Strategic Toxic Air Reduction Regulation 5.30 Stakeholder Group Report and Plan of Action

September 19, 2007

STAR Program

Strategic Toxic Air Reduction

LOUISVILLE · JEFFERSON COUNTY METRO

Strategic Toxic Air Reduction Program
Regulation 5.30 Stakeholder Group

Report and Plan of Action

Executive Summary

The West Louisville Air Toxics Study documented that there were high concentrations of harmful air toxics, including cancer-causing chemicals, in specific neighborhoods in Louisville Metro. A U.S. Environmental Protection Agency (EPA) study, that included modeling of reported emissions, concluded that the air in Jefferson County had the highest potential risk for adverse effects of all of the counties in the eight southeastern states. In the absence of federal and state air toxics programs to provide a safe environment for the citizens of Louisville, the Air Pollution Control Board (Board) adopted the Strategic Toxic Air Reduction (STAR) Program.

One component of the STAR Program is Regulation 5.30 *Report and Plan of Action for Identified Source Sectors*, which requires the Louisville Metro Air Pollution Control District (District) to develop a proposed Report and Plan of Action to assess and address the risk to human health and welfare from ambient concentrations of toxic air contaminants (TACs) from minor stationary sources, area sources, non-road mobile sources, and mobile sources. In developing the proposed Report and Plan of Action, the District is required to implement a process allowing for active and meaningful stakeholder involvement in the development of, and review and comment on, the Report and Plan of Action.

To provide a structured forum for insuring active and meaningful stakeholder involvement, the District created a formal stakeholder group. In determining the appropriate members of the stakeholder group, the District reviewed the various source categories and groups that may be affected by a comprehensive toxics abatement program or had shown an interest in the STAR Program. The District invited industry and academic experts, planners, health and environmental advocates, health professionals, business representatives, and citizens to be members of the STAR 5.30 Stakeholder Group.

The Stakeholder Group formed working committees to review and discuss the basic issues facing the Stakeholder Group: developing recommended environmental acceptability risk goals, identifying the sources of TAC emissions and current risk levels, and developing recommendations for abatement of the identified high levels of toxics risks. Reports of the committees are included in Section 10 (Health/Risk Committee), Section 11 (Area and Minor Source Committee), Section 12 (Mobile and Non-Road Mobile Source Committee), and Section 13 (Report and Plan of Action Committee).

This Report and Plan of Action is the result of the collaborative effort of the members of the Stakeholder Group that began in July of 2006. The Plan of Action is comprised of 35 recommendations of the full Stakeholder Group, which are included in Section 14.

Recommendation 13 establishes the recommended environmental acceptability (EA) goals for the source sectors assessed pursuant to Regulation 5.30. These EA goals continue the concepts adopted by the Board in Regulation 5.21 for large and moderate stationary sources and include an overall cumulative cancer risk EA goal of 25 in one million and a single chemical noncancer risk goal of a Hazard Quotient of 1.0. The Stakeholder Group recognized that there may be some situations for which the employment of current technology will not allow the goal to be reached. In those instances, the Stakeholder Group emphasized the need for public education regarding land use and site planning to minimize exposure to high levels of risk, especially for highly sensitive populations such as schools, recreational facilities, and daycare centers.

Regulation 5.30 established specific requirements for the contents of the proposed Report and Plan of Action. Through the course of its assessment of the myriad of issues and emission sources, the committees and the full Stakeholder Group evaluated many suggested recommendations. For a large number of these suggested recommendations, a strong consensus was reached. For others, consensus was not reached.

The Stakeholder Group recognized the dynamic nature of toxics issues in Louisville Metro and around the country. The 35 recommendations represent a snapshot in time of possible strategies for toxics reductions and exposure abatement. As new reduction technologies are developed and more funds become available, the opportunity to further reduce toxic emissions may arise. In addition, the Stakeholder Group concluded that the time constraint in Regulation 5.30 for preparation of the proposed Report and Plan of Action precluded the Stakeholder Group from completely assessing and addressing all applicable sources of toxic air emissions. Thus, the Stakeholder Group recognized the need for continual evaluation of Regulation 5.30 sources and possible control strategies not covered in this report. This Report and Plan of Action establishes some procedures to be used in the continued review and deliberation process by the Board and the District. This review may lead to additional specific strategies, recommendations, and timetables being developed. Progress toward achievement of the environmental acceptability goals should be quantified. Additionally, the Stakeholder Group recognized that the evaluation of some issues should include stakeholders who were not a part of the Stakeholder Group. Therefore, some of the recommendations include the creation of additional, ad hoc stakeholder groups to further evaluate specific issues.

Finally, the Stakeholder Group recognized that success in continued and future evaluation of air toxics is dependent upon additional and updated information. This Report and Plan of Action identifies future monitoring and emissions inventory needs.

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Section 1 Introduction

The Strategic Toxic Air Reduction (STAR)[1] Program of the Louisville Metro Air Pollution Control District (District or APCD) is designed to reduce harmful contaminants in the air we breathe. The program was created in response to several studies which showed that Louisville had unacceptably high levels of toxic chemicals in the air. A monitoring study documented that there were high concentrations of harmful air toxics, including cancer-causing chemicals, in specific neighborhoods. A study, that included modeling of reported emissions, concluded that our air had the highest potential risk for adverse effects of all of the counties in the eight southeastern states. The threat to public health from toxic air contaminants was deemed sufficient to warrant action on the part of local government. Louisvillians knew that we could and should do better.

... several studies showed that Louisville had unacceptably high levels of toxic chemicals in the air. ... Louisvillians knew that we could and should do better.

The STAR Program ... provides a regulatory framework for assessing and addressing toxic air emissions and improving air quality.

The STAR Program is our community's response to these disturbing findings and commitment to improve our air quality. After the District developed a draft program, comments and suggestions from the business sector, neighborhood leaders, air quality professionals, and clean air advocates were considered before the final STAR Program was adopted on June 21, 2005, by the Air Pollution Control Board (Board), whose members are appointed by the Mayor with the consent of the Louisville Metro Council. The STAR Program, administered by the District, a Louisville Metro government agency, provides a regulatory framework for assessing and addressing toxic air emissions and improving air quality. There are three key components of the STAR Program to address different categories of sources contributing to toxic air pollution.

The first component of the STAR Program establishes the overall framework and methodologies for determining risk from toxic air contaminants (TACs) and a general duty not to emit a TAC in a quantity or duration that is harmful to the health and welfare of humans, animals, and plants.

Large and moderate industrial and commercial operations are responsible for the largest, single-source emissions of most toxic air pollutants. These emissions come from process stacks, general building ventilation systems, and fugitive sources of outdoor equipment. These stationary, non-mobile operations are likely the cause of the highest risks in the vicinity of the companies. Regulating these operations is the second component of the STAR Program, under Regulation 5.21 *Environmental Acceptability for Toxic Air Contaminants*.

[1] Acronyms and abbreviations used in this report are listed in Appendix 1.

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The third component of the STAR Program, Regulation 5.30 *Report and Plan of Action for Identified Source Sectors*, was adopted in recognition that large and moderate industrial and commercial operations are not the only sources of toxic air pollution. Regulation 5.30, which is included as Appendix 2, covers the myriad of smaller sources of air toxics emissions. There are smaller industrial and commercial operations, like auto body repair shops and perchloroethylene dry cleaners. The pollution from cars, trucks, buses, and motorcycles as well as from non-road engines, such as construction equipment, watercraft, locomotives, and aircraft, also contributes significantly to Louisville's air toxics problem. Additionally, there are aspects of citizens' everyday lives, such as mowing the lawn, automobile choice, or driving patterns, which have an impact on air quality.

Because addressing these diverse sources of air toxics may affect all Louisvillians, the Board required the District to implement a process allowing for active and meaningful stakeholder involvement in developing a plan of action. To provide a structured forum for insuring active and meaningful stakeholder involvement, the District formed the STAR 5.30 Stakeholder Group, made up of industry and academic experts, planners, health and environmental advocates, health professionals, business representatives, and citizens. The Stakeholder Group was charged with assisting the District in developing a recommended road map for the Board's adoption of an implementation plan to effectively reduce the emissions of toxic chemicals from applicable non-industrial sources. In developing recommendations for an implementation plan, the Stakeholder Group recognized the need to seek answers to numerous questions:

To provide a structured forum for insuring active and meaningful stakeholder involvement, the District formed the STAR 5.30 Stakeholder Group, made up of industry and academic experts, planners, health and environmental advocates, health professionals, business representatives, and citizens.

- What air toxics need to be addressed? The U.S. Environmental Protection Agency (EPA) has developed several lists of chemicals. Regulation 5.21 requires review of specific lists of chemicals for large and moderate sources. Are these the appropriate chemicals for review under Regulation 5.30 or are there other chemicals of concern for Louisville?

- What sources or activities are responsible for the emissions of the chemicals of concern?

- Are the high concentrations of toxic chemicals in the air caused by a single source or are they the result of the accumulation of emissions of many sources?

- What is an acceptable level of pollution? Is there an acceptable level of risk, or is it the lowest level that can reasonably be obtained?

- What sources of air toxics emissions would it be appropriate to regulate? While the

Board routinely regulates stationary sources, the air-polluting activities of citizens are generally not subject to regulation. Some chemicals are transported from outside Jefferson County and thus beyond the authority of the Board to regulate. Some pollutants, no longer actively emitted, are in the air everywhere and can only be reduced by chemical transformation to other chemicals, which may take years.

- What technologies are available to minimize the pollution? Usually this applies to industrial and larger commercial sources, but it is critical to determine what we can do as individuals to reduce air toxics emissions. What would controls cost and are the costs reasonable?

- How do we identify problems? What type of monitoring can be used? We can measure some pollutants in some places, which gives us important information. We can also calculate concentrations of pollutants through emissions inventory and modeling exercises.

- Should a control plan utilize a voluntary or a regulatory approach, or should it be a combination of approaches? What types of incentives would facilitate voluntary approaches?

- What strategies to reduce pollution will be most effective? Cost-effective solutions that provide the greatest air quality benefits need to be identified. We need to plan for long-term as well as short-term emission reductions.

- Are there toxic emissions that contribute to other air quality issues, such as ozone or fine particles? If so, are there opportunities for these recommendations to contribute to a multi-pollutant air quality management plan?

The Stakeholder Group, with assistance from the District, has given careful consideration to these and other questions. This report contains the Stakeholder Group's findings and recommendations. The Stakeholder Group notes that some of the recommendations include a further recommendation that the Board and District provide a forum for continued discussions, particularly where regulatory actions are recommended.

Section 2 Background of the STAR Program

2.1 Why Action was Needed

2.1.1 Identification of the Toxics Problems in Louisville

In the spring of 1996, the Jefferson County Health Department received a grant to undertake a study to determine the health needs and concerns of the residents of western Jefferson County. This study was called the West County Community Involvement Project (WCCIP). Confidential written environmental health surveys were collected and public meetings were used to solicit input from citizens. The result was an *Action Agenda* listing 38 concerns (with six identified as priority items) and 15 recommendations. This *Action Agenda* was presented to Louisville and Jefferson County elected officials on September 3, 1996.

Given the success of assessing the issues of concern, the participants in the WCCIP continued to meet, forming the WCCIP Task Force, believing that the Task Force "should now move towards *resolving* the identified environmental and environmental health problems in order to improve environmental health in the neighborhoods that comprise the West County area." Concurrently, the University of Louisville was awarded an EPA Environmental Justice through Pollution Prevention (EJP2) grant. With over $300,000 in funding, the University of Louisville and the WCCIP Task Force joined forces to begin addressing the identified problems. The Task Force members agreed that the first "action item" should be a comprehensive air monitoring project in the Rubbertown area. Additional funding was appropriated by the Kentucky Legislature over the years with the help of State Senator Gerald Neal. The WCCIP Task Force was later renamed the West Jefferson County Community Task Force (WJCCTF). This initial air monitoring project became known as the West Louisville Air Toxics Study (WLATS).

In September 2002, the EPA Region 4 released a county-by-county *Air Toxics Relative Risk Screening Analysis* that identified Jefferson County as having the highest potential adverse impact of toxics of the 736 counties in the eight southeast states.

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>
> Seventeen chemicals were monitored at cancer risk levels greater than 1 in one million and one additional chemical at an unsafe level considering noncancer effects.

In October 2003, the final results from the WLATS identified seventeen chemicals that were monitored at levels representing a cancer risk of greater than 1 in one million ($1 \otimes 10^{-6}$) and one additional chemical (which is also a carcinogen but the cancer risk was not calculated as part of the study) was monitored at an unsafe level considering noncancer effects. Two chemicals were monitored at cancer risk levels greater than 100 in one million ($1 \otimes 10^{-4}$), one of which, 1,3-butadiene, was monitored at a cancer risk level of

500 in one million. An additional twelve chemicals were monitored at cancer risk levels greater than 10 in one million ($1 \otimes 10^{-5}$). The cumulative monitored cancer risk at each of the twelve sites exceeded 100 in one million; the highest monitored cancer risk was 841 in one million.

At about the same time, the Kentucky Division for Air Quality (DAQ) had begun implementing risk-based review within the construction permit process for selected processes, establishing a standard of a $1 \otimes 10^{-6}$ increased risk of cancer as meeting the provision of 401 KAR 63:020, the state's toxics general duty requirement (shall not emit a toxic pollutant in a quantity or duration as to be harmful to the health and welfare of humans, animals, and plants).

> What is a 1 in one million cancer risk? A cancer risk is associated with a concentration of a carcinogen in the air and represents the number of excess cancer cases that would be expected to develop if one million people were exposed for a lifetime to that carcinogen at that concentration. A 1 in one million cancer risk may be written as $1 \otimes 10^{-6}$; a 100 in one million cancer risk may be written as either $100 \otimes 10^{-6}$ or $1 \otimes 10^{-4}$.

The allowed concentrations of many toxics pursuant to the 1986 Kentucky-developed toxic air pollutant program (which is now effectively repealed by the state, but was incorporated by reference in District Regulations 5.11 *Standards of Performance for Existing Sources Emitting Toxic Air Pollutants* and 5.12 *Standards of Performance for New or Modified Sources Emitting Toxic Air Pollutants* and enforced by the District) are generally several orders of magnitude less stringent than the levels allowed by most cancer risk-based state toxics programs in the United States.

The federal Toxics Release Inventory (TRI), which is comprised, in part, of emissions actually released into the air, reported by industrial and commercial companies located in Jefferson County continued to constitute a significant portion of the TRI air emissions reported by companies located in Kentucky. Additionally, Jefferson County continued to rank towards the top of the list of counties in the country with the highest reported TRI air emissions.

However, toxics in the air are not exclusively the result of emissions from permitted industrial and commercial sources. Non-permitted commercial sources, mobile sources, non-road mobile sources, general activities by citizens, and transported pollution from outside of Jefferson County, all contribute to the toxics problems in Jefferson County.

A source sector is a general grouping of sources of air contaminants used by air pollution control agencies to describe the various types of sources of air pollutant emissions. The four source sectors commonly used are described in the following table:

Source Sector	Description
Point source	Industrial or commercial stationary source that is subject to the District's permit requirements, also called a permitted stationary source. Depending upon the level of emissions, point sources may be described as:
Title V	• The largest of the industrial sources, this is defined as "major" by the EPA and subject to the Clean Air Act Title V operating permit program and STAR Regulation 5.21
FEDOOP	• The "moderate" level of industrial source, a Federally Enforceable District Origin Operating Permit (FEDOOP) source has the potential to emit at a major level, but has enforceable permit conditions to limit its potential to emit (PTE), subject to STAR Regulation 5.21
Minor	• The smallest of the industrial sources, not subject to STAR Regulation 5.21, this stationary source will be considered under STAR Regulation 5.30
Mobile source	Motorized vehicle that is registered for use on the public roads and highways, including an automobile, light-duty truck, heavy-duty truck, bus, and motorcycle
Non-road mobile source	Motorized vehicle that is 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 an aircraft, boat, railroad engine, construction equipment, off-road recreational equipment, and lawn mower and other lawn equipment
Area source	Permitted or non-permitted commercial stationary source or other "anthropogenic" source of emissions that is not included as a point, mobile, or non-road mobile source. Anthropogenic means resulting from human activities, as opposed to biogenic which means resulting from living organisms or biological processes, such as trees, vegetation, and microbial activity. Examples include a printer, gas station, architectural surface coating operation, auto repair shop, residential heating device, and the use of a consumer product

A list of source categories in the non-road mobile source sector and area source sector is included as Appendix 3.

Following the release of the preliminary results of the WLATS that identified 1,3-butadiene as the chemical with the highest monitored cancer risk, Mayor Jerry Abramson called upon the

three Rubbertown industrial emitters of 1,3-butadiene to make voluntary reductions of those emissions. A fourth Rubbertown industry, emitting chloroprene, was later called upon to make voluntary reductions of chloroprene. One year later, agreements were reached with the four companies for specific reductions and adopted by the Board as enforceable orders.

Implementation of these agreements has caused reductions of 1,3-butadiene and chloroprene as well as several other chemicals monitored in the WLATS at high cancer risk levels. Most notably, the company responsible for the largest emission of 1,3-butadiene replaced its major control device, a flare, with a different technology, a thermal oxidizer, capable of significantly reducing these emissions. Additionally, recognition of the toxics problems identified by the WLATS likely caused other industrial companies to review their emissions of these chemicals and consider plans to reduce these emissions.

However, while improving the air quality in the vicinity of the industrial companies, these voluntary actions left many issues to be addressed: the need for a systematic review of the toxic chemicals identified as unacceptable by the WLATS, whether the resulting cancer or noncancer risks would be considered acceptable, whether there were other locations in Louisville or other chemicals emitted with unacceptable risks, and the toxic chemical emissions of other source sectors. Clearly, all sources of toxic emissions and all areas of Jefferson County had not, in the past, been comprehensively assessed and addressed, nor were they, at that time, being comprehensively assessed and addressed by federal, state, or local programs.

2.1.2 Federal Action

Section 112 of the Clean Air Act (CAA) was significantly expanded by the 1990 Amendments to address the issue of toxics. However, implementation of the federal program has not, and will not, adequately abate the toxics problems in Jefferson County.

The EPA is required to develop a comprehensive national toxics abatement program. However, while the EPA has developed a work plan to address this requirement, *Workplan for the National Air Toxics Program and Integrated Air Toxics State/Local/Tribal Program Structure*, September 2001, timely and adequate implementation has not occurred. This work plan and discussions with EPA Region 4 staff suggest that developing an actual toxics program for a specific community will be the responsibility of the local or state air pollution control agency. In evaluating the EPA's toxics program, the United States Government Accountability Office (GAO) concluded[2]:

"While EPA has made some progress in implementing its air toxics program mandated by the 1990 Clean Air Act Amendments, most of its regulatory actions were completed late and major

[2] United States Government Accountability Office, *EPA Should Improve the Management of Its Air Toxics Program*, June 2006, GAO-06-669.

aspects of the program have still not been addressed. ... many of the unmet requirements pertain to limiting emissions from small stationary and mobile sources, which collectively account for most emissions of air toxics. The agency faces continuing implementation challenges stemming from the program's low priority relative to other programs and related funding constraints. To this end, the agency lacks a comprehensive strategy for completing the unmet requirements. ... As a result of EPA's limited progress, the agency has not addressed health risks from air toxics to the extent or in the time frames envisioned in the Clean Air Act."

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>
> Government Accountability Office
> June 2006

In its evaluation of the EPA's air toxics program, the GAO reviewed the State programs of California, New Jersey, Oregon, and Wisconsin, and the Louisville STAR Program. These air toxics programs were recommended for review because they go beyond the federal program and employ innovative program designs or management practices. The GAO concluded, "The state and local programs we reviewed use practices that could potentially help EPA enhance the effectiveness of its air toxics program."

To address the toxic emissions from major sources, Section 112 of the CAA included the maximum achievable control technology (MACT) program. While the EPA has historically implemented programs to regulate these larger industrial sources, e.g., the Standards of Performance for New Stationary Sources (NSPS) and reasonably available control technology (RACT), neither portion of the two-step MACT program has been effective in abating the high cancer risks from these sources.

The first step of the MACT program considers only emission reduction technology and does not evaluate the resulting risk levels from compliance with the technology-based standards. Further, the implementation of the technology-based MACT standards by the affected Jefferson County sources has not resulted in a sufficient reduction in the emissions of toxics.

The second step of the MACT program, which considers the "residual risk" after implementation of the first-step technology-based standards, does not occur until ten years after the adoption of the technology-based standards. Further, the EPA is not required to strengthen the MACT standards so that all sources will cause no more than a $1 \otimes 10^{-6}$ risk; the EPA could allow up to a $1 \otimes 10^{-4}$ risk (a risk of 100 in one million). In its first residual risk standard (coke ovens), the EPA allowed an individual risk of 270 in one million, with 300,000 people being exposed to a risk greater than 1 in one million.

2.2 State and Local Toxics Programs

Many state and local toxics programs in the United States use a $1 \otimes 10^{-6}$ risk level as the goal for carcinogenic effects and a 1.0 Hazard Quotient[3] as the goal for non-carcinogenic effects (collectively, under the STAR Program, considered the level of "environmental acceptability" or the level that is "environmentally acceptable"). However, state and local toxics programs, while establishing methods for evaluating the environmental acceptability of the emissions of toxics, generally do not provide a model for the comprehensive toxics abatement program that is needed to address all of the toxics problems in a particular area. The limitations of these programs include the following: the $1 \otimes 10^{-6}$ risk-level goal is generally applied to only industrial sources and doesn't consider toxics emissions from other source sectors, the $1 \otimes 10^{-6}$ risk-level goal is often applied to only new or modified processes or process equipment, and the $1 \otimes 10^{-6}$ risk-level goal is generally applied to only a single chemical from a single process.

Because of these limitations, no single state or local toxics program provided a model for a comprehensive toxics program that could be implemented in Louisville to address all of the emission sources of toxic air pollutants. A program that assesses and addresses only a portion of the toxics in the air cannot assure the protection of health and welfare.

2.3 Development of the STAR Program

Under the directive of both Mayor Jerry Abramson and the Louisville Metro Air Pollution Control Board, the District developed the concepts for a comprehensive air toxics program and draft regulations for its implementation. Named the Strategic Toxic Air Reduction (STAR) Program, draft regulations were released in September 2004. "This community must take decisive action to further reduce the levels of toxic chemicals in our air - for the health and safety of our citizens," Mayor Abramson said. "So today I'm presenting a framework for a focused, strategic plan that will significantly reduce levels of toxic chemicals in our air beginning next year and prompt sharp reductions over the next five years."

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>
> Mayor Jerry Abramson
> September 9, 2004

[3] The term "Hazard Quotient" or "HQ" is used in the context of a single chemical. The Hazard Quotient is the ratio between the concentration of that chemical and the "safe" or "acceptable" level for that chemical. In contrast, the term "Hazard Index" or "HI" is the sum of the Hazard Quotients for more than one chemical.

The STAR Program is comprised of three major components:

Regulation	Purpose
5.01 - general provisions 5.20 - benchmark ambient concentrations 5.22 - modeling	Establish overall framework and methodologies for determining risk; general duty
1.06 - enhanced toxic air contaminant (TAC) emissions inventory reporting 5.21 - environmental acceptability for major and moderate companies 5.23 - lists of TACs	More detailed emissions reporting; environmental acceptability goals and timelines for specific TACs emitted by major and moderate companies
5.30 - report and plan of action for other source sectors	**Framework for assessing and addressing toxic risks for minor, area, mobile, and non-mobile sources**

Following the release of the September 2004 draft regulations, the District held more than 60 meetings, with over 1200 in attendance, to explain and discuss the draft STAR Program regulations; the outcome being a comment/response document exceeding 200 pages and many changes to the draft regulations. Modified STAR Program regulations were proposed in January 2005. The comment/response document was nearly 350 pages and the formal public review process led to many additional changes to the proposed regulations. The Board adopted the STAR Program regulations in June 2005, with an effective date of July 1, 2005.

The portion of the STAR Program directly affecting major and moderate companies is currently being implemented. As of the date of this report, submittals of enhanced TAC emissions inventories for Category 1 and 2 TACs, stack and fugitive emission release parameters for Category 1 and 2 TACs, demonstrations of environmental acceptability for Category 1 TACs, and compliance plans for Category 1 TACs have been required from the Title V (major) companies; submittals of enhanced TAC emissions inventories for Category 1 TACs and stack and fugitive emission release parameters for Category 1 TACs have been required from the FEDOOP (moderate) companies.

In May 2007, the STAR program was recognized by the EPA for its innovative approach to addressing toxics issues. The District and the STAR Program were awarded the EPA's top honor, the Clean Air Excellence Award for 2006, and characterized as a program with "the potential to serve as a model at the local, state, and federal level."

Section 3 EPA, Kentucky, and other Applicable Programs

3.1 U.S. Environmental Protection Agency (EPA) Programs

3.1.1 Area Source Program

3.1.1.1 Background

The EPA defines area sources as those sources with potential to emit less than 10 tons per year (tpy) for a single hazardous air pollutant (HAP) and less than 25 tpy for combined HAP. Typically, individual area sources are small emitters, with many sources emitting less than 100 pounds of HAPs per year. However, collectively, area sources are important air toxics contributors especially in urban areas, representing about 50 percent of national stationary source emissions. Area sources emit a wide variety of HAPs; many emit air toxic metals which are also fine particulate matter (PM, also referred to as $PM_{2.5}$).

3.1.1.2 Clean Air Act Requirements

The Clean Air Act (CAA) requires the EPA to create a strategy to control air toxics emissions from area sources in urban areas. In developing this strategy, the EPA must identify at least 30 HAPs that represent the greatest threat to public health and then list area source categories representing at least 90 percent of the emissions of those identified HAPs. Most importantly, the CAA requires the EPA's strategy to achieve at least a 75 percent reduction in risk attributable to area source emissions.

The CAA requires the EPA's strategy to achieve at least a 75 percent reduction in risk attributable to area source emissions.

3.1.1.3 Status

The EPA's Integrated Urban Strategy was published July 19, 1999 (64 FR 38706). Completed in November 2002, the source category list includes 70 area source categories. Most source categories were prioritized via a toxicity weighting analysis (i.e., multiplied tons of each HAP emitted by a source category by the potency of each HAP). To date, standards have been promulgated for 15 area source categories; 55 source categories remain to be addressed. Based upon lawsuits filed by Earth Justice, court-ordered deadlines for five area source standards to be issued have been established. The EPA had indicated that work on developing all remaining area source standards was to be initiated by October 2006.

Of the 70 categories identified for listing, the District believes that there are companies in Louisville in only the 16 area source categories listed below. Thus, review of the residual risks based upon compliance with federal area source regulations will be done for only the following

16 area source categories:

Dry cleaning facilities
Municipal landfills
Portland cement
Publicly owned treatment works
Stationary internal combustion engines
Hospital sterilizers
Gasoline distribution Stage I
Industrial boilers
Paint and allied products
Plastic parts and products (surface coating)
Clay ceramics manufacturing
Auto body refinishing
Institutional/commercial heaters
Miscellaneous organic chemical manufacturing
Industrial organic chemicals manufacturing
Synthetic rubber manufacturing

If the District becomes aware of sources in Louisville in the remaining source categories, the District would perform a similar review of this additional area source category.

3.1.1.4 EPA Rulemaking

The CAA allows the standards for area sources to be based on generally available control technology (GACT) or maximum achievable control technology (MACT). As prescribed by the CAA, a MACT standard must be at least as stringent as the average of the best performing 12 percent of sources if there are 30 or more sources in the source category or the average of the best performing five sources if there are less than 30 sources in the source category. The EPA has found that the typical time needed to develop a MACT standard is four to five years. In contrast to developing MACT standards, the EPA has more flexibility in developing GACT standards because the CAA did not establish a floor (minimum stringency) requirement and cost effectiveness may be considered. Thus, the time for developing a GACT standard could be considerably less than that needed to develop a MACT standard.

3.1.2 Voluntary Programs and Potential Grant Resources – Area and Minor Sources

The following is a compilation of programs administered by the EPA that encourage voluntary activities aimed at reducing air pollution. These programs can be applied in our community to reduce the risk associated with toxics from area and minor sources. Several of these programs have very broad applications and the reduction of toxics may be only one of the many possible benefits of participation. Some programs provide grants to help recipients initiate these activities in their own communities while others seek to form partnerships or create clearinghouses of information. There are a myriad of opportunities for collaboration and partnership among different sectors of our community in the implementation of these programs; including government, private, and non-profit groups.

A. Community Action for a Renewed Environment

The Community Action for a Renewed Environment (CARE) program, sponsored by the EPA, is a competitive grant program that offers an innovative way for communities to take action to reduce toxic pollution. Through CARE, communities create local collaborative partnerships that implement local solutions to reduce releases of toxic pollutants and minimize exposure to toxic pollutants. EPA helps CARE communities assess the environmental risks they face and provides access to voluntary programs to address local environmental priorities. In addition, EPA offers support for communities to develop their own approaches to reducing toxics. Examples of some of the EPA voluntary programs that reduce exposure to toxics and create safer communities include programs that: reduce emissions from diesel engines, clean abandoned industrial sites, reduce emissions from small business operations while reducing costs, improve the indoor environment in schools, and use pollution prevention to protect drinking water supplies. For more information about CARE, please visit www.epa.gov/CARE.

B. Design for the Environment (DfE)

DfE provides tools and approaches that allow businesses and communities to integrate environmental and health considerations into business decisions. Any community seeking to promote the use of alternative processes, safer product formulations, and emerging innovative technologies in industry in an effort to reduce chemical emissions and exposures, cut chemical waste, and improve overall safety will benefit from this program.

The DfE program promotes pollution prevention and risk reduction activities in industrial sectors and surrounding communities. To accomplish this mission, DfE forms partnerships with industry and other interested parties to develop information on environmental and human health impacts, performance, and cost of cleaner technologies and approaches. The program also disseminates information to help businesses design and redesign cost-effective products and processes that are cleaner and safer for workers and the public. It achieves this goal through technical support and advice. For more information, please visit www.epa.gov/dfe.

C. Green Suppliers Network

The Green Suppliers Network provides technical assistance to small- and medium-sized manufacturers to help them optimize their resources and improve their environmental footprint. To achieve this, EPA collaborates with larger manufacturers to engage their small- and medium-sized suppliers in low-cost technical reviews that focus on process improvement and waste minimization. Teaching suppliers about "Lean and Clean" manufacturing techniques can help them to increase energy efficiency, identify cost-saving opportunities, and optimize resources to eliminate waste. The result is local manufacturers who are more competitive and are able to better contribute to the local economy. For more information, please visit www.epa.gov/greensuppliers.

D. GreenScapes

This program was designed to provide cost-efficient and environmentally friendly solutions for large-scale landscaping. GreenScapes preserves natural resources and prevents waste and pollution by encouraging organizations to make more holistic decisions regarding waste generation and disposal. The program also encourages organizations to protect and conserve land, water, air, and energy resources. It is a government-industry partnership program that promotes green land management practices. For more information, please visit www.epa.gov/greenscapes.

E. High Production Volume (HPV) Challenge Program

The HPV Challenge Program will ensure that a baseline set of health and environmental effects data on approximately 2,800 high production volume chemicals (industrial chemicals that are manufactured or imported into the U.S. in volumes of 1 million pounds or more per year) is made available to EPA and the American public. Through this program, communities will be assured of having access to the type of information that will allow them to actively participate in environmental decision making at all levels. The HPV Challenge Program is beneficial to all communities because it aims to provide website access to health and environmental effects data for many industrial chemicals that have been used in commerce for the last 30 years but which did not have basic screening level information made available to the public. In addition, to ensure that the public has access to baseline health and environmental data for all HPV chemicals, including those "orphan" chemicals not sponsored in this program, the EPA is taking regulatory actions to gather and make this information available through a series of test rules and information gathering rules.

Since it was launched, this voluntary program has brought about significant progress in the collection and availability of previously unpublished health and environmental data resulting in 2,000 chemicals becoming more widely understood by the public. Because the public's access to HPV chemical information is the cornerstone of the HPV Challenge Program, EPA will launch the HPV Information System (HPVIS), which will provide the public with complete and easy access to critical information on HPV chemicals. HPVIS also has a comprehensive website that allows a wide range of users to search existing data summary information and new data as they are developed. This collection of hazard data will provide the public with basic information about the chemicals that are produced in the largest quantities. For more information, please visit www.epa.gov/chemrtk/index.htm.

F. National Environmental Performance Track

The aim of the program is to recognize and encourage top environmental performance among private and public facilities, which go beyond compliance with regulatory requirements to achieve environmental excellence. Performance Track is a public/private partnership recognizing top environmental performance among participating U.S. facilities of all types,

sizes, and complexity, both public and private. Program partners are providing leadership in many areas, including preventing pollution at its source. Currently, the program has 344 members and welcomes all qualifying facilities. Applications are accepted twice a year. Some of the benefits of the program include recognition and technical support. For more information, please visit www.epa.gov/performancetrack.

3.1.3 Voluntary Programs and Potential Grant Resources - Mobile and Non-Road Mobile Sources

The following is a compilation of programs administered by the EPA that encourage voluntary activities aimed at reducing air pollution from mobile and non-road mobile sources. A number of these programs are focused on a specific sector, such as Clean Construction USA, while others have a broad, community-wide scope, for instance the CARE program. Also, some programs provide grants to help recipients initiate these activities in their own communities.

There are a myriad of opportunities for collaboration and partnership among different sectors of our community in the implementation of these programs, including government, private, and non-profit groups. The Mobile and Non-Road Mobile Source Committee considered many of these opportunities; and examples of potential partners or participants are listed following those programs below. The examples given are not intended to be exhaustive; other potential partners or participants should be considered.

A. Community Action for a Renewed Environment

The CARE program, as described in section 3.1.2, additionally offers grant opportunities for communities to take action to reduce toxic pollution from mobile and non-road mobile sources. For more information about CARE, please visit www.epa.gov/CARE.

B. National Clean Diesel Campaign

Building on the successes of EPA's regulatory and voluntary efforts to reduce emissions from diesel engines, EPA has created the National Clean Diesel Campaign (NCDC). The NCDC participants are committed to reducing diesel emissions and finding innovative ways to protect human health and the environment. To fully address the challenges of reducing diesel emissions, the 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 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.

C. Southeast Diesel Collaborative

The Southeast Diesel Collaborative is a voluntary, public/private partnership involving leaders from federal, state, and local government, the private sector, and other stakeholders in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. The Southeast Diesel Collaborative is part of the EPA's National Clean Diesel Campaign.

The goal of the Southeast Diesel Collaborative 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 on-road sectors. For more information, please visit http://www.southeastdiesel.org.

D. 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 ("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/.

Potential Partners/Participants: Jefferson County Public Schools (JCPS)

E. 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/.

Potential Partners/Participants: Jefferson Riverport International; CSX; Norfolk Southern; Paducah & Louisville

F. 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/.

Potential Partners/Participants: Arena Authority; KYDOT - Bridges project; Contractors/Construction Managers; GLI; Louisville Metro Government; Home Builders Association of Louisville

G. SmartWay Transport

The SmartWay Transport Partnership is a voluntary collaboration between the 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 large local presence, is a charter member of the SmartWay program. For more information, please visit http://www.epa.gov/smartway/index.htm.

Potential Partners/Participants: Freight carriers; Freight shippers; Logistics companies

H. Voluntary Diesel Retrofit Technology Verification Program

This program offers information and technical support on retrofitting diesel engines to cut down 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.

Potential Partners/Participants: All diesel equipment owners

3.1.4 Other Programs

A. Best Workplaces for Commuters (BWC)

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. The EPA and the 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 the EPA's National Standard of Excellence in commuter benefits are included on the list of Best Workplaces for Commuters - 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 Best Workplaces for Commuters District. For more information, please visit http://www.bestworkplacesforcommuters.gov/.

Potential Partners/Participants: Metro; GLI; TARC

Potential BWC Districts: Downtown: Medical campus

B. 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 better pedestrian and bicycle amenities. For more information, please visit http://www.epa.gov/smartgrowth/index.htm.

Potential Partners/Participants: Metro Planning and Design Services; KIPDA; GLI; Developers

3.1.5 Federal Emissions and Fuels Standards

A table of federal mobile source and non-road mobile source emission standards and fuel standards is included as Appendix 4.

3.2 Kentucky Division for Air Quality

The Kentucky Division for Air Quality (DAQ) has begun a process of developing a regulatory air toxics program. After holding four stakeholder group meetings, the DAQ presented concepts of an air toxics program and subsequently released draft regulations. After providing an opportunity for informal comment, the DAQ revised the draft regulations and filed proposed regulations with the Kentucky Legislative Research Commission on May 14, 2007.

The May 2007 proposed air toxics regulations contain the following features:

- In general, the requirements apply to permitted stationary sources.
- A source shall not exceed a source-wide cancer risk of approximately 100 in one million from all listed carcinogenic toxic air pollutants (TAPs).
- A source shall not exceed a source-wide noncancer Hazard Index of 10 from all listed TAPs.
- A source shall apply best available control technology for toxic air pollutants (TAP-

BACT) (a technology requirement) if the source-wide cancer risk exceeds 1 in one million from all listed carcinogenic TAPs.

- A source shall apply TAP-BACT if the source-wide noncancer Hazard Index exceeds 1.0 from all listed TAPs.
- Any other source of air toxics, such as area, non-road mobile, or mobile, would not be regulated except through a "safety net program." Sources would be selected by the DAQ on a case-by-case basis.

On May 14, 2007, the DAQ filed proposed air toxics regulations with the Kentucky Legislative Research Commission. A public hearing was held on June 29, 2007.

Section 4 STAR Program Regulation 5.30

Regulation 5.30 *Report and Plan of Action for Identified Source Sectors*, included as Appendix 2, requires the District to develop "a proposed Report and Plan of Action to assess and address the risk to human health and welfare from ambient air concentrations of toxic air contaminants (TACs) from minor stationary sources, area sources, non-road mobile sources, and mobile sources. In developing the proposed Report and Plan of Action, the District shall implement a process allowing for active and meaningful stakeholder involvement in the development of, and review and comment on, the Report and Plan of Action." [Regulation 5.30 section 2.1]. As amended in July 2006, Regulation 5.30 requires the proposed Report and Plan of Action to be submitted to the Board by June 1, 2007. The STAR 5.30 Stakeholder Group reported to the Board in March 2007 that, although significant progress was being made on assessing and addressing the Regulation 5.30 sources, a comprehensive Report and Plan of Action would not be completed by June 1, 2007. The Report and Plan of Action was expected to be submitted to the Board by the September 19, 2007, Board meeting.

> Regulation 5.30 requires the District to develop a proposed Report and Plan of Action to assess and address the risk to human health and welfare from ambient air concentrations of toxic air contaminants from minor stationary sources, area sources, non-road mobile sources, and mobile sources ... allowing for active and meaningful stakeholder involvement in the process.

Regulation 5.30 section 2.2 requires the Report to:

1. Include a general identification of the sources and, to the extent that it can reasonably be determined, estimates, by TAC, of the emissions from each source sector and the relative ambient air risk from each sector,

2. Evaluate the status of and need for improvement of TAC emission inventories for these source sectors,

3. Identify and evaluate existing and likely programs at the federal level and in Kentucky that are intended to reduce emissions from these sources,

4. Identify and evaluate existing and likely programs in other jurisdictions that are intended to reduce emissions from these sources,

5. Identify appropriate risk goals for these source sectors,

6. Assess any needs for monitoring of the sources,

7. Identify any special considerations relating to addressing risk from these sectors, and

8. Identify all resources necessary to implement the Plan of Action.

The proposed Plan of Action is required to suggest specific programs, activities, areas to be addressed by regulation, if any, and a timetable to achieve the identified risk goals by no later than December 31, 2012 [Regulation 5.30 section 2.3]. Programs may include, but are not limited to, the following:

1. For area sources, in addition to any appropriate emission reductions, strategies such as land use mechanisms to minimize impacts, especially on sensitive sub-populations such as the young, the elderly, and those with health conditions,

2. For non-road mobile sources, cleaner fuels and cleaner equipment, including accelerating their availability and use, and

3. For mobile sources, promoting and accelerating the use of alternative fuel vehicles, cleaner fuels, cleaner vehicles, effective transportation policies such as improved and increased public transit, improved and increased bike and pedestrian facilities, promoting urban in-fill policies, and diesel retrofits.

The District developed, and submitted to the Board on September 21, 2005, a timeline and description of a proposed stakeholder process for developing the proposed Report and Plan of Action. The September 21, 2005, version of the timeline and description document, as it was submitted, is included as Appendix 5. Pursuant to this identified stakeholder process, the District provided technical assistance to the Stakeholder Group. This Report and Plan of Action reflects the consensus of the Stakeholder Group. As staff to the Board, the District can provide further technical information to the Board regarding the assessment and potential strategies for addressing the toxic air contaminant emissions from minor stationary sources, area sources, non-road mobile sources, and mobile sources.

Section 5 Chemicals of Concern

5.1 Basis for Title V and FEDOOP Source TACs

Pursuant to Regulation 5.21, the Title V and FEDOOP companies are required to demonstrate environmental acceptability for Category 1 and 2 toxic air contaminants (TACs) from existing processes and process equipment and for Category 1, 2, 3, and 4 TACs for new and modified processes and process equipment. The following is a description of the Category 1-4 TACs. A list of the TACs in each category is included as Appendix 6.

The Category 1 TACs were chosen because these were the chemicals that were monitored in the West Louisville Air Toxics Study (WLATS) at a concentration representative of a risk greater than 1 in one million or a Hazard Quotient greater than 1.0.

The Category 2 TACs were chosen because of their role in the high level of risk determined for Jefferson County by EPA Region 4. The risk derived from the Risk-Screening Environmental Indicators (RSEI) model was based on reported actual emissions of those TACs. An assessment, through emissions inventory and modeling for the Category 2 TACs, will determine whether the emissions are environmentally acceptable. If the emissions of those chemicals are determined to be environmentally acceptable, then emission reductions would not be needed.

The Category 3 TACs are chemicals identified by the EPA as urban air toxics because these hazardous air pollutants "... present the greatest threat to public health in the largest number of urban areas ..." [Clean Air Act Section 112(k)(3)(B)(i)].

The Category 4 TACs are chemicals identified pursuant to Section 112(b) of the Clean Air Act as hazardous air pollutants (HAPs) because these chemicals "present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to, substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic) or adverse environmental effects whether through ambient concentrations, bioaccumulation, deposition, or otherwise ..." [Clean Air Act Section 112(b)(2)]. The District notes that the HAPs included in the STAR Program via adoption in Regulation 5.30 reflect technical changes identified by the EPA but not formally adopted by the EPA through rulemaking. The most significant change is the inclusion of phosphorous compounds in Regulation 5.30.

5.2 Approach for Regulation 5.30 Source Sector TACs

Regulation 5.30 requires that the Report and Plan of Action assess and address the risk to human health and welfare from ambient air concentrations of TACs from minor stationary sources, area sources, non-road mobile sources, and mobile sources. However, the regulation does not identify the TACs that are to be evaluated. While not restricted in the TACs that may be

evaluated, the existence of thousands of chemicals suggests that a practical approach was necessary to complete the Report and Plan of Action within the allotted timeframe.

> Regulation 5.30 requires that the Report and Plan of Action assess and address the risk to human health and welfare from ambient air concentrations of TACs from minor stationary sources, area sources, non-road mobile sources, and mobile sources.
>
> The regulation does not identify the TACs that are to be evaluated.

Two approaches were considered for identifying the chemicals for evaluation under Regulation 5.30. One approach was to develop chemical profiles for the individual source categories. The chemicals identified as being emitted from a source category would then be evaluated for potential risk. The other approach was to establish the source categories that are known to emit a specific chemical of concern. While the major sources of emissions of some of the eighteen Category 1 TACs, such as chloroprene, ethyl acrylate, or acrylonitrile, are easily established as being emitted by the larger industrial sources (subject to Regulation 5.21), the sources of some of the other Category 1 TACs, such as arsenic and chromium are not as easily identified and may not be emitted by, or emitted exclusively by, the larger industrial sources. In these cases, research of available literature would be conducted to identify the sources of these particular chemicals, followed by an evaluation of those sources for risk. In general, the first approach was used by the District and the Stakeholder Group; chemical profiles for the area source and non-road mobile source categories were developed and assessed.

Section 6 STAR 5.30 Stakeholder Group

6.1 Development of the Stakeholder Group

In developing the proposed Report and Plan of Action, the District was required by Regulation 5.30 section 2.1 to implement a process allowing for "active and meaningful stakeholder involvement in the development of, and review and comment on, the Report and Plan of Action." To provide a structured forum for insuring active and meaningful stakeholder involvement, the District decided that the most successful approach would be to create a formal stakeholder group. In determining the appropriate members of the stakeholder group, the District reviewed the various source categories and groups that may be affected by a comprehensive toxics abatement program or have shown an interest in the STAR Program. The District invited industry and academic experts, planners, health and environmental advocates, health professionals, business representatives, and citizens to be members of the STAR 5.30 Stakeholder Group. The invitation letter to prospective members of the Stakeholder Group is included as Appendix 7. Based upon the responses received, the District determined whether all stakeholder groups were adequately represented and invited other stakeholders to provide comprehensive coverage of all stakeholder interests. A list of the STAR 5.30 Stakeholder Group members is included as Appendix 8.

To provide a structured forum for insuring active and meaningful stakeholder involvement ... the most successful approach would be to form a formal stakeholder group.
The District invited industry and academic experts, planners, health and environmental advocates, health professionals, business representatives, and citizens to be members of the STAR 5.30 Stakeholder Group.

The first meeting of the Stakeholder Group was devoted to welcoming the members, providing opening remarks and expectations of the members, providing an overview of Louisville air quality issues, and a brief overview of the STAR Program.

Over the next several meetings, the Stakeholder Group heard from Dr. Solomon Pollard, a toxicologist from the EPA, on the health and science of toxicity assessment; from Russ Barnett and Arnita Gadson, from the University of Louisville, on the framework for risk assessment developed by the West Jefferson County Community Task Force (WJCCTF); from Dr. Ken Mitchell, a toxicologist from the EPA, on the EPA's national air toxics program; and from the District on the STAR Program framework for environmental acceptability goals. In addition to these technical presentations, the District held a workshop for the Stakeholder Group members to explain the technical details and applicability of the STAR Program.

The next phase of the Stakeholder Group process was to form the working committees to review and discuss the various issues, sources of TAC emissions and risk, and possible recommendations for abatement of the identified high toxics risks. Reports of the committees

are included in Section 10 (Health/Risk Committee), Section 11 (Area and Minor Source Committee), Section 12 (Mobile and Non-Road Mobile Source Committee), and Section 13 (Report and Plan of Action Committee). The Stakeholder Group reviewed the original and follow-up West Louisville Air Toxics Studies (WLATS) to understand the relevance of the toxics monitoring data to the Stakeholder Group's task. Presentations on the current and future activities at several sources were made by Stakeholder Group members: Karen Scott on the Louisville International Airport, Anne Nash on perchloroethylene and Stoddard solvent dry cleaners, Kirsten Morrell on UPS, and Mark Young on the auto body repair industry. Field trips to Highland Cleaners (Stoddard solvent dry cleaner) and Ivy Hill (printer) were taken.

Starting in December 2006, each committee reported its activities monthly to the full Stakeholder Group, so that all of the members were aware of the activities, issues discussed, and findings of all of the committees.

As the committee work came to a conclusion and the committee reports, including recommendations, were submitted to the full Stakeholder Group, the Stakeholder Group members began discussions on the overall report and plan of action to recommend to the Board.

A month-by-month matrix of the presentations and handouts for each meeting of the Stakeholder Group and the activities of the District and Stakeholder Group is included as Appendix 9.

As a means to compare or rank the effectiveness of potential toxic risk reduction strategies, the Stakeholder Group developed the following criteria for evaluating various strategies:

Criteria for Evaluating Potential Strategies

I. Categories to be scored

1. Current risk-weighted emissions
2. Available emission reduction strategy options
3. Future risk reduction
4. Reduce other pollutants (two-fers, three-fers), e.g., ozone, fine particulates
5. Economic reasonableness
6. Public/source acceptance (legal, political, social factors)

II. Additional information

1. Timing
2. Implementation method (Public/source education, Partnership, Regulation)
3. Responsibility (District, Other Metro Government agency, GLI/industry)

In the evaluation process, each strategy could be considered independently and a numeric score given for each of the six criteria. These scores could then be totaled and analyzed in conjunction with additional information, including timing, implementation method, and responsibility, to suggest which strategies might be effective in reducing toxic risk if implemented. Although the Stakeholder Group and its committees did not formally use this tool for evaluating potential risk reduction strategies, the criteria were discussed as part of the process for developing discrete recommendations. The established criteria, methodology, and evaluation form (Appendix 10) are included in the Report and Plan of Action so that the Board and District would have these for rating the risk reduction strategies under consideration by the Board for implementation.

6.2 Committees of the Stakeholder Group

6.2.1 Report and Plan of Action Committee

The focus of this committee was to work with the District staff in planning and developing the Report and Plan of Action (RAPA) that was required to be submitted to the Air Pollution Control Board by June 1, 2007. This group discussed what the District and the Stakeholder Group would like to achieve through the implementation of STAR Regulation 5.30, as well as what the overall plan might be for the community. The members of each committee are listed in Appendix 11.

6.2.2 Health/Risk Committee

The focus of this committee was health-based risk, which is a key element in the successful implementation of Regulation 5.30. The cancer risk goals established in Regulation 5.21 for the larger industrial sources include 1 in one million for a single chemical from a single process and 10 in one million cumulative for neighboring companies. Recognizing that even with the implementation of the best available technology for toxics (T-BAT) these goals may not be met, the regulation includes an administrative process for approving a modification of the goals up to a level of 100 in one million. The goal of this group was to develop a recommendation to the full Stakeholder Group for an appropriate upper-bound risk level for the community, taking into consideration all sources of emissions.

The goal of the Health/Risk Committee was to develop a recommendation to the full Stakeholder Group for an appropriate upper-bound risk level for the community, taking into consideration all sources of emissions.

6.2.3 Area and Minor Source Committee

This committee focused on developing strategies for the area and minor source sectors, two of the sectors that STAR Regulation 5.30 is mandated to address, and analyzed various educational, voluntary, and/or regulatory channels through which this regulation could be implemented. Area and minor sources include gas stations, perchloroethylene dry cleaners, printers, architectural

and industrial surface coatings, traffic markings, and consumer products.

6.2.4 Mobile and Non-Road Mobile Source Committee

This committee focused on developing strategies for the mobile and non-road mobile source sectors, two of the sectors that STAR Regulation 5.30 is mandated to address, and analyzed various educational, voluntary, and/or regulatory channels through which this regulation could be implemented. Mobile sources include automobiles, trucks, buses, and motorcycles that operate on public roads and highways. Non-road mobile sources include aircraft, boats, railroad engines, construction equipment, off-road recreational equipment, and lawn mowers and other lawn equipment.

Section 7 Emissions Inventory

7.1 Minor Sources

Previous emissions inventories for area sources were developed to address requirements for ozone nonattainment areas. Thus, the focus was on volatile organic compounds (VOCs) as a class, not the individual chemicals. Minor sources are required to submit to the District every three years a report of their actual emissions of particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone precursor emissions of VOCs and oxides of nitrogen (NO_x), and lead (Pb) (the criteria pollutants); ammonia (NH_3); and all hazardous air pollutants (HAPs) listed in Regulation 5.14 *Hazardous Air Pollutants and Source Categories*. The most recent required emissions inventory for minor sources was for calendar year 2005. The completeness of the submitted emissions reports varies widely; some minor sources reported their emissions of criteria pollutants and individual chemicals, some just the criteria pollutants, and some just activity levels. In the past, where the reports were incomplete, the District staff used generic emission profiles to complete the minor source emissions inventory. This had been sufficient for the criteria pollutant emissions inventories required to be submitted to the EPA. However, for the Regulation 5.30 requirement to assess minor sources, more refined information was necessary.

In the past, where the reports were incomplete, the District staff used generic emission profiles to complete the minor source emissions inventory. This had been sufficient for the criteria pollutant emissions inventories required to be submitted to the EPA. However, for the Regulation 5.30 requirement to assess minor sources, more refined information was necessary.

The District has completed its review of the 2005 minor source emissions inventories (approximately 550 sources). Where a minor source had not identified the individual chemicals emitted, the District either used an applicable chemical profile to speciate the VOC or particulate emissions, used data from Material Safety Data Sheets submitted by that company, developed a generic source-category specific chemical profile based upon Material Safety Data Sheets submitted by several companies in the source category to speciate the VOC or particulate emissions, or requested additional information from the company.

7.2 Area Sources

Previous emissions inventories for area sources were developed to address requirements for ozone nonattainment areas. Thus, the focus was on volatile organic compounds (VOCs) as a class, not the individual chemicals. The most recent required emissions inventory for area sources was for calendar year 2005. The District found chemical profiles developed by the EPA or the State of California. The District then used the existing VOC emissions inventories in

conjunction with these chemical profiles to determine the countywide emissions of specific chemicals from each of the area source categories.

7.3 Non-Road Mobile Sources

The most recent emissions inventory for non-road mobile sources was generated by using the EPA's National Mobile Inventory Model (NMIM), A Consolidated Emissions Modeling System for MOBILE6 and NONROAD. In generating the required emissions inventories, the District had used only the criteria pollutant emission functions of NMIM. However, NMIM also provides speciated emissions, i.e., individual chemical emissions. The District ran NMIM to develop the countywide speciated emissions inventories for each non-road source category.

7.4 Mobile Sources

The recent emissions inventories for (on-road) mobile sources were generated by using the EPA's MOBILE6.x model (the current version is MOBILE6.2). In generating these emissions inventories, which were required as part of the general emissions inventory requirements, redesignation requests, transportation mobile source budgets, and transportation conformity demonstrations, the District had used only the criteria pollutant emission functions of MOBILE6.x. However, the MOBILE6.2 version also provides speciated emissions, which were used to develop the countywide speciated emissions inventories for mobile sources.

Section 8 Computer Dispersion Modeling

Total countywide emissions of a toxic pollutant do not directly determine the health effects of that pollutant on the general population. Risk, whether cancer risk or noncancer risk, depends upon both the toxicity of the chemical as well as the concentration to which one is exposed. For example, a large emission coming from a tall stack that is located in the middle of a large industrial property may have a lower off-property concentration than a smaller emission coming from a stack that is not much taller than the building and located near the property line. In a similar way, equal amounts of different toxic pollutants emitted under identical dispersion parameters may not have the same risk due to the intrinsic toxicities of the chemicals.

Total countywide emissions of a toxic pollutant do not directly determine the health effects of that pollutant on the general population. Risk, whether cancer risk or noncancer risk, depends upon both the toxicity of the chemical as well as the concentration to which one is exposed.

To evaluate the effects certain pollutants may have on a community, the mass emission of a chemical must be converted to ambient concentrations with the use of a computer dispersion model. Based upon the maximum concentration of a pollutant, as estimated by the model, the cancer risk and noncancer risk can then be determined based upon the toxicity of that chemical. The toxicity of a chemical is identified by the Benchmark Ambient Concentration (BAC), which is determined by the procedures established in Regulation 5.20 *Methodology for Determining Benchmark Ambient Concentration of a Toxic Air Contaminant*. The ratio of the maximum modeled concentration to the BAC is the risk of that chemical from the modeled emission. Cancer risks are expressed in terms of how many instances of excess cancer per one million individuals could result. Noncancer risks are expressed in terms of a Hazard Quotient, a Hazard Quotient of 1.0 being the level below which adverse health effects are not expected to occur, above which adverse health effects may occur.

Cancer risks are expressed in terms of how many instances of excess cancer per one million individuals could result. Noncancer risks are expressed in terms of a Hazard Quotient.

By quantifying the levels of risk from the emissions of various chemicals, the risks caused by various sources can be compared, both against the risks from other sources as well as against environmental acceptability goals. Through additional computer dispersion modeling, the effects on risk caused by process changes, such as the addition of control devices, material reformulations, and increased stack heights, can be evaluated.

Using the same concepts, a screening exercise of dividing emissions (for example, in tons per year) by the BAC can provide insight on which emissions are more likely to cause a higher level of risk. In doing such an exercise, it is noted that the calculated number of an emission is not an actual risk number, but is relative to the calculated number from a different emission. A

circumstance with a significantly higher number is likely to have a higher actual risk than a circumstance with a significantly lower number. Logically, one would focus first on circumstances with a significantly higher number. This screening exercise can be done at different levels. On a countywide basis, total emissions of a chemical, or all chemicals, from an entire source category can be divided by the BAC to rank entire source categories as to their hazard potential. However, because risk is dependent upon concentration, a more refined screening exercise would determine the number of sources in the county within the source category and then divide the average emission of a chemical, or all chemicals, from individual sources by the BAC to rank average individual sources as to their hazard potential. Again, circumstances with significantly higher numbers would then logically be reviewed in a more refined fashion, i.e., by performing computer dispersion modeling, before reviewing circumstances with significantly lower numbers.

8.1 Minor Sources

Where the District had sufficient chemical information from the company, the District made a general assessment as to whether any of the chemicals emitted would be likely to cause a high level of cancer or noncancer risk. The screening process described above was used to focus first on circumstances with a higher screening hazard potential. Computer dispersion modeling, using either the AERMOD or ISC model, was performed to determine the maximum ambient concentration for each chemical being reviewed. Based upon those concentrations, cancer risks and noncancer risks were calculated. These risk numbers were then compared to the environmental acceptability goals recommended by the STAR 5.30 Stakeholder Group.

8.2 Area Sources

Based upon the results of the screening process described above and District experience, several area source categories were chosen to undergo full computer dispersion modeling analysis. The first five source categories chosen for analysis were perchloroethylene dry cleaners, waste oil furnaces, automobile body repair shops, gas stations, and printers. A single company was chosen for each of the source categories to represent the average size of, and emissions from, the category in computer dispersion modeling. The District used actual building, property, and release parameters from the chosen companies in modeling (either AERMOD or ISC) to determine the maximum ambient concentration for each chemical being reviewed. Based upon those concentrations, cancer risks and noncancer risks were calculated. These risk numbers were then compared to the environmental acceptability goals recommended by the STAR 5.30 Stakeholder Group.

8.3 Non-Road Mobile Sources

Several reports examining non-road mobile sources from the California Air Resources Board (CARB) were reviewed. The reports focused on construction equipment, locomotives, marine vessels, and transport refrigeration units (TRU's) to evaluate their impact on the ambient air. A

large city block size construction site was modeled with typical equipment running at various times throughout a year. A mixture of new and old construction equipment was evaluated to estimate emissions. Modeled risk of ferry and excursion marine vessel traffic in several California ports is assumed to be similar to tugboat traffic on the Ohio River. A relatively short section of track was modeled with several trains passing by daily. A typical facility with numerous TRUs with average diesel particulate matter (PM) emissions was evaluated for its impact to the surrounding community. These general evaluations allow for a basic understanding of non-road mobile sources and serve as a guide to build upon for a more local analysis.

8.4 Mobile Sources

To determine the potential human exposure to mobile source air toxics, the District used dispersion modeling of high traffic intersections. Projects were begun using two different computer dispersion modeling tools to assess two specific intersections known to be high in traffic, the intersections of Hurstbourne Parkway/Shelbyville Road and Preston Highway/Outer Loop. The two computer dispersion modeling tools readily available to the District were CAL3QHC and ISC/AERMOD. Each model was used to estimate annual concentrations using different sources of raw data. The two modeling tools could provide a check upon the soundness of each other.

ISC/AERMOD is currently used for STAR Program point source modeling, and can work at micro and regional (countywide) scales, but its ability to represent mobile sources is limited to treatment of generic area sources that are the size and shape of roads. CAL3QHC is specifically geared for microscale screening of intersections for maximum concentrations, considering varying wind angles, queuing, volumes, etc., but prior District experience had been limited to evaluation of carbon monoxide (CO) hotspots. Both can be adapted for multiple pollutants and varying meteorological conditions to simulate hourly or daily average concentrations.

8.4.1 Project 1 - AERMOD

The AERMOD project looked at emissions from a top-down point of view. The District maintains countywide emissions inventories for Jefferson County using vehicle miles traveled (VMT) data developed by the Kentuckiana Regional Planning and Development Agency (KIPDA) with a Travel Demand Model (TDM). The TDM calculates current and predicted traffic flow on a computer-modeled network of over 14,000 roadway segments spanning five local counties. The District extracted 2005 KIPDA link-level data from a prior emissions analysis which describe the daily geographic distribution of countywide VOC emissions. The links with geographic coordinates near the intersections of interest were isolated, and put into a spreadsheet that converted the link data into rectangles approximating locations and shapes of roadway segments for each intersection and allocated VOC emissions to each rectangle in units applicable to ISC/AERMOD area source modeling.

After converting the initial model geographic and emission representations to fit the AERMOD requirements, annual average VOC concentrations were calculated for the area surrounding one of the intersections, Preston and Outer Loop. These concentrations were plotted on a contour map and report which also included a list of the range of VOC concentrations found within the study area. The final map was presented to the Mobile and Non-Road Mobile Source Committee.

8.4.2 Project 2 - CAL3QHC

The CAL3QHC project drew upon longstanding experience by District staff in modeling high-traffic intersections as potential CO hotspots. The District acquired traffic data and constructed updated CAL3QHC models for the two intersections selected to represent expected high ambient CO concentrations in Jefferson County. The model scenarios were built using recent traffic statistics for volume and signal timing to evaluate the intersections for worst likely traffic. The model's results were verified to fall within expected values for such intersections. The model files were then used to further expand the models to evaluate 500-by-500-foot grids of receptors to allow contour mapping of concentrations. The extracted grid data were then used to construct a series of presentation contour maps showing varying levels of CO pollution (isopleths) caused by traffic at the intersections assuming various wind directions.

MOBILE6 emission factors were analyzed to construct a conversion table which associated expected ambient concentrations of various HAP compounds given a modeled or monitored level of CO. These tables were then used to convert modeled CO concentrations to expected concentrations of toxics such as diesel PM, benzene, and formaldehyde. As a final step, a toxic concentration may be converted to an expected risk level per million by dividing an annual average concentration at a given point by the BAC for that compound.

The modeled average annual CO concentrations within 500 feet of each intersection were converted to associated toxics concentrations for the compounds with highest expected risk: diesel PM, benzene, formaldehyde, ethylbenzene, naphthalene, formaldehyde, and acetaldehyde. Because the risk from diesel PM alone was found to be highest by an order of magnitude over the risk from all other mobile source toxics emissions, the risk from the other non-diesel toxics were evaluated together as a collective non-diesel risk.

Two sets of maps were constructed representing annualized risk at risk per million contour levels surrounding the intersections for diesel PM and for cumulative risk from all other known (non-diesel) mobile source pollutants. Animated series were presented to the Mobile and Non-Road Mobile Source Committee showing the (small) year-to-year variation in risk levels up to 500 feet around each intersection.

The ensuing committee assessment of this information clearly established the dominance of diesel PM in risk associated with on-road mobile sources and the rapid falloff of risk as distance from the roadway edge increases.

8.4.3 Comparison of Project 1 and 2

The AERMOD results were derived from countywide daily inventories and assume the same flow all day, every day, along the entire length of each modeled road segment. The CAL3QHCR modeling was developed from localized traffic signal and volume data and took into account queuing effects and daily flow variations. The use of CAL3QHCR can be assumed preferable for small-scale reviews and the evaluation of mitigation measures. The overall inventory data used to construct the AERMOD project and the CO emission factors used by CAL3QHC/ CAL3QHCR were derived from related MOBILE6 modeling work, but completely different processes distribute those emissions within each model scenario.

The annual average VOC concentrations plotted from AERMOD outputs were converted to annualized CO using a similar ratio process as that used to associate CO emissions to air toxics levels. Since the CAL3QHCR model was used to produce annual CO concentrations, the two modeling techniques can be readily compared by examination of the contour maps and gridded output reports. It was found that AERMOD predicted highest annual concentrations of CO near the Preston/Outer Loop intersection to be about 0.61 ppm.

The corresponding highest level from CAL3QHCR modeling is 0.74 ppm (1994) within the roadway. Examination of the 1994 contour map suggests average concentrations of 0.5 - 0.7 ppm in the vicinity of the turn lanes. The results of each model are thus fairly close with the other's estimates. The close comparison of the annual results suggests a mutual corroboration of soundness of underlying data and modeling techniques for both methods.

Section 9 Hot Spot Monitoring

The goal of the short-term hot spots monitoring project was to collect four weekly one-hour samples at selected emission sources and receptors in Louisville, Kentucky, to help assess possible VOC emission levels from smaller businesses and mobile sources in the community. The sampling began on November 29, 2006, and continued through the week of December 18, 2006. Air Toxics Ltd. in Folsom, California, was selected to provide the equipment and chemical analysis. Two samples from November 29 were inadvertently voided at the lab. The replacement samples were collected on January 8, 2007.

The following is the Executive Summary of the report *Hot Spots Monitoring: Short Term Study, November 2006 - January 2007*. The text of the full report is included as Appendix 12. The appendices, maps, pictures, and tables from the full report are available from the District.

9.1 Executive Summary from the Hot Spots Monitoring Report

This report summarizes the results and the methodology for the Hot Spots monitoring project conducted by Louisville Metro Air Pollution Control District (APCD). Analysis included reviewing the data results from the samples provided by Air Toxics Ltd., the meteorological data collected by APCD, and preparing visual summaries and comparisons of the data results. The purpose of the study was to identify findings and observations that were most significant and to help shape and direct the future toxics monitoring plan for Louisville Metro.

Three area sources were selected for the short term monitoring plan (see Table 1). They were chosen because they are area sources in close proximity to a receptor and they are a type of facility representative of various sources in Louisville Metro. The three sources from Table 1 are in different parts of Jefferson County. Those sources, a dry cleaner, a busy road intersection, and a gas station provided diversity in the monitoring.

The receptor sites of interest in the study were chosen because they contain “at risk” population groups and were screened to be within 500 meters (0.311 miles) of the area source. “At risk” populations include any group that may be more sensitive to the health effects of toxic chemicals, such as children, the elderly, or those with pre-existing illnesses. The study’s three receptors identified are all considered to be sensitive populations: a child care center, an elementary school and a high school.

The Preston Highway/Outer Loop source revealed no inconsistencies with what was expected for the sampling location being near a road and a gas station. The data results were consistent with the speciation for evaporative emissions of a gas station and/or vehicle car exhaust. Okolona Elementary, the corresponding receptor, did have one atypical positive hit. On December 19, tetrachloroethylene (perchloroethylene) was reported at 10.0 $\mu g/m^3$for the one hour sample.

Thorntons (source) and Ballard High School (receptor) sampling sites had data results consistent

with the speciation for evaporative emissions of a gas station and/or vehicle car exhaust. Thorntons and Ballard High had reported tetrachloroethylene concentrations of 1.2 and 1.5 $\mu g/m^3$, respectively, on December 19. STAR lists the BAC for Cancer Risk for this compound at 0.17 and it is a Category 1 TAC.

The Village Cleaner (source) and Southside Christian Childcare Center (SCCC) (receptor) did not have a single positive hit for tetrachloroethylene. Before choosing this source/receptor set for this monitoring project, District staff called Village Cleaner to confirm that the dry cleaning equipment was in operation. Unfortunately, District staff was misinformed regarding the status of the dry cleaning operations. After receiving the monitoring data, District staff again contacted Village Cleaner, which then provided the correct information that this location is only a drop-off/ pick-up site and dry cleaning is no longer performed at this location. Although the monitoring data did not identify concentrations of tetrachloroethylene, the data did reveal the impact that idling cars have on the air quality surrounding the daycare. The air samples taken at the daycare were similar in composition (compounds and concentrations) to the air samples from the intersection of Preston Highway and Outer Loop. Therefore, although not quantifying the impact of the intended source's emissions (tetrachloroethylene) on this sensitive population receptor, this portion of the monitoring project revealed a different concern for this receptor site.

Future study recommendations may include a longer study period and sampling time. A recommendation may be made to SCCC and other daycares to voluntarily enforce the local regulation that mentions "no idling" to improve the air quality for the children. The Louisville ordinance that mentions no idling, 72.032, states "It shall be a parking violation for any person driving or in charge of a motor vehicle to permit it to stand unattended without stopping the engine, locking the ignition, and removing the key, or when standing on any perceptible grade without setting the brake thereon and turning the front wheels to the curb."

The high level of tetrachloroethylene at Okolona Elementary is a concern. Future samples should be collected to see if this was a chance occurrence or a result of a regular event. If the compound is detected again, an effort will be made to identify the source.

Table 1. Monitoring Plan Sources and Receptors

Source	Receptor	Distance
Intersection of Preston Highway and Outer Loop Louisville, KY	Okolona Elementary School 7606 Preston Highway Louisville, KY 40219	~ 330 meters
Thorntons Oil Company 4950 Brownsboro Rd Louisville, KY 40222	Ballard High School 6000 Brownsboro Rd Louisville, KY 40222	~225 meters
Village Cleaners 3618 Klondike Lane Louisville, KY 40218	Southside Christian Child Care 3620 Klondike Lane Louisville, KY 40218	Separated by narrow alley in a strip mall

Section 10 Report of the Health/Risk Committee

10.1 Background

In the initial adoption of the STAR Program regulations, the Board established cancer and noncancer risk goals for large and moderate industrial sources. Through implementation of Regulation 5.30, the Board intended to establish appropriate risk goals for other source categories. By establishing comprehensive, community-level risk goals, the Board would then have a benchmark for establishing appropriate risk-management programs. The task of the Health/Risk Committee was to recommend risk goals for minor, area, mobile, and non-road mobile sources.

To develop recommended risk goals, the Committee members needed to have a working understanding of the STAR Program's framework for determining risk from toxic air contaminants (TACs) as well as the current level of risk of the various sources. Initial meetings of the Committee focused on the methodology of determining risk and an evaluation of the results of the West Louisville Air Toxics Study (WLATS).

The STAR Program uses the term "environmental acceptability" to connote compliance with the risk goals. With respect to the noncarcinogenic effects of a chemical, the benchmark ambient concentration (BAC_{NC}) is the level below which adverse health effects are not expected. The goals in Regulation 5.21 for large and moderate industrial sources are set at the BAC_{NC}, thus at a level at which no adverse health effects are expected. However, with respect to cancer risk, the benchmark ambient concentration (BAC_C) is the level that is representative of an additional lifetime cancer risk of 1 in 1,000,000 ($1 \otimes 10^{-6}$). The goals in Regulation 5.21 for the large and moderate industrial sources range from $1 \otimes 10^{-6}$ to $10 \otimes 10^{-6}$. There was concern expressed that the word "acceptable" as used in the term "environmental acceptability" or "environmentally acceptable" was inappropriate because one cancer case was deemed to be too many and should not be thought of as acceptable. It was pointed out that the goal of acceptable cancer risk was a policy decision, in contrast to the noncancer risk goal that is the level below which adverse health effects are not expected. While, as in other aspects of life, there are quantifiable risks, the sentiment was expressed that the goal of the community should be on risk prevention, not on acceptance of a level of cancer risk.

The STAR Program uses the term "environmental acceptability" to connote compliance with the risk goals. ... While, as in other aspects of life, there are quantifiable risks, the sentiment was expressed that the goal of the community should be on risk prevention, not on acceptance of a level of cancer risk.

10.2 Committee Actions

In developing recommended environmental acceptability (EA) goals, the Committee considered not only what the goals would be ideally, but also what levels of risk currently exist, both from community monitoring data and source-specific computer dispersion modeling, and what levels of risk could be achieved through the implementation of reasonable risk-reduction measures.

In several Committee meetings, the Study I (2000-2001) and Study II (2002-2005) WLATS results were analyzed. Many of the WLATS monitors were located in the Rubbertown area, an area with a large concentration of large industrial sources. Therefore, the WLATS monitoring results were not representative of most of the areas in Louisville Metro. However, the University of Louisville, Shelby Campus, monitor is located in an urban area that is relatively unaffected by emissions from industrial sources, so the data from this monitor had more relevance to the general levels of risk throughout the Louisville Metro area.

In another analysis, the risks from chemicals that were clearly associated with industrial activities were subtracted from the data of the monitors in the Rubbertown area to get additional information on the likely general levels of risk that currently exist in the Louisville area. By subtracting the cancer risks from these industrial-activity chemicals, the cumulative risks for the volatile organic compounds (VOCs) that were analyzed at the six current monitoring sites for the 2002 to 2005 time period ranged from 21 in one million to 73 in one million, typically in the 30 to 40 in one million range. The 2002 to 2005 average cumulative risk of the monitored VOCs at the Shelby Campus site was 31 in one million, half of the cumulative risk for those chemicals in the 2000-2001 Study I. It was noted that the cumulative cancer risk of these monitored VOCs at the Shelby Campus site in the 2000-2001 Study I (63 in one million) was at the same level as the cumulative cancer risk of the compounds that were monitored only in Study I (63 in one million for formaldehyde and metals). Because monitoring for formaldehyde and metals has not occurred after the 2000-2001 Study 1, there are no comparable data to assess the risk levels from formaldehyde and metals during the 2002-2005 Study II. However, if one were to assume the same approximate reductions for the cumulative risk from formaldehyde and metals as occurred for the monitored VOCs, the total cancer risk would be in the 60 to 65 in one million range. With the cumulative cancer risk for formaldehyde and metals unchanged from the 2000-2001 Study 1, the total cancer risk would be in the 90 to 95 in one million range.

As was explained, the cancer risk from carbon tetrachloride is considered to generally be not from current, local emissions but from historic emissions of that chemical that will remain in the environment for decades (the half life of carbon tetrachloride is 10 years), causing a background concentration of carbon tetrachloride that uniformly blankets the country. Subtracting the average cancer risk from carbon tetrachloride (10 in one million) from the 2002-2005 total cancer risks estimated above, the current cumulative cancer risk that might be affected by the implementation of risk-reduction strategies could be on the order of 50 to 85 in one million for areas not significantly and locally impacted by a specific emission source.

The Health/Risk Committee reviewed the same modeling/risk results for various sources as were reviewed by the Area and Minor Source Committee and the Mobile and Non-Road Mobile Source Committee. A table of the modeling/risk results is included as Appendix 13. The Health/Risk Committee was also provided with the same information as to the risk reductions that could be achieved through the implementation of various risk-reduction strategies. The purpose of this review was to gain an understanding of the cancer risks posed by various sources, both currently and after the implementation of potential risk reduction measures.

10.3 Recommendations

For stationary sources in the minor and area source categories, the Committee recommended the same EA goals as established by the Board for the Title V and FEDOOP companies. For cancer risk, this includes EA goals for a single chemical/single process (new or existing), cumulative risk from all new or modified chemicals/processes, cumulative risk from all chemicals/processes (new or existing) at the same company, and cumulative risk from all chemicals/processes (new or existing) from multiple companies in the stationary minor and area source category. For noncancer risk, the various EA goals apply to chemicals individually. The Committee agreed that the same framework adopted by the Board for the major and moderate companies was appropriate to apply to the smaller industrial and commercial companies.

For stationary sources in the minor and area source categories, the Committee recommended the same EA goals as established by the Board for the Title V and FEDOOP companies. ... For mobile sources, the Committee decided that only one cancer risk (cumulative for all carcinogens) and one noncancer risk (for each chemical separately) EA goal, applicable to all mobile sources, was appropriate.

For mobile sources, the Committee decided that only one cancer risk (cumulative for all carcinogens) and one noncancer risk (for each chemical separately) EA goal, applicable to all mobile sources, was appropriate, as opposed to the EA goals for individual chemicals and individual processes that apply to the stationary sources. This is because, unlike a single process at a stationary source, mobile source emissions and resulting risk are analyzed on a road segment or intersection basis, not by individual vehicles, and it was deemed inappropriate to assess risk on an individual vehicle basis.

Based upon the modeling/risk analyses and future reductions from current and future federal emission and fuel standards, the Committee understood that the cancer risk goal would not likely be achieved for the intersections and road segments with the highest levels of traffic. However, the EA goals recommended represent goals that most intersections and road segments could achieve. Where an intersection or road segment is not likely to achieve the EA goal, the District should provide public education on the risk associated with those areas and further studies, detailing inappropriate land uses and exposures for those areas, should be undertaken.

For the non-road mobile sources, the Committee decided that there should be an EA goal for a single piece of equipment, an EA goal collectively for all of the pieces of equipment at a site, and an EA goal collectively for multiple sites, but that there should not be a distinction between new and existing pieces of equipment. As with the other source categories, the cancer risk goal is cumulative for all carcinogens and the noncancer goal is for each chemical separately.

For the non-stationary minor and area sources, the Committee decided that there should be an EA goal for a single area source/activity and an EA goal collectively for all area sources/activities. Based upon the information that was available to the Committee, it was not believed that sources or activities in this category posed a significant cancer risk or noncancer risk. Many of the activities in the area source category are not continuous over the course of a year. For example, considering architectural coating, painting a house or building is usually done in a few days or weeks and is unlikely to be repainted for many years. Therefore, an annual risk would be minimal because the emission did not occur most of the days of a year.

Because of the low level of risk expected from most area sources/activities, the Committee believed that a cumulative cancer risk of 1 in one million would not likely be exceeded and thus, unlike the other source categories, an EA goal of 10 in one million cancer risk was not necessary.

For the total EA goal (excluding background), the Committee believed that it was very unlikely that the maximum EA goals individually for all of the source categories would occur at the same location, i.e., a risk of 10 in one million would not be caused by each of the larger industrial sources, minor/area sources, non-road mobile sources, and mobile sources, and a risk of 1 in one million by area sources, at the same location. Thus, the Committee believed that the total EA goal should not be the sum of all of the individual EA goals (10 + 10 + 10 + 10 + 1 = 41). The Committee recommended 25 in one million as the appropriate cancer risk EA goal.

For the total EA goal (excluding background), the Committee believed that it was very unlikely that the maximum EA goals individually for all of the source categories would occur at the same location ... The Committee recommended 25 in one million as the appropriate cancer risk EA goal.

Because a Hazard Quotient of 1.0 is the level below which adverse health effects are not expected and above which adverse health effects may occur, the Committee believed that the total noncancer risk EA goal should be a Hazard Quotient of 1.0. However, the Committee recognized that it is possible that adding the Hazard Quotients for a single chemical from all source categories could lead to a total Hazard Quotient exceeding the recommended noncancer risk goal of 1.0. Therefore, the Committee recommended that if the cumulative Hazard Quotient from all source categories for a single chemical exceeded 1.0, the District should perform a more detailed analysis for that chemical, performing a target organ-specific Hazard Index (TOSHI) analysis, to determine whether public health was being protected

The Committee recommended that if the cumulative Hazard Quotient from all source categories for a single chemical exceeded 1.0, the District should perform a more detailed analysis for that chemical, performing a target organ-specific Hazard Index (TOSHI) analysis, to determine whether public health was being protected with an adequate margin of safety even though the cumulative Hazard Quotient exceeded 1.0.

with an adequate margin of safety even though the cumulative Hazard Quotient exceeded 1.0.

The footnotes for the Tables in Section 10.3.1 *Environmental Acceptability Goals for Cancer Risk* and Section 10.3.2 *Environmental Acceptability Goals for Noncancer Risk* contain additional details regarding the recommended EA goals.

Recommendation 1: *The Health/Risk Committee has recommended five sets of EA goals for consideration by the full Stakeholder Group. Below are tables of the cancer and noncancer risk EA goals already established by the Board for Title V and FEDOOP companies and recommended by the Health/Risk Committee for:*

1. *Stationary sources in the minor and area source categories*
2. *Mobile sources*
3. *Non-road mobile sources*
4. *Sources in the area source category that are not considered stationary, i.e., not industrial or commercial activities at a fixed location*
5. *Cumulative risk from anthropogenic (resulting from human activities) emissions, not including background risks*

10.3.1 Environmental Acceptability Goals for Cancer Risk

Environmental Acceptability Goals
Cancer Risk, in units of how many in one million

	Title V FEDOOP[1]	Stationary Minor/Area[2]	Mobile [3]	Non-Road Mobile[4]	Area[5]	Total
▪ Single process[6] Single TAC	1.0	1.0				
▪ Single non-road mobile source[6], Single TAC				1.0		
▪ Single area source/activity[6] Single TAC					1.0	
▪ All new/modified processes[7] All TACs Single company	3.8	3.8				
▪ All processes[8] All TACs Single company	7.5	7.5				
▪ All non-road mobile sources[9] All TACs Single site				7.5		
▪ All processes[10] All TACs Multiple companies	10.0	10.0				25[13]
▪ All mobile sources[11] All TACs			10.0			
▪ All non-road mobile sources[12]; All TACs Multiple sites				10.0		
▪ All area sources/activities All TACs					1.0	

[1] Adopted by the Louisville Metro Air Pollution Control Board, June 21, 2005. Title V companies are major sources, FEDOOP companies are companies that have the potential to emit pollutants in major amounts but accept permit restrictions to reduce allowed emissions to less than major amounts.

[2] Recommended by the Health/Risk Committee, March 5, 2007.
The "area source" category, as used for emissions inventory purposes, includes (1) small industrial and commercial activities at fixed locations and (2) miscellaneous other sources or activities that cause the emissions of air pollutants. Examples in the first group include printers, gasoline service stations, auto body repair shops, and perchloroethylene dry cleaners. For the purpose of establishing EA goals, these small industrial and commercial activities are included in the "Stationary Minor/Area" column.

[3] Recommended by the Health/Risk Committee, April 3, 2007.

[4] Recommended by the Health/Risk Committee, April 27, 2007.

[5] Recommended by the Health/Risk Committee, June 11, 2007.
The "area source" category, as used for emissions inventory purposes, includes (1) small industrial and commercial activities at fixed locations and (2) miscellaneous other sources or activities that cause the emissions of air pollutants. Examples in the second group, miscellaneous other sources or activities, include architectural surface coating, consumer and commercial products, cigarette smoke, pesticide application, and backyard charcoal grills. For the purpose of establishing EA goals, these miscellaneous other sources and activities are separated from the small industrial and commercial activities and are included in the "Area" column.

[6] This EA goal is the cancer risk for a single carcinogenic chemical emitted by a single process at a single company, or a single piece of non-road mobile source equipment or source/activity at a single site. A single process, piece of equipment, or source/activity may emit several carcinogenic chemicals and a company or site may have several processes, pieces of equipment, or sources/activities that emit carcinogenic chemicals.

[7] This EA goal is the cumulative cancer risk for all applicable carcinogenic chemicals emitted by all processes at a single company that are new or modified starting July 1, 2005, for Title V and FEDOOP companies, or a date to be established by rule for new stationary minor or area source processes. Applicable carcinogenic chemicals for Title V and FEDOOP companies are, in general, only those that are on one of the four lists in Regulation 5.23 (See Appendix 6). A company may have other existing processes that emit carcinogenic chemicals.

[8] This EA goal is the cumulative cancer risk for all applicable carcinogenic chemicals emitted by all processes at a single company, whether new, modified, or existing. Applicable carcinogenic chemicals for Title V and FEDOOP companies are, in general, only those that are on one of the four lists in Regulation 5.23 for new or modified processes, or on one of the first two lists in Regulation 5.23 for existing processes; the company may emit other carcinogenic chemicals. There may be more than one company whose emissions result in a cancer risk at a given location.

[9] This EA goal is the cumulative cancer risk at an individual location of all carcinogenic chemicals, including diesel particulate matter, emitted by all non-road mobile sources at a single site. There may be additional cancer risk associated with emissions from other source categories.

[10] This EA goal is the cumulative cancer risk at an individual location for all applicable carcinogenic chemicals emitted by all processes, whether new, modified, or existing, from all applicable companies. Applicable carcinogenic chemicals for Title V and FEDOOP companies are, in general, only those that are on one of the four lists in Regulation 5.23 for new or modified processes, or on one the first two lists in Regulation 5.23 for existing processes; the company may emit other carcinogenic chemicals. There may be additional cancer risk associated with emissions from other source categories.

[11] This EA goal is the cumulative cancer risk at an individual location of all carcinogenic chemicals emitted by all mobile sources, including diesel particulate matter. There may be additional cancer risk associated with emissions from other source categories.

[12] This EA goal is the cumulative cancer risk at an individual location of all carcinogenic chemicals, including diesel particulate matter, emitted by non-road mobile sources at multiple sites. There may be additional cancer risk associated with emissions from other source categories.

[13] Recommended by the Health/Risk Committee, June 11, 2007.
This is the total of the cumulative cancer risk EA goals at an individual location associated with all source categories. With the exception that this total does not include the "background" cancer risk, i.e., the cancer risk from chemicals not directly related to an applicable emission from one of the listed source categories, this is the cancer risk goal for the air that we breathe.

10.3.2 Environmental Acceptability Goals for Noncancer Risk

Environmental Acceptability Goals
Noncancer Risk, in units of Hazard Quotient

	Title V FEDOOP[1]	Stationary Minor/Area[2]	Mobile[3]	Non-Road Mobile[4]	Area[5]	Total
▪ Single process[6] Single TAC	1.0	1.0				
▪ Single non-road mobile source[6]; Single TAC				1.0		
▪ Single area source/activity[6] Single TAC					1.0	
▪ All new processes[7] Single TAC Single company	1.0	1.0				
▪ All processes[8] Single TAC Single company	1.0	1.0				
▪ All non-road mobile sources[9] Single TAC Single site				1.0		
▪ All processes[10] Single TAC Multiple companies	1.0	1.0				1.0[13]
▪ All mobile sources[11] Single TAC			1.0			If exceeds 1.0 TOSHI review[14]
▪ All non-road mobile sources[12]; Single TAC Multiple sites				1.0		
▪ All area sources/activities Single TAC					1.0	

[1] Adopted by the Louisville Metro Air Pollution Control Board, June 21, 2005. Title V companies are major sources, FEDOOP companies are companies that have the potential to emit a pollutant in a major amount but accept permit restrictions to reduce allowed emissions to less than a major amount.

[2] Recommended by the Health/Risk Committee, March 5, 2007.
The "area source" category, as used for emissions inventory purposes, includes (1) small industrial and commercial activities at fixed locations and (2) miscellaneous other sources or activities that cause the emissions of air pollutants. Examples in the first group include printers, gasoline service stations, auto body repair shops, and perchloroethylene dry cleaners. For the purpose of establishing EA goals, these small industrial and commercial activities are included in the "Stationary Minor/Area" column.

[3] Recommended by the Health/Risk Committee, April 3, 2007.

[4] Recommended by the Health/Risk Committee, April 27, 2007.

[5] Recommended by the Health/Risk Committee, June 11, 2007.
The "area source" category, as used for emissions inventory purposes, includes (1) small industrial and commercial activities at fixed locations and (2) miscellaneous other sources or activities that cause the emissions of air pollutants. Examples in the second group, miscellaneous other sources or activities, include architectural surface coating, consumer and commercial products, cigarette smoke, pesticide application, and backyard charcoal grills. For the purpose of establishing EA goals, these miscellaneous other sources and activities are separated from the small industrial and commercial activities and are included in the "Area" column.

[6] This EA goal is the noncancer risk for a single chemical emitted by a single process at a single company, or a single piece of non-road mobile source equipment or source/activity at a single site. A company or site may have several processes, pieces of equipment, or sources/ activities that emit the same chemical.

[7] This EA goal is the noncancer risk for a single chemical emitted by all processes at a single company that are new or modified starting July 1, 2005, for Title V and FEDOOP companies, or a date to be established by rule for new stationary minor or area source processes. Applicable chemicals for Title V and FEDOOP companies are, in general, only those that are on one of the four lists in Regulation 5.23 (See Appendix 6). A company may have other existing processes that emit that chemical.

[8] This EA goal is the noncancer risk for a single chemical emitted by all processes at a single company, whether new, modified, or existing. Applicable chemicals for Title V and FEDOOP companies are, in general, only those that are on one of the four lists in Regulation 5.23 for new or modified processes, or on one of the first two lists in Regulation 5.23 for existing processes. There may be more than one company that emits that chemical whose emissions result in a noncancer risk at a given location.

[9] This EA goal is the noncancer risk at an individual location for a single chemical emitted by all non-road mobile sources at a single site. There may be additional noncancer risk associated

with emissions from other source categories.

[10] This EA goal is the noncancer risk at an individual location for a single chemical emitted by all processes, whether new, modified, or existing, from all applicable companies. Applicable chemicals for Title V and FEDOOP companies are, in general, only those that are on one of the four lists in Regulation 5.23 for new or modified processes, or on one of the first two lists in Regulation 5.23 for existing processes. There may be additional noncancer risk associated with emissions of that chemical from other source categories.

[11] This EA goal is the noncancer risk at an individual location for a single chemical emitted by all mobile sources. There may be additional noncancer risk associated with emissions from other source categories.

[12] This EA goal is the noncancer risk at an individual location for a single chemical emitted by all non-road mobile sources at multiple sites. There may be additional noncancer risk associated with emissions from other source categories.

[13] Recommended by the Health/Risk Committee, June 11, 2007.
This is the total of the noncancer risk EA goals at an individual location associated with all source categories. With the exception that this total does not include the "background" noncancer risk, i.e., the noncancer risk from that chemical not directly related to an applicable emission from one of the listed source categories, this is the noncancer risk goal for the air that we breathe.

[14] Recommended by the Health/Risk Committee, April 27, 2007.
If the Hazard Quotient for a single TAC exceeds 1.0, the District may perform a more refined risk assessment, including a target organ-specific Hazard Index (TOSHI) analysis to determine whether public health is being protected with an adequate margin of safety.

10.3.3 Other Recommendations

Recommendation 2: *Where traffic signals have already been synchronized, the design speed for continuous flow of traffic should be posted.*

Recommendation 3: *Where an intersection or road segment is not likely to achieve the EA goal, the District should provide public education on the risk associated with those areas and further studies, detailing inappropriate land uses and exposures for those areas, should be undertaken.*

Recommendation 4: *Where there may be many minor and area sources in a neighborhood or where there are significant risks from different source categories, i.e., Title V and FEDOOP companies, stationary minor and area sources, mobile sources, non-road mobile sources, and miscellaneous area*

sources, an assessment of risk at the neighborhood level should be undertaken.

Section 11 Report of the Area and Minor Source Committee

11.1 Background Information

The Area and Minor Source Committee was formed to assess the risks from the toxic air contaminant (TAC) emissions from area and minor sources and, where risks were found to exceed the recommended environmental acceptability (EA) goals, develop recommendations for measures to reduce those risks to levels meeting the EA goals. To develop recommended risk reduction measures, the Committee members needed to have a working knowledge of the TAC emissions and risk levels from area and minor sources.

The District developed speciated profiles (breakdown of volatile organic compound [VOC] emissions by percent makeup for each chemical) for the area source categories and, using 2005 VOC emissions inventory data, generated the amounts of individual TACs emitted by sources in each of the area source categories. Based upon this information, the District calculated a cancer and noncancer hazard potential for each source category. The hazard potential was used to estimate and rank the relative risk of each area and minor source category. The District also provided the 2005 emissions inventory data for individual minor sources.

Through dispersion modeling, the District determined the cancer and noncancer risk for typical emission scenarios for several area source categories of concern, including perchloroethylene (perc) dry cleaners, waste oil furnaces, auto body repair shops, gas stations and printers. At the Committee's request, the District refined the modeling scenarios for perc dry cleaners and waste oil furnaces and included potential risk reduction strategy scenarios in its analysis.

Finally, the District developed a summary of facilities and control options for perc dry cleaners and waste oil furnaces, including rough cost estimates for implementation of each control option.

11.2 Committee Actions

The Area and Minor Source Committee identified source categories of concern for Louisville Metro based on the source information and data provided. It reviewed the EPA's list of area source categories and determined which were relevant to Louisville Metro. The Committee also reviewed and discussed speciated toxics emissions and hazard potential by source category and later by an average source in the source category. The Committee then narrowed its focus to the eight area source categories of concern that were found to have the highest relative risk based on their hazard potential.

The District undertook preliminary modeling projects for several of the area source categories of concern. The Committee reviewed and discussed the results of this modeling and risk analysis. It became clear early in the modeling project that the timeline of the STAR 5.30 process would not allow for in-depth modeling and risk analysis for all of the identified source categories of concern. The Committee decided that it was necessary to further limit the number of sources to

be reviewed to consider each source in enough detail to make specific risk-reduction recommendations. The Committee requested refined modeling for perc dry cleaners and waste oil furnaces. Several Committee members along with District staff toured a dry cleaning facility to get a better understanding of the dry cleaning process and the manner in which emissions were released outside the building. The Committee agreed that the remaining area source categories of concern would need to be considered in a second-tier review to be completed at a later date outside of the STAR 5.30 Stakeholder Group process.

After a review and discussion of the refined modeling and risk analysis, the Committee reviewed the applicable federal standards for perchloroethylene dry cleaning processes to determine if additional measures could and should be taken to reduce risk from perc dry cleaners. The Committee also reviewed a detailed list of voluntary programs and grant opportunities including the EPA's Community Action for a Renewed Environment (CARE) Program. Descriptions of the area and minor source programs and grants reviewed are included in Section 3.1.2. The Committee reviewed the rough cost estimates compiled by the District. Based upon its work, the Committee reached consensus on eight risk-reduction recommendations. Section 11.3 details the discussion of the Committee and final recommendations for which consensus was reached.

11.3 Recommendations

11.3.1 Perchloroethylene Dry Cleaner Recommendations

The Area and Minor Source Committee reached consensus on several recommendations regarding perchloroethylene (perc) dry cleaners to be presented to the full Stakeholder Group.

All Committee members endorsed the proposal for operator awareness/training for Kentucky Fabricare Association (KFA) member and non-member businesses and enhanced enforcement by the District that was presented by the KFA at the May 31, 2007, committee meeting, and which is included as Appendix 14. One Committee member stated a preference that the operator perform a leak detection test using a leak detection instrument more frequently than the suggested monthly schedule. While the Committee believes that these training and enforcement measures are important, it was agreed that some technology-based regulatory efforts will be necessary to reduce the risk of exposure from perc dry cleaning operations to meet environmental acceptability goals recommended by the Health/Risk Committee.

The Committee also unanimously recommended that any new or re-installation of perc dry cleaning equipment (including the movement of such equipment) trigger a requirement that the newly installed or re-installed equipment have the attributes of 4th-generation technology (defined as machines controlled by a primary refrigerated condenser and a secondary carbon adsorber), effective July 2008. This date coincides with a related compliance date under the National Emissions Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 63 Subpart M, *National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities*. There was also consensus on phasing out less than 4th-generation equipment by a deadline certain, though

the specific date or year was not specified. It was noted that the STAR program's overall compliance date is 2012, so five years might be appropriate. Industry representatives felt that a phase out deadline of 15 years was more realistic, based on the average life of a perc machine. One Committee member suggested that a phase out of less than 4th-generation technology is not a strong enough measure and that the use of perc in dry cleaning operations should be phased out completely over a period of 15 years.

Two of the perc dry cleaner risk scenarios modeled by the District included partial and total enclosure of the dry cleaning equipment with air pulled through the enclosure being exhausted vertically upwards through a stack that was one-half the height of the building above the building. The modeling showed that this strategy for exhausting the perc emissions from the building would reduce the exposure risk at the property line of the dry cleaning establishment. Although the cost of a partial enclosure, exhaust fan, and stack was considered by some of the Committee members to be reasonable, some of the Committee members indicated that the physical logistics of installing even a partial enclosure at many of the perc dry cleaning establishments would not be feasible.

Several members of the Committee agreed that the District should require all perc dry cleaners, regardless of size, to conform to the parts of the NESHAPs for dry cleaners that apply to major (vs. area) sources (40 CFR Part 63, Subpart M). This would require leak detection monitoring with more sensitive and expensive equipment and the use of perc capture/control technology. One Committee member was hesitant to endorse this, and other recommendations that might present an insurmountable cost to small business owners, without further data on actual risk reduction.

Recommendation 1: *The District should require annual perc machine operations training for all perc operators as a part of licensure by the District.*

- *The KFA has agreed to provide training opportunities for both members and non-members to fulfill a training requirement made by the District.*

Recommendation 2: *The District should enhance its enforcement including annual inspection of all perc dry cleaning plants, timely notifications of violation and verification of corrective action.*

- *The KFA has agreed to purchase for the District a high quality leak detection sensor (meeting or exceeding minor source requirements) and provide leak detection and repair (LDAR) training for District staff at no expense to the District.*

Recommendation 3: *The District should regulate perc dry cleaning equipment so that effective July 2008 all new or re-installations of perc equipment,*

including the movement of such equipment, must be at least 4th-generation technology.

Recommendation 4: *A deadline should be set for the complete phase out of the use of all less-than-4th-generation perc equipment in Louisville.*

11.3.2 Waste Oil Furnace Recommendations

The Area and Minor Source Committee reached consensus on recommendations to be presented to the full Stakeholder Group regarding waste oil furnaces.

The Committee agreed that an increase in stack height and removal of a rain cap effectively changes the dispersion of toxic emissions from waste oil furnaces and reduces the risk from toxics to a level at or below the environmental acceptability goals recommended by the Health/Risk Committee. The Committee also determined that research on stack height and modified design may be appropriate for other area and minor sources. The Committee recommended that the Air Pollution Control Board reevaluate the best method of reducing toxic emissions (T-BAT) from stacks of existing area and minor sources.

Recommendation 5: *The District should mandate an increase in stack height and removal of a rain cap to effectively change the dispersion of toxic emissions from waste oil furnaces. The Committee believes that these changes will reduce the risk from these furnaces to a level at or below the environmental acceptability goals set by the Health/Risk Committee.*

Recommendation 6: *The District should reevaluate the best method of reducing toxic emissions (T-BAT) from stacks of existing area and minor sources, taking into consideration the effect of modified stack height and design.*

11.3.3 Recommendations for Future Sources for Review

The Area and Minor Source Committee reached consensus on recommendations to be presented to the full Stakeholder Group for the next tier or set of area and minor sources to be reviewed by the District.

The Committee agreed that the Metropolitan Sewer District (MSD) wastewater treatment plants [also known as publicly owned treatment works (POTWs)] are an important source to be considered in the next phase of source review. The Committee identified at least three large POTWs of concern that receive wastewater from industrial sources, including the Morris Forman plant in West Louisville (which receives Rubbertown industry pre-treated influent), Hikes Creek plant in the Fern Valley area and the Jeffersontown plant (which receives Bluegrass Industrial Park influent). These sources ranked relatively high on both cancer and noncancer hazard

potential lists. The Committee recommended that these and other large industrial wastewater treatment plants be reviewed by the District in the future.

The Committee also discussed tank and drum cleaning as a candidate for second-tier source review. The Committee questioned whether there are dedicated facilities or companies for tank and drum cleaning in the city of Louisville or if this source is already captured in Title V permits through the larger STAR program. The Committee recommended that the District research tank and drum cleaning activities in the jurisdiction to determine if there is a need to review the source emission further. If there are dedicated tank and drum cleaning facilities outside of Title V permitted operations, the Committee recommended that the District review this source in the future.

Two other sources were discussed by the Committee for recommendation. The Committee recommended that gas stations, with a relatively high hazard potential, along with the number and perceived clustering of gas stations throughout the city, should be considered in the next phase of source review by the District. Several Committee members were also concerned with significant cumulative risks in "hot spot neighborhoods," for example a gas station next to a perc dry cleaner next to an auto body repair shop close to a residential area. The Committee recommended that the District determine the cumulative risk for areas with multiple sources of significant risk.

The Committee considered recommending architectural surface coating as a fifth source for the next tier of review. The Committee discussed a federal rule requiring product reformulation to reduce volatile organic compound (VOC) content that may address concerns regarding toxic emissions from architectural surface coating. The Committee received additional information from a trade association; i.e., that the EPA is in the process of further regulating architectural surface coatings by requiring a 31% reduction in VOC emissions, to be effective in 2009. The information was submitted at the time this summary was being finalized and has not yet been reviewed by all members. With the understanding that more time is necessary to review information and make a decision, the Committee does not wish to make a formal recommendation on the need to review architectural surface coatings at this time. However the Committee did express concern about the relative hazard potential of toxic emissions from this source.In light of this additional information, the Committee recommended that no further action be taken at this time, but that the District should review this source category once the effect on toxic emissions from the EPA's pending regulation is known.

Finally, with the support of the Area and Minor Source Committee chair, District staff recommended that auto body shops should be considered for the next tier of review. Auto body shops were cited in the Committee's original list of eight to ten sources of concern. That list was later narrowed to two, perc dry cleaners and waste oil furnaces, based on the time available for in-depth analysis. The Committee felt it did not have the time or the information necessary to make a recommendation on including auto body shops in the next tier of sources for review.

Recommendation 7: *The next tier of area source review should include the following sources:*

- *MSD wastewater treatment plants*
- *Gas stations*
- *Areas where multiple sources are located in close proximity and may produce a higher than acceptable cumulative risk.*

Recommendation 8: *The following area sources should be analyzed to determine if potential risk levels justify being listed as a "next tier" source:*

- *Tank and drum cleaning*
- *Architectural surface coating (after federal rulemaking)*
- *Auto body repair shops*

Section 12 Report of the Mobile and Non-Road Mobile Source Cmte

12.1 Background Information

The Mobile and Non-Road Mobile Source Committee was formed to assess the risks from the toxic air contaminant (TAC) emissions from mobile and non-road mobile sources and, where risks were found to exceed the recommended environmental acceptability (EA) goals, develop recommendations for measures to reduce those risks to levels meeting the EA goals. To develop recommended risk reduction measures, the Committee members needed to have a working knowledge of the TAC emissions and risk levels from mobile and non-road mobile sources.

To model concentration levels of toxics in road ways and intersections, the District developed a relationship between carbon monoxide (CO) and toxics which could be used in the available computer dispersion model program, CAL3QHC. Initially, the District modeled toxics concentrations of two high-traffic intersections in Louisville, at Hurstbourne Parkway and Shelbyville Road and at Preston Highway and Outer Loop. The preliminary modeling results were cross-checked using a second dispersion modeling program, AERMOD. The results from the two separate modeling approaches were consistent with each other. Risk levels were calculated based on the modeled pollutant concentrations.

The District also used these computer dispersion models to determine concentration levels of toxics in several other on-road mobile source scenarios. The stretch of the Watterson Expressway at Interstate 65 was modeled and risk levels were determined. This section of the Watterson Expressway represents the highest volume roadway in the Louisville area. The District also modeled and determined risk levels for the intersection at Briarcliff Road and Outer Loop to represent an intersection with a more moderate volume of traffic.

The District assessed the cancer risk for diesel particulate matter (PM) emissions separate from the other on-road mobile source emissions. The results showed that the risk level from diesel emissions was significantly higher than the risk from other on-road mobile source emissions.

The District presented several reports from the California Air Resources Board (CARB) to the Committee for identification and review of non-road mobile sources. These reports covered a wide variety of non-road mobile sources including construction equipment, locomotives, marine vessels, and transport refrigeration units (TRUs) as well as facilities at which diesel trucks historically idle for extended periods of time.

12.2 Committee Actions

The Mobile and Non-Road Mobile Source Committee identified source categories of concern for Louisville Metro based on the information and data provided. It reviewed and discussed speciated toxics emissions (breakdown of volatile organic compound [VOC] emissions by percent makeup for each chemical) and hazard potential by non-road mobile source category and

modeled risk for mobile sources. The Committee also reviewed the list of emissions reduction strategies developed by the Air Quality Task Force for Ozone that were approved by the Board for Phase I implementation, which is included as Appendix 15. Vehicle emissions are a major source of ozone-forming pollutants and many of the Task Force recommendations were aimed at reducing emissions from mobile sources. The Committee used many of these strategies as a starting point for discussion.

The Committee also reviewed the applicable regulations in other jurisdictions and voluntary programs and grant opportunities to reduce mobile source emissions. It discussed the applicability of each for Louisville Metro. The Committee reviewed and discussed a summary of existing idling regulations and related enforcement issues for states, counties, and local jurisdictions. The Committee also reviewed a detailed list of voluntary programs and grant opportunities including the EPA's Community Action for a Renewed Environment (CARE) Program and suggested potential partners and participants for grant application submittals and implementation. Descriptions of the mobile and non-road mobile source programs and grants reviewed are included in Section 3.1.3.

Finally, the Committee determined four major categories of strategies available for reducing adverse impacts from mobile and non-road mobile source emissions that could be addressed at the local level. The categories included retrofitting and upgrading equipment, reductions in idling, the use of renewable and/or alternative fuels and technologies, and long-range land use and transportation planning. The Committee also recognized the importance of new federal engine requirements and fuel standards in reducing emissions from mobile sources. However, the federal Clean Air Act does not provide regulatory authority for local jurisdictions, like the District, to strengthen these federal regulations. The Committee discussed recommendations for each of four categories of strategies and agreed upon more than twenty strategies to reduce adverse impacts from mobile and non-road mobile source emissions. Section 12.3 details the discussion of the Committee and final recommendations for which consensus was reached.

12.3 Recommendations

The Mobile and Non-Road Mobile Source Committee of the STAR 5.30 reached consensus on recommendations to be presented to the full Stakeholder Group to reduce adverse impacts from mobile and non-road mobile source emissions in Louisville, with a few noted exceptions. The Committee further recognized that a majority of these recommendations will also reduce ozone precursor emissions, fine particle and fine particle precursor emissions, and greenhouse gas emissions. The Committee noted that many of its recommendations are consistent with the recommendations of the (ozone) Air Quality Task Force that were approved by the Board.

12.3.1 Federal Engine Requirements and Fuel Standards

The Committee recognized the efforts of the federal government, through proposed national engine requirements and fuel standards, to reduce emissions further from mobile and non-road mobile sources. While Louisville will benefit from increased toxic reductions due to these tougher standards, the federal Clean Air Act does not provide regulatory authority for local jurisdictions, like the District, to alter or affect these tailpipe emission reduction strategies. The Committee believed that existing and proposed federal engine requirements and fuel standards will be responsible for a majority of toxic emission reductions from mobile and non-road mobile sources in the future and are an important part of a comprehensive toxics reduction strategy for Louisville. Furthermore, as part of an ongoing public outreach campaign, the District will attempt to quantify the toxic emission reductions and the effects of the existing and proposed federal engine requirements and fuel standards on Louisville Metro.

Recommendation 1: *Quantify, where feasible, toxic emissions reduction from existing and proposed federal engine requirements and fuel standards, as a part of ongoing public outreach and education.*

12.3.2 Idling Reduction

The Committee agreed that idling is a significant source of toxic emissions. The Committee also endorsed a diesel engine idling regulation. However, there was not consensus among all Committee members on the specific language of a draft idling regulation. The Committee recommended the Air Pollution Control Board's adoption of an idling regulation, to be initiated by convening a stakeholder process. The Committee agreed that the EPA's model state idling law, as slightly revised by the District into regulation form, included as Appendix 16, should serve as a starting point for discussion.

Beyond a regulation, several other idling reduction strategies were discussed. The Committee was particularly concerned with potentially significant increases in idling and toxic emissions from the Louisville-Southern Indiana Ohio River Bridges project and other major development planned for the region in the near future. The Committee recommended significant coordination among state and local transportation officials and private fleets from both sides of the Ohio River during major highway repair and construction projects to develop plans to minimize traffic backups and delays. Increased coordination will reduce idling and toxic emissions.

The Committee believed that developing an outreach program to discourage idling at public and private schools, expanding the synchronization of traffic signals throughout Louisville, and improving the Traffic Response and Incident Management Assisting the River Cities (TRIMARC) system are important strategies to help reduce idling and the resulting toxic emissions.

Recommendation 2: *Initiate a stakeholder process for local adoption of an idling*

regulation with the proposed draft regulation, included as Appendix 16, as a starting point for discussion.

Recommendation 3: *Encourage significant coordination among the Kentucky Transportation Cabinet, local transportation officials, and private fleets during major highway repair and construction projects, specifically the Louisville-Southern Indiana Ohio River Bridges project, to develop plans to minimize traffic backups and delays to reduce idling and toxic emissions.*

Recommendation 4: *Develop an outreach program for public and private schools to discourage idling during student drop off and pickup at the schools. Provide signs to be posted in areas where automobiles queue asking the parents to not idle.*

Recommendation 5: *Increase traffic signal synchronization throughout Louisville Metro.*

Recommendation 6: *Improve the TRIMARC incident management and roadside assistance system to reduce idling on the highways.*

12.3.3 Renewable Fuels and/or Alternative Fuels and Technologies

The Committee agreed that universal use of biodiesel, meeting the applicable quality standards established by the American Society for Testing and Materials (ASTM standard), in Louisville Metro Government's diesel fleet is an important step in moving toward widespread renewable and/or alternative fuel use in Louisville. The Committee recommended that the Board make a strong recommendation to the Mayor's Office to require, within the first year after approval of this report, the use of biodiesel (ASTM standard) in government diesel fleets through an executive order.

With respect to Louisville Metro's non-diesel fleets, the Committee applauded the efforts made in the past by municipal and transit fleets to explore and adopt the use of alternative fuels and technologies. The Committee recommended expanded use of alternative fuels and technologies by all municipal and transit fleets (on- and off-road) in Louisville Metro within the first year after approval of this report.

The Committee also discussed the issue of blend requirements for biodiesel fuel sold in Louisville. Although specific biodiesel blend requirements and timelines for product rollout were discussed and preliminarily accepted [5% biodiesel (ASTM standard) within the second year after adoption of this report and 20% biodiesel (ASTM standard) within the third year], the Committee's final consensus was not to propose specific blend requirements and timelines. Concerns expressed included a potential lack of consumer demand for biodiesel, distribution issues, whether the blend goals were achievable and the need for all diesel fuel sold in Louisville

to be blended with biodiesel.

The Committee recommended that a partnership with the Kentucky Petroleum Marketers Association (KPMA) be created to develop a recommendation for specific biodiesel blend requirements and timeline goals.

The Committee endorsed the creation of other partnerships, tax incentives, and other financial incentives to increase the use of biodiesel (ASTM standard) and/or alternative fuels and technologies.

Recommendation 7: *The Air Pollution Control Board should recommend to the Mayor's Office a mandate, through executive order, to use biodiesel (ASTM standard) in the Louisville Metro Government's diesel fleets within the 1st year.*

Recommendation 8: *Expand the use of alternative fuels and technologies by all municipal and transit fleets (on- and off-road) in Louisville Metro in 1st year.*

Recommendation9: *Work in partnership with Kentucky Petroleum Marketers Association to evaluate, develop, and achieve goals to provide biodiesel (ASTM standard) blends at retail stations throughout Louisville Metro.*

Recommendation 10: *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 11: *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.*

12.3.4 Long-Range Land Use and Transportation Planning Solutions

The Committee found that long-range land use and transportation planning solutions to reduce emissions of and exposure to toxics are an integral part of a comprehensive strategy. However, the Committee determined that it did not have the time necessary to thoroughly address this matter. The Committee recommended initiating a process, involving interested parties, to explore feasible long-range planning solutions to reduce exposure to all tailpipe emissions, with initial emphasis placed on diesel PM emissions. Such a process should encourage a multi-pollutant approach, exploring solutions for additionally minimizing emissions of ozone precursors, fine particulate matter, fine particle precursors, and greenhouse gases. The Committee also recommended that community-wide education about land use and site planning is necessary to minimize exposure to toxics, especially among highly sensitive populations.

Finally, several long-range planning recommendations, detailed below, were developed at an internal Louisville Metro Government meeting that included the District, Planning and Design Services and Economic Development Department staff representatives. The Committee agreed that these staff recommendations should serve as a starting point for further discussion on long-range planning solutions.

Recommendation 12: *Institute a process, involving interested parties, to explore feasible long-range planning solutions to reduce exposure to all tailpipe emissions with initial emphasis placed on diesel particulate matter (PM) emissions.*

Recommendation 13: *Educate the community at large about land use and site planning techniques to minimize exposure to high volumes of diesel PM emissions, with a particular focus on those members engaged in locating facilities for highly sensitive populations such as schools, recreational facilities, and daycares.*

Recommendation 14: *The following recommendations were made during an internal Louisville Metro exploratory meeting and will serve as a starting point for further discussion of long-range planning solutions.*

1. *Increased coordination among Planning and Design Services, the District, and other development review agencies to assure diesel emission reduction best practices are suggested and plans comply with applicable sections of the Cornerstone 2020 and the Land Development Code.*

2. *The Planning Commission and staff in cooperation with the District should develop neighborhood and area-wide plans, review and revise, if necessary, the Land Development Code, and develop Best Management Practice Guidelines with the following goals:*

    a. *Minimize exposure from high concentrations of diesel PM emissions to sensitive populations. For instance, land use change and development reviews of land uses with high volumes of diesel engine usage should consider their proximity to sensitive populations.*

    b. *Reduce diesel idling within land uses with high volumes of diesel engine usage.*

    c. *Reconcile the need for efficient movement of goods and services by diesel trucks with the need for such movement to*

minimally impact residential neighborhoods.

d. Reduce diesel vehicle miles traveled, increase trip efficiencies and reduce congestion.

12.3.5 Future Mobile and Non-Road Mobile Source Assessment

The Committee recommended that the District, with the help of interested stakeholders, identify the next steps and the process to follow for future modeling, monitoring, and emissions inventory analysis for diesel PM and other mobile source emissions to continue to better understand their effects on public health. One Committee member stated that the Committee should be more specific about the types of sources to be addressed in this next phase of assessment and suggested locomotive switch yards, inland waterways, and facilities where there are an aggregate of trucks that may present cumulative toxic emission issues.

Recommendation 15: *The Committee recommends that the District, with the help of interested stakeholders, identify the next steps and the process to follow for future modeling, monitoring,, and emissions inventory analysis for diesel PM and other mobile source emissions to continue to better understand their effects on public health.*

12.3.6 Additional Education/Outreach Strategies to Increase Public Awareness

The Committee endorsed a recommendation to increase utilization of, and incentives for, commuter and other programs aimed at reducing vehicle miles traveled (VMT) in passenger vehicles. The Committee also recommended providing items and services, such as tire pressure stations and gas caps, free of charge, to promote increased fuel efficiency and reduced toxics emissions. Other education and outreach strategy recommendations included development of a GREEN STAR program to recognize businesses that are developing and implementing environmentally friendly practices and government incentives to reduce toxic emissions.

Recommendation 16: *Increase utilization of, and incentives for, Bike to Work, TARC public transit programs, Ticket to Ride, and other programs aimed at reducing vehicle miles traveled in passenger vehicles.*

Recommendation 17: *Provide free tire pressure stations, free air, free on-board diagnostics checks, and free gas caps to promote increased fuel economy and reduced toxic emissions.*

Recommendation 18: *Develop a GREEN STAR program to recognize the voluntary efforts of businesses in reducing toxic emissions through employee incentives that encourage alternatives to single-occupancy vehicle commutes.*

Recommendation 19: *Louisville Metro Government should provide incentives to businesses to reduce toxic emissions.*

12.3.7 Additional Grants and Partnerships to Increase Resources for Reducing Toxic Emissions

The Committee recommended that Louisville Metro Government explore the creation of a Louisville Metro Environmental Grant Partnership to aggressively coordinate, apply for, and receive federal and state grants to reduce toxic emissions from mobile and non-road mobile sources.

The Committee also discussed the availability of funding to incentivize and, in some cases, pay for retrofits and/or upgrades to existing diesel engines. The Committee recommended that the District work through incentives and grants to help existing fleets in Louisville to retrofit and/or upgrade diesel engines to reduce diesel PM emissions.

Recommendation 20: *Explore the creation of a Louisville Metro Environmental Grant Partnership to aggressively coordinate, apply for, and receive federal and state grants to reduce toxic emissions from mobile and non-road mobile sources. Utilize federal political partnerships to increase success.*

Recommendation 21: *Work with public and/or private fleets operating in Louisville Metro through incentives and grants to aggressively retrofit equipment with the best technology available.*

Section 13 Report of the Report and Plan of Action Committee

13.1 Background

The Report and Plan of Action (RAPA) Committee of the STAR 5.30 Stakeholder Group was formed to oversee documentation of the issues reviewed and process undertaken by the group to determine recommendations for reducing adverse impacts from exposure to toxic air contaminants (TACs). District staff drafted a majority of the background sections of the Report based on information presented to the Stakeholder Group and committees throughout the process. The committee report sections and the Plan of Action were drafted by the District and reflect the discussions that led to consensus on recommendations by the respective committees and the Stakeholder Group as a whole.

13.2 Committee Actions

The RAPA Committee determined the basic structure of the Report and Plan of Action. As new information was added to the Report, the Committee revised and edited the document. It also determined where additional information was needed throughout the process and requested appropriate activity to fulfill those needs (i.e., additional research, modeling, committee discussion, etc). Finally, the Committee agreed upon several recommendations (see Section 13.3) regarding the overall scope and content of the Report and Plan of Action.

13.3 Recommendations

The Report and Plan of Action Committee reached consensus on recommendations to be presented to the full Stakeholder Group regarding the scope and content of the Report and Plan of Action (RAPA) document.

13.3.1 Fulfilling Regulation 5.30 Mandate

The Committee applauded the efforts of the STAR 5.30 Stakeholder Group to come to consensus on recommendations for reducing adverse impacts from toxic emissions in Louisville. However, the Committee found that due to time constraints, the Stakeholder Group identified only an initial set of strategies the implementation of which would move toward achieving the Environmental Acceptability Goals. Although additional risk-reduction strategies were considered, the Stakeholder Group's recommendations include only those strategies for which consensus was reached. Additionally, it was recognized that current technology may not be available to achieve the Environmental Acceptability Goals by 2012 for all sources for all situations. While the Report suggests several specific risk-reduction strategies, including timetables for implementation, many of the recommendations suggest processes for further consideration and review in developing additional risk-reduction strategies.

The Committee also discussed the need to be able to quantify the risk reduction achieved by each

strategy to determine if the proposed recommendations are sufficient to achieve the Environmental Acceptability Goals recommended by the Health/Risk Committee. It was noted that several recommendations lead to a reduction in actual emissions, which makes associated risk reduction easier to quantify. However, many of the recommendations do not reduce actual emissions. Instead, these recommendations aim to change the dispersion of and/or reduce exposure to toxic emissions to reduce risk, especially from sources that are not easily regulated. The risk reduction associated with these recommendations is more difficult to quantify. The Committee is concerned that, in many cases, it may be very difficult to calculate risk reduction by strategy and/or total risk reduction. Therefore, in some cases, it may be very difficult to determine if the Environmental Acceptability Goals will be met and whether the mandate set forth by Regulation 5.30 will be fulfilled.

The Committee unanimously agreed that the executive summary should reflect that developing control strategies for toxic air emissions from non-industrial sources is a work in progress and that this Report is limited to providing some initial recommended strategies and process guidelines to be considered by the Board. The executive summary should further clarify that the STAR 5.30 Stakeholder Group recognized the need for the District and Board to engage in an on-going process of considering and implementing risk reduction measures to comply with requirements of Regulation 5.30.

Recommendation 1: *Include in the executive summary that there are additional elements in Regulation 5.30 that need to be addressed by the District and Board, including additional specific strategies and recommendations, timetables, and quantifying progress toward goals.*

13.3.2 Consideration of District Recommendations

With the understanding that the Report and Plan of Action does not address every element of Regulation 5.30, the Committee recommended that this document suggest that the Board consider this Report in conjunction with other recommendations made by the District. The Committee also wished to acknowledge the District's expertise in the area of air pollution reduction, in addition to the District's and Board's statutory authority and obligation to protect public health.

Recommendation 2: *The Board should recognize and consider the District's expertise and recommendations for reducing toxic emissions along side the STAR 5.30 Stakeholder Group's Report and Plan of Action.*

13.3.3 Accountability and Reporting Methods

The Committee discussed the accountability for, and reporting on, implementation of the Plan of Action. The Committee agreed that guidelines for reporting to the Board should be outlined in this document. The Committee unanimously agreed that a bimonthly report to the Board should

be made by the District detailing the implementation of the STAR Regulation 5.30 Program and new opportunities and technological advances that may become available in the future.

Recommendation 3: *The District should make a bimonthly report to the Board on the implementation of the STAR Regulation 5.30 Program and new opportunities and technological advances that may become available in the future.*

13.3.4 Future Involvement of the STAR 5.30 Stakeholder Group

At the June 14, 2007, meeting of the STAR 5.30 Stakeholder Group, members were asked to develop their vision for future involvement of the group as the process proceeds into an implementation phase. The Report and Plan of Action Committee members discussed their individual visions for the future of the group and developed a recommendation unanimously agreed upon by the Committee. The Committee believed that it will be extremely difficult to sustain the STAR 5.30 Stakeholder Group at its current level of involvement. However, the Committee recognized that the need for future stakeholder involvement may arise. The Committee recommended that future involvement of ad hoc stakeholder groups to fulfill the mandate of Regulation 5.30 be convened on an issue-specific, as-needed basis. It also acknowledged the possibility that future issue-specific groups may require a different makeup of interested stakeholders.

Recommendation 4: *Future involvement of ad hoc stakeholder groups to fulfill the mandate of Regulation 5.30 should be convened on an issue-specific, as-needed basis and may require stakeholders not included in the STAR 5.30 Stakeholder Group process.*

Section 14 Plan of Action

14.1 Approach and Limitations of Recommended Actions

14.1.1 Recommended Comprehensive, Multi-Pollutant Approach

Historically, air pollution issues have been addressed through separate strategies for separate pollutants - ozone, carbon monoxide, particulates, etc. However, over time, it has become clear that a more sensible and effective approach would be to develop an air quality management plan for a community or area that comprehensively addresses multiple pollutants through harmonized strategies. After decades of the former approach, our community has an opportunity to move toward such a comprehensive approach. In 2006, the Louisville Metro Air Pollution Control Board (Board) adopted a set of recommendations for reducing ozone precursor emissions to lower ozone concentrations in the Louisville area. Implementation of the Strategic Toxic Air Reduction (STAR) Regulation 5.30 process to assess and address other source categories has resulted in the development of this Report and Plan of Action for various sources of toxic emissions. A Climate Change Committee is underway to reduce greenhouse gas emissions. By April 2008, a State Implementation Plan must be submitted to the EPA identifying strategies to achieve attainment of the federal annual standard for fine particles.

Through these efforts, it is clear that for these pollutants and issues, similar sources and similar strategies are involved. It is recommended that the Board and District take the appropriate next steps to begin the development of a unified Air Quality Management Plan through which multiple pollutants can be addressed efficiently and effectively in our community.

Recommendation 1: *The Air Pollution Control Board (Board) and Louisville Metro Air Pollution Control District(District) should take the appropriate next steps to begin the development of a unified Air Quality Management Plan through which multiple pollutants can be addressed efficiently and effectively in our community.*

14.1.2 Limitations

The Stakeholder Group would like to acknowledged that while this Report and Plan of Action represents an innovative approach to reducing adverse impacts from exposure to toxic emissions at the community level, it is only the beginning of the process to fulfill the requirements of Regulation 5.30. The Stakeholder Group agreed that the stakeholder process is an important component of the STAR 5.30 Program. However, the Stakeholder Group believed strongly that the Board should consider the expertise and recommendations of the District, in conjunction with this Report, in determining the appropriate course of action for reducing the adverse impacts from toxic emissions in our community. It should also be noted that while many toxic reduction strategies were discussed and considered throughout the process, the recommendations found in this Report and Plan of Action represent only the strategies for which consensus was reached.

The Stakeholder Group also recognized the dynamic nature of toxics issues in Louisville and around the country. The recommendations in this Report represent a snapshot in time of possible strategies for toxics reductions and exposure abatement. Thus, the Stakeholder Group foresaw the need for continual evaluation of Regulation 5.30 sources and possible control strategies not covered in this Report. In an effort to continue down the path of innovation and excellence in toxics reduction, the Stakeholder Group recognized the need for regular progress reports to the Board on Regulation 5.30 implementation efforts and new opportunities and technological advances that may become available in the future.

The following recommendations address the limitations of the Report and Plan of Action:

Recommendation 2: *The Board should recognize and consider the District's expertise and recommendations for reducing toxic emissions in conjunction with the STAR 5.30 Stakeholder Group's Report and Plan of Action.*

Recommendation 3: *The District should make a report to the Board once every other month on the implementation of the STAR Regulation 5.30 Program and new opportunities and technological advances that may become available in the future.*

14.1.3 Future Information Needs and Further Planning; Neighborhoods and Environmental Justice

The Stakeholder Group determined that more information was necessary to make an informed recommendation in several cases. The constraints of the STAR 5.30 process timeline did not allow for this information to be collected and/or presented for review. For example, a total of eight area and minor source categories of concern were identified. It was determined early in the process that a complete examination of all eight source categories of concern would not be possible given the resources needed to thoroughly analyze each source category. As a result, the list of eight was narrowed down to the two source categories of greatest concern for in-depth modeling and risk analysis, to be reviewed and discussed by the Area and Minor Source Committee. However, the Stakeholder Group recommended that three of the six remaining source categories of concern be considered in a second tier area source category review. The Stakeholder Group also recommended that three other source categories be analyzed to determine if the risk levels justify a full area source category review in the future.

The following recommendations address issues for which more information is needed:

Recommendation 4: *The next tier of area source review should include the following source categories:*

- *MSD industrial wastewater treatment plants*
- *Gas stations*

- *Areas where multiple sources are located in close proximity and may produce a higher than acceptable cumulative risk.*

Recommendation 5: *The following area source categories should be analyzed to determine if potential risk levels justify being listed as a "next tier" source:*

- *Tank and drum cleaning*
- *Architectural surface coating*
- *Auto body repair shops*

Recommendation 6: *Quantify, where feasible, toxic emissions reduction from existing and proposed federal engine requirements and fuel standards, as a part of ongoing public outreach and education.*

Concern was expressed regarding the clustering of relatively high hazard potential sources, such as gas stations, as well as significant cumulative risks in "hot spot neighborhoods," for example a gas station next to a perchloroethylene dry cleaner next to an auto body repair shop close to a residential area. The Stakeholder Group recommended that the District determine the cumulative risk for areas with multiple sources of significant risk.

Related to the concern for significant cumulative risks in "hot spot neighborhoods" was the concern for "environmental justice" impacts from sources reviewed under the Regulation 5.30 program, i.e., high levels of toxic emissions disproportionately adversely affecting communities based on race, color, national origin, household composition, or income, such as West Louisville. According to the EPA, environmental justice is the fair treatment and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies; everyone should enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

Throughout the STAR 5.30 Stakeholder Group review, members considered the potential for environmental justice impacts from toxic emissions reviewed under Regulation 5.30. The Stakeholder Group explored source location and distribution around the city and determined that no one community was disproportionately affected by air toxics from STAR 5.30 sources. Appendix 17 is a map showing the location of the autobody repair shops, dry cleaners, gasoline stations, waste oil furnaces, and wastewater treatment plants in Louisville Metro. The most heavily used roadway intersections and segments are not located in areas of potential environmental justice concern. Coupled with the overall concern for the existence of "hot spot neighborhoods," the Stakeholder Group recognized the need for neighborhood-level monitoring and modeling where there is a concern for environmental justice impacts.

Recommendation 7: *Where there may be many minor and area sources in a neighborhood*

or where there are significant risks from different source categories, i.e., Title V and FEDOOP companies, stationary minor and area sources, mobile sources, non-road mobile sources, and miscellaneous area sources, an assessment of risk at the neighborhood level should be undertaken.

The Stakeholder Group found several issues incredibly complex and deserving of more time and resources than the STAR 5.30 Stakeholder Group process timeline could allow for. For example, the Stakeholder Group came to consensus on the need for an idling regulation in Louisville. However, the Stakeholder Group could not agree on the language of an idling regulation to be proposed to the Board. As a result, the Stakeholder Group recommended that a stakeholder process be initiated and use, as a starting point for discussion, the Draft Idle Reduction Regulation included as Appendix 16 to develop a recommended idling regulation for adoption by the Board.

The following recommendations address issues for which more time and/or resources are necessary:

Recommendation 8: *Future ad hoc stakeholder groups to fulfill the mandate of Regulation 5.30 should be convened on an issue-specific, as-needed basis and may require stakeholders not included in the STAR 5.30 Stakeholder Group process.*

Recommendation 9: *Initiate a stakeholder process for local adoption of an idling regulation with the Draft Idle Reduction Regulation included as Appendix 16 used as a starting point for discussion.*

Recommendation 10: *The District, with the help of interested stakeholders, should identify the next steps and the process to follow for future modeling, monitoring, and emissions inventory analysis for diesel particulate matter (PM) and other mobile source emissions to continue to better understand their effects on public health.*

A majority of the long-range land use and transportation planning solutions, including the recommendation to initiate a stakeholder process, were originally recommended by the Mobile and Non-Road Mobile Source Committee and focused on reducing exposure to tailpipe emissions, with particular emphasis placed on diesel PM emissions. Based on the disproportionately high levels of risk associated with exposure to diesel PM, the STAR 5.30 Stakeholder Group did not wish to detract from the importance of the planning solutions in reducing exposure to diesel PM. However, the Stakeholder Group believed that these long-range planning solutions could also be beneficial in reducing exposure to other sources of toxic emissions.

While the following recommendations pay particular attention to diesel PM emissions, they are intended to be considered as a strategy for reducing all toxic emissions in our community:

Recommendation 11: *Institute a process involving interested parties, including planning organizations, to explore feasible long-range planning solutions to reduce exposure to toxic emissions with initial emphasis placed on diesel PM and other tailpipe emissions.*

Recommendation 12: *The following recommendations were made during an internal Louisville Metro Government Agency exploratory meeting and will serve as a starting point for further discussion of long-range planning solutions to reduce exposure to toxic emissions.*

- *Increased coordination among Planning and Design Services, the District, and other development review agencies to assure that best practices are suggested for diesel and other toxic emission reduction and plans comply with applicable sections of the Cornerstone 2020 and the Land Development Code.*

- *The Planning Commission and staff, in cooperation with District staff, should develop neighborhood and area-wide plans, review and revise, if necessary, the Land Development Code, and develop Best Management Practice Guidelines with the following goals:*

  a. *Minimize exposure from high concentrations of diesel PM and other toxic emissions to sensitive populations. For instance, land use change and development reviews of land uses with high volumes of diesel engine usage should consider their proximity to sensitive populations.*

  b. *Reduce idling, particularly diesel idling, within land uses with high volumes of diesel engine usage.*

  c. *Reconcile the need for efficient movement of goods and services by diesel trucks with the need for such movement to minimally impact residential neighborhoods.*

  d. *Reduce vehicle miles traveled, with initial emphasis on diesel vehicles, through increased trip efficiencies and reduced congestion.*

14.2 Recommended Actions

The following recommended actions of the STAR 5.30 Stakeholder Group address strategies for toxic emissions reductions and/or strategies for reducing exposure to toxic emission.

14.2.1 Environmental Acceptability Goals

Recommendation 13: *The Board should adopt the environmental acceptability goals in section 10.3.1 and 10.3.2 of this Report and Plan of Action as a benchmark for establishing appropriate risk-management programs.*

14.2.2 Stationary Sources

Recommendation 14: *The District should require annual perchloroethylene (perc) dry cleaning machine operations training for all perc operators as a part of licensure by the District. The Kentucky Fabricare Association (KFA) has agreed to provide training opportunities for both members and nonmembers to fulfill a training requirement made by the District.*

Recommendation 15: *The District should enhance its enforcement including annual inspection of all perc dry cleaning plants, timely notifications of violation, and verification of corrective action. The KFA has agreed to purchase for the District a high quality leak detection sensor (meeting or exceeding minor source requirements) and provide leak detection and repair (LDAR) training for District staff at no expense to the District.*

Recommendation 16: *The District should regulate perc dry cleaning equipment so that, effective July 2008, all installations of perc equipment, including the relocation of such equipment, must be at least 4th-generation technology.*

Recommendation 17: *A deadline should be set for the complete phase-out of the use of all less than 4th-generation perc equipment in Louisville.*

Recommendation 18: *The District should require an increase in stack height and removal of a rain cap to effectively change the dispersion of toxic emissions from waste oil furnaces. The Stakeholder Group believes that these changes will reduce the risk from these furnaces to a level at or below the recommended environmental acceptability goals.*

Recommendation 19: *The District should reevaluate the best method of reducing toxic emissions (T-BAT) from stacks of existing area and minor sources, considering the effect of modified stack height and design.*

14.2.3 Mobile and Non-Road Mobile Sources

Recommendation 20: *Improve and expand traffic signal synchronization throughout Louisville Metro.*

Recommendation 21: *Improve Traffic Response and Incident Management Assisting the River Cities (TRIMARC) incident management and roadside assistance to reduce idling on the highways.*

Recommendation 22: *Encourage significant coordination among the Kentucky Transportation Cabinet, local transportation officials, and private fleets during major highway repair or construction, specifically the Louisville-Southern Indiana Ohio River Bridges project, to develop plans to minimize traffic backups and delays to reduce idling and toxic emissions.*

Recommendation 23: *Develop an outreach program for public and private schools to discourage vehicle idling during student drop off and pickup at the schools. Provide signs to be posted, where appropriate, in areas where automobiles queue, asking the drivers not to idle.*

Recommendation 24: *The Board should recommend to the Mayor's office the issuance of an executive order requiring the use of biodiesel (ASTM standard) in the Louisville Metro Government's diesel fleets within one year.*

Recommendation 25: *Expand the use of alternative fuels and technologies by all municipal and transit fleets (on- and off-road) in Louisville Metro within one year.*

Recommendation 26: *Work in partnership with the Kentucky Petroleum Marketers Association to evaluate, develop, and achieve goals to provide biodiesel (ASTM standard) blends at retail stations throughout Louisville Metro.*

Recommendation 27: *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 28: *Create partnerships, tax incentives, and other financial incentives to encourage the use of biodiesel (ASTM standard) and/or alternate fuels and technologies by private fleets.*

Recommendation 29: *Increase utilization of, and incentives for, Bike to Work, TARC programs, Ticket to Ride, and commuter and other programs aimed at reducing vehicle miles traveled in passenger vehicles.*

Recommendation 30: *Provide free tire pressure stations, free air, free onboard diagnostics checks, and free gas caps to promote increased fuel economy and reduced toxic emissions from on-road mobile sources.*

Recommendation 31: *Develop a GREEN STAR program to recognize the voluntary efforts of businesses in reducing toxic emissions through employee incentives that encourage alternatives to single-occupancy vehicle commutes.*

Recommendation 32: *Work with public and/or private fleets operating in Louisville Metro through incentives and grants to aggressively retrofit equipment with state-of-the-art technology.*

14.2.4 Other Education/Outreach Opportunities and Financial Incentives

Recommendation 33: *Educate the community, including citizens, contractors, planners, developers, and others, about land use and site planning techniques to minimize exposure to high volumes of diesel PM and other toxic emissions, with a particular focus on those members engaged in locating facilities for highly sensitive populations such as schools, recreational facilities, and daycare centers.*

Recommendation 34: *Explore the creation of a Louisville Metro Environmental Grant Partnership to aggressively coordinate, apply for, and receive federal and state grants to reduce toxic emissions from mobile and non--road mobile sources. Utilize federal political partnerships to increase success.*

Recommendation 35: *Louisville Metro Government should provide incentives to businesses to reduce toxic emissions.*

14.3 Resources Needed

The successful implementation of the strategies and recommendations in this Report and Plan of Action will likely require the acquisition of new resources (and the retention of existing resources), including staff and necessary support capabilities (office space, computers, phones, training etc.), equipment (monitoring devices), and other resources to be determined. As the Board evaluates the strategies and recommendations in this Report and Plan of Action, it and the District should determine any additional resources needed to successfully implement the

strategies and recommendations. The Mayor and Louisville Metro Council should assure that these needed resources are made available to the District and any other agencies or organizations with implementation roles and responsibilities.

Section 15 Future Monitoring Needs

15.1 Assessment of Future Monitoring Needs

Throughout the STAR 5.30 process, there was a general sentiment from the Stakeholder Group that future toxics monitoring activities were necessary. The District provided information on the available types of monitoring equipment and the chemicals monitored by each. Based on this information, the Stakeholder Group was asked to articulate (1) the kind of information it would like monitoring activities to produce and (2) the kind of action it would like to be taken or goals met as a result of future monitoring.

The Stakeholder Group identified three basic information needs: cumulative risk, event-specific data, and source-specific data. The Stakeholder Group acknowledged that there may be enough existing information from current monitoring activities in Louisville, and knowledge about other comparable cities, to partially fulfill these needs. The Stakeholder Group emphasized that information from monitoring activities, regardless of the source, should be made available and readily accessible to the general public and researchers.

15.1.1 Cumulative Risk Data Needs

The Stakeholder Group discussed the need for future toxics monitoring at the neighborhood scale, conducted at specific locations where high cumulative risk from toxics would be expected. However, the Stakeholder Group did not identify specific potential monitoring sites.

While there is no one instrument that can monitor for all toxic chemicals of concern, the District could quantify site-specific toxic emission and risk levels using known monitoring technologies. By identifying an indicator or surrogate compound to approximate the ratio of the toxic compound(s) present in ambient air, the District could determine where in the community risk levels exceed the environmental acceptability goals on a neighborhood scale. The District could then analyze the monitoring data to help determine the sources of toxic emissions at the site and explore options for reducing toxic emissions from those sources. If source emissions cannot easily be reduced, the monitoring data assessment could then be passed on to local land-use planners to determine appropriate strategies for reducing exposure of sensitive populations to high levels of toxics emissions.

15.1.2 Source-Specific Data Needs

The Stakeholder Group also identified the need for additional hot spot monitoring and analysis to determine risk levels attributable to a specific pollutant from a specific source at a particular location. The first hot spot monitoring short-term study for toxics was completed in January 2007. Several future study recommendations, e.g., investigating the high level of tetrachloroethylene monitored at Okolona Elementary, were highlighted in the conclusions of the Hot Spots Monitoring Report, which is included as Appendix 12. The Stakeholder Group

identified mobile and non-road mobile sources as the priority for source-specific monitoring. Other sources proposed for hot spot monitoring and analysis include perchloroethylene dry cleaners and industrial waste water treatment facilities.

15.1.3 Event-Specific Data Needs

Finally, trigger monitoring was suggested as a future need to produce event-specific monitoring data. Trigger monitors work in conjunction with continuous monitors to monitor a target toxic compound. A trigger compound is identified based on its relationship to the target compound, i.e. when the trigger compound is high the target compound will be high. When the trigger compound reaches the predetermined level of concern indicative of elevated risk levels from the target compound, a separate monitoring function is triggered. This type of instrument lends itself to monitoring of larger industrial sources which may experience unusual release events that negatively impact the surrounding air quality.

In order to monitor event-specific emissions using a trigger monitor, the District would also need to purchase a continuous monitor. Based on the target toxic compound to be monitored, trigger compounds would need to be identified.

15.2 Recommendation for Future Monitoring Activities

It is recommended that the District develop a process to better understand where in Louisville elevated cumulative risk from toxic air contaminants are common through neighborhood-scale monitoring activities. By understanding site-specific cumulative risk, community leaders, planning and design teams, and air pollution control officials can work together to reduce emissions of, and exposure to, toxics.

15.3 Resources Needed

Future monitoring activities that require the purchase of additional instruments could require significant capital investment. The District recently researched several different options for monitoring equipment purchases. Depending on the instrument, there is a wide array of costs and associated capabilities, including analyzing compounds down to the detection limits of interest to assess a relative risk. Additionally, many of the instruments researched have operating costs, necessary calibration equipment, and maintenance needs. These costs vary widely depending on the type of instrument, the number of runs conducted, the quantity and cost of consumables required, and other operating variables. Finally, new instruments will require additional training and District staff time during operation.

Section 16 Future Emission Inventory Needs

16.1 Assessment of Emission Inventory Needs

Emission inventories are developed from several types of data. In a few cases, continuous emissions monitoring instruments (CEMs) actually measure an air pollutant in the exhaust gases of a process. Within the accuracy of the CEMs, the actual emissions are determined. However, by far, most emissions estimates are based upon an emission factor and a level of activity. A typical example of an emissions factor is pounds of air pollutant emitted per ton of coal burned or per 1,000 gallons of liquid fuel burned. A special case of an emission factor is a material balance, where, e.g., the amount of solvent in a material used is known and assumed to be emitted. In both cases, the emission factor is multiplied by an activity level (tons of coal burned, gallons of material used) to calculate the emission of that air pollutant.

For the permitted stationary and area sources, most companies are required to submit emissions inventory information to the District; Title V and FEDOOP companies, annually, for some of the minor and area sources, every three years. Based upon the submitted emissions and activity levels reported, the District completes the stationary source emissions inventory. For mobile sources, the emission factors are derived using the EPA's MOBILE model (which calculates emission factors using local information such as vehicle fleet makeup) and activity levels (in vehicle miles traveled [VMT] and speed, which are obtained from the Kentuckiana Regional Planning and Development Agency [KIPDA]).

Emission inventories for area sources and non-road mobile sources are likewise generally developed using emission factors and activity levels. However, unlike the permitted stationary source and mobile source emission inventories which are developed using local information, many of the sources in the area source and non-road mobile source categories are developed using national emission factors, such as pounds of air pollutant per 1,000 people. The emissions for those sources are then calculated by multiplying the emission factor by the population for the area.

Much of the past emission inventory data developed by the District pertained to criteria pollutants, i.e., particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, volatile organic compounds, and lead. Section 7 describes the work that the District undertook to develop the chemical-specific emission inventory used for evaluating the cancer and noncancer risks from various sources. Because the larger industrial sources submit speciated (i.e., relating to individual chemicals) emissions inventory data, these data are considered reasonably accurate for these larger industrial sources. MOBILE6.2 provides speciated emission factors. Thus, in conjunction with the extensive local VMT and speed data provide by KIPDA, the speciated mobile source emission inventory is considered reasonably accurate.

Section 7.2 describes the process that the District underwent to develop the speciated emission inventory for area sources. While the District obtained speciation profiles for many of the

sources in the area source category, speciation profiles were not found for some of the sources in the area source category. The EPA's National Mobile Inventory Model (NMIM) was used to develop the speciated emission inventory for non-road mobile sources. While NMIM contained speciation profiles for most of the non-road mobile source categories, the District did not have local source activity data for many of the non-road mobile source categories.

16.2 Recommendation for Emission Inventory Improvements

It is recommended that the District continue obtaining, developing, and improving speciation profiles for minor, area, and non-road mobile source categories. Additionally, it is recommended that the District continue obtaining, developing, and improving source activity level data for minor, area, and non-road mobile source categories. Improvements in speciation profiles and activity level data will allow the District to develop more accurate risk assessments of these source categories.

16.3 Resources Needed

The District currently has two staff members assigned full-time to emission inventory activities. The District believes that this level is sufficient to undertake the recommended emission inventory improvements.

Strategic Toxic Air Reduction Program
Regulation 5.30 Stakeholder Group

Report and Plan of Action

Appendices

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Appendix 1
Acronyms and Abbreviations

$1 \otimes 10^{-6}$ . . . . . (Cancer risk of) 1 in one million
$1 \otimes 10^{-5}$ . . . . . (Cancer risk of) 1 in one hundred thousand (equivalent to 10 in one million)
$1 \otimes 10^{-4}$ . . . . . (Cancer risk of) 1 in ten thousand (equivalent to 100 in one million)
AERMOD . . . . . AMS/EPA Regulatory Model (EPA computer dispersion model)
APCD . . . . . Air Pollution Control District (also District)
AQTF . . . . . Air Quality Task Force (Ozone)
ASTM . . . . . American Society for Testing
BAC . . . . . Benchmark ambient concentration for a TAC
BAC_C . . . . . Benchmark ambient concentration for a carcinogen
BAC_{NC} . . . . . Benchmark ambient concentration for a noncarcinogen
Board . . . . . Air Pollution Control Board
B.H. . . . . Building height
CAA . . . . . Clean Air Act, 42 USC 7401 et seq.
CARB . . . . . California Air Resources Board
CARE . . . . . Community Action for a Renewed Environment (EPA program)
CEM . . . . . Continuous emissions monitor
CFR . . . . . Code of Federal Regulations
CO . . . . . Carbon monoxide
DAQ . . . . . Division for Air Quality (KY)
DfE . . . . . Design for the Environment (EPA program)
District . . . . . Air Pollution Control District (also APCD)
DOT . . . . . U.S. Department of Transportation
EA . . . . . Environmentally acceptable, or environmental acceptability
EJP2 . . . . . Environmental Justice through Pollution Prevention (EPA grant)
EPA . . . . . U.S. Environmental Protection Agency
FEDOOP . . . . . Federally enforceable District origin operating permit
GACT . . . . . Generally available control technology
GAO . . . . . U.S. Government Accountability Office
GLI . . . . . Greater Louisville, Inc.
HAP . . . . . Hazardous air pollutant
HI . . . . . Hazard Index
HPV . . . . . High Production Volume Change Program (EPA program)
HPVIS . . . . . High Production Volume Information System (EPA database)
HQ . . . . . Hazard Quotient
ISC3 . . . . . Industrial Source Complex (EPA computer dispersion model)
JCPS . . . . . Jefferson County Public Schools
KAR . . . . . Kentucky Administrative Regulation
KFA . . . . . Kentucky Fabricare Association
KIPDA . . . . . Kentuckiana Regional Planning and Development Agency
KPMA . . . . . Kentucky Petroleum Marketers Association
LDAR . . . . . Leak detection and repair
MACT . . . . . Maximum achievable control technology
MSD . . . . . Metropolitan Sewer District

Appendix 1
Acronyms and Abbreviations

MSDS . . . . . Material safety data sheet
NATA . . . . . National Air Toxics Assessment
NCDC . . . . . National Clean Diesel Campaign (EPA program)
NESHAP . . . . . National Emission Standards for Hazardous Air Pollutants
NMIM . . . . . National Mobile Inventory Model (EPA emission inventory model)
NO_x . . . . . Oxides of nitrogen, commonly referred to as nitrogen oxides
NSPS . . . . . Standards of Performance for New Stationary Sources
Perc . . . . . Perchloroethylene, more formally referred to as tetrachloroethylene
PM . . . . . Particulate matter
POTW . . . . . Publicly owned treatment works
PPM . . . . . Parts per million
PTE . . . . . Potential to emit
RAPA . . . . . Report and Plan of Action
RSEI . . . . . Risk-Screening Environmental Indicator
SCCC . . . . . Southside Christian Childcare Center
STAR . . . . . Strategic Toxic Air Reduction
TAC . . . . . Toxic air contaminant
TAP . . . . . Toxic air pollutant (DAQ proposed rule)
TAP-BACT . . . . . Best available control technology for toxic air pollutants (DAQ proposed rule)
TARC . . . . . Transit Authority of River City
T-BAT . . . . . Best available technology for toxics
TDM . . . . . Travel Demand Model
Title V, TV . . . . . Title Five of the Clean Air Act, 42 USC 7661 et seq.
TOSHI . . . . . Target organ-specific Hazard Index
TPY. . . . . Tons per year
TRI . . . . . Toxics Release Inventory (EPA)
TRIMARC . . . . . Traffic Response and Incident Management Assisting the River Cities
TRU . . . . . Transport refrigeration unit
$\mu g/m^3$ . . . . . Micrograms per cubic meter
ULSD . . . . . Ultra low sulfur diesel
VMT . . . . . Vehicle miles traveled
VOC . . . . . Volatile organic compound
WCCIP . . . . . West County Community Involvement Project
WJCCTF . . . . . West Jefferson County Community Task Force
WLATS . . . . . West Louisville Air Toxics Study

Appendix 2

REGULATION 5.30 Report and Plan of Action for Identified Source Sectors

Air Pollution Control District of Jefferson County
Jefferson County, Kentucky

Relates To: KRS Chapter 77 Air Pollution Control
Pursuant To: KRS Chapter 77 Air Pollution Control
Necessity and Function: KRS 77.180 authorizes the Air Pollution Control Board to adopt and enforce all orders, rules, and regulations necessary or proper to accomplish the purposes of KRS Chapter 77. This regulation establishes the requirement for the District to develop a proposed report and plan of action to assess and address the toxic air contaminant emissions from minor stationary sources, area sources, nonroad mobile sources, and mobile sources.

SECTION 1 Definitions

Terms used in this regulation that are not defined in this regulation shall have the meaning given to them in Regulation 1.02 *Definitions* or Regulation 5.01 *General Provisions*.

1.1 "Source sector" means the general grouping of sources of air contaminants used by the District for developing anthropogenic emissions inventories. These source sectors are as follows:

1.1.1 Point source - industrial or commercial stationary source that is subject to the permit requirements in Regulation 2.03 section 1.1 or 1.2 (permitted stationary source).

1.1.1.1 Major or moderate point source - a Group 1 or Group 2 stationary source as defined in Regulation 5.01 sections 1.8 and 1.9.

1.1.1.2 Minor stationary source - a point source that is not a major or moderate point source.

1.1.2 Area source - non-permitted commercial stationary source or other anthropogenic source of emissions that is not included in section 1.1.1, 1.1.3, or 1.1.4.

1.1.3 Mobile source - motorized vehicle that is registered for use on the public roads and highways.

1.1.4 Nonroad mobile source - motorized vehicle that is not registered for use on the public roads and highways or any other equipment with a fossil fuel-fired engine that is not included as a point source.

SECTION 2 Report and Plan of Action

2.1 By no later than June 1, 2007, the District shall submit to the Board a proposed Report and Plan of Action to assess and address the risk to human health and welfare from ambient air concentrations of toxic air contaminants (TACs) from minor stationary sources, area sources, non-road mobile sources, and mobile sources. In developing the proposed Report and Plan of Action, the District shall implement a process allowing for active and meaningful stakeholder involvement in the development of, and review and comment on, the Report and Plan of Action.

Appendix 2

2.2 The Report shall, at a minimum:

2.2.1 Include a general identification of the sources and, to the extent that it can reasonably be determined, estimates, by TAC, of the emissions from each source sector and the relative ambient air risk from each sector,

2.2.2 Evaluate the status of and need for improvement of TAC emission inventories for these source sectors,

2.2.3 Identify and evaluate existing and likely programs at the federal level and in Kentucky that are intended to reduce emission from these sources,

2.2.4 Identify and evaluate existing and likely programs in other jurisdictions that are intended to reduce emission from these sources,

2.2.5 Identify appropriate risk goals for these source sectors,

2.2.6 Assess any needs for monitoring of the sources,

2.2.7 Identify any special considerations relating to addressing risk from these sectors, and

2.2.8 Identify all resources necessary to implement the Plan of Action.

2.3 The proposed Plan of Action shall suggest specific programs, activities, areas to be addressed by regulation, if any, and a timetable to achieve the identified risk goals by no later than December 31, 2012. Programs may include, but are not limited to, the following:

2.3.1 For area sources, in addition to any appropriate emission reductions, strategies such as land use mechanisms to minimize impacts, especially on sensitive sub-populations such as the young, the elderly and those with health conditions,

2.3.2 For non-road mobile sources, cleaner fuels and cleaner equipment, including accelerating their availability and use, and

2.3.3 For mobile sources, promoting and accelerating the use of alternative fuel vehicles, cleaner fuels, cleaner vehicles, effective transportation policies such as improved and increased public transit, improved and increased bike and pedestrian facilities, promoting urban in-fill policies, and diesel retrofits.

2.4 The District shall, by September 21, 2005, submit to the Board a timeline and description of the proposed stakeholder process for developing the proposed Report and Plan of Action required in section 2.1.

Adopted v1/6-21-05, effective 7-1-05; amended v2/7-19-06.

Appendix 3
List of Area and Non-Road Mobile Source Categories

Area Source Categories

Aircraft refueling - jet fuel
Aircraft refueling - aviation gas
Architectural surface coating
Asphalt paving
Backyard charcoal grills
Bakeries
Barge, tank, and drum cleaning
Cigarette smoke
Cold cleaning - automobile repair
Cold cleaning - manufacturing
Commercial charbroiling
Commercial deep fat frying
Consumer and commercial products
Dry cleaning - perchloroethylene
Gasoline service stations
Graphic arts
Leaking underground storage tanks
LPG combustion - commercial/industrial
Natural gas combustion - residential
Pesticide application
Printing - fabricated paper products
Publicly owner treatment plants
Solid waste disposal
Structural fires
Surface coating - automobile refinishing
Surface coating - industrial
Surface coating - traffic markings
Surface coating - wood products
Surface coating - furniture and fixtures
Tank truck unloading
Underground storage tanks
Vehicle refueling
Waste oil furnaces

Non-Road Mobile Source Categories

Agricultural equipment
Air conditioning/refrigeration units
Air compressors
Aircraft
Airport ground support equipment
All-terrain vehicles
Chain saws
Concrete/industrial saws
Construction equipment
Forklifts and other industrial equipment
Golf carts
Lawn and garden equipment - residential
Lawn and garden equipment - commercial
Marine vessels
Mining equipment
Motorcycles - off-road
Railroad lines
Railroad switchyards
Watercraft - pleasure
Welders

Appendix 4

Motor Vehicle and Off-Road Equipment

Emission Control Requirements

Category	Examples	Controlled Since…	Date of Recent and\or Future Standards	Comments
Passenger Vehicles	Cars, SUVs, minivans, pick ups	1975	2004 [Tier 2 program]	Implementation through 2009; VOC and PM standards
Diesel Trucks & Buses	Large and mid-size trucks and all buses	1988	October 2002 [consent decrees]; 2004; 2007 [Clean diesel program]	VOC and PM standards, NOx adsorbers, catalyzed traps, selective catalytic reduction technology, and oxidation catalysts in 2007
Gasoline Trucks & Buses	Mid-size trucks and all buses	1988	2004	VOC and PM standards
Diesel Buses	Urban buses heavy duty retrofit	1994	Completed 1998	PM standard
Non-road Diesel Engines	Construction, mining, industrial, agricultural, and airport equipment	1994	2006 [Tier 3]; 2010 [Tier 4]	
Non-road Gasoline Engines	Construction, mining, industrial, agricultural, and airport equipment, and small (<37kW) marine diesel engines	Not controlled	2004; 2007	
Locomotives	Long-haul, switch engines, passenger	2000	**Proposed**: Tier 3 requirements for new engines by 2009-12; Tier 4 requirements for new engines by 2015-17; Remanufactured Tier 0-2 engines will have to meet higher standards between 2008 and 2013	

Appendix 4

Motor Vehicle and Off-Road Equipment

Emission Control Requirements

Category	Examples	Controlled Since…	Date of Recent and\or Future Standards	Comments
Small Gasoline Engines (lawn and garden)	Lawn mowers, string trimmers, chain saws, leaf blowers, etc.	1997	**Proposed:** HC & NOx exhaust emission standards of 10 g/kW-hr for Class I engines starting in the 2012 model year and 8 g/kW-hr for Class II engines starting in the 2011 model year. Evaporative emission standards also proposed.	
Large spark-ignition engines	Non-road spark-ignition (si) engines over 19 KW(25 hp) – Forklifts, compressors, generators, etc.	2004	2007 - Tier 2	VOC standards
Gasoline Outboards and Personal Water Craft	Outboard engines, jet skis	1998	**Proposed:** Emission standards for outboard and personal watercraft engines starting with the 2009 model year are 16 g/kW-hr for HC+NOx and 200 g/kW-hr for CO for engines above 40 kW. For engines below 40 kW, the standards increase based on the engine's maximum power.	
Gasoline Sterndrive and Inboard Engines		Not controlled	**Proposed:** Standards for sterndrive and inboard marine engines will be 5 g/kW-hr for HC+NOx and 75 g/kW-hr for CO starting with the 2009 model year and require that these engines have a diagnostic system to detect failures in the emission control system. For sterndrive and inboard marine engines above 373 kW with high-performance characteristics, a CO standard of 350 g/kW-hr will be applied.	

Appendix 4

Motor Vehicle and Off-Road Equipment

Emission Control Requirements

Category	Examples	Controlled Since…	Date of Recent and\or Future Standards	Comments
Marine Diesel – Categories 1 & 2	Tugboats, Great Lakes freighters, etc. Cat. 1 = ≥37 kW with <5 liters displacement per cylinder; Cat. 2 = ≥37kW with between ≥5 liters and <30 liters displacement per cylinder		Tier 1 – 2003-04 ; Tier 2 – 2004-07; **Proposed**: Tier 3 requirements for new engines by 2009-12; Tier 4 requirements for new engines by 2015-17; Remanufactured Tier 0-2 engines will have to meet higher standards between 2008 and 2010	
Diesel Recreational Water Craft	Yachts and cruisers	2006	Tier 1 - 2004; Tier 2 2006-09; **Proposed**: Tier 3 requirements for new engines by 2009-14; Tier 4 requirements for new engines by 2014-17;	
Marine Diesel – Category 3	Ocean-going diesel tugs, tankers, freighters, cruise ships	2003	Tier 1 2003-04; Next Tier to be proposed by 2009	
Aircraft Jet Engines	Commercial passenger and cargo aircraft	1984 smoke 2005 NOx		
Highway Motorcycles		1978	2006 [Proposed]	VOC standard
Off Road Motorcycles		Not controlled	2006	
All Terrain Vehicles; snowmobiles		Not controlled	2006; 2010/2012	

Appendix 4

Federal Fuel Requirements

Program	Description	Effective Date	Other
Unleaded Gasoline	Gas stations must have at least one unleaded pump	1974	
Lead Phase Down	Refiners gradually lower the amount of lead in leaded gas	1979	
Lead Ban	Lead is no longer allowed in U.S. gasoline	1996	
Gasoline Volatility	Summer-only requirement to lower the evaporation rate of gasoline	1989; 1992	
Oxygenated Gasoline	Winter-only requirement to add oxygenates to gas in carbon monoxide non-attainment areas	Winter of 1992-93	
Reformulated Gasoline	VOC, NOx, and toxics reduction standards, benzene cap, and addition of an oxygenate	1995 (Phase 1) 2000 (Phase 2)	
Mobile Source Air Toxics	MSAT1	2002	
Gasoline Sulfur	Reduction to 30 ppm average	2004 [Part of Tier 2 program]	
Diesel Sulfur	Reduction to 500 ppm average [Part of clean diesel program]	1993; 2006	
Ultra Low Sulfur Diesel (ULSD)	A cleaner-burning diesel fuel containing a maximum 15 ppm sulfur introduction into supply chain	2006-10	Distribution terminals extended to 9/1/06 and retail to 10/15/06
Highway ULSD introduction	Reduction from 500+ ppm to 15 ppm (at 100%)	2006 - 2010	≥80% supply beginning 6/1/2006 & 2007
Non-road diesel fuel	< 500 ppm	2007 - 2010	
Locomotive & marine diesel fuel	Reduction from 500+ ppm to 15 ppm (at 100%)	2007 - 2012	
Non-road ULSD	15 ppm	2010	
Gasoline Benzene	MSAT2	2011	
Locomotive & Marine ULSD	15 ppm (at 100%)	2012	
Heating oil	Remains at ~3400 ppm		

Appendix 5

Note: This document was submitted to the Board on September 21, 2005. On July 19, 2006, the Board changed the submittal date of the proposed Report and Plan of Action in Regulation 5.30 to June 1, 2007. The current timeline is identified in Appendix 9 *STAR 5.30 Stakeholder Group Timeline*.

Timeline and Description of Proposed Stakeholder Process

Timeline and description of the proposed stakeholder process for developing the proposed Report and Plan of Action required in APCD Regulation 5.30, section 2.1. Submitted pursuant to APCD Regulation 5.30 section 2.4

Timeline:

October 2005

Hire primary staff
Create and have first meeting of stakeholder group
Review proposed timeline and proposed work plan
Form key subcommittees (target risk levels and/or emission reduction goals, control strategies)

November

Identify/categorize appropriate sources: minor, area, mobile, non-road. Section 2.2.1

December - January 2006

Develop emission inventories. Section 2.2.1, 2.2.2

January - March

Identify and evaluate existing and likely TAC emission reduction programs at federal level and other jurisdictions, including Kentucky. Section 2.2.3, 2.2.4

April - May

Identify appropriate risk goals, assess monitoring needs, identify resources to implement Plan of Action.

June

Report and Plan of Action to APCD Board

Description of Proposed Process:

The stakeholder group would meet at least monthly to review and provide feedback at each step and on each component of the process. It would review and comment on proposed target risk levels and/or emission reduction goals and potential control strategies. It would review and comment on a draft of the Report and Plan of Action prior to submittal to the Board.

Appendix 6
Chemicals of Concern

REGULATION 5.23 Categories of Toxic Air Contaminants

SECTION 1 Category 1 Toxic Air Contaminants

1.1 The *Category 1 Toxic Air Contaminants* list includes the compounds monitored in the 2000 to 2001 *West Louisville Air Toxics Study* at a concentration representative of a cancer risk greater than $1.0 \otimes 10^{-6}$ or a non-cancer Hazard Quotient (HQ) greater than 1.0.

1.2 The *Category 1 Toxic Air Contaminants* list reads as follows:

Category 1 Toxic Air Contaminants

	CAS No.	Compound
1.	107-13-1	Acrylonitrile
2.	7440-38-2 & various	Arsenic and arsenic compounds
3.	71-43-2	Benzene
4.	75-25-2	Bromoform
5.	106-99-0	1,3-Butadiene
6.	7440-43-9 & various	Cadmium and cadmium compounds
7.	56-23-5	Carbon tetrachloride
8.	67-66-3	Chloroform
9.	126-99-8	Chloroprene [2-Chloro-1,3-butadiene]
10.	7440-47-3 & various	Chromium and chromium compounds
11.	106-46-7	1,4-Dichlorobenzene
12.	140-88-5	Ethyl acrylate
13.	50-00-0	Formaldehyde
14.	75-09-2	Methylene chloride [Dichloromethane]
15.	7440-02-0 & various	Nickel and nickel compounds
16.	127-18-4	Perchloroethylene [Tetrachloroethylene]
17.	79-01-6	Trichloroethylene
18.	75-01-4	Vinyl chloride

***Category 1 Toxic Air Contaminants* notes:**

For all listings above that contain the word "compounds," the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., arsenic, cadmium, chromium, and nickel) as part of that chemical's infrastructure.

Appendix 6
Chemicals of Concern

SECTION 2 Category 2 Toxic Air Contaminants

2.1 The *Category 2 Toxic Air Contaminants* list includes the compounds with 2002 Toxics Release Inventory (TRI) reported air emissions for Jefferson County, Kentucky, with an EPA Risk-Screening Environmental Indicators (RSEI) Full Model Relative Risk Score equal to or greater than 500 that are not included in *Category 1 Toxic Air Contaminants*.

2.2 The *Category 2 Toxic Air Contaminants* list reads as follows:

Category 2 Toxic Air Contaminants

	CAS No.	Compound
1.	7429-90-5	Aluminum (fume or dust)
2.	7664-41-7	Ammonia
3.	7637-07-2	Boron trifluoride
4.	141-32-2	Butyl acrylate
5.	7782-50-5	Chlorine
6.	7440-48-4	Cobalt
	& various	and cobalt compounds
7.	7440-50-8	Copper
	& various	and copper compounds
8.	Various	Diisocyanates[1]
9.	Various	Glycol ethers[2]
10.	7647-01-0	Hydrochloric acid [Hydrogen chloride]
11.	7664-39-3	Hydrofluoric acid [Hydrogen fluoride]
12.	Various	Lead compounds
13.	7439-96-5	Manganese
	& various	and manganese compounds
14.	91-20-3	Naphthalene
15.	7697-37-2	Nitric acid
16.	7664-93-9	Sulfuric acid
17.	108-88-3	Toluene
18.	95-63-6	1,2,4-Trimethylbenzene
19.	1330-20-7	Xylene (mixed isomers)
**	95-47-6	o-Xylene
**	108-38-3	m-Xylene
**	106-42-3	p-Xylene

***Category 2 Toxic Air Contaminants* notes:**

** The specific isomer is included in the “mixed isomers” listing.

For all listings above that contain the word "compounds," the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., cobalt, copper, lead, and manganese) as part of that chemical's infrastructure.

[1] Diisocyanates include the specific chemicals listed in the 2003 Reporting Year List

of TRI Chemicals, available on the Internet at "http://www.epa.gov/tri/chemical/RY2003ChemicalList.pdf".

[2] Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol

$R-(OCH_2CH_2)_n-OR'$

where:

n = 1, 2, or 3;
R = alkyl C7 or less, or
R = phenyl or alkyl substituted phenyl; and
R′ = H or alkyl C7 or less, or
OR′ consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate;

but excludes ethylene glycol monobutyl ether (EGBE, CAS No. 111-76-2).

SECTION 3 Category 3 Toxic Air Contaminants

3.1 The *Category 3 Toxic Air Contaminants* list includes the compounds identified by the EPA pursuant to Section 112(k) of the Clean Air Act as presenting significant risks to public health in urban areas that are not included in *Category 1 Toxic Air Contaminants* or *Category 2 Toxic Air Contaminants*.

3.2 The *Category 3 Toxic Air Contaminants* list reads as follows:

Category 3 Toxic Air Contaminants

	CAS No.	Compound
1.	75-07-0	Acetaldehyde
2.	107-02-8	Acrolein
3.	7440-41-7 & various	Beryllium and beryllium compounds
4.	None	Coke oven emissions
5.	542-75-6	1,3-Dichloropropene
6.	None	Diesel particulate matter
7.	106-93-4	Ethylene dibromide [1,2-Dibromoethane]
8.	107-06-2	Ethylene dichloride [1,2-Dichloroethane]
9.	75-21-8	Ethylene oxide
10.	118-74-1	Hexachlorobenzene
11.	302-01-2	Hydrazine
12.	7439-97-6 & various	Mercury and mercury compounds
13.	1336-36-3	Polychlorinated biphenyls [PCBs]
14.	50-32-8 & various	Polycyclic organic matter[1] [POM] (Benzo[a]pyrene) (also represented as 7-PAH)
15.	78-87-5	Propylene dichloride [1,2-Dichloropropane]
16.	91-22-5	Quinoline
17.	79-34-5	1, 1, 2, 2-Tetrachloroethane

***Category 3 Toxic Air Contaminants* notes:**

Appendix 6
Chemicals of Concern

For all listings above that contain the word "compounds," the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., beryllium and mercury) as part of that chemical's infrastructure.

[1] Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C. The seven polycyclic aromatic hydrocarbon (7-PAH) compounds are Benz[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Chrysene, Dibenz[a,h]anthracene, and Indeno[1,2,3-cd]pyrene.

SECTION 4 Category 4 Toxic Air Contaminants

4.1 The *Category 4 Toxic Air Contaminants* list includes the Hazardous Air Pollutants (HAPs) listed by the EPA pursuant to Section 112(b) of the Clean Air Act that are not included in *Category 1 Toxic Air Contaminants*, *Category 2 Toxic Air Contaminants*, or *Category 3 Toxic Air Contaminants*.

4.2 The *Category 4 Toxic Air Contaminants* list reads as follows:

Category 4 Toxic Air Contaminants

	CAS No.	Compound
1.	60-35-5	Acetamide
2.	75-05-8	Acetonitrile
3.	98-86-2	Acetophenone
4.	53-96-3	2-Acetylaminofluorene
5.	79-06-1	Acrylamide
6.	79-10-7	Acrylic acid
7.	107-05-1	Allyl chloride
8.	92-67-1	4-Aminobiphenyl
9.	62-53-3	Aniline
10.	90-04-0	o-Anisidine
11.	7440-36-0 & various	Antimony and antimony compounds
12.	1332-21-4	Asbestos
13.	151-56-4	Aziridine [Ethyleneimine]
14.	114-26-1	Baygon [Propoxur]
15.	92-87-5	Benzidine
16.	106-51-4	p-Benzoquinone [Quinone]
17.	98-07-7	Benzotrichloride
18.	100-44-7	Benzyl chloride
19.	92-52-4	Biphenyl
20.	117-81-7	Bis (2-ethylhexyl) phthalate [DEHP]
21.	111-44-4	Bis (2-chloroethyl) ether [Dichloroethylether]
22.	542-88-1	Bis (chloromethyl) ether
23.	74-83-9	Bromomethane [Methyl bromide]
24.	156-62-7	Calcium cyanamide

Appendix 6
Chemicals of Concern

25.	133-06-2	Captan
26.	63-25-2	Carbaryl
27.	75-15-0	Carbon disulfide
28.	463-58-1	Carbonyl sulfide
29.	120-80-9	Catechol
30.	133-90-4	Chloramben
31.	57-74-9	Chlordane
32.	8001-35-2	Chlorinated camphene [Toxaphene]
33.	79-11-8	Chloroacetic acid
34.	532-27-4	2-Chloroacetophenone
35.	108-90-7	Chlorobenzene
36.	510-15-6	Chlorobenzilate
37.	106-89-8	1-Chloro-2,3-epoxypropane [Epichlorohydrin]
38.	75-00-3	Chloroethane [Ethyl chloride]
39.	74-87-3	Chloromethane [Methyl chloride]
40.	107-30-2	Chloromethyl methyl ether [CMME]
41.	1319-77-3	Cresol/Cresylic acid (mixed isomers)
**	95-48-7	o-Cresol
**	108-39-4	m-Cresol
**	106-44-5	p-Cresol
42.	98-82-8	Cumene [Isopropylbenzene]
43.	72-55-9	DDE [1,1-Dichloro-2,2-bis (p-chlorophenyl)ethylene]
44.	334-88-3	Diazomethane
45.	132-64-9	Dibenzofuran
46.	96-12-8	1,2-Dibromo-3-chloropropane
47.	84-74-2	Dibutylphthalate
48.	91-94-1	3,3′-Dichlorobenzidine
*	72-55-9	1,1-Dichloro-2,2-bis (p-chlorophenyl) ethylene [DDE]
49.	75-34-3	1,1-Dichloroethane [Ethylidene dichloride]
50.	75-35-4	1,1-Dichloroethylene [Vinylidene chloride]
*	111-44-4	Dichloroethyl ether [Bis (2-chloroethyl) ether]
51.	94-75-7	2,4-Dichlorophenoxyacetic acid [2,4-D]
	& various	including salts and esters
52.	62-73-7	Dichlorvos
53.	111-42-2	Diethanolamine
54.	123-91-1	1,4-Diethyleneoxide [1,4-Dioxane]
55.	64-67-5	Diethyl sulfate
56.	119-90-4	3,3′-Dimethoxybenzidine
57.	60-11-7	4-Dimethylaminoazobenzene
58.	121-69-7	N,N-Dimethylaniline
59.	119-93-7	3,3′-Dimethylbenzidine
60.	79-44-7	Dimethylcarbamoyl chloride
61.	68-12-2	N,N-Dimethylformamide [DMF]
62.	57-14-7	1,1-Dimethylhydrazine
63.	131-11-3	Dimethyl phthalate
64.	77-78-1	Dimethyl sulfate

Appendix 6
Chemicals of Concern

65.	534-52-1	4,6-Dinitro-o-cresol
	& various	including salts
66.	51-28-5	2,4-Dinitrophenol
67.	121-14-2	2,4-Dinitrotoluene
*	123-91-1	1,4-Dioxane [1,4-Diethyleneoxide]
68.	122-66-7	1,2-Diphenylhydrazine
*	106-89-8	Epichlorohydrin [1-Chloro-2,3-epoxypropane]
69.	106-88-7	1,2-Epoxybutane
70.	100-41-4	Ethylbenzene
71.	51-79-6	Ethyl carbamate [Urethane]
*	75-00-3	Ethyl chloride [Chloroethane]
72.	107-21-1	Ethylene glycol
*	151-56-4	Ethyleneimine [Aziridine]
73.	96-45-7	Ethylene thiourea
*	75-34-3	Ethylidene dichloride [1,1-Dichloroethane]
74.	76-44-8	Heptachlor
75.	87-68-3	Hexachlorobutadiene
76.	58-89-9	1,2,3,4,5,6-Hexachlorocyclohexane
	& various	All stereo isomers, including Lindane
77.	77-47-4	Hexachlorocyclopentadiene
78.	67-72-1	Hexachloroethane
79.	822-06-0	Hexamethylene-1,6-diisocyanate
80.	680-31-9	Hexamethylphosphoramide
81.	110-54-3	Hexane
82.	108-10-1	Hexone [Methyl isobutyl ketone]
83.	123-31-9	Hydroquinone
84.	74-88-4	Iodomethane [Methyl iodide]
85.	78-59-1	Isophorone
*	98-82-8	Isopropylbenzene [Cumene]
*	58-89-9	Lindane and all stereo isomers
	& various	see 1,2,3,4,5,6-Hexachlorocyclohexane
86.	108-31-6	Maleic anhydride
87.	67-56-1	Methanol
88.	72-43-5	Methoxychlor
89.	75-55-8	2-Methylaziridine [1,2-Propylenimine]
*	74-83-9	Methyl bromide [Bromomethane]
*	74-87-3	Methyl chloride [Chloromethane]
90.	71-55-6	Methyl chloroform [1,1,1-Trichloroethane]
91.	60-34-4	Methylhydrazine
*	74-88-4	Methyl iodide [Iodomethane]
*	108-10-1	Methyl isobutyl ketone [Hexone]
92.	624-83-9	Methyl isocyanate
93.	80-62-6	Methyl methacrylate [MMA]
94.	1634-04-4	Methyl tert-butyl ether [MTBE]
95.	101-14-4	4,4′-Methylene bis (2-chloroaniline)
96.	101-77-9	4,4′-Methylenedianiline

Appendix 6
Chemicals of Concern

97.	98-95-3	Nitrobenzene
98.	92-93-3	4-Nitrobiphenyl
99.	100-02-7	4-Nitrophenol
100.	79-46-9	2-Nitropropane
101.	684-93-5	N-Nitroso-N-methylurea
102.	62-75-9	N-Nitrosodimethylamine
103.	59-89-2	N-Nitrosomorpholine
104.	56-38-2	Parathion
105.	82-68-8	Pentachloronitrobenzene [Quintobenzene]
106.	87-86-5	Pentachlorophenol
107.	108-95-2	Phenol
108.	106-50-3	p-Phenylenediamine
109.	75-44-5	Phosgene
110.	7803-51-2	Phosphine
111.	7723-14-0	Phosphorus
	& various	and phosphorus compounds
112.	85-44-9	Phthalic anhydride
113.	1120-71-4	1,3-Propane sultone
114.	57-57-8	beta-Propiolactone
115.	123-38-6	Propionaldehyde
*	114-26-1	Propoxur [Baygon]
116.	75-56-9	Propylene oxide
*	75-55-8	1,2-Propylenimine [2-Methylaziridine]
*	106-51-4	Quinone [p-Benzoquinone]
*	82-68-8	Quintobenzene [Pentachloronitrobenzene]
117.	100-42-5	Styrene
118.	96-09-3	Styrene oxide
119.	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin
120.	7550-45-0	Titanium tetrachloride
121.	95-80-7	Toluene-2,4-diamine
122.	584-84-9	2,4-Toluene diisocyanate [TDI]
123.	95-53-4	o-Toluidine
*	8001-35-2	Toxaphene [Chlorinated camphene]
124.	120-82-1	1,2,4-Trichlorobenzene
*	71-55-6	1,1,1-Trichloroethane [Methyl chloroform]
125.	79-00-5	1,1,2-Trichloroethane
126.	95-95-4	2,4,5-Trichlorophenol
127.	88-06-2	2,4,6-Trichlorophenol
128.	121-44-8	Triethylamine
129.	1582-09-8	Trifluralin
130.	540-84-1	2,2,4-Trimethylpentane
*	51-79-6	Urethane [Ethyl carbamate)]
131.	108-05-4	Vinyl acetate
132.	593-60-2	Vinyl bromide
*	75-35-4	Vinylidene chloride [1,1-Dichloroethylene]
133.	57-12-5	Cyanide

	& various		and cyanide compounds[1]
134.	N/A	. . . . .	Fine mineral fibers[2]
135	10043-92-2	. . . . .	Radon
	& various		and other radionuclides[3]
136.	7782-49-2	. . . . .	Selenium
	& various		and selenium compounds

***Category 4 Toxic Air Contaminants* notes:**

* This compound is also listed under a different name and the other listing has a listing number.

** The specific isomer is included in the “mixed isomers” listing.

For all listings above that contain the word "compounds," the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, cyanide, phosphorus, and selenium) as part of that chemical's infrastructure.

[1] X′CN where X = H′ or any other group where a formal dissociation may occur. For example, KCN or $Ca(CN)_2$

[2] Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

[3] A type of atom which spontaneously undergoes radioactive decay.

SECTION 5 Exemptions from the Definition of Toxic Air Contaminant

As used in these regulations, the following substances shall not be considered to be a toxic air contaminant:

5.1 Any substance for which there is a national ambient air quality standard, but only to the extent that a particular substance is treated in a generic fashion, for example, as particulate matter or a volatile organic compound,

5.2 Carbon dioxide,

5.3 Ethane,

5.4 Grain dust,

5.5 Helium,

5.6 Hydrogen,

5.7 Liquified petroleum gas,

5.8 Methane,

5.9 Nitrogen,

5.10 Oxygen,

5.11 Propane, and

5.12 Water vapor.

SECTION 6 Implementation Guidance

6.1 If a TAC is a compound that is included in a listed compound group, for example, a metal compound group, and a benchmark ambient concentration (BAC) is derived for the

compound group, then that BAC shall be the default BAC for a compound in that group unless a BAC for the specific compound is derived pursuant to the methodology in Regulation 5.20.

6.2 If a TAC is a compound that is included in two listed compound groups, then environmental acceptability shall be demonstrated based upon the more stringent BAC. If the two compound groups applicable to that TAC are listed in different TAC categories, then the requirements of the lower numbered category (Category 2 is a lower numbered category than Category 3) shall apply.

6.3 The owner or operator of a process or process equipment that has the potential to emit chromium or a chromium compound may, using information that is derived using one of the methods in Regulation 1.06 *Stationary Source Self Monitoring, Emissions Inventory Development, and Reporting* section 3.2, speciate the chromium emissions by oxidation state. If the chromium is not speciated by oxidation state, then the hexavalent oxidation state shall be assumed.

Appendix 7
Invitation Letter

June 26, 2006

Dear _____:

On behalf of the Louisville Metro Air Pollution Control District (APCD), I would like to invite you to participate in a new multi-stakeholder group being formed to assist in the development of a Report and Plan of Action to reduce levels of toxic air contaminants in Louisville's air as part of our community's Strategic Toxic Air Reduction (STAR) Program.

This group, required by APCD Regulation 5.30, will bring together community and neighborhood leaders, business officials from key sectors, and relevant government, academia and health representatives.

We anticipate the group will meet approximately once per month for about two hours at each meeting over the next year to guide the agency's development of the Report and Plan of Action. This Report will serve as the road map to the implementation of strategies to reduce effectively the emissions of toxic chemicals from applicable sources.

For your information and reference, I am attaching a copy of APCD Regulation 5.30 which establishes the framework for the work of the stakeholder group and a copy of the agency's Plan of Action Outline which has recently been submitted to the APCD Board.

Your involvement and participation in this process will help insure a Report and Plan of action that is thorough, comprehensive, balanced and effective.

We are setting the first meeting of the group for Thursday, July 13, 2006, from 2:00 to 4:00 p.m. in the APCD Board Room at 850 Barret Avenue. If you would, please call my assistant, Monica Little, at 574-7246, to let her know if you will be accepting our invitation to join this stakeholder group and whether you will attend this first meeting. Also, please feel free to call me at 574-8689 if you might have any questions about the group or its focus.

Thank you for favorably considering this request. I know your time is valuable and we will use it wisely and carefully to improve the air quality and public and economic health of our community.

Sincerely,

Arthur L. Williams, Director

Attachments

Cc: Mayor Jerry Abramson
C. Bruce Traughber
Erin Simpson

Appendix 8
STAR 5.30 Stakeholder Group Members

J. Barry Barker
Transit Authority of River City

Russ Barnett
U of L KIESD

Leslie Barras
River Fields, Inc.

Derek Bland
[Greater Louisville, Inc.]
Houston-Johnson, Inc.

Gregory Brotzge
Kentucky Paint Council

Wallace Deener
Louisville Metro Development Authority

Carolyn Embry
American Lung Association of Kentucky

Mary Rose Evans
Louisville Neighborhoods

Tom FitzGerald
Kentucky Resources Council

Chuck Fleischer
Jefferson County Public Schools

Mike Fothergill
Holiday Cleaners

Christopher French
Lou. Metro Planning and Design Services

Arnita Gadson
U of L, W. Jeff. Co. Community Task Force

Sam George
American Commercial Barge Lines

Tim Hagerty
GLI Environmental Affairs Committee

Susan Hamilton
Metro Development Authority

Matt Hanka
U of L student
Cntr. for Sustainable Urban Neighborhoods

Cathy Hinko
Metropolitan Housing Coalition

Melissa Howell
Kentucky Clean Fuels Coalition

Mark Hussung
GE Consumer & Industrial

Dr. John Lewis
[Greater Louisville Medical Society]
Health Care Excel of Kentucky

Joan Lindop
Sierra Club

Jesse Mayes
KY Transportation Cabinet
Division of Planning

Cam Metcalf
U of L, KY Pollution Prevention Center

Kirsten Morell
United Parcel Service

Mike Mulheirn
JCPS Division of Facilities

Anne K. Nash
Highland Cleaners

Patrick Peak
Ivy Hill Corporation

Dionne Reams
U of L student

Karen Scott
Louisville Regional Airport Authority

Barbara Sexton Smith
Air Pollution Control Board

William Somplatsky-Jarman
Presbyterian Church (USA)

Dr. David Tollerud
University of Louisville

Dr. Adewale Troutman
Dept. of Public Health and Wellness

David Wicks
Jefferson County Public Schools

Mark Young
[auto body repair]
Grinstead Group

Appendix 9
STAR 5.30 Stakeholder Group Timeline

Date of STAR 5.30 Stakeholder Group Meeting	Meeting 1 July 13, 2006	Meeting 2 August 10, 2006	Meeting 3 Sept 14, 2006
Presentations	■ Welcome remarks and Introductions, Art Williams (AW) ■ Overview of Group, AW ■ Opening comments, Bruce Traughber, Dr. Karen Cassidy, Arnita Gadson (AG), Dr. Adewale Troutman ■ Overview of Louisville Air Quality Issues, AW ■ Review of STAR Program, Jon Trout (JT)	■ Federal Documents, AW ■ Plan of Action Outline Overview, ES ■ The health and science of toxicity assessment, Dr. Solomon Pollard (SP), EPA	■ The District's tools and monitoring plan of action, TP and AW ■ Risk assessment framework developed by WJCCTF, AW, Russ Barnett, and AG
Handouts	■ Regulation 5.30 ■ Regulation 5.30 Plan of Action Outline ■ Louisville Metro Air Quality Task Force Report ■ *Air Pollution Control Law* (Chapter 6) ■ STAR Program Overview ■ 6 news items ■ JT presentation slides	■ GAO Report to Congressional Requestors: *EPA Should Improve the Management of Its Air Toxics Program* ■ EPA *Federal Register* notice: *National Air Toxics Program: The Integrated Urban Strategy*, 7-9-99 ■ Regulation 5.30 Plan of Action Outline ■ SP presentation slides	■ STAR Monitoring Update presentation slides ■ *Hot Spots Monitoring: Short Term Plan of Action Outline* ■ *West Louisville Air Toxics Study: Risk Assessment Work Plan and Quality Assurance Project Plan* ■ Agency for Toxic Substances and Disease Registry's *Health Consultation: Rubbertown Industrial Area* (available upon request)
District and Stakeholder Group Activities	**District:** ■ Bo Fawbush (BF) completed and quality assured 2004 emissions inventories for 2004 for EPA ■ Billy DeWitt (BD) worked on a modeling project pursuant to 5.30 section 2.2.1 ■ Tua Pickering (TP) conducted a comparison study of 2 pieces of monitoring equipment ■ Erin Simpson (ES) attended EPA conference	**District:** ■ BF verified 2005 emissions inventories ■ Lilibeth Lanceta (LL) began training ■ BD reviewed and merged AERMOD data files ■ TP collected air samples for analysis ■ ES presented Plan of Action Outline to stakeholder group	**District:** ■ JT and BD attended Atlanta RSEI workshop ■ ES began work on 5.30 matrix ■ JT led the STAR 5.30 Workshop 300 ■ LL began speciating emission factors for area sources ■ BF continued to review Title V emission inventories ■ Cynthia Lee (CL) and TP worked on the air monitoring plan of action

Appendix 9
STAR 5.30 Stakeholder Group Timeline

Date of STAR 5.30 Stakeholder Group Meeting	Meeting 4 October 12, 2006	Meeting 5 November 9, 2006	Meeting 6 December 14, 2006
Presentations	■ EPA's national air toxics program, Dr. Ken Mitchell (KM), EPA Region 4 ■ Monitoring equipment comparison chart, CL ■ Monitoring plan of action, AW and CL ■ Matrix and Timeline for Stakeholder Group, AW	■ STAR environmental acceptability framework, JT ■ WJCCTF Risk Management Plan ■ National Air Toxics Assessment ■ EPA-4 Relative Risk Screening Assessment	■ WLATS Study 2, JT ■ Committee Reports ■ AQTF--APCD Board recommendations, AW ■ Current and future activities at Louisville International Airport, Karen Scott (KS) ■ Criteria for evaluating potential strategies, JT ■ Preview of modeled mobile source emissions at large intersections, JT
Handouts	■ KM presentation slides and three attachments ■ Monitoring equipment information ■ Matrix and timeline ■ Mobile Source controls chart **For next month:** ■ EPA's Community Guide to Voluntary Programs/ CARE ■ WJCCTF *Risk Management Plan* ■ EPA-4 Relative Risk Screening Analysis	■ JT presentation slides (Framework for Environmental Acceptability) ■ Carbon Monoxide (CO) hotspots map ■ 5.30 November Board Report ■ National-Scale Air Toxics Assessment narrative	■ AQTF Recommendations to the APCD Board (handed out in Nov) ■ December 5.30 Board Report ■ WLATS Study 2 summary ■ Matrix of other state toxics programs' risk framework ■ KS presentation slides ■ Graphs for modeled intersections
District and Stakeholder Group Activities	**District:** ■ CL and TP took research trip to TX and revised monitoring plan ■ LL worked on speciated emissions factors for various source sectors ■ BD developed QA procedures, worked on Tier 4 modeling project ■ Staff met with Paul Wagner, EPA-4 on CARE ■ JT led STAR 5.30 Workshop 300	**District:** ■ 1st committee meetings ■ CL and TP attended Air Monitoring conference ■ LL continued to work on speciated emissions factors for various sources ■ BD, Gary Flispart (GF), and Tom Pinto (ToP) began modeling mobile source emissions ■ ES researched NATA narrative and prepared for Stakeholder Group committee meetings	**District:** ■ 2nd committee meetings ■ TP begins short term air monitoring program ■ ES created idling matrix ■ LL continues to work on speciated emissions factors for various sources ■ BD, GF, and ToP continue to model mobile source emissions

Appendix 9
STAR 5.30 Stakeholder Group Timeline

Date of STAR 5.30 Stakeholder Group Meeting	Meeting 7 January 11, 2007	Meeting 8 February 8, 2007	Meeting 9 March 8, 2007
Presentations	■ Current and future activities of dry cleaners, Anne Nash (AN) ■ Current and future activities of UPS, Kirsten Morell (KM) ■ Committee Reports ■ Discuss planned field trips	■ Committee Reports ■ Latest draft of Report and Plan of Action ■ Mobile modeling results, GF ■ Area source emissions and modeled risk, LL, BD, and MK ■ Discuss planned field trip	■ Third draft of Report and Plan of Action ■ Committee Reports ■ Health/Risk Committee present findings to the large Stakeholder Group ■ Short-term monitoring results, TM
Handouts	■ Current and future activities at perc. dry cleaners (AN) ■ KM presentation slides ■ Mobile Source Carcinogenic Risk ■ Toxics profiles for selected minor and area sources ■ Area and minor source modeling results ■ List of minor permitted companies	■ Outline for Report and Plan of Action ■ Latest draft of Report and Plan of Action ■ February 5.30 Board Report	■ Health/Risk Committee's recommended EA goals for stationary area and minor sources ■ Risk Analysis Summary ■ Tables C-2 & C-3 *Estimated Range of Potential Cancer Health Risks*, diesel truck idling ■ Latest draft of Report and Plan of Action
District and Stakeholder Group Activities	**District:** ■ 3rd committee meetings ■ Tua McDermott (formerly Pickering) (TM) finished short term air monitoring program ■ BD and GF continue modeling projects ■ LL continues to work on speciated emissions factors for various sources ■ Matt King (MK) continues modeled risk **Stakeholder Group:** ■ Field trip to Highland Cleaners ■ Field trip to Ivy Hill	**District:** ■ 4th committee meetings ■ LL, MK, BD, and GF continue modeling projects ■ LL, MK, BD, and GF refined hazard potential analysis of area and non-road mobile sources **Stakeholder Group:** ■ Refine Report and Plan of Action	**District:** ■ 5th committee meetings ■ Six staff attended USEPA Region 4 Air Toxics Workshop **Stakeholder Group:** ■ Refine Report and Plan of Action

Appendix 9
STAR 5.30 Stakeholder Group Timeline

Date of STAR 5.30 Stakeholder Group Meeting	Meeting 10 April 12, 2007	Meeting 11 May 10, 2007	Meeting 12 June 14, 2007
Presentations	■ Current and future activities in the auto body repair industry, Mark Young (MY) ■ Committee Reports ■ Timeline for completing committee work and final report, KS ■ Opportunities for future involvement in the Regulation 5.30 process, KS	■ Environmental Acceptability Goals recommended by Health/Risk Committee, Dr. John Lewis (JL) ■ Committee Reports ■ Timeline for completing committee work and final report, KS	■ Introduced new member, Mike Fothergill (MF), representing perc dry cleaners ■ Board perspective on STAR 5.30 process, product and timeline, Barbara Sexton Smith (BSS) ■ Presentation of Committee Recommendations ■ Future inventory and monitoring needs, JT and CL ■ Future involvement of the Stakeholder Group, BSS
Handouts	■ MY presentation slides ■ Latest draft of Report and Plan of Action ■ Draft Environmental Acceptability Goals ■ April 5.30 Board Report	■ Health/Risk Committee recommended Environmental Acceptability Goals for (1) stationary area and minor sources, (2) mobile sources, and (3) non-road mobile sources ■ May 5.30 Board Report ■ Risk Analysis Summary	■ Latest draft of Report and Plan of Action
District and Stakeholder Group Activities	**District:** ■ 6th committee meetings ■ LL, BF, and GF worked on comprehensive toxics emissions inventory for EPA ■ LL, BD, GF, and MK continue modeling projects **Stakeholder group:** ■ Refine Report and Plan of Action	**District:** ■ 7th committee meetings ■ TM attended WJCCTF meeting, gave update on monitoring efforts. ■ LL and BF continue minor source emissions inventories. ■ LL, BD, and MK continue modeling projects ■ GF and BD completed modeling for mobile sources. **Stakeholder Group:** ■ Refine Report and Plan of Action	**District:** ■ 8th committee meetings ■ LL and BF attended EPA conference ■ CL and Erin Vachon (EV) attended EPA workshop ■ LL, BD, and MK continue modeling projects ■ LL and BF continue minor source emissions inventory **Stakeholder Group:** ■ Refine Report and Plan of Action

Appendix 9
STAR 5.30 Stakeholder Group Timeline

Date of STAR 5.30 Stakeholder Group Meeting	Meeting 13 July 12, 2007	Meeting 14 August 9, 2007
Presentations	■ Presentation of the Report and Plan of Action Committee recommendations, Carolyn Embry (CE) ■ Discussion ro reach consensus on Stakeholder Group recommendations ■ Future monitoring needs, CL	■ Discussion to reach consensus on final Report and Plan of Action ■ Discussion to reach consensus on future monitoring needs ■ Discuss future involvement of stakeholders in STAR 5.30 process, KS
Handouts	■ Latest draft of Report and Plan of Action ■ Comprehensive recommendations list ■ Air toxics monitoring equipment report	■ Latest draft of Report and Plan of Action ■ August 5.30 Board Report
District and Stakeholder Group Activities	**District:** ■ LL and BF completed minor source emissions inventory LL began emissions inventory for gas stations LL, BD, and MK completed modeling projects ■ ToP and Michelle Stites (MS) attended meeting on land use planning strategies ■ Craig Bulter (CB) attended training on mobile issues and modeling software ■ AW, CL, and EV presented overview of STAR 5.30 at WJCCTF meeting **Stakeholder Group:** ■ Refine Report and Plan of Action ■ Committee work completed ■ Reached consensus on recommendations for Plan of Action	**District:** ■ Completed draft of Report and Plan of Action ■ LL continues review of gas station emissions inventories ■ CL presented report on stakeholder process on Air Quality conference call ■ CB attended training on FHWA project analysis and mobiel source analysis **Stakeholder Group:** ■ Reached consensus on language for final Report and Plan of Action to be presented to the Board for consideration ■ Reached consensus on future monitoring needs ■ Refine Report and Plan of Action

Appendix 10
Evaluation of Potential Risk Reduction Strategies

Source	Current Risk-Weighted Emissions	Risk Reduction Strategy	Future Risk Reduction	Reduces other Pollutants	Economic Reason-ableness	Public/ Source Accept-ance	Total Score	Timing	Implement-ation Method	Responsi-bility
Mobile Sources										
Non-Road Mobile Source										
Area Source										
Minor Source										

Category Score	Implementation Methods	Responsibility
1 - never/low 2 - sometimes/medium 3 - always/high	ED - Public/Source Education PR - Partnership RG - Regulation	APCD - the District Metro - Other Metro Government Agency BLI/Ind - Greater Louisville Inc./ Industry

Appendix 10
Evaluation of Potential Risk Reduction Strategies
Instructions

The six categories to be scored are all given relative ratings of 1-low/never, 2-medium/ sometimes, or 3-high/always. The current risk-weighted emissions category rates the current emissions/risk for each source category from low to high. The available emissions reduction strategy options score is also a low to high rating depending upon the known risk reduction measures available. These scores are used to determine a baseline perspective of the relative severity of current emissions issues and the availability of technology and/or other strategies to achieve risk reductions.

Future risk reduction scores represent the relative amount of risk reduction achievable by implementing the strategy. The economic reasonableness category rates the resources necessary and available to implement the strategy. The public/source acceptance score represents the anticipated response, from sources and the community at large, to implementation of the strategy based on legal, political, and social factors. Each of these categories is scored on a relative low to high scale. The final category to be evaluated considers whether the strategy has the potential to reduce other pollutants such as oxides of nitrogen, fine particulate matter, or greenhouse gases. This category is scored on a relative no to yes scale.

The sum of the individual scores is calculated for each strategy. The lowest possible score is 6 and the highest possible score is 18. These scores are then considered with respect to additional issues, which are less easily rated or ranked. The evaluation considers whether potential reductions could occur by the 2012 deadline established in Regulation 5.30. The method of implementation for each strategy is also noted. Finally, the responsibility category identifies who would be responsible for implementation of the strategy. Expected implementation entities are the District, other Metro Government Agencies, Greater Louisville, Inc., in cooperation with local industry, or a combination of these entities.

Appendix 11
STAR 5.30 Stakeholder Group
Committee Members

Report and Plan of Action Committee

Chris French
Carolyn Embry *
Cathy Hinko
Mark Young
Karen Scott
Derek Bland

* Chair

Health/Risk Committee

Dr. John Lewis **
Dr. David Tollerud *
Carolyn Embry
Bill Somplatsky-Jarman
Mark Hussung
Tom FitzGerald
David Wicks

*Chair ** Vice-Chair

Area and Minor Source Committee

Leslie Barras *
Wally Deener
Greg Brotzge
Patrick Peak
Chuck Fleischer
Joan Lindop

* Chair

Mobile and Non-Road Mobile Source Committee

Mark Hussung
Chris French
Melissa Howell
Dionne Reams
Kirsten Morell
Susan Hamilton *
Leslie Barras
Karen Scott
Joan Lindop

*Chair

Appendix 12
Hot Spots Monitoring Report

Louisville Metro Air Pollution Control District
Hot Spots Monitoring: Short Term Study
November 2006 – January 2007

Tua McDermott, Louisville Metro APCD

[Full report, including maps, pictures, tables, and appendices, may be downloaded from http://www.louisvilleky.gov/APCD/STAR/Reg530Report.htm#aDocs]

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Hot Spots Monitoring Report

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Hot Spots Monitoring Report

EXECUTIVE SUMMARY

This report summarizes the results and the methodology for the Hot Spots monitoring project conducted by Louisville Metro Air Pollution Control District (APCD). Analysis included reviewing the data results from the samples provided by Air Toxics Ltd., the meteorological data collected by APCD, and preparing visual summaries and comparisons of the data results. The purpose of the study was to identify findings and observations that were most significant and to help shape and direct the future toxics monitoring plan for Louisville Metro.

Three area sources were selected for the short term monitoring plan (see Table 1). They were chosen because they are area sources in close proximity to a receptor and they are a type of facility representative of various sources in Louisville Metro. The three sources from Table 1 are in different parts of Jefferson County. Those sources, a dry cleaner, a busy road intersection, and a gas station provided diversity in the monitoring.

The receptor sites of interest in the study were chosen because they contain "at risk" population groups and were screened to be within 500 meters (0.311 miles) of the area source. "At risk" populations include any group that may be more sensitive to the health effects of toxic chemicals, such as children, the elderly, or those with pre-existing illnesses. The study's three receptors identified are all considered to be sensitive populations: a child care center, an elementary school and a high school.

The Preston Highway/Outer Loop source revealed no inconsistencies with what was expected for the sampling location being near a road and a gas station. The data results were consistent with the speciation for evaporative emissions of a gas station and/or vehicle car exhaust. Okolona Elementary, the corresponding receptor, did have one atypical positive hit. On December 19, tetrachloroethylene (perchloroethylene) was reported at 10.0 $\mu g/m^3$ for the one hour sample.

Thorntons (source) and Ballard High School (receptor) sampling sites had data results consistent with the speciation for evaporative emissions of a gas station and/or vehicle car exhaust. Thorntons and Ballard High had reported tetrachloroethylene concentrations of 1.2 and 1.5 $\mu g/m^3$ respectively on December 19. STAR lists the BAC for Cancer Risk for this compound at 0.17 and it is a Category 1 TAC.

The Village Cleaner (source) and Southside Christian Childcare Center (SCCC) (receptor) did not have a single positive hit for tetrachloroethylene. Before choosing this source/receptor set for this monitoring project, District staff called Village Cleaner to confirm that the dry cleaning equipment was in operation. Unfortunately, District staff was misinformed regarding the status of the dry cleaning operations. After receiving the monitoring data, District staff again contacted Village Cleaner, which then provided the correct information that dry cleaning no longer occurred at this location. Although the monitoring data did not identify concentrations of tetrachloroethylene, the data did reveal the impact that idling cars have on the air quality surrounding the daycare. The air samples taken at the daycare were similar in composition (compounds and concentrations) to the air samples from the intersection of Preston Highway and Outer Loop. Therefore, although not quantifying the impact of the intended source's emissions

(tetrachloroethylene) on this sensitive population receptor, this portion of the monitoring project revealed a different concern for this receptor site.

Future study recommendations may include a longer study period and sampling time. A recommendation may be made to SCCC and other daycares to voluntarily enforce the local regulation that mentions "no idling" to improve the air quality for the children. The Louisville ordinance that mentions no idling, 72.032, states "It shall be a parking violation for any person driving or in charge of a motor vehicle to permit it to stand unattended without stopping the engine, locking the ignition, and removing the key, or when standing on any perceptible grade without setting the brake thereon and turning the front wheels to the curb."

The high level of tetrachloroethylene at Okolona Elementary is a concern. Future samples should be collected to see if this was a chance occurrence or a result of a regular event. If the compound is detected again, an effort will be made to identify the source.

1.0 INTRODUCTION

The hot spot monitoring program was designed to assess emissions primarily from area sources or minor sources. The monitoring plan focused on both source and receptors as monitoring points. The sources chosen fall under Regulation 5.30 of the STAR Program. Louisville Metro APCD collected air samples for analysis of volatile organic compounds (VOCs) beginning on November 29, 2006 with the final sample collected on January 8, 2007. The study focused on many of the volatile organic compounds from the chemicals of concern for the Louisville Metro area identified by the 2003 West Louisville Air Toxics Study Risk Assessment. The goal of the short term monitoring program was to collect and analyze air toxics data so that recommendations for future monitoring, policy development, regulation, or enforcement could be developed and presented to the to the 5.30 Stakeholder group and the Air Pollution Control District's (APCD) Board for further consideration and possible action.

1.1 Sources and Receptors

Regulation 5.30 requires the District to assess and address the toxic air contaminant emissions from non-major point sources such as:

- Mobile sources: motorized vehicles that are registered for use on the public roads and highways.
- Non-road mobile sources: 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 included as a point source.
- Minor stationary sources: a point source that is not a major or moderate point source.
- Area sources: a non-permitted commercial stationary source or other anthropogenic source of emissions that is not included in section 1.1.1, 1.1.3, or 1.1.4 of Regulation 5.30.

Three area sources were selected for the short term monitoring plan (see Pictures 1-3). They were chosen because they are area sources in close proximity to a receptor and they are a type of facility representative of various sources in Louisville Metro. A review of

Map 1 illustrates that the three sources from Table 1 are in different parts of Jefferson County. Those sources, a dry cleaner, a busy road intersection, and a gas station provided diversity in the monitoring.

The receptor sites (Pictures 3-6) of interest in the study were considered because they contain "at risk" population groups and were initially screened to be within 500 meters (0.311 miles) of an area source (see Maps 2 – 4). "At risk" populations include any group that may be more sensitive to the health effects of toxic chemicals, such as children, the elderly, or those with pre-existing illnesses. The study's three receptors identified are all considered to be sensitive populations: a child care center, and elementary school and a high school. The source-receptor monitoring distance was chosen was to reflect the average sampling criteria for middle-scale and neighborhood-scale objectives defined in 40 CFR Part 58 appendices D and E.

Another consideration of the study was area source monitoring of businesses that operate during the times when sensitive populations occupy the receptor sites. The receptors in Table 1 were selected because of proximity to a source, hours of business, and type of business. Table 2 shows the hours of business for both the source and receptor sites. It was important that the receptors had similar business hours to the sources to collect air samples that would exhibit the most significant effect that the sources can have on the receptors.

1.2 Chemicals of Concern

The chemicals of concern consist of many of the volatile organic compounds listed in Regulation 5.23. The results of the monitoring study highlight any chemical found above the detection limit in the Hot Spot areas. A list of the compounds that were included in the lab analysis was provided by Air Toxics LTD and is included in Appendix A.

1.3 Monitoring Plan

Six-liter Summa canisters were used to collect one-hour samples at the selected source and/or receptor sites. The monitoring at each site was scheduled for once per week beginning November 29, 2006 and continuing until January 8, 2007. The whole air sample was collected on a different day of the week and at a different time each monitoring day. The Summa canister was placed at the site, the valve opened and subsequently closed after the one hour duration. The canisters were sent to Air Toxics Ltd. laboratory to be analyzed using FRM TO-15. The VOC's in the sample were analyzed and quantified by GC/MS. The lab cleaned and delivered canisters to APCD for each round of sampling. A field blank and a lab blank were incorporated for quality assurance.

1.4 Laboratory

Research was done to find labs that were capable of performing TO-15 analysis. Only two labs were found that were capable of chloroprene analysis and quantification. A quote package was submitted and Air Toxics Ltd. (ATL) in Folsom, CA was selected to provided the equipment and analysis. APCD received all the data back from ATL by the end of January 2007. The invoiced total from ATL for the equipment and analysis was $8,292.00.

2.0 PROJECT MANAGEMENT

2.1 Project and Task Organization

The following individuals and organizations were involved in collecting data and analyzing the air samples.

- Louisville Metro Air Pollution Control District: Tua McDermott, Marty Layman, Damon Harris and Mario Beeler
- Air Toxics Ltd.

2.2 Problem Definition

This short term study was conducted to collect air toxics data to provide the basis for long-term studies, regulation, and policy development. The data was evaluated in an effort to provide a connection between source and receptor locations and to give an overview of the toxic chemical composition of the air at each site.

2.3 Project Description

This monitoring project consisted of a point-monitoring technique (Summa cans) to measure airborne concentrations of VOCs. The locations selected were area sources in close proximity to a receptor.

APCD personnel collected ambient air samples in six liter evacuated Summa canisters. A flow controller was attached to the canister which allowed the canister to slowly fill over one hour. A meteorological station was set up and operated by APCD at either the source or receptor sampling location during each sampling event.

2.4 Special Training Requirements

No special training requirements or certifications are required to operate the Summa canisters or the meteorological station. All four APCD staff that assisted with the project have years of monitoring background. ATL sent a document explaining the Summa canisters and equipment with explanations on the correct way to sample. The MetOne instruction book was used as a reference for the operation of the meteorological station.

2.5 Documentation and Records

APCD maintained standard field documentation for the VOC samples and electronic data storage in regard to saving the meteorological data. The data was downloaded at the office and saved as text file. Manual field logs were maintained including photos, daily notes, general field procedures, and monitoring notes.

3.0 SAMPLING METHODOLOGY

3.1 Sampling Design

The main objective of this sampling project was to monitor for VOCs at designated source and receptor sites for a specified period of time. A passivated canister was set up at each source and at the correspondent receptor site. The canisters were placed at the approximate breathing height of a child. The canister sampling equipment has been designated as Federal Reference Method TO-15. The meteorological station was set up at either the source or receptor site for each sampling period.

Four one-hour samples were collected at each of the source sites and receptor sites. Table 3 shows the date, weekday and time that the samples were collected.

3.2 Canisters and Associated Apparatus

3.2.1 Canister Description

An air sampling canister is a container for collecting whole air samples. The air sample is collected by opening the hand valve on the canister. Once the desired volume is collected or designated time has elapsed, the valve is closed.

A Summa canister is a stainless canister that has had the internal surfaces specially passivated using a "Summa" process. This process makes the interior nearly chemically inert. The canisters used for this study were 6- liter spherical Summa canisters.

3.2.2 Critical Orifice Flow Restrictor

The air flow entering the canister is controlled by the critical orifice flow controller. The flow restrictor is pre-set at ATL for the designated sampling interval which was one hour for this sampling project. The flow is controlled by forcing the air sample through a minute capillary. The capillary is replaced by ATL after every sample to avoid contamination from previous use. A vacuum gauge is also part of the device which allows monitoring of the sample progress.

3.3 Quality Control

The canisters were evacuated by ATL to a vacuum of approximately 29.9 inches of Mercury (in. Hg). Each canister was individually 100% certified by ATL before being shipped to APCD. This ensured that the cans were cleaned properly and not contaminated before being shipped. With each sampling batch, a canister was set up in the field but not opened to serve the purpose of a field blank. The field blank was analyzed at ATL to check the canisters for leaks during times that the valve was not opened. All field blank results except one showed no contamination. The field blank from 12/15/2007 was received at the lab with a vacuum of 9.0 in. Hg. The vacuum was confirmed at -27 in. Hg before being shipped back to California. The can may have leaked during shipment or once unpacked at the lab.

A laboratory blank was also analyzed with each batch to further assure that no contamination was occurring in the lab. No lab blanks showed signs of contamination.

One canister from each sample batch was analyzed twice at ATL to show that the results were reproducible. All lab duplicates reproduced well.

4.0 Lab Results

4.1 Results from November 29 Sampling

There were no unexpected results from November 29, 2006 sampling date (see Table 4.). The Ballard High School and Thorntons samples were deleted inadvertently by ATL. APCD sampled on a future day at these two sites to make up for the lost samples.

Most of the Preston Highway/Outer Loop results reflect vehicle exhaust composition (see Appendix B of this report). 4-ethyltoluene, 2-butanone, acetone, chloromethane, Freon 11, Freon 12, and heptane are not included in the vehicle exhaust profile.

Freon 11, Freon 12, ethanol, chloromethane and acetone occur at all sights each sampling day with consistent variance in concentrations which may suggest that there is a persistent background in the atmosphere. These compounds, except for chloromethane, are generally innocuous to humans unless ingested in large amounts. Chloromethane is listed as a hazardous air pollutant (HAP) in the Clean Air Act (http://www.epa.gov/ttn/atw/188polls.html). Freon 11 and 12 have ozone depleting potential once they reach the upper atmosphere so should still remain a concern.

The Okolona Elementary School sample and the Southside Christian Child Care (SCCC) samples both contained carbon disulfide which was not found that day at the other two sites. Although carbon disulfide is not included on the STAR list, it is a health hazard and ranks in the worst 10% to ecosystems and human health (www.scorecard.org). The University of Louisville reports carbon disulfide detection in its 24 hour toxics samples and it was detected at different sites on the sample days closest to November 29.

The SCCC sample was similar to the Preston Highway/Outer Loop sample due to the number of cars idling outside the front door of the daycare. Most cars were left running as the guardian went in to pick up a child or to drop a child off at the daycare. Delivery trucks and school transportation (buses and vans) were also left idling outside of the daycare. Cyclohexane and 2-propanol were unique at this site of all the November 29 samples. Cyclohexane is included in the vehicle exhaust profile. 2-propanol (also known as isopropyl alcohol) is not one of the most toxic chemicals and it was not detected at a high level so raises no concerns.

4.2 Results from December 5 Sampling

There were no unusual results from December 5, 2006 sampling date (see Table 5). The Ballard High School and Thorntons samples were voided at the request of APCD. The flow controller at the Thorntons site malfunctioned and the sample was not collected. APCD sampled on a future day at these two sites to make up for the lost samples.

The Preston Highway/Outer Loop sample has the same composition as the sample from November 29 with one exception. Cyclohexane was detected in the sample which is part of the vehicle exhaust profile. Almost all the compounds were at higher concentrations in the December 5 sample compared to the November 29 sample.

Once again, the SCCC sample was similar to the Preston Highway/Outer Loop sample. Carbon disulfide and 2-propanol were not detected in this sample like on December 19. Four additional compounds were detected that were not detected on November 29 at this site: 1, 3-butadiene, 4-ethyltoluene, o-xylene, and ethylbenzene. Except for 4-ethyltoluene, the additional four compounds are included in the vehicle exhaust profile.

The Okolona Elementary school sample did not contain carbon disulfide or 2-butanone in this sample. Hexane was detected which was not present in the first sample.

Village Cleaners had a similar sample to the November 29 sample. The concentration of ethanol increased from 3.7 to 17 $\mu g/m^3$. Hexane and m,p-xylene were detected in the December 5 sample. Both are part of the vehicle exhaust profile (see Appendix B of this report).

4.3 Results from December 8 Sampling

The sample on December 8, 2006 was a replacement for one of the samples that was voided (see Table 6). The two samples had similar composition that reflected vehicle exhaust and/or evaporative emissions from a gas station (Appendix B and Appendix C of this report). Ballard High School also had positive hits for 1,2, 4-trimethylbenzene, ethylbenzene, and o-xylene which are all included in the vehicle exhaust speciation. Benzene, ethylbenzene, and toluene are all included in the gas station evaporative emissions speciation.

It would be difficult to differentiate the source of the pollutants at Ballard because most of the compounds are not unique to gas stations and could have also come from vehicle exhaust.

4.4 Results from December 15 Sampling

December 15, 2006 was the first sampling day that had successful data collection at all 6 sites (see Table 7). 1, 3-butadiene was not detected in any of the samples. The samples did not have a positive hit for heptane and hexane which was a variance from the three other samples at this location. Methylene chloride was present in the Preston Hwy/Outer Loop intersection sample. This was the only date that this compound was detected. Methylene chloride is a Category 1 TAC that is a recognized human carcinogen.

4.5 Results from December 19 Sampling

December 19, 2006 also had successful data collection at all 6 sites. 1, 3-butadiene was not detected at any of the sites. The lab results for the Okolona sample showed four compounds that were not detected on any other sampling day at this location: 1, 2, 4-trimelthylbenzene, ethylbenzene, m, p-xylene and tetrachloroethene. A 0.76 $\mu g/m^3$ concentration for 1, 2, 4-trimelthylbenzene was reported. STAR Regulation 5.23 does not list a cancer risk BAC for this compound. It is included as part of the vehicle exhaust profile (Appendix B of this report). Ethylbenzene was reported at 0.84. The cancer risk BAC is listed as 3 $\mu g/m^3$. M, p-xylene is not listed in STAR regulation 5.23 but it is listed as a HAP in the Clean Air Act. A concentration of 10 $\mu g/m^3$ of tetrachloroethene was reported. STAR Regulation 5.23 lists this is compound as a Category 1 TAC with a cancer BAC of 0.17 $\mu g/m^3$.

The only difference from other sampling dates in results from the Village Cleaners and the SCCC samples was a concentration of heptane. Heptane is not listed in Regulation 5.23 or as HAP in the Clean Air Act. It is part of the vehicle exhaust profile.

Thorntons data results had four compounds detected that were not detected on other dates at this location: 1, 2, 4-trimelthylbenzene, ethylbenzene, heptane and tetrachloroethene.

Tetrachoroethene was also detected at Ballard High School on this date and not on any other sampling dates.

4.6 Results from January 8 Sampling

The sample on January 08, 2007 was a replacement for one of the samples that was voided. The two samples had similar composition that reflected vehicle exhaust and/or evaporative emissions from a gas station (Appendix B and Appendix C of this report). There were no compounds detected that had not been detected on previous dates at these two sites.

5.0 Meteorological Station Results

A MetOne portable meteorological station was set up at either the source or receptor site for each sampling event. The meteorological station should be started about 10 minutes before sampling begins and be allowed to run for ten minutes after sampling ends to ensure that all data is captured. Wind speed, wind direction, temperature, barometric pressure and relative humidity were recorded (Tables 10-18). The wind direction and

wind speed were modeled as wind roses using free software from Lakes Environmental called WRPLOT View (Appendix D of this report).

The wind roses indicate the frequency of speed and direction that the wind is blowing to and which direction was dominant. Wind roses can help identify the source of particular pollutants. The highest 5 minute average for wind speed was 4.8 m/s (10.75 mph). The wind was not notably strong on any sampling date. On December 5th at Okolona the wind did not have any wind speeds register on the Met Station.

Conclusions

The focus of this study was to identify and help define how minor sources affect high risk receptors. The results will be used to develop a long-term monitoring plan and help develop and support new policy and enforcement with the goal of protecting public health and the environment.

There were three unexpected results that should be noted. The most significant was the positive identification of tetrachloroethylene (perchloroethylene) at Okolona Elementary, Thorntons and Ballard High School on December 19. The results from the daycare should also be noted because the results were similar in composition (compounds and concentrations) to the air samples from the intersection of Preston Highway and Outer Loop. These two results pose an increased risk to the receptors.

The third unexpected result was that the Village Cleaner (source) and Southside Christian Childcare Center (SCCC) (receptor) did not have a single positive hit for tetrachloroethylene. Before choosing this source/receptor set for this monitoring project, District staff called Village Cleaner to confirm that the dry cleaning equipment was in operation. Unfortunately, District staff was misinformed regarding the status of the dry cleaning operations. After receiving the monitoring data, District staff again contacted Village Cleaner, which then provided the correct information that this location is only a drop-off/pick-up site and dry cleaning is no longer performed at this location. Although the monitoring data did not identify concentrations of tetrachloroethylene, the data did reveal the impact that idling cars have on the air quality surrounding the daycare. The air samples taken at the daycare were similar in composition (compounds and concentrations) to the air samples from the intersection of Preston Highway and Outer Loop. Therefore, although not quantifying the impact of the intended source's emissions (tetrachloroethylene) on this sensitive population receptor, this portion of the monitoring project revealed a different concern for this receptor site.

Future study recommendations may include a longer study period and sampling time. A recommendation may be made to SCCC and other daycares to voluntarily recommend and enforce a "no idling" rule to improve the air quality for the children. The Louisville ordinance 72.032 that mentions no idling states "It shall be a parking violation for any person driving or in charge of a motor vehicle to permit it to stand unattended without stopping the engine, locking the ignition, and removing the key, or when standing on any perceptible grade without setting the brake thereon and turning the front wheels to the curb." This ordinance is not very strong because it does not prohibit idling if the vehicle is occupied by the operator.

Appendix 12
Hot Spots Monitoring Report

The high level of tetrachloroethylene at Okolona Elementary, Thorntons and Ballard High School is a concern. Future samples should be collected to see if this was a chance occurrence or a regular event. If the compound is detected again, an effort will be made to identify the source.

Appendix 13
Risk Analysis Summary

	Process	Risk/10^6	Comment	Risk Driver
1	Printer	2	Cleaning material, not ink solvent	Naphthalene
2	Body shop	2.4	Metals in primer and coating solids	Chromium
3.1	Perchloroethylene dry cleaner	338	Fan vent on side of building	Perchloroethylene
3.2	Perchloroethylene dry cleaner	155	Volume source - doors, windows, etc.	Perchloroethylene
3.3	Perchloroethylene dry cleaner	169	Fan vent on side of building, w/ EPA-required leak detection and repair (LDAR)	Perchloroethylene
3.4	Perchloroethylene dry cleaner	78	Volume source - doors, windows, etc., w/ EPA-required LDAR	Perchloroethylene
3.5	Perchloroethylene dry cleaner	43	Partial enclosure w/ 80% capture efficiency, stack w/ sufficient height	Perchloroethylene
3.6	Perchloroethylene dry cleaner	22	Partial enclosure w/ 80% capture efficiency, stack w/ sufficient height, EPA-required LDAR	Perchloroethylene
3.7	Perchloroethylene dry cleaner	11	Total enclosure, stack w/ sufficient height, EPA-required LDAR,	Perchloroethylene
4.2	Gas station	9	Modeled as 3-dimensional volume source	Benzene, ethylbenzene
5.1	Waste oil furnace	2 to 11	Actual stack 4', 20' building height (B.H.), with or without rain cap on stack	Waste oil emissions[1]
5.2	Waste oil furnace	0.9 to 5	Minimum acceptable stack height (1.5 x B.H.), with rain cap on stack	Waste oil emissions[1]
5.3	Waste oil furnace	0.3 to 1.5	Minimum acceptable stack height (1.5 x B.H.), without rain cap on stack	Waste oil emissions[1]
6.1	Hurstbourne/Shelbyville Rd	52	All carcinogens except diesel particulate	Mobile source emissions[2]

Appendix 13
Risk Analysis Summary

	Process	Risk/10^6	Comment	Risk Driver
6.2	Hurstbourne/Shelbyville Rd	748	Diesel particulate	Diesel particulate
7.1	Outer Loop/Preston	30	All carcinogens except diesel particulate	Mobile source emissions[2]
7.2	Outer Loop/Preston	430	Diesel particulate	Diesel particulate
8.1	Outer Loop/Briarcliff	11	All carcinogens except diesel particulate	Mobile source emissions[2]
8.2	Outer Loop/Briarcliff	165	Diesel particulate	Diesel particulate
9.1	Watterson (I-264) segment	41	All carcinogens except diesel particulate	Mobile source emissions[2]
9.2	Watterson (I-264) segment	621	Diesel particulate	Diesel particulate
10.1	Diesel truck idling (2.77 g/hr)[3]	> 100 10	At 150 meters from distribution center At 700 meters from distribution center	Diesel particulate
10.2	Diesel truck idling (0.3 g/hr)[3]	10	At 250 meters from distribution center	Diesel particulate
10.3	Idling school buses [3]	up to 90	20 buses//30 min/day//180 days/year	Diesel particulate
10.4	Emergency/standby engine [3]	up to 90	From CARB document	Diesel particulate
10.5	Prime engine [3]	up to 725	From CARB document	Diesel particulate
10.6	Low-volume freeway [3]	200 30	Residence located 20 meters away Residence located 500 meters away	Diesel particulate
10.7	Construction site [3]	50-134 36-102 30-97 25-77	Older equipment, 5 meter release height Older equipment, 10 meter release height Mix w/ newer equipment, 5 m release height Mix w/ newer equipment, 10 m release height 20 meters from fence, range due to different meteorological conditions	Diesel particulate

Appendix 13
Risk Analysis Summary

	Process	Risk/10^6	Comment	Risk Driver
10.8	Excursion/ferry vessel [3]	169-886 14-76 4-21	100 meters downwind 400 meters (0.25 mile) downwind 800 meters (0.5 mile) downwind	Diesel particulate
10.9	Short-haul locomotive [3]	2-14 2-12 1-6	60 meters downwind 200 meters (0.125 mile) downwind 400 meters (0.25 mile) downwind	Diesel particulate
10.10	Transport refrigeration unit (TRU) and TRU generator set [3]	> 100 10-100 < 10	250 meters downwind 250 to 1,000 meters downwind 1,100 meters downwind	Diesel particulate
11	Backyard charcoal grill	0.02	1 hour/day, 5 days/week, 30 weeks/year	Formaldehyde, acetaldehyde

[1] Waste oil emissions: hexavalent chromium, arsenic, nickel, cadmium, and berrylium (listed in order of decreasing contribution to the waste oil furnace risk). Risk is expressed as range, based upon different emission factors.
[2] Mobile source emissions: benzene, formaldehyde, 1,3-butadiene, hexavalent chromium, naphthalene, acetaldehyde, and, ethylbenzene (listed in order of decreasing contribution to the mobile source risk)
[3] Modeling/risk results from a California Air Resources Board document

Appendix 14
Proposal from Kentucky Fabricare Association, trade association for professional drycleaners

Contact: Tom Underwood, Executive Director, 502-223-5322

1. Adoption of 40 CFR 63, Subpart M) for Area Sources and Major Sources
   Area Sources – less than 2100 gallons perc purchased per year
   - Monthly leak check with detector – begin July 2008
   - No transfer machines allowed – effective July 2008
   - Full ban on co-residential units – effective December 2008

   Major Sources – as specified under federal regulations

2. Operator Awareness/Training
   - Requirement of annual perc machine operations training for all operators as part of licensure.
   - Kentucky Fabricare Association will conduct training sessions to industry best practices standard in cooperation with national training school.
   - Training will be made available to reasonable number of LDAR personnel
   - Reminder calendars/recordkeeping templates developed in cooperation with LDAR and distributed in cooperation with KFA.

3. Increased APCD Enforcement
   - Annual inspection – KFA will provide high quality leak detection sensor and training at no expense to LDAR
   - Timely notification of violations
   - Verifications of corrective action

Appendix 15
Air Quality Task Force Recommended 8-Hour Ozone Strategies
District Recommendations for Phase I

	Suggested Emission Reduction Measure	Strategy Type	Total[1]
1	Idling restriction, especially diesel engine idling	Mobile Source Strategies	11
2	Diesel retrofit	Mobile Source Strategies	9
3	Diesel retrofit (construction equipment)	Non-road Source Strategies	9
4	Free tire pressure station, free air, free on-board diagnostics checks, gas caps	Mobile Source Strategies	8
5	Airport measures - Ground support equipment - switch to biodiesel	Area Source Strategies	8
6	Offset lithography printing controls, process modifications, reformulated materials	Stationary Source Strategies	7
7	Plastic Part coating controls, reformulated materials	Stationary Source Strategies	7
8	Increase number of truck docking facilities for powering electric compressors to replace use of diesel engines	Mobile Source Strategies	6
9	Airport measures - Gate electrification	Area Source Strategies	6
10	Railroads/railyards - Cleaner switch engines	Area Source Strategies	5
11	Railroads/railyards - Idling restriction on engines and locomotives	Area Source Strategies	5

[1] The "Total" column is the total number of points out of 12 assigned by the District in the categories (3 points each) of current emissions, available control strategies, amount of reduction, and reasonableness of implementation.

The District believes that it has the resources available to begin implementation of these strategies in Fiscal Year 2007.

Appendix 16
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.

(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.

Appendix 17
Map of Selected Minor/Area Sources

[Map may be downloaded from http://www.louisvilleky.gov/APCD/STAR/Reg530Report.htm#aDocs]