to aggressively retrofit or replace both onroad and nonroad diesel fleets with state-of-the-art technology that reduces emissions.*

### **Leading Recommendation 6:**

*The District should cooperate with local and regional planning agencies to evaluate major subdivision proposals and development plan proposals for all emission components (e.g. PM<sub>2.5</sub> and precursors, ozone, air toxics, greenhouse gases), projected changes in vehicle miles traveled (VMT), projected changes in average daily trips (ADT) and their corresponding impacts on the emissions budget.*

### **Leading Recommendation 7:**

*The District should initiate a stakeholder process for local adoption of onroad and nonroad idling regulations, with the proposed Draft Idle Reduction Regulation (included as Appendix 10) used as a starting point for discussion.*

### **Leading Recommendation 8:**

*Counties and municipalities within the Louisville nonattainment area should enact local ordinances to prohibit open burning. To the extent it is allowed, open*

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*burning should be restricted on days when PM<sub>2.5</sub> concentrations are forecasted to be unhealthy for sensitive populations.*

### 9.2 Recommendations for Regional and State Action

The following recommendations include those that can only be achieved with action from regional and state entities. Reductions below the federal standard would require a unified regional effort aimed at reducing direct PM<sub>2.5</sub> and precursor emissions.

#### 9.2.1 Currently Achievable

##### **Recommendation 1:**

*All regulated utilities should continue to install control devices according to their current schedules, set forth to comply with Clean Air Interstate Rule (CAIR) requirements.*

##### **Recommendation 2:**

*Local and regional authorities should strictly enforce current speed limits throughout the Louisville nonattainment area to reduce emissions of direct PM<sub>2.5</sub> and precursors.*

Kentucky and Indiana have state regulations on open burning. Within the Louisville nonattainment area, open burning is strictly prohibited in Clark and Floyd Counties in Indiana. Jefferson County, Kentucky, also restricts open burning through regulation. Because direct emissions of PM<sub>2.5</sub> from open burning can affect local ambient air quality, the Task Force recommends several strategies to reduce open burning throughout the entire Louisville nonattainment area. Issues of enforcement and response times were discussed and the Task Force determined that additional local ordinances could enhance state efforts to restrict open burning.

##### **Recommendation 3:**

*The Kentucky Division for Air Quality (KY DAQ) and the Indiana Department of Environmental Management (IDEM) should continue to enforce regulations regarding open burning (401 KAR 63:005 and 326 IAC 4)*

#### 9.2.2 Achievable in the Short-term

##### **Recommendation 4:**

*Counties and municipalities within the Louisville nonattainment area should enact local ordinances to prohibit open burning. To the extent it is allowed, open burning should be restricted on days when PM<sub>2.5</sub> concentrations are forecasted to be unhealthy for sensitive populations.*

##### **Recommendation 5:**

*The Kentucky Division for Air Quality (KY DAQ) should consider amending its regulation to ban open burning in areas in nonattainment of the federal primary*

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*annual standard for PM<sub>2.5</sub> and to prohibit all burning of household rubbish and waste.*

### 9.2.3 Achievable in the Long-term

#### **Recommendation 6:**

*Federal, state and local governments should create tax incentives, low interest loans and other financial incentives for the retrofit or replacement of onroad and nonroad diesel fleets.*

### 9.3 Recommendations for Louisville Metro Government Action

The following recommendations will require action by Louisville Metro Government. The Task Force recognizes that several of these recommendations are only achievable through regional collaboration initiated by Louisville Metro Government.

#### 9.3.1 Currently Achievable

#### **Recommendation 7:**

*The Partnership for a Green City (PGC) entities should continue to move toward the use of alternative fuels and technologies that reduce onroad and nonroad mobile emissions, including retrofit and replacement options.*

#### 9.3.2 Achievable in the Short-term

#### **Recommendation 8:**

*In the funding decisions of the Partnership for a Green City (PGC) entities, priority should be given to energy efficiency projects as specified by the committees of the PGC.*

The Stationary and Area Source Committee proposed a recommendation to address direct PM<sub>2.5</sub> emissions from a specific regional source generally thought to influence ambient concentrations of PM<sub>2.5</sub> in the Louisville nonattainment area. The Task Force believed that the recommendation should not be limited to a single source and should be expanded to include precursor emissions.

#### **Recommendation 9:**

*Louisville Metro Government should encourage all regional electric generating units (EGUs) to continue to look at cost-effective controls for direct PM<sub>2.5</sub> and precursor emissions in the future.*

#### **Recommendation 10:**

*Encourage significant coordination among the Kentucky Transportation Cabinet (KTC), the Indiana Department of Transportation (INDOT), the Kentuckiana Regional Planning and Development Agency (KIPDA), local transportation officials and private fleets during major highway repair or construction,*

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*including the Louisville-Southern Indiana Ohio River Bridges project, to develop plans to minimize traffic backups and delays to reduce emissions.*

### **Recommendation 11:**

*Louisville Metro Government should explore the creation of a Louisville Metro Environmental Grant Partnership to aggressively coordinate, apply for and receive federal and state grants to reduce direct PM<sub>2.5</sub> and precursor emissions from onroad and nonroad mobile sources. Federal political partnerships should be utilized to increase success.*

The Task Force discussed the many reasons for the use of alternative fuels and technologies, such as improving air quality, increasing fuel economy and reducing dependence on foreign oil. However the Task Force believed that only those alternative fuels and technologies that reduce air pollution emissions should be considered in this Report.

### **Recommendation 12:**

*Louisville Metro Government should give preference to contractors that provide the best project emission profile through the use of diesel retrofits or newer equipment and alternative fuels that reduce onroad and nonroad mobile emissions.*

### **Recommendation 13:**

*Louisville Metro Government's General Services Administration (GSA) should analyze the Metro fleet and create a plan to improve fleet emissions through diesel retrofit or replacement along with the use of alternative fuels that reduce onroad and nonroad mobile emissions.*

### **9.3.3 Achievable in the Long-term**

### **Recommendation 14:**

*Louisville Metro Government and quasi-governmental agencies should adopt a plan to accelerate the retrofit or replacement of all diesel fleet vehicles and equipment with state-of-the-art technology and the use of alternative fuels that reduce onroad and nonroad mobile emissions.*

### **Recommendation 15:**

*Create partnerships, tax incentives and other financial incentives to encourage the use of biodiesel (ASTM standard) or other alternative fuels and technologies that reduce onroad and nonroad mobile emissions by private fleets.*

### **Recommendation 16:**

*Louisville Metro Government should cooperate with regional transportation and planning agencies to identify opportunities to spur transit-oriented development through the implementation of economic incentive packages (EIPs) and land use measures (LUMs).*

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### **Recommendation 17:**

*Louisville Metro Government should work with the Kentucky Transportation Cabinet (KTC) and the Indiana Department of Transportation (IDEM) to improve and expand traffic signal synchronization throughout Louisville Metro to reduce average commute duration and idling.*

### **Recommendation 18:**

*Louisville Metro Government should work with the Kentucky Transportation Cabinet (KTC), the Indiana Department of Transportation (INDOT) and the Federal Highway Administration to improve Traffic Response and Incident Management Assisting the River Cities (TRIMARC) incident management and roadside assistance to reduce idling on the highways.*

### **Recommendation 19:**

*Louisville Metro Government should provide free tire pressure stations, free air, free on-board diagnostics checks and free gas caps to promote increased fuel economy and reduce emissions of direct PM<sub>2.5</sub> and precursors.*

### **Recommendation 20:**

*The Partnership for a Green City (PGC) entities should increase funding for facility audits to determine where energy efficiency projects are needed most.*

## **9.4 Recommendations for District Action**

The following recommendations will require action by the District. The Task Force recognizes that several of these recommendations are only achievable through collaborative efforts and partnerships initiated by the District.

### **9.4.1 Currently Achievable**

#### **Recommendation 21:**

*The District should continue to address pollution from stationary diesel engine sources through compliance with Strategic Toxic Air Reduction (STAR) regulations (DR 5.21).*

#### **Recommendation 22:**

*The District should make enforcement of its regulation on control of open burning (DR 1.11) a priority in 2008 and 2009.*

#### **Recommendation 23:**

*The District should make enforcement of its regulation to control fugitive particulate emissions (DR 1.14) a priority in 2008 and 2009.*

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### **Recommendation 24:**

*The District should continue providing rebates, through the Lawn Care for Cleaner Air Program, for the retirement of gasoline powered lawn and garden equipment and the purchase of low emissions equipment.*

In committee, consensus was reached for highlighting the regional modeling results from one regional planning organization over another based on the use of more recent data. While the majority of the Task Force agreed with the committee recommendation, one member of the Task Force cautioned against comparing results from two different regional models. While the two models project very different results, both models are technically sound and relevant to the Louisville nonattainment area, and thus, should be given proper consideration in the State Implementation Plan (SIP). The following recommendation represents the consensus of the full Task Force.

### **Recommendation 25:**

*Of the two regional modeling efforts considered by the Task Force, the District should give the Lake Michigan Air Directors Consortium (LADCO) projected design values as much, or more, weight as the Association for Southeastern Integrated Planning (ASIP) projections for reasons listed in Section 5.2.2.1.*

### **Recommendation 26:**

*Based on current monitoring and modeling data from local and regional sources, it may be worthwhile for the District to pursue local measures to reduce emissions of organic carbon in addition to measures outside the local area to reduce emissions of SO<sub>2</sub>, a precursor of sulfate formation.*

### **Recommendation 27:**

*The District should continue to monitor the progress of the regional modeling groups and other sources of PM<sub>2.5</sub> data utilized by the Task Force to look for additional information that will assist the community in improving its understanding of PM<sub>2.5</sub> emissions and health impacts.*

## **9.4.2 Achievable in the Short-term**

### **Recommendation 28:**

*Building upon the Clean Air Act (CAA) principle that ambient concentrations of PM<sub>2.5</sub> should be reduced to levels sufficient to protect public health with an adequate margin of safety, reductions below the federal primary annual standard of 15 µg/m<sup>3</sup> are advisable to provide an additional margin of safety that allows and compensates for scientific uncertainty, including the potential health impacts on sensitive populations. To achieve these reductions, the District should establish an ongoing and continuous process of review of all sources of PM<sub>2.5</sub> emissions (including onroad and nonroad mobile sources, area sources, stationary sources, etc.) and develop and implement policies, practices and standards to continue progress towards reducing ambient concentrations of PM<sub>2.5</sub> and precursors. In the development of such policies, practices and standards,*

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*stakeholder involvement should be an integral part of the process. Those strategies that achieve lower emissions of hazardous air pollutants (HAPs) and ozone precursors in conjunction with reducing PM<sub>2.5</sub> should be a priority and a strong emphasis should be placed on educational programs for the public.*

### **Recommendation 29:**

*The District should create a diverse stakeholder advisory committee to continue to focus and advise the Board on issues of air pollution, public health and environmental justice related to PM<sub>2.5</sub> and to strategize on policies, practices and programs to reduce PM<sub>2.5</sub> ambient concentrations, as outlined in Recommendation 28.*

The Task Force agreed that there is no theoretically safe level of PM<sub>2.5</sub> and that reducing ambient concentrations of PM<sub>2.5</sub> to levels below the federal standard would further protect public health and welfare. Several Task Force members initially supported the notion of setting a numeric health-based annual goal of 12 to 10 µg/m<sup>3</sup> by 2018. Several other members believed that setting an interim numeric goal was premature given the magnitude of emission reductions expected over the next few years with the implementation of federal rules, namely CAIR. In the end, many proponents of setting a numeric goal agreed that such an effort may be premature, noting that a goal more stringent than 12 to 10 µg/m<sup>3</sup> by 2018 may be necessary given the anticipated reductions for ambient PM<sub>2.5</sub>. The following recommendation represents consensus of the full Task Force on this issue.

### **Recommendation 30:**

*As a part of the ongoing process, a stakeholder group should be convened in 2010 to review peer-reviewed health literature, ambient monitoring data and modeling results to determine whether interim numeric goals are advisable to achieve continued progress towards the reduction of ambient PM<sub>2.5</sub> concentrations sufficient to protect public health with an adequate margin of safety. Six months prior to convening the 2010 review, committees responsible for synthesizing data shall be convened to have sufficient time to collect, analyze and synthesize needed information.*

### **Recommendation 31:**

*The District should work with the states of Kentucky and Indiana to pursue and develop strategies to reduce the PM<sub>2.5</sub> precursor emissions from major regional sources within a range of 150 miles to achieve additional reduction in ambient PM<sub>2.5</sub> concentrations to protect public health.*

### **Recommendation 32:**

*The District should cooperate with local and regional planning agencies to evaluate major subdivision proposals and development plan proposals for all emission components (e.g. PM<sub>2.5</sub> and precursors, ozone, air toxics, greenhouse gases), projected changes in vehicle miles traveled (VMT), projected changes in*

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*average daily trips (ADT) and their corresponding impacts on the emissions budget.*

**Recommendation 33:**

*The District should initiate a stakeholder process for local adoption of onroad and nonroad idling regulations, with the proposed Draft Idle Reduction Regulation (included as Appendix 10) used as a starting point for discussion.*

**Recommendation 34:**

*The District should prescreen permit applications and give review priority to pollution prevention projects, especially those that could reduce direct PM<sub>2.5</sub> and precursor emissions.*

**Recommendation 35:**

*The District should review the backlog of construction permit applications for pollution prevention projects that could reduce direct PM<sub>2.5</sub> and precursor emissions. If any construction permit applications that meet these criteria are identified, the District should prioritize review of these applications so that, if approved, these projects can be installed in early 2008.*

**Recommendation 36:**

*The District should encourage electric generating units (EGUs) to achieve as many early reduction credits as possible for 2008.*

**Recommendation 37:**

*The District should cooperate with local and regional agencies to determine if any transportation control measures (TCMs), economic incentive packages (EIPs) and land use measures (LUMs) are currently being implemented that have not been included in the existing emissions budget and could be credited in the State Implementation Plan (SIP).*

**Recommendation 38:**

*The District should consider including as contingency measures in the State Implementation Plan (SIP) for the annual PM<sub>2.5</sub> standard those onroad and nonroad mobile contingency measures from the 8-hour Ozone State SIP that will also reduce direct PM<sub>2.5</sub> and precursor emissions.*

**Recommendation 39:**

*The District should evaluate and employ existing mechanisms under the Clean Air Act (CAA) to address identifiable contributing sources of fine particulates and particulate precursors that interfere with attainment and maintenance of healthful air quality in the Louisville Metro community.*

**Recommendation 40:**

*The District should work with EPA, the regional modeling groups and local sources to conduct updated and more detailed regional and local modeling*

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*studies to gain a better understanding of the relative impact and timing of regional and local emission reductions, beyond planned controls, on local PM<sub>2.5</sub> concentrations after 2009.*

**Recommendation 41:**

*The District should explore partnership opportunities with companies specializing in energy efficient products and services to increase awareness of the benefits of energy efficiency for industrial, commercial and residential customers.*

**Recommendation 42:**

*The District should work with Louisville, Kentucky and Indiana Home Builders Associations to educate members on the economic and environmental benefits of incorporating energy efficiency measures into building projects.*

**Recommendation 43:**

*The Board should encourage existing funding entities to increase funding of Project Warm.*

**Recommendation 44:**

*The District should increase public awareness of the effects of charcoal grilling on ambient concentrations of PM<sub>2.5</sub> and NO<sub>x</sub>.*

**Recommendation 45:**

*The District should meet with Louisville and southern Indiana restaurant associations to discuss potentially feasible and cost-effective PM<sub>2.5</sub> control measures that that could reduce PM<sub>2.5</sub> emissions from local restaurants, particularly those with commercial charbroilers.*

**Recommendation 46:**

*The District should promote EPA's Great American Woodstove Changeout program.*

**Recommendation 47:**

*The District should increase public awareness of the effects of using fireplaces, woodstoves and wood boilers on ambient concentrations of PM<sub>2.5</sub> and NO<sub>x</sub> and the benefits of switching to more efficient sources of heat.*

**Recommendation 48:**

*The District should expand corporate sponsorship of the Lawn Care for Cleaner Air Program to increase brands and products that are rebate eligible.*

**Recommendation 49:**

*Through outreach, the District should increase public awareness of alternatives to residential solvent usage and the benefits of avoiding household products containing organic compounds such as toluene, xylene and trimethyl benzene.*

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### **Recommendation 50:**

*The District should recognize those businesses that have implemented Best Workplaces for Commuters (BWC) practices to reduce the total vehicle miles traveled by employees.*

### **Recommendation 51:**

*The District should encourage members of the Associated General Contractors (AGC) of Kentucky, The Association of Union Constructors (TAUC) and other trade associations to retrofit or replace both onroad and nonroad diesel equipment.*

### **9.4.3 Achievable in the Long-term**

### **Recommendation 52:**

*The District should work with public and private fleet owners operating in Louisville Metro through education, incentives and grants to aggressively retrofit or replace both onroad and nonroad diesel fleets with state-of-the-art technology that reduces emissions.*

### **Recommendation 53:**

*A partnership should be created, among state and local agencies and chambers of commerce, to increase awareness of and participation in electric utilities' demand side management (DSM) programs.*

### **Recommendation 54:**

*The District should develop and implement a recognition program to reward energy efficiency initiatives and achievements throughout the community on a variety of scales.*

### **Recommendation 55:**

*The District should consider working in voluntary partnership with the owners of non-utility coal-fired boilers to research the cost-effectiveness of converting these boilers to alternative fuels and/or installing additional direct PM<sub>2.5</sub>, NO<sub>x</sub> and SO<sub>2</sub> control devices.*

### **Recommendation 56:**

*The District should initiate efforts to create an interstate commission to reduce ambient PM<sub>2.5</sub> and precursor emissions through coordinated regional efforts within and among states whose sources of direct PM<sub>2.5</sub> and precursor emissions are identified as contributing to the boundary air pollution levels in the Louisville nonattainment area.*

### **Recommendation 57:**

*The District should work with EPA, the states of Kentucky and Indiana and local sources to improve methods to estimate local sources of PM<sub>2.5</sub> emissions.*

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**Recommendation 58:**

*The District should work with EPA and the states of Kentucky and Indiana to continue to fund existing, as well as increase the number of, PM<sub>2.5</sub> speciation monitors in the area so as to better understand the local and regional contributors of PM<sub>2.5</sub>.*

**Recommendation 59:**

*The District should develop and implement a program to encourage replacement of charcoal grills in Jefferson County with gas and/or electric units through a rebate system similar to the Lawn Care for Cleaner Air program.*

**Recommendation 60:**

*The District should cooperate with local and regional planning agencies to quantify the difference between emissions budgets that result from business-as-usual and alternative growth scenarios using comparison guidelines provided by EPA.*

**Recommendation 61:**

*The District, in conjunction with Greater Louisville Inc. (GLI), should develop a partnership, between rental car agencies and public and private entities utilizing rental fleets, to increase the use of biodiesel (ASTM standard) or other alternative fuels and technologies that reduce emissions from rental fleets.*

**Recommendation 62:**

*The District should work in partnership with the Kentucky Petroleum Marketers Association, the Indiana Petroleum Marketers and Convenience Store Association, retailers, distributors and other stakeholders to evaluate, develop and achieve goals to provide biodiesel (ASTM standard) blends at retail stations throughout the Louisville nonattainment area.*

**Recommendation 63:**

*The District should work in partnership with marine and railroad operations in the Louisville nonattainment area to identify and reduce direct PM<sub>2.5</sub> and precursor emissions.*

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**Fine Particle Air Quality Task Force**

**Report and Plan of Action**

**Appendices**

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# Fine Particle Air Quality Task Force Report and Plan of Action

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## Appendix 1 Acronyms and Abbreviations

ACI.....	Airports Council International
ADT .....	Average daily trips
AGC .....	Associated General Contractors
APU.....	Auxiliary power unit
ASIP .....	Association for Southeastern Integrated Planning
ASRC .....	American Synthetic Rubber Company
ASTM Standard .....	Quality standard set by the American Society for Testing and Materials
BART .....	Best Available Retrofit Technology
BWC .....	Best Workplaces for Commuters
Board.....	Air Pollution Control Board
CAA .....	Clean Air Act, 42 USC 7401 et seq
CAIR.....	Clean Air Interstate Rule
CARB.....	California Air Resources Board
CASAC .....	Clean Air Scientific Advisory Committee
CFR .....	Code of Federal Regulations
CO .....	Carbon monoxide
District.....	Air Pollution Control District
DOC .....	Diesel oxidation catalyst
DOT .....	United States Department of Transportation
DPF .....	Diesel particulate filter
DR.....	District Regulation
DSM.....	Demand side management
DV.....	Design value
DVF.....	Future Design Value
EC .....	Elemental carbon
EGU .....	Electric generating unit
EIP.....	Economic incentive packages
EPA.....	U.S. Environmental Protection Agency
ESP.....	Electrostatic precipitator
EUP .....	Energy Use Partnership
FAA.....	Federal Aviation Administration
FEDOOP .....	Federally enforceable District origin operating permit
FGD.....	Flue gas desulfurization
FR.....	Federal Register
FRM .....	Federal Reference Method
GE .....	General Electric
GLI.....	Greater Louisville Inc. (Chamber of Commerce)
GSA.....	Louisville Metro General Services Administration
GSE.....	Ground support equipment
HAP.....	Hazardous air pollutant
HEPA filter .....	High efficiency particulate air filter

## Fine Particle Air Quality Task Force Report and Plan of Action

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IAC.....	Indiana Administrative Code
IDEM .....	Indiana Department of Environmental Management
Implementation Rule.....	Clean Air Fine Particle Implementation Rule
INDOT .....	Indiana Department of Transportation
JCPS.....	Jefferson County Public Schools
KAR.....	Kentucky Administrative Regulations
KIPDA .....	Kentuckiana Regional Planning and Development Agency
KMTA.....	Kentucky Motor Transport Association
Kosmos .....	Kosmos Cement Company
KPPC.....	Kentucky Pollution Prevention Center
KTC.....	Kentucky Transportation Cabinet
KWh.....	Kilowatt hour
KY DAQ.....	Kentucky Division for Air Quality
LED.....	Light-emitting diode
LADCO.....	Lake Michigan Air Directors Consortium
LUM.....	Land use measures
MACT.....	Maximum achievable control technology
µm.....	Micrometers
µg/m <sup>3</sup> .....	Micrograms per cubic meter
NAAQS.....	National Ambient Air Quality Standard
NACAA .....	National Association of Clean Air Agencies
NCDC .....	National Clean Diesel Campaign (EPA program)
NH <sub>3</sub> .....	Ammonia
NH <sub>4</sub> .....	Ammonium
NMIM.....	National Mobile Inventory Model (EPA model)
NO <sub>2</sub> .....	Nitrogen dioxide
NO <sub>3</sub> .....	Nitrate
NO <sub>x</sub> .....	Nitrogen oxides
OC.....	Organic carbon
Pb.....	Lead
PGC.....	Partnership for a Green City
PM.....	Particulate matter
PM <sub>0.1</sub> .....	Ultrafine particulate matter
PM <sub>10</sub> .....	Inhalable particulate matter
PM <sub>10-2.5</sub> .....	Course particulate matter
PM <sub>2.5</sub> .....	Fine particulate matter
ppm .....	Parts per million
RAA .....	Regional Airport Authority
RACM.....	Reasonably Available Control Measures
RACT.....	Reasonably Available Control Technology
Report.....	Report and Plan of Action
RFP .....	Reasonable Further Progress
SCR.....	Selective catalytic reduction
SEDC .....	Southeast Diesel Collaborative
SIP.....	State Implementation Plan

## Fine Particle Air Quality Task Force Report and Plan of Action

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SNCR .....	Selective non-catalytic reduction
SO <sub>2</sub> .....	Sulfur dioxide
SO <sub>4</sub> .....	Sulfate
STAI .....	School Transportation Association of Indiana
STAR .....	Strategic Toxic Air Reduction
TARC .....	Transit Authority of River City
Task Force .....	Fine Particle Air Quality Task Force
TAUC .....	The Association of Union Constructors
TCM .....	Transportation control measures
Tier # .....	Represents the corresponding iteration of federal engine requirements
Title V, TV .....	Title Five of the Clean Air Act, 42 USC 7661 et seq.
tpy .....	Tons per year
TRIMARC .....	Traffic Response and Incident Management Assisting the River Cities
TSP .....	Total suspended particulate
TVA .....	Tennessee Valley Authority
ULSD .....	Ultra Low Sulfur Diesel
U of L .....	University of Louisville
UPS .....	United Parcel Service
VALE .....	Voluntary Airport Low Emissions
VISTAS .....	Visibility Improvement State and Tribal Association of the Southeast
VMT .....	Vehicle miles traveled
VOC .....	Volatile organic compound
WHO .....	World Health Organization

# Fine Particle Air Quality Task Force Report and Plan of Action

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## Appendix 2 Fine Particle Air Quality Task Force Members

**Tony Arnold**

University of Louisville

**Graham Baughman**

Thorntons Inc.

**John Brazel**

Associated General Contractors of Kentucky

**Lona Brewer**

Kentucky Division for Air Quality

**Christy Lee Brown**

Community Representative

**Dennis Conniff**

Frost Brown Todd LLC

Representing Greater Louisville, Inc.

Air Toxics Task Force

**Tim Corrigan**

The Rotunda Group

Representing Greater Louisville, Inc.

**Pat Daniel**

Indiana Dept. of Environmental Management

**Sharon Dodson**

E.ON U.S.

Alt. Gary Revlett

Alt. Sarah Scheetz

**Jamie Fiepke**

Kentucky Motor Transport Association

**Tom FitzGerald**

Kentucky Resources Council

Alt. Sarah Lynn Cunningham

**Arnita Gadson**

University of Louisville

West Jefferson County Community Task Force

**Tim Hagerty**

Frost Brown Todd LLC

Representing Greater Louisville, Inc.

Environmental Affairs Committee

**Dr. Lauren Heberle**

University of Louisville

Alt. Isabella Christensen

**Regina Henry**

Cemex Kosmos Cement Company

Alt. Shannon Graves

Alt. Amy Osborn

**Wayne Hicks**

Transit Authority of the River City

Alt. Geoffrey Hobin

**Mark Hussung**

General Electric

Alt. Steve Marks

Alt. Tim Hooker

**Bill Jacob**

United Parcel Service

**Rick Larkins**

Highview Fire District

**Dr. John Lewis**

Greater Louisville Medical Society

**Jesse Mayes**

Kentucky Transportation Cabinet

**Heidi McKenzie**

Ford Motor Company

Alt. Greg Long

**Wallace McMullen**

Sierra Club

**Patrick Moran**

Community Representative

**Suzy Post**

Metropolitan Housing Coalition

**Dr. Robert Powell**

Norton Healthcare

Representing Greater Louisville Medical Society

& Louisville Metro Air Pollution Control Board

**Karen Scott**

Regional Airport Authority

Alt. Bob Slattery

**Kevin Spangler**

OxyVinyls, L.P.

**Jim Vaughn**

Jefferson County Public Schools

**Dan Weiss**

Duke Energy

**Paul Wheatley**

One Southern Indiana

# Fine Particle Air Quality Task Force Report and Plan of Action

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## Appendix 3 Fine Particle Air Quality Task Force Committee Members

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### Report and Plan of Action Committee

Tony Arnold	Heidi McKenzie
Dennis Conniff	Dr. Robert Powell
Tim Corrigan	<b>Karen Scott (Chair)</b>
Arnita Gadson	Kevin Spangler
Lauren Heberle	

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### Health Committee

Christy Lee Brown	Tim Hagerty
Sharon Dodson	Dr. Lauren Heberle
Tom FitzGerald	<b>Dr. John Lewis (Chair)</b>
Arnita Gadson	<b>Dr. Robert Powell (Vice-chair)</b>

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### Stationary and Area Source Committee

<b>Tim Corrigan (Chair)</b>	Heidi McKenzie
Sharon Dodson	Dr. Robert Powell
Tom FitzGerald	Karen Scott
Arnita Gadson	Kevin Spangler
Rick Larkins	Dan Weiss
Wallace McMullen	Paul Wheatley

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### Mobile and Nonroad Mobile Source Committee

Tim Corrigan	Jim Vaughn
Jamie Fiepke	Mark Hussung
<b>Tom FitzGerald (Chair)</b>	Bill Jacob
Arnita Gadson	Pat Moran
Wayne Hicks	Karen Scott

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### Emissions Inventory and Modeling Data Committee

Tim Corrigan, GLI	Wallace McMullen
Sharon Dodson	Pat Moran
Arnita Gadson	Karen Scott
Regina Henry	<b>Dan Weiss (Chair)</b>

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## Fine Particle Air Quality Task Force Report and Plan of Action

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### Appendix 4 Record of Health Committee Meeting Attendance

The following table is a record of Health Committee meeting attendance. A record of attendance is kept through meeting sign in sheets, which may be supplemented by District staff notes from each meeting.

<b>Member</b>	<b>19-Sep</b>	<b>26-Sep</b>	<b>3-Oct</b>	<b>10-Oct</b>	<b>25-Oct</b>
Christy Lee Brown	Y	Y			
Sharon Dodson (Alt. Sarah Scheetz)	Y		Y	Y	Y
Tom FitzGerald (Alt. Sarah Lynn Cunningham)	Y	Y	Y	Y	Y
Arnita Gadson		Y	Y	Y	Y
Tim Hagerty	Y			Y	
Lauren Heberle	Y	Y	Y	Y	Y
Dr. John Lewis	Y	Y	Y	Y	Y
Suzy Post				Y	
Dr. Robert Powell		Y	Y		Y
Dan Weiss	Y				

## **Fine Particle Air Quality Task Force Report and Plan of Action**

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### **Appendix 5 List of source categories for starting point for identifying potentially available control strategies for nonattainment area**

#### **Stationary source measures**

- Stationary diesel engine retrofit, rebuild or replacement, with catalyzed particle filter
- New or upgraded emission control requirements for direct PM<sub>2.5</sub> emissions at stationary sources (e.g., installation or improved performance of control devices such as a baghouse or electrostatic precipitator; revised opacity standard; improved compliance monitoring methods)
- Improved capture of particulate emissions to increase the amount of PM<sub>2.5</sub> ducted to control devices, and to minimize the amount of PM<sub>2.5</sub> emitted to the atmosphere, for example, through roof monitors
- New or upgraded emission controls for PM<sub>2.5</sub> precursors at stationary sources (e.g., SO<sub>2</sub> controls such as wet or dry scrubbers, or reduced sulfur content in fuel; desulfurization of coke oven gas at coke ovens; improved sulfur recovery at refineries; increasing the recovery efficiency at sulfuric acid plants)
- Energy efficiency measures to reduce fuel consumption and associated pollutant emissions (either from local sources or distant power providers)
- Measures to reduce fugitive dust from industrial sites

#### **Mobile source measures**

- Onroad diesel engine retrofits for school buses,<sup>34</sup> trucks and transit buses using EPA-verified technologies
- Nonroad diesel engine retrofit, rebuild or replacement, with catalyzed particle filter<sup>35</sup>
- Diesel idling programs for trucks, locomotive, and other mobile sources<sup>36</sup>
- Transportation control measures (including those listed in section 108(f) of the CAA as well as other TCMs), as well as other transportation demand management and transportation systems management strategies<sup>37</sup>
- Programs to reduce emissions or accelerate retirement of high emitting vehicles, boats, and lawn and garden equipment
- Emissions testing and repair/maintenance programs for onroad vehicles
- Emissions testing and repair/maintenance programs for nonroad heavy-duty vehicles and equipment<sup>38</sup>

## **Fine Particle Air Quality Task Force Report and Plan of Action**

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- Programs to expand use of clean burning fuels<sup>39</sup>
- Low emissions specifications for equipment or fuel used for large construction contracts, industrial facilities, ship yards, airports, and public or private vehicle fleets
- Opacity or other emissions standards for “gross-emitting” diesel equipment or vessels

### **Area source measures**

- New open burning regulations and/or measures to improve program effectiveness such as programs to reduce or eliminate burning of land clearing vegetation
- Programs to reduce emissions from woodstoves and fireplaces including outreach programs, curtailments during days with expected high ambient levels of PM<sub>2.5</sub>, and programs to encourage replacement of woodstoves when houses are sold
- Controls on emissions from charbroiling or other commercial cooking operations
- Reduced solvent usage or solvent substitution (particularly for organic compounds with 7 carbon atoms or more, such as toluene, xylene, and trimethyl benzene)

### **Category-Specific Guidelines on innovative approaches.**

The EPA has issued a number of category specific guidelines on approaches to taking into account innovative approaches to emissions reductions for purposes of SIPs. Categories currently covered by these guidelines include: (1) Electric-sector Energy Efficiency and Renewable Energy Measures (2) Long Duration Switch Yard Locomotive Idling (3) Long Duration Truck Idling (4) Clean Diesel Combustion Technology (5) Commuter Choice Programs. See [http://www.epa.gov/ttn/airinnovations/measure\\_specific.html](http://www.epa.gov/ttn/airinnovations/measure_specific.html)

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<sup>34</sup> See Clean School Bus USA program at <http://www.epa.gov/cleanschoolbus/>. See also: "What You Should Know About Diesel Exhaust and School Bus Idling", (June 2003, EPA420-F-03-021) at <http://www.epa.gov/otaq/retrofit/documents/f03021.pdf>.

<sup>35</sup> See EPA's voluntary diesel retrofit program web site at <http://www.epa.gov/otaq/retrofit/overfleetowner.htm>.

<sup>36</sup> See EPA's voluntary diesel retrofit program web site at <http://www.epa.gov/otaq/retrofit/idling.htm>.

<sup>37</sup> See EPA's website on transportation control measures at <http://www.epa.gov/otaq/transp/traqtcms.htm>.

<sup>38</sup> See EPA's web site on nonroad engines, equipment, and vehicles at <http://www.epa.gov/otaq/nonroad.htm>.

<sup>39</sup> Fuels adopted in SIPs must be consistent with the Energy Policy Act of 2005 and EPA guidance on SIP-approved boutique fuels at 71 FR 78192 (December 28, 2006).

## Fine Particle Air Quality Task Force Report and Plan of Action

### Appendix 6 Stationary/Area Source Reduction Strategy Evaluation Matrix

Suggested Emission Reduction Measure	Strategy Type	Responsible Entities and Potential Partners	Impacted Pollutants (including Co-benefits)	Ease of Implementation (political climate, stakeholder receptivness, challenges, additional resources required, available resources, etc.)	Local Examples of Implementation	Additional APCD Resources Needed for Implementation	Current	Control	Reduction Contribution	Reduction Efficiency	M/V/P	Reasonableness-Social	Reasonableness-Political	Cost-Effective	Total
Current: Relative ranking (1-3: low to high) of current emissions from the source category affected by the reduction measure															
Control: Are there measures that could be implemented to reduce emissions, relative ranking (1-3: low to high)															
Reduction Contribution: How much emission reduction could be achieved compared to area emission, relative ranking (1-3: low to high)															
Reduction Efficiency: How much emission reduction could be achieved compared to current emissions per source, relative ranking (1-3: low to high)															
M/V/P = Mandatory, Voluntary or Partnership															
Reasonableness-Social: How socially feasible are the measures? (1-3: low to high)															
Reasonableness-Political: How politically feasible are the measures?															
Cost-Effective: Relative cost-effectiveness measure (1-3: low to high)															
Total: Total points from the four relative ranking factors															

## Fine Particle Air Quality Task Force Report and Plan of Action

### Appendix 7 DRAFT E.ON U.S. Planned Control Projects

#### Planned NO<sub>x</sub> Control Projects

Company	Facility	Unit	Existing Controls	Planned Controls	Regulatory Driver	Operating Year	% Change (2005 Baseline)	2005 Emission	Projected Annual Emission	Change in Tons
LGE	Cane Run	4	Low NOx Burners					2,115		
LGE	Cane Run	5	Low NOx Burners					2,325		
LGE	Cane Run	6	Low NOx Burners					2,601		
WKE	Coleman	1	Rotary Over-Fire Air					1,655		
WKE	Coleman	2	Advanced Over-Fire Air					1,723		
WKE	Coleman	3	Advanced Over-Fire Air					1,755		
KU	E.W. Brown	1	Low NOx Burners					1,694		
KU	E.W. Brown	2	Low NOx Burners					1,607		
KU	E.W. Brown	3	Low NOx Burners					2,504		
KU	Ghent	1	SCR	year round	CAIR	2009	-81%	4,778	914	-3,864
KU	Ghent	2	Low NOx Burners					3,736		
KU	Ghent	3	SCR	year round	CAIR	2009	-75%	2,585	658	-1,927
KU	Ghent	4	SCR	year round	CAIR	2009	-75%	2,810	701	-2,109
KU	Green	1	Coal Re-burn	year round	CAIR	2009	-17%	3,041	2,524	-517
KU	Green	2	Coal Re-burn	year round	CAIR	2009	-12%	2,650	2,332	-318
KU	Green River	3	Low NOx Burners					900		
KU	Green River	4	Low NOx Burners					655		
WKE	Henderson	1	SCR	year round	CAIR	2009	-71%	1,574	456	-1,118
WKE	Henderson	2	SCR	year round	CAIR	2009	-74%	2,133	555	-1,578
LGE	Mill Creek	1	Low NOx Burners					3,205		
LGE	Mill Creek	2	Low NOx Burners					2,845		
LGE	Mill Creek	3	SCR	year round	CAIR	2009	-79%	3,280	674	-2,607
LGE	Mill Creek	4	SCR	year round	CAIR	2009	-81%	3,738	724	-3,015
WKE	Reid	1	Over-fire Air					1,097		
LGE	Trimble County	1	SCR	year round	CAIR	2009	-74%	3,381	894	-2,487
KU	Tyrone	3	Low NOx Burners					955		
WKE	Wilson	1	SCR	year round	CAIR	2009	-80%	6,330	1,266	-5,064
	Reductions E.ON U.S.						-36%	67,671		-24,604
	Total/Ave at units with additional controls						-68%	36,301		-24,604

Note: The following facilities plan to run existing SCR's year round starting 2009: Henderson Units 1 & 2, Mill Creek Units 3 & 4, Ghent 1, 3 & 4, Trimble 1, Wilson 1. There will be significant increased operating costs to do this, although relatively little capital expense. KY ERC's available: 14,035

## Fine Particle Air Quality Task Force Report and Plan of Action

### Planned SO<sub>2</sub> Control Projects

Company	Facility	Unit	Existing Controls	Planned Controls	Regulatory Driver	Operating Year	% Change (2005 Baseline)	2005 Emission	Projected Annual Emission	Change in Tons	Project Cost Original Estimates* (million \$)
LGE	Cane Run	4	FGD					5,543			
LGE	Cane Run	5	FGD					5,085			
LGE	Cane Run	6	FGD					8,234			
WKE	Coleman	1		FGD	CAIR	2006	-97%	17,988	540	-17,448	\$98
WKE	Coleman	2		FGD	CAIR	2006	-97%	17,757	533	-17,224	
WKE	Coleman	3		FGD	CAIR	2006	-97%	21,069	632	-20,437	
KU	E.W. Brown	1		FGD	CAIR	2009	-96%	8,682	340	-8,342	\$234
KU	E.W. Brown	2		FGD	CAIR	2009	-95%	13,804	720	-13,084	
KU	E.W. Brown	3		FGD	CAIR	2009	-91%	20,376	1,860	-18,516	
KU	Ghent	1	FGD					5,503			
KU	Ghent	2		FGD	CAIR	2009	-87%	13,960	1,780	-12,180	\$150
KU	Ghent	3		FGD	CAIR	2007	-87%	15,054	2,000	-13,054	\$129
KU	Ghent	4		FGD	CAIR	2008	-86%	15,669	2,200	-13,469	\$146
KU	Green	1	FGD					1,434			
KU	Green	2	FGD					846			
KU	Green River	3						9,017			
KU	Green River	4						6,901			
WKE	Henderson	1	FGD					2,104			
WKE	Henderson	2	FGD					2,637			
LGE	Mill Creek	1	FGD					4,157			
LGE	Mill Creek	2	FGD					4,270			
LGE	Mill Creek	3	FGD					7,703			
LGE	Mill Creek	4	FGD					7,903			
WKE	Reid	1						9,280			
LGE	Trimble County	1	FGD	FGD upgrade		2006	-84%	5,236	862	-4,373	\$7
KU	Tyrone	3						3,192			
WKE	Wilson	1	FGD					11,008			
	Subtotal Original Estimate						-57%	244,409		-138,127	\$764
	Expected Increase in Costs										\$240
	Current Estimate E.ON U.S.						-57%	244,409		-138,127	\$1,004
	Total/Ave at units with additional controls						-92%	149,594		-138,127	\$1,004

The FGD's being installed at Brown and Ghent are expected to achieve around 98% removal. However, since the units will be switching to higher sulfur coal than they burned in 2005, the net reduction compared to 2005 is somewhat less.

\*Project Cost Original Estimates includes estimated Costs for KU & LGE from PSC Testimony of John Malloy, Dec. 2004.

Costs for FGDs at Brown and Ghent are now expected to be approx. \$900 million, rather than the originally estimated ~ \$660M.

The total cost is now expected to be over \$1 Billion.

## Fine Particle Air Quality Task Force Report and Plan of Action

### Appendix 8 Current and Planned Pollutant Control Measures for Indiana Utilities

	Plant Name	Capacity	Existing Control*	Southern Indiana CAIR Policy Case Controls					CAIR Costs (Millions\$)
				2008	2009	2010-12	2015	2018	2008-2025
SIGECO	A B BROWN: 1	250	SCR+Scrubber						
SIGECO	A B BROWN: 2	250	SCR+Scrubber						
DUKE	CAYUGA: 1	500			Scrubber		SCR		244.651
DUKE	CAYUGA: 2	495			Scrubber		SCR		242.984
IKEC	CLIFTY CREEK: 1	199	SCR			Scrubber			81.519
IKEC	CLIFTY CREEK: 2	199	SCR			Scrubber			81.519
IKEC	CLIFTY CREEK: 3	199	SCR			Scrubber			81.519
IKEC	CLIFTY CREEK: 4	199	SCR			Scrubber			81.519
IKEC	CLIFTY CREEK: 5	199	SCR			Scrubber			81.519
IKEC	CLIFTY CREEK: 6	199				SCR+Scrubber			130.872
DUKE	EDWARDSPORT: 7-1	40		Retire					-
DUKE	EDWARDSPORT: 7-2	40		Retire					-
DUKE	EDWARDSPORT: 8-1	40		Retire					-
IPL	ELMER W STOUT: 50	109		SNCR					3.817
SIGECO	F B CULLEY: 2	90	Scrubber						-
SIGECO	F B CULLEY: 3	270	SCR+Scrubber						-
HEC	FRANK E RATTS: 1SG1	122							-
HEC	FRANK E RATTS: 2SG1	121							-
DUKE	GIBSON: 1	630	SCR	Scrubber					181.820
DUKE	GIBSON: 2	630	SCR	Scrubber					181.820
DUKE	GIBSON: 3	630	SCR	Scrubber					181.820
DUKE	GIBSON: 4	622	SCR+Scrubber						-
DUKE	GIBSON: 5	620	SCR+Scrubber						-
HEC	MEROM: 1SG1	507	SCR+Scrubber						-
HEC	MEROM: 2SG1	493	SCR+Scrubber						-
NIPSCO	MICHIGAN CITY: 12	469	SCR						-
IPL	PETERSBURG: 1	232	Scrubber						-
IPL	PETERSBURG: 2	407	Scrubber	SCR					78.600
IPL	PETERSBURG: 3	510	Scrubber	SCR					91.050
IPL	PETERSBURG: 4	545	Scrubber						-
DUKE	R GALLAGHER: 1	140		baghouse					25.000
DUKE	R GALLAGHER: 2	140		baghouse					25.000

## Fine Particle Air Quality Task Force Report and Plan of Action

DUKE	R GALLAGHER: 3	140		baghouse					25.000
DUKE	R GALLAGHER: 4	140		baghouse					25.000
AEP	ROCKPORT: MB1	1,300							-
AEP	ROCKPORT: MB2	1,300							-
AEP	TANNERS CREEK: U1	140							-
AEP	TANNERS CREEK: U2	140							-
AEP	TANNERS CREEK: U3	200							-
AEP	TANNERS CREEK: U4	500						SCR+Scrubber	244.651
DUKE	WABASH RIVER: 2	85		SNCR					3.245
DUKE	WABASH RIVER: 3	85		SNCR					3.245
DUKE	WABASH RIVER: 4	85		SNCR					3.245
DUKE	WABASH RIVER: 5	95							-
DUKE	WABASH RIVER: 6	318						SCR+Scrubber	565.446
SIGECO	WARRICK: 4	150		SCR					41.007

**Total Capital  
Dollars = 2,705.865**

**Run Year Structure:** MY2008 = 2007-2008, MY2009 = 2009, MY2012 = 2010-2013, MY2015 = 2014-2017, MY2018=MY2018, MY2020 = 2019-2022

# Fine Particle Air Quality Task Force Report and Plan of Action

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## Appendix 9 Energy Efficiency Programs and Projects

### Duke Energy Indiana Energy Efficiency & Conservation Initiatives

#### A. Residential Customers

##### *Free Services*

##### [Home Energy House Call](#)

Home Energy House Call is a free in-home energy analysis for Duke Energy homeowners who meet the guidelines. Sign up today and receive a free Energy Efficiency Starter Kit retail valued at \$40.

##### [Refrigerator Replacement](#)

Duke Energy offers free installation of energy-efficient refrigerators for those customers meeting income qualifying guidelines and who live in single-family homes.

##### [Indiana Home Weatherization](#)

Duke Energy, in partnership with the State of Indiana, offers free energy-saving home upgrades for customers meeting income qualifying guidelines.

##### *Products, Rebates & Other Programs*

##### [Power Manager](#)

The Power Manager Program pays you annually for having your air conditioning cycled off-and-on a few days each summer and up to a \$35 installation credit.

##### [Smart Saver®](#)

Smart Saver promotes the use of high-efficiency heat pump and air-conditioning systems for existing homes. Install a new high-efficiency heat pump and you may be eligible to receive a rebate up to \$200. [Smart Saver Eligibility and FAQs](#)

##### [ENERGY STAR® New Home](#)

ENERGY STAR® is a government-backed symbol of quality that identifies a new home as being more energy efficient than a standard home. ENERGY STAR homes may qualify for Duke Energy Indiana's ENERGY STAR incentives. [ENERGY STAR® Eligibility & FAQs](#)

##### [Online Energy Store](#)

Visit our Online Energy Store to purchase a variety of energy-efficient products including compact fluorescent bulbs, water conservation tools and much more.

##### *Energy Saving Tools*

##### [Home Energy Calculator](#)

## **Fine Particle Air Quality Task Force Report and Plan of Action**

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This tool provides a quick example of how energy saving measures could lower your energy costs. It estimates how new energy efficient practices and/or equipment in your home could save you money.

### [Appliance Calculator](#)

Use this tool to estimate the cost of operating the electric appliances in your home.

## **B. Business Customers - Energy Management Programs**

### [Energy Efficiency Incentive Program](#)

Reward your business for saving energy. Install qualifying high-efficiency lighting, cooling or motors/pumps at your facility, complete a short application form, and you will receive a rebate.

### [Business Services Newsletter](#)

Our Duke Energy Business Services Newsline For Your Business is a free electronic newsletter filled with information about energy efficiency, industry trends and Duke Energy products and services.

### [Energy Saving Tips](#)

Take advantage of these money-saving tips to help manage your energy costs.

### [Business Energy Calculator](#)

This tool provides a quick example of how energy saving measures could lower your energy costs. It estimates how different business practices and/or equipment could save you money.

### [Business Energy Systems Library](#)

This extensive library provides in-depth information on various business energy systems, building design, and energy technologies.

### [Understanding Demand](#)

Learn more about how your demand for electricity can impact your electricity costs. This interactive tool explains the concept of demand and how the equipment you use add up each hour of the day.

### [Power Quality](#)

From voltage fluctuations to flickering lights, our team of engineers and technicians can visit your business to evaluate your power supply or distribution system and answer any questions you may have.

[Products and Services](#)

[News and Reports](#)

[Information](#)

[Contact Us](#)

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### C. Industrial Customers Energy Management Programs

#### [Energy-Saving Tips](#)

It's very simple! As a service to our customers, we put together a reference guide to help you better manage your electric bill.

#### [Cutting Your Energy Costs Calculator](#)

Use this calculator to estimate possible savings which may be gained from reducing your energy usage.

#### [PowerShare®](#)

PowerShare provides the opportunity for you to *profit* from curtailment of your energy usage. Duke Energy will work with you to help you better understand your unique energy consumption profile. Then, we can assist you in developing a customized plan that identifies potential curtailable loads. For more information or to enroll in PowerShare, contact our business service center at 1-800-774-1202.

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### E.ON U.S. Energy Efficiency Programs

<b>Existing Programs</b>	
Program / Offering / Activity	Comment
"Demand Conservation" Load Control Program	This program provides for the installation of a switch on the customer air conditioning unit or water heater that permits LG&E/KU to cycle that load to manage demand at peak times. For participating, the customer receives either a \$20 credit per year or a programmable thermostat. Program enrollment exceeds 80,000 at present and provides ~100 MW of peak demand savings.
Residential Energy Audits	This program provides energy audits for residential customers to identify areas in the home for reduction of wasted energy.
Commercial Energy Audits	This program provides energy audits for commercial customers to identify areas in the facility for reduction of wasted energy.
Low-Income Weatherization (WeCare)	This program provides for energy improvements at the homes of qualified low income customers.
Online Home Energy Calculator	This is an online web tool for customers to help them estimate their home energy bill and find savings.
Online Commercial Energy Calculator	This is an online web tool for customers to help them estimate their workplace energy bill and find savings.
Online Home Energy Reference Library	This is an online web tool for 'room by room' analysis of a typical home to help the customer find energy savings.
Online Commercial Energy Reference Library	This is an online web tool for 'room by room' analysis of a typical workplace to help the customer find energy savings.
Energy Efficiency in E.ON U.S. Corporate Facilities	E.ON U.S. has implemented energy efficiency initiatives at corporate facilities where conditions (leased facilities vs. company-owned) permit – including efficient lighting, load control switching, and/or programmable thermostats.
Net Metering Tariff	This tariff is available to customers who own, operate and maintain a solar, wind or hydroelectric generation system on their premises, in parallel with the Company's electric system to provide all or part of their electrical requirements.

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Green Energy Program	This program allows customers to contribute funds in \$5 blocks (residential/commercial) or \$13 blocks (industrial) for LG&E/KU to purchase Green Tags from qualified renewable resources (hydro, landfill gas, or wind) in KY and surrounding states.
Responsive Pricing & Smart Metering Pilot Program	This program combines the use of Smart Meters, Programmable Thermostats, Energy Use Displays, and a Time of Use Rate (with critical peak component) to provide customers greater control of their energy usage--and thus their energy bill.
Carbon Footprint on the Bill	Beginning July 2007, LG&E and KU are placing on customer bills the amount of carbon dioxide emissions associated with their consumption, coupled with monthly tips on what actions they can take to reduce the effects of those emissions. This is to help give customers greater awareness of and control over the impact of their energy usage.
Hybrid Vehicle Addition to Company Fleet	Beginning in July 2007, LG&E and KU began to add hybrid electric Ford Escape vehicles to the Company fleet; further additions will be subject to on-going economic analysis.

<b>Proposed Programs</b>	
Program / Offering / Activity	Comment
Brownfield Tariff	Filed with the Kentucky PSC on 5/10/07. This tariff provides an incentive to commercial/industrial customers to locate facilities at sites for which distribution infrastructure already exists but for which some environmental mitigation may be required. Under review by the KPSC at this time.
Real-Time Pricing Pilot Program	Filed with Kentucky PSC on 4/21/07. This program permits participating industrial customers to receive a real-time hourly price signal, to provide them the opportunity to modify consumption and control costs. Under review by the KPSC at this time.
Energy Efficiency Program Filing: New Programs	Filed with the Kentucky PSC on 07/19/07 for the 2008 – 2014 time period. Under review by the KPSC at this time.

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Efficient Lighting Program	Working with manufacturers and retailers, this program would provide incentives to put significant numbers of Compact Fluorescent Light ("CFL") bulbs into the residential market. Promotion of other forms of efficient lighting is included. Several million CFLs are contemplated over the first few years.
HVAC Diagnostics/ Tune-Up	The program would offer central air conditioning or heat pump diagnostics at a subsidized cost. Customers needing remediation could choose to have an "approved" dealer make repairs at a reduced cost. The program would focus on over- or under-refrigerant charge and air flow restrictions. This program would be available to residential and commercial customers.
Residential New Construction Certification	The Company would encourage builders to develop homes that meet the Energy Star standards. Homes would have to pass plan reviews as well as on-site inspections to ensure compliance.
Dealer Referral Network	This program would provide customers with a list of energy efficiency dealers who had agreed to meet certain minimum standards, such as insurance and bonding, but would also agree to perform the service according to manufacturer and industry standards and requirements.
Energy Efficiency Education & Promotion	This program would educate the public about energy efficiency. This includes a program for students, about sources of energy and energy efficiency in homes and schools through a curriculum provided to schools in the service territory. Teacher workshops are anticipated. The curriculum includes lesson plans, energy efficiency materials, and demonstration materials.
Program Development and Administration	This program would allow LG&E/KU to invest in energy efficiency program design that is not easily assigned to an individual program noted above, including research—e.g. new technologies for metering, control systems, appliances & home electronics, etc., as appropriate.

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### Jefferson County Public Schools Recent, Current and Future Energy Efficiency Projects

	New School project	Renovation Project	Occupancy sensors cycling HVAC	Occupancy sensors cycling lights	Direct Digital Control building automation	hot/cold AHU recovery wheels	New high efficient chillers	New high efficient boilers	Lighting replacements	New windows	Variable frequency drive motors	Solar domestic hot water	Daylight harvesting ballast controls	Shelf lighting	Roof replacements	Energy Star Award	Dishwasher removal (Kitchen)	Pot Scrubbers (Kitchen)	Trash Compactors (Kitchen)	Pulpers (Kitchen)
Conway Middle 2008		●	●	●	●		●	●	●		●						●	●	●	
Hartstern Elementary 2008		●	●	●	●		●	●	●		●						●		●	
Klondike Elementary 2008		●	●	●	●		●	●	●		●				●		●	●		●
Luhr Elementary 2008		●	●	●	●		●	●	●		●						●	●	●	
Pleasure Ridge Park Tech 2008		●	●	●	●		●	●	●		●						●			
Ramsey Middle 2008	●		●	●	●	●	●	●	●	●	●	●	●	●			●			
Ahrens/Brown 2007/08		●	●	●	●		●	●	●		●						●	●	●	
Barrett Middle 2007		●	●	●	●		●	●	●	●	●				●		●	●		●
Breckinridge Metro 2007		●	●	●	●		●	●	●	●	●						●	●		
Farmer Elementary 2007	●		●	●	●	●	●	●	●	●	●	●	●				●			
Myers Middle 2007		●	●	●	●		●	●	●		●						●	●	●	
Price Elementary 2007		●	●	●	●		●	●	●		●						●	●	●	
Johnsontown Road El 2007		●	●	●	●		●	●	●		●						●	●	●	
Iroquois High 2007		●			1994		●										●	●	●	
Stopher Elementary 2007	●		●	●	●	●	●	●	●	●	●						●			
Auburndale Elementary 2006		●	●	●	●		●	●	●		●				●		●	●	●	
Churchill Park 2006		●	●	●	●		●	●	●		●	●			●		●	●		
Gutermuth Elementary 2006		●	●	●	●		●	●	●		●						●	●	●	
Highland Middle 2006		●	●	●	●		●	●	●	●	●						●	●	●	
Watterson Elementary 2006		●	●	●	●		●	●	●		●						●	●	●	
Wheeler Elementary 2006		●	●	●	●		●	●	●		●						●	●	●	
Shelby Elementary 2004	●		●	●	●	●	●	●	●	●	●		●	●		●	●	●	●	
All 170 JCPS buildings Gas and Electric Usage/Cost are recorded and compiled into several reports by Energy Watchdog.																				
All 170 JCPS buildings Gas, Electric, Water, Sewage, and Drainage Usage/Cost are recorded and monitored by the JCPS Energy Auditor.																				
JCPS has over 1000 buses that travel a combined 85,000 miles a day. All JCPS diesel powered engines are using a bio-diesel blend.																				
JCPS is open to alternative fuels as they are made available.																				
JCPS hopes to include Vending machine energy saving devices in the upcoming district wide contract.																				
JCPS replaced lighting in 13 buildings, and windows in 11 buildings as part of a 2001 Energy Performance contract.																				
The Performance contract has guaranteed an annual savings of nearly \$400,000.																				

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### Appendix 10 Draft Idle Reduction Regulation

- (a) **Purpose:** The purpose of this law is to protect public health and the environment by reducing emissions while conserving fuel and maintaining adequate rest and safety of all drivers of diesel vehicles.
- (b) **Applicability:** This law applies to commercial diesel vehicles which are designed to operate on highways (as defined under 49 CFR 390.5), and to locations where commercial diesel vehicles load or unload (hereinafter referred to as “load/unload locations”).
- (c) **General Requirement for Load/Unload Locations:** No load/unload location owner shall cause vehicles covered by this rule to idle for a period greater than 30 minutes while waiting to load or unload at a location under their control.
- (d) **General Requirement for Vehicles:** No owner or operator of a vehicle shall cause or permit vehicles covered by this rule to idle for more than 5 minutes in any 60 minute period except as noted in sections (e) and (f), and except as provided in section (c) in the case of a load/unload location.
- (e) **Exemptions:** Section (d) does not apply for the period or periods where:
- (1) A vehicle idles while forced to remain motionless because of on-highway traffic, an official traffic control device or signal, or at the direction of a law enforcement official.
  - (2) A vehicle idles when operating defrosters, heaters, air conditioners, or installing other equipment solely to prevent a safety or health emergency, and not as part of a rest period.
  - (3) A police, fire, ambulance, public safety, military, other emergency or law enforcement vehicle, or any vehicle being used in an emergency capacity, idles while in an emergency or training mode and not for the convenience of the vehicle operator.
  - (4) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity.
  - (5) A vehicle idles as part of a state or federal inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection.
  - (6) Idling of the primary propulsion engine is necessary to power work-related mechanical or electrical operations other than propulsion (e.g., mixing or processing cargo or straight truck refrigeration). This exemption does not apply when idling for cabin comfort or to operate non-essential on-board equipment.

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- (7) An armored vehicle idles when a person remains inside the vehicle to guard the contents, or while the vehicle is being loaded or unloaded.

**(f) Conditional Exemptions:** Subsection (d) does not apply for the period or periods where:

- (1) A passenger bus idles a maximum of 15 minutes in any 60 minute period to maintain passenger comfort while non-driver passengers are onboard. The exemption expires 5 years after implementing a state financial assistance program for idle reduction technologies or strategies.
- (2) An occupied vehicle with a sleeper berth compartment idles for purposes of air conditioning or heating during rest or sleep period, until 5 years after implementing a state financial assistance program for idle reduction technologies or strategies, whereupon this exemption expires.
- (3) An occupied vehicle idles for purposes of air conditioning or heating while waiting to load or unload, until 5 years after implementing a state financial assistance program for idle reduction technologies or strategies, whereupon this exemption expires.
- (4) A vehicle idles due to mechanical difficulties over which the driver has no control; provided that the vehicle owner submits the repair paperwork or product receipt (by mail; within 30 days) to the appropriate authority verifying that the mechanical problem has been fixed.

**(g) Auxiliary Power Units**

- (1) Generally, operating an auxiliary power unit or generator set as a means to heat, air condition, or provide electrical power as an alternative to idling the main engine is not an idling engine, per se.
- (2) Operating an auxiliary power unit or generator set on all model year 2006 or older commercial diesel vehicles is allowed. *[Reserved for possible inclusion of criteria for APU use on 2007 and subsequent model year commercial vehicles]*

**(h) Penalties:** The owner and/or operator of a vehicle, and/or the owner of a load/unload location, that is in violation of this law is responsible for penalties as follows.

- (1) First offense: Warning ticket issued to vehicle driver and owner, and where applicable, the load/unload facility owner.
- (2) Second and subsequent offenses: \$150 citation is issued to the vehicle driver; and/or, \$500 citation issued to the registered vehicle owner or load/unload location owner.

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## Appendix 11 Report and Plan of Action Committee Leading Recommendations

*The following recommendations include strategies that should be given priority for implementation. These recommendations represent a diverse group of strategies addressing the full breadth of issues considered by the Task Force and its committees. It should be noted that the following eight recommendations were selected from the full list of 63 recommendations which are presented, without exclusion, in Sections 9.2 and 9.3 below.*

### **Leading Recommendation 1:**

*Building upon the Clean Air Act (CAA) principle that ambient concentrations of PM<sub>2.5</sub> should be reduced to levels sufficient to protect public health with an adequate margin of safety, reductions below the federal primary annual standard of 15 µg/m<sup>3</sup> are advisable to provide an additional margin of safety that allows and compensates for scientific uncertainty, including the potential health impacts on sensitive populations. To achieve these reductions, the District should establish an ongoing and continuous process of review of all sources of PM<sub>2.5</sub> emissions (including onroad and nonroad mobile sources, area sources, stationary sources, etc.) and develop and implement policies, practices and standards to continue progress towards reducing ambient concentrations of PM<sub>2.5</sub> and precursors. In the development of such policies, practices and standards, stakeholder involvement should be an integral part of the process. Those strategies that achieve lower emissions of hazardous air pollutants (HAPs) and ozone precursors in conjunction with reducing PM<sub>2.5</sub> should be a priority and a strong emphasis should be placed on educational programs for the public.*

### **Leading Recommendation 2:**

*The District should create a diverse stakeholder advisory committee to continue to focus and advise the Board on issues of air pollution, public health and environmental justice related to PM<sub>2.5</sub> and to strategize on policies, practices and programs to reduce PM<sub>2.5</sub> ambient concentrations, as outlined in Leading Recommendation 1.*

### **Leading Recommendation 3:**

*As a part of the ongoing process, a stakeholder group should be convened in 2010 to review peer-reviewed health literature, ambient monitoring data and modeling results to determine whether interim numeric goals are advisable to achieve continued progress towards reducing ambient PM<sub>2.5</sub> concentrations sufficient to protect public health with an adequate margin of safety. Six months prior to convening the 2010 review, committees responsible for synthesizing data shall be convened to have sufficient time to collect, analyze and synthesize needed information.*

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### ***Leading Recommendation 4:***

*The District should work with the states of Kentucky and Indiana to pursue and develop strategies to reduce the PM<sub>2.5</sub> precursor emissions from major regional sources within a range of 150 miles to achieve additional reduction of ambient PM<sub>2.5</sub> concentrations to protect public health.*

### ***Leading Recommendation 5:***

*The District should work with public and private fleet owners operating in Louisville Metro through education, incentives and grants to aggressively retrofit or replace both onroad and nonroad diesel fleets with state-of-the-art technology that reduces emissions.*

### ***Leading Recommendation 6:***

*The District should cooperate with local and regional planning agencies to quantify the difference between emissions budgets that result from business-as-usual and alternative growth scenarios using comparison guidelines provided by EPA.*

### ***Leading Recommendation 7:***

*The District should initiate a stakeholder process for local adoption of onroad and nonroad idling regulations, with the proposed Draft Idle Reduction Regulation (included as Appendix 10) used as a starting point for discussion.*

### ***Leading Recommendation 8:***

*Counties and municipalities within the Louisville nonattainment area should enact local ordinances to prohibit open burning. To the extent it is allowed, open burning should be restricted on days when PM<sub>2.5</sub> concentrations are forecasted to be unhealthy for sensitive populations.*