

Louisville Metro Air Pollution Control District

Regulatory Impact Assessment

STAR Program Regulations

Purpose of the Strategic Toxic Air Reduction (STAR) Program:

The issue of high concentrations of toxic air contaminants¹ (TACs or toxics) in Jefferson County is being addressed by Louisville Metro government for several reasons:

- ◆ The final results from the West Louisville Air Toxics Study (WLATS)² identified seventeen chemicals that were monitored at levels representing a cancer risk of greater than one in one million (1×10^{-6}) and one additional chemical at an unsafe level considering non-cancer effects.
- ◆ The U.S. Environmental Protection Agency (EPA) Region 4 released a county-by-county *Air Toxics Relative Risk Screening Analysis (ATTRSA)*³ that identified Jefferson County as having the highest potential adverse impact of toxics of all of the counties in the eight southeast states.
- ◆ The Toxics Release Inventory (TRI)⁴ air emissions reported by companies located in Jefferson County continue to constitute a significant portion of the TRI air emissions reported by companies located in Kentucky. Additionally, Jefferson County continues to

¹ “Toxic air contaminant” (also “TAC” or “toxic”) means any air contaminant for which there is no national ambient air quality standard and that is, or may become, harmful to public health or the environment when present in sufficient quantities and duration in the ambient air.

² The *West Louisville Air Toxics Study Risk Assessment* Final Report, October 2003, is available on the Internet at [http://www.apcd.org/toxics_risk/wlats_risk_assessment_report.pdf]. The Appendices to this report are available on the Internet at [http://www.apcd.org/toxics_risk/wlats_risk_assessment_appendices.pdf] and the Errata to this report are available on the Internet at [http://www.apcd.org/toxics_risk/errata.pdf].

³ The EPA Region 4 *Air Toxics Relative Risk Screening Analysis* is available on the Internet at [http://www.apcd.org/toxics_risk/epar4_relative_risk_analysis.pdf] for the discussion paper and [http://www.apcd.org/toxics_risk/epar4_relative_risk_matrix.pdf] for the County rankings spreadsheet.

⁴ The EPA’s Toxic Release Inventory Program can be accessed on the Internet at [<http://www.epa.gov/tri/>] for the TRI home page and [<http://www.epa.gov/triexplorer/>] for the TRI Explorer that provides “fast and easy access to the TRI data to help communities identify facilities and chemical releases that warrant further study and analysis.”

rank towards the top of the list of counties in the country with the highest reported TRI air emissions.

- ◆ The Kentucky Division for Air Quality (DAQ) has begun implementing risk-based review within the construction permit process, identifying a goal of a 1×10^{-6} increased risk of cancer as meeting the provision of 401 KAR 63.020.
- ◆ The allowed concentrations of many toxics, especially of carcinogens, pursuant to the 1986 Kentucky-developed toxic air pollutant program (which has since been effectively repealed by the state, but is incorporated by reference in Louisville Metro Air Pollution Control District (District) Regulations 5.11 and 5.12 and enforced by the District) are generally several orders of magnitude less stringent than the levels allowed by most other risk-based toxics programs in the United States.

The air toxics issues often have been chronicled in *The Courier-Journal*, bringing much public attention to these issues⁵. Studies and reports published by the Kentucky Environmental Quality Commission⁶ and the Kentucky Institute for the Environment and Sustainable Development of the University of Louisville⁷ also address these air toxics issues.

⁵ See, for example, articles in *The Courier-Journal* on May 12, 2003, *Chemicals exceed levels seen as safe, Pollutants could raise residents' health risks*, Page A1; May 22, 2003, *Air tests show cancer risks, Unsafe level of pollutants found in Louisville*, Page A1; May 23, 2003, *Air-quality study alarms Louisvillians*, Page A1; July 13, 2003, Special Report, *Pollution remains a threat*, Pages A17-A22; August 7, 2003, *EPA to watch Rubbertown plants*, Page B1; November 13, 2003, *Toxic-air risk in Louisville confirmed, Report finds health dangers at 13 locations*, Page A1; November 15, 2003, *Air study prompts EPA call for tests, Rubbertown plants to be inspected; health risks cited*, Page A1; November 19, 2003, *2nd agency to check data on pollution, Air-quality study of Louisville area will be reviewed*, Page A1; November 27, 2003, *Tests detect high level of chemical, Chloroprene data inadvertently left off list of air-quality risks*, Page B1; December 21, 2003, *Louisville may impose tougher air regulations, Other states establish requirements exceeding those of EPA*, Page A1; and March 17, 2004, *Pollutant's level up sharply, Study shows Louisville's air has more of cancer-causing chemical than four years ago*, Page A1.

⁶ *State of Kentucky's Environment, 2000-2001, A Report on Environmental Trends and Conditions*, prepared by the Kentucky Environmental Quality Commission, is available on the Internet at [<http://www.eqc.ky.gov/pubs/soke/soke01>].

⁷ *Air Quality in Louisville: Past, Present, and Future*, and *Chemical Air Pollutants in Jefferson County, Ky.; Potential Health Effects*, *Sustain*, Volume 6, Spring/Summer, 2002, The University of Louisville Kentucky Institute for the Environment and Sustainable Development.

Kentucky's Environmental Future, Environmental Futures-Looking Backward to Look Forward, Stationary and Mobile Sources of Air Pollution: What the Future Holds, and *Public and Environmental Health Concerns in the 21st Century*, *Sustain*, Volume 9, Fall/Winter 2004, The University of Louisville Kentucky Institute for the Environment and Sustainable

All source sectors, including 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 (background), contribute to the toxics problems in Jefferson County.

Section 112 of the Clean Air Act 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 for several reasons:

- The maximum achievable control technology (MACT) program applies, in general, to only the large industrial sources.
- The MACT program is comprised of two steps, each of which is problematic:
 - The first step [Clean Air Act Section 112(d)] considers only emission reduction technology and does not evaluate the resulting risk levels from compliance with the technology-based standards. While the Clean Air Act required all MACT standards to be promulgated by November 15, 2000, the EPA has not yet completed this first step for all source categories. Further, the implementation of the technology-based standards by the affected Jefferson County sources has not resulted, and is not likely to result, in an appreciable reduction in the emissions of toxics.
 - The second step, that considers the “residual risk” after implementation of the first-step technology-based standards [Clean Air Act Section 112(f)], does not occur until ten years after the adoption of these technology-based standards (eight years to promulgate a risk-based MACT standard plus an allowance of up to two years for companies to comply). Further, the EPA is not required to strengthen the MACT standards so that all sources will cause no more than a 1×10^{-6} risk. In fact, the EPA has acknowledged that it could allow up to a 1×10^{-4} risk (a risk of one hundred in one million). The EPA’s *Fact Sheet, Final Amendments to Air Toxics Standards for Coke Oven Batteries* includes the following statement:

After implementation of the residual risk standards, EPA estimates that fewer than 10 people may have a cancer risk greater than 100 in a million, and about 300,000 people may have a cancer risk greater than 1 in a million. The maximum individual risk (i.e., the individual most exposed) would be reduced from about 300 in a million to about 270 in a million.

Additionally, the EPA is not required to perform a residual risk review or strengthen the MACT standards for source categories listed pursuant to Section 112(c)(3) of the Clean Air Act. These area source categories include municipal landfills, commercial and hospital sterilizers, chromium electroplating operations, dry cleaning facilities, gasoline distribution facilities, and autobody refinishing paint shops. And lastly, while the EPA was required to promulgate revised MACT standards based upon residual risk for the first two (of four) groups of MACT standards (the 1992 and 1994 groups), the EPA has, to date, promulgated only the residual risk standard for coke

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ovens (no coke oven is located in Jefferson County).

- The EPA is required to develop a comprehensive national toxics abatement program. As part of EPA's National Air Toxics Assessment activities, EPA conducted a national-scale assessment of 33 air pollutants (a subset of 32 air toxics from the Clean Air Act's list of 188 air toxics plus diesel particulate matter (diesel PM))⁸. Cancer and non-cancer information associated with each of the toxic air pollutants assessed, as well as a reference to the source of that information, was developed⁹.

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*¹⁰, September 2001, 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. The EPA's stated rationale is that the air toxics problems in each community are unique, requiring unique solutions.

The District reviewed information on the various State air toxics programs in the country. A starting point was the EPA's documents *State, Local, and Tribal Air Toxic Program Profiles, Volume I: EPA Regions 1-5*, and *Volume II: EPA Regions 6-10*, July 2003. The District discussed the individual State programs with staff members of the various states and developed a document summarizing the State programs¹¹. The District also developed a document summarizing the toxics programs that are implemented in Louisville's "peer cities"¹². The EPA has provided information on methods of assessing and addressing air toxics.¹³ Please see the

⁸ Information resulting from these National Air Toxics Assessment activities is available on the Internet at [<http://www.epa.gov/ttn/atw/nata>]. See also *Health Effects Information Used in Cancer and Noncancer Risk Characterization for the NATA 1996 National-Scale Assessment*, available on the Internet at [<http://www.epa.gov/ttn/atw/nata/nettables.pdf>].

⁹ Modeled human exposure information developed as part of the National Air Toxics Assessment activities is available on the Internet at [<http://www.epa.gov/ttn/atw/nata/natsa3.html>].

¹⁰ The EPA's *Workplan for the National Air Toxics Program and Integrated Air Toxics State/Local/Tribal Program Structure* is available on the Internet at [<http://www.epa.gov/ttn/atw/urban/urbandev.html>].

¹¹ *Summary of State Air Toxics Programs*, April 29, 2004, available on the Internet at [<http://www.apcd.org/star/stateprogram.pdf>].

¹² *Summary of Peer City Air Toxics Programs*, August 26, 2004, available on the Internet at [<http://www.apcd.org/star/peercity.pdf>].

¹³ *Air Toxics Risk Assessment Reference Library, Volume 1 Technical Resource Manual*, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-453-K-04-001A, and *Air Toxics Risk Assessment Reference Library, Volume 2 Facility-Specific*

section on *Feasibility of All Alternatives: STAR Program: Review of other air pollution control agency toxics programs*, later in this document for a discussion of the District's consideration of the components of other air pollution control agency toxics programs.

The following is a list of the draft regulations comprising the STAR program, with a brief description of the significant changes to existing regulations and what the new regulations would accomplish if adopted:

No.	Regulation	Status	Purpose
1.02	Definitions	Amended	Clarify definitions of ambient air and malfunction; add new definitions for acute noncancer effect, bypass, cancer, carcinogen, chronic noncancer effect, excess emissions, preventable upset condition, toxic air contaminant (TAC), upset condition, and welfare
1.06	Stationary Source Self-Monitoring, Emissions Inventory Development, and Reporting	Amended	Clarify current criteria pollutant reporting requirements; add reporting of enhanced emissions data for TACs
1.07	Excess Emissions During Startups, Shutdowns, and Upset Conditions	Amended	Remove exemption from enforcement if report excess emissions and met specified provisions; add operational and reporting requirements for excess emissions resulting from startups, shutdowns, and upset conditions
1.20	Upset Condition Prevention Programs	New	Require development and implementation of upset condition prevention program for certain processes and process equipment
3.01	Ambient Air Quality Standards	Amended	Incorporate all Part 3 regulations into one regulation; update national ambient air quality standards
3.02	Applicability of Ambient Air Quality Standards	Repealed	Incorporate into Regulation 3.01
3.03	Definitions	Repealed	Incorporate into Regulation 3.01

Assessment, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-453-K-04-001B.

No.	Regulation	Status	Purpose
3.04	Ambient Air Quality Standards	Repealed	Incorporate into Regulation 3.01
3.05	Methods of Measurement	Repealed	Incorporate into Regulation 3.01
5.01	General Provisions	Amended	Establish general provisions for TACs
5.03	Potential Hazardous Emissions	Repealed	Incorporate into Regulation 5.01
5.11	Standards of Performance for Existing Processes and Process Equipment Emitting Toxic Air Pollutants	Amended	Clarify existing toxic air pollutant (TAP) requirements; sunset TAP emission standards when replaced pursuant to Regulation 5.21
5.12	Standards of Performance for New or Modified Processes or Process Equipment Emitting Toxic Air Pollutants	Amended	Clarify existing toxic air pollutant (TAP) requirements; sunset TAP emission standards when replaced pursuant to Regulation 5.21
5.20	Methodology for Determining Benchmark Ambient Concentration of a Toxic Air Contaminant	New	Establish methodology for determining the benchmark ambient concentration of a TAC
5.21	Environmental Acceptability for Toxic Air Contaminants	New	Establish ambient goals and criteria for determining the environmental acceptability of certain TAC emissions
5.22	Procedures for Determining the Maximum Ambient Concentration of a Toxic Air Contaminant	New	Establish procedures for determining the maximum concentration of a TAC in the ambient air
5.23	Categories of Toxic Air Contaminants	New	Identify the TACs by category
5.30	Report and Plan of Action for Identified Source Sectors	New	Require the District to develop a proposed report and plan of action to assess and address TAC emissions from minor sources and other source sectors

Comparison with Any Minimum or Uniform Standards:

Regulation 1.02

- The additional sentence in the definition of “ambient air” reflects computer dispersion

modeling written guidance provided by the EPA regarding public access to private property that is not under the control of the stationary source from which an emission under study originates.

- The definition of “toxic air contaminant” (TAC) differentiates between the specific “hazardous air pollutant” (HAP) list pursuant to Section 112 of the Clean Air Act and the specific “toxic air pollutant” lists pursuant to Kentucky 401 KAR 63:021 (11-11-86) and 401 KAR 63:022 (11-11-86).
- The definition of “malfunction” adds the qualification that the failure causes, or is likely to cause, emissions that exceed an applicable emission standard. While this qualification is not in the Kentucky definition, in its use, increased emissions from a malfunction that did not exceed an applicable emission standard are not required to be reported.
- The definition of “welfare” is taken from Section 302(h) of the Clean Air Act.
- Definitions are added for “acute noncancer effect,” “cancer,” “carcinogen,” “chronic noncancer effect,” and “excess emissions.” These new definitions are used in the STAR Program, which provides clarity as to the requirements in 401 KAR 63:020.
- The definitions of “bypass,” “preventable upset condition,” and “upset condition” are used in Regulation 1.07, which is generally consistent with, although more detailed than, 401 KAR 50:055.
- The District is also identifying, and thus exempting, five organic compounds that the EPA, on November 29, 2004, exempted from the definition of “volatile organic compound.”

Regulation 1.06 - The emission reports in Section 3 for criteria pollutants (particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide/oxides, lead, and volatile organic compounds), HAPs, and ammonia are required by the EPA. Current District regulations require annual emissions inventory submittals for the HAPs. While current practice allows the submittal of the total plant-wide emissions of a HAP, the total would be the sum of individual emissions. Total plant-wide emissions, broken down into stack and fugitive emissions, are required by the EPA’s Toxic Release Inventory (TRI) Program to be reported for all of the TRI chemicals that exceed the applicable threshold, which include all of the Category 2 TACs and many of the Category 1 TACs. The enhanced emissions data for TACs in Section 5 will be used in determining environmental acceptability (see the discussion under Regulation 5.21).

Regulation 1.07 - The treatment of excess emissions is part of the District’s EPA-approved State Implementation Plan (SIP) program to attain and maintain compliance with the national ambient air quality standards (NAAQS). The current regulation, which provides an exemption from being deemed a violation if certain reporting requirements and other specified provisions are met, is inconsistent with EPA policy memos dated September 28, 1982, February 15, 1983, and September 20, 1999. The changes would correct these deficiencies. The changes to the reporting requirements would provide information to the District to more quickly and thoroughly evaluate whether ambient standards and goals have been exceeded and whether actions are needed to protect public health and welfare. Pursuant to 40 CFR 70.6(a)(3)(iii)(B), the District is required to have Title V companies promptly report “deviations,” i.e., excess emissions, resulting from upset conditions. The Part 70 regulations allow the permitting authority to define “prompt,” and the EPA has approved the District’s Regulation 1.07 as part of the District’s Title V Program for this purpose. The proposed changes to Regulation 1.07 are, with one exception, generally consistent with Kentucky 401 KAR 50:055, although there is significantly more

specificity of timeframes and reporting requirements in Regulation 1.07. The exception is that 401 KAR 50:055 Section (4) relieves a source from compliance if the director determines that the five specified provisions were met, whereas the proposed amendments to Regulation 1.07 would remove this relief from compliance.

Regulation 1.20 - This new regulation would require preventive measures to minimize the likelihood that excess emissions from malfunctions would occur that could exceed the ambient standards or jeopardize public health and welfare. There is not a federal or state requirement for this regulation.

Regulations 3.01 to 3.05 - These regulation are being updated to identify the current federal NAAQS. The Kentucky ambient standards for fluoride and hydrogen sulfide are being retained although emissions of these compounds would additionally be addressed by the STAR program because the exemption from the definition of TAC pursuant to Regulation 5.23 section 5.1 applies only to a “substance for which there is a **national** ambient air quality standard” (emphasis added). The Kentucky ambient odor standard is being removed; odors are addressed in Regulations 1.09, 1.12, and 1.13.

Regulations 5.01 and 5.03 - Draft regulation 5.01 includes the general provisions in 401 KAR 63:020 (moved from existing Regulation 5.03) that a person shall not allow any process or process equipment to emit a toxic air contaminant in a quantity or duration that could be harmful to the health and welfare of humans, animals, and plants. The Kentucky Division for Air Quality (DAQ) has identified a goal of meeting a cancer risk of one in one million as demonstrating compliance with 401 KAR 63:020 for new sources. The detailed procedures for determining environmental acceptability that are contained in Regulation 5.20, 5.21, and 5.22 provide the methodology for demonstrating compliance with the requirements of this general duty clause. While the District uses slightly different terminology in its regulations than the DAQ, the District considers that Regulation 5.01 Section 3 contains the same substantive requirements as 401 KAR 63:020.

Regulations 5.11 and 5.12 - These regulations incorporate 401 KAR 63:021 and 63:022 as they existed on November 11, 1986. Upon adoption of the STAR Program regulations, the District will no longer establish new toxic air pollutant (TAP) emission standards pursuant to Regulations 5.11 and 5.12. However, any emission standards that were established pursuant to Regulations 5.11 and 5.12 will remain in effect until replaced by emission standards developed pursuant to the STAR Program. The Kentucky Division for Air Quality (DAQ) essentially repealed 401 KAR 63:021 and 63:022, although the DAQ also adopted savings clauses similar to the savings clauses proposed in Regulations 5.11 and 5.12.

Regulation 5.20 - This regulation, one of the components necessary to implement Regulation 5.21, establishes the methodology for determining the acceptable concentration of a specific toxic air contaminant (see the discussion under Regulation 5.21). In developing this benchmark ambient concentration, the unit risk estimate for a carcinogen and the reference concentration for the noncancer effects of a toxic air contaminant that are developed by the EPA and published in the EPA’s Integrated Risk Information System (IRIS) are used as the preferred

source of toxicity information in the hierarchy of information sources. Likewise, the DAQ uses IRIS as the basis of toxicity information for chemicals in its reviews. There is not a federal or state requirement for this regulation, although Clean Air Act Section 112(k)(3)(C) requires a strategy to address stationary source emissions, to be implemented by the EPA or by the States (including local jurisdictions).

Regulation 5.21 - Pursuant to several sections of the Clean Air Act, the EPA has developed an Integrated Urban Air Toxics Strategy (Strategy), 64 *Federal Register* 38706 (July 19, 1999). The Clean Air Act requirements, and the resulting Strategy, address all source categories: stationary, area, non-road mobile, and mobile sources. The EPA's Strategy reflects the mandates of the Clean Air Act, including both technology requirements and reduction in risk from both cancer and adverse non-cancer effects. Section 112(k)(3)(C) of the Clean Air Act [described at 64 FR 38708 1st column] specifically requires the Strategy, which may be implemented by either the EPA or the State and local air pollution control agencies, to reduce the incidence of cancer attributed to the emissions of stationary sources by not less than 75%. The EPA's stated goal is "to significantly reduce the risk to the public of cancer and other serious adverse health effects caused by airborne toxics." [64 FR 38708 2nd column]

One of the EPA's stated four key components to accomplish the Strategy is to encourage and support strategies developed by State or local air pollution control agencies. The EPA has recognized that local community toxics problems are unique and require unique solutions, not national solutions. Including State and local toxics abatement programs in the EPA's strategy is consistent with the direction given in Section 112(k)(4) of the Clean Air Act.

Another of the EPA's stated four key components to accomplish the Strategy is to develop, and periodically update, toxics emissions inventories and to perform modeling of stationary and mobile sources. "These activities will provide us with improved characterizations of air toxics risk and risk reductions resulting from emissions control standards and initiatives for both stationary and mobile source programs." [64 FR 38708 3rd column]

The STAR Program encompasses the Clean Air Act requirements placed on the EPA but that are also identified and encouraged as being implemented by State and local air pollution control agencies.

The Kentucky Division for Air Quality has identified a goal of meeting a cancer risk of one in one million as demonstrating compliance with 401 KAR 63:020 for new sources.

Regulation 5.22 - This regulation, another of the components necessary to implement Regulation 5.21, establishes the methodology for determining the maximum ambient concentration of a toxic air contaminant. The Tier 1 and Tier 2 tables are based upon the EPA's SCREEN3 model. An explanation of the model and parameters used, including averaging time conversion factors, is included in Attachment #1, which consists of Appendices C and D from *A New Regulatory Framework for Control of Toxic Air Pollutants*, Prepared by: Air Toxics Subcommittee, for the Michigan Department of Environmental Quality, Air Advisory Group, February 1997, 2nd Edition. The models referenced in Tier 3 and Tier 4 are EPA models.

Regulation 5.23 - All 18 of the Category 1 TACs are hazardous air pollutants (HAPs) listed pursuant to the Clean Air Act Section 112(b). Fourteen of the Category 1 TACs are also urban air toxics listed pursuant to the Clean Air Act Section 112(k). Thirteen of the 19 Category 2 TACs are HAPs; two of these eleven are also urban air toxics. Sixteen of the 17 Category 3 (urban air toxics) TACs are HAPs. Category 4 TACs are the remaining HAPs. Thus, 48 of the 54 Category 1, 2, and 3 TACs, and all of the Category 4 TACs, are specifically regulated pursuant to Section 112 of the Clean Air Act, either as a HAP or an urban air toxic.

Regulation 5.30 - This regulation 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 TACs from minor stationary sources, area sources, non-road mobile sources, and mobile sources. There is not a federal or state requirement for this regulation, although Clean Air Act Section 112(k)(3)(C) requires a strategy to address stationary source and area source emissions, to be implemented by the EPA or by the States (including local jurisdictions). Additionally, pursuant to several sections of the Clean Air Act, the EPA has developed an Integrated Urban Air Toxics Strategy (Strategy) (64 *Federal Register* 38706). The Clean Air Act requirements, and the resulting Strategy, address all source categories: stationary, area, non-road mobile, and mobile sources.

Feasibility of All Alternatives:

STAR Program: Review of other air pollution control agency toxics programs.

A risk-based air toxics program will have certain basic elements: a method for establishing the toxicity of a chemical; a policy for establishing the acceptable risk of a chemical; and a method for comparing emission levels to the acceptable risk. Additionally, an air toxics program will specify which chemicals are to be included in the program and any exemptions deemed appropriate. There was no program that the District considered to comprehensively and appropriately address the entire range of toxics issues in Louisville. Many of these programs affect only new and modified stationary sources, an approach that would not address the unsafe levels monitored in the WLATS or the reported TRI actual emissions. The District examined, to varying degrees, some of the approaches used by other jurisdictions for these elements, and incorporated some aspects of other programs into the STAR Program regulations, keeping in mind Louisville's unique circumstances.

Several of the programs have lists of affected chemicals that range from several hundred to several thousand. The District believes that the STAR Program should initially focus on chemicals which screening tools have shown are, or may be, of concern to the Louisville area and chemicals that have been identified at the national level as being of concern. However, like at least 22 state programs, the District has recommended a program that includes the evaluation of chemicals that have not been monitored at unsafe levels.

There are a number of risk-based programs that use a 1×10^{-6} risk and a 1.0 Hazard Quotient as goals to be met at the property line of the emitting stationary source, although, especially for carcinogens, some of these programs include specific or case-by-case allowances for a higher risk based on evaluation of demographic and land use factors. There are various methods for

exempting chemicals and processes from the review of the respective programs. The District's proposed methods for establishing de minimis emissions are based on the structure of the STAR Program, including a review of the District's specific trivial and insignificant activities lists, compliance with the environmental acceptability goals of Regulation 5.21, and the treatment of certain processes under Regulation 5.30. Exemptions based on meeting a different requirement, such as a technology-based MACT standard, would not accomplish the goal of the STAR Program to assess and address the risk resulting from allowed emissions.

Most of the programs use EPA-approved dispersion models for determining the maximum concentration of a compound at a location downwind of the emission point. A few programs have developed lookup tables that incorporate the results of dispersion modeling in an easy-to-use format. However, because Michigan developed tables using an appropriate EPA-approved model and the District believes that they form an appropriate basis for an easy-to-use tool, the lookup tables from these other programs were not evaluated. The District notes that these lookup tables, in proposed Regulation 5.22 secs. 2 and 3, provide a relationship between an emission point and an ambient concentration, and may be used for different purposes, i.e., to derive an emission rate based upon a specific ambient concentration or to derive an actual ambient concentration based upon a specific emission rate.

Regulation 1.02

- “Ambient air”: The addition clarifies the definition to be consistent with the EPA's requirements, and thus would not have an effect on allowed emissions. The EPA's guidance makes it clear that ambient air includes a neighboring company's property, even if the neighboring company restricts access by the general public.
- “Malfunction”: The modification clarifies that a malfunction, as included in the new definition of “upset condition” which is used in Regulation 1.07, occurs only if the failure causes, or is likely to cause, excess emissions. Without this clarification, failures, regardless of causing, or likely causing, excess emissions would be required to be reported to the District.
- “Welfare”: This definition is from section 302(h) of the Clean Air Act and is included to prevent disagreement as to what harmful effects from the emissions of toxics air contaminants are prohibited.

Regulation 1.06 - The changes to this existing emission reporting regulation do not require a change in emissions, just in the reporting of emissions and release parameters. The number of toxic air contaminants to be reported and the number of companies required to submit emission reports were considered. The enhanced reporting of the Category 1 TACs by the Group 1 and 2 stationary sources¹⁴ was determined to be most efficient because these TACs are of the greatest local concern, and these stationary sources are responsible for over 97% of the reported HAP emissions from stationary sources. For the same reasons, the reporting of the Category 2 TACs by the Group 1 and 2 stationary sources was determined to be efficient, but the District is

¹⁴ A list of the Group 1 (Major) stationary sources is available on the Internet at [<http://www.apcd.org/permit/t5/t5status.html>] and a list of the Group 2 (Moderate) stationary sources is available on the Internet at [<http://www.apcd.org/star/group2.pdf>].

recommending that the reporting of the Category 2 TACs be limited to those Group 1 and 2 stationary sources that reported emissions of those TACs to the EPA's TRI Program. This was one of the factors used by the EPA in its Air Toxics Relative Risk Screening Analysis, which is the basis for inclusion of the Category 2 TACs in the STAR Program. The detailed stack and fugitive emission release parameters will give the District the information to confirm environmental acceptability demonstrations submitted by the companies or to perform independent modeling.

Regulation 1.07 - The District considered various reporting mechanisms, time frames, and amounts of information to be submitted. Those chosen were considered to be the most effective in providing timely information to the District so the District can respond appropriately to a situation in which excess emissions resulting from upset conditions may occur. The provision in the current regulation that allows an exemption from being deemed a violation if certain reporting requirements and other specified provisions are met is in conflict with the EPA's policy memos dated September 28, 1982, February 15, 1983, and September 20, 1999, and is therefore being removed.

Regulation 1.20 - This new regulation will require affected facilities to prepare and implement a specific program to minimize the likelihood of a malfunction resulting in increased emissions. The reduction in emissions will be process equipment specific, depending upon the number and magnitude of malfunctions that the program is designed to prevent or minimize. Studies in other communities of companies that are subject to the same federal regulations as the companies in Louisville have documented significant emissions resulting from malfunctions.¹⁵ Adoption of this regulation will likely reduce the number of malfunctions that occur and will thus reduce the excess emissions that would have resulted from malfunctions.

Regulations 3.01 to 3.05 - In addition to consolidating all of the Part 3 regulations into one regulation, the District is updating the standards to reflect the current federal standards.

Regulation 5.01 and 5.03 - De minimis emissions and source categories were developed using four concepts. The first was a recognition of the current exemptions: de minimis values not required to be reported on Material Safety Data Sheets, and trivial and insignificant activities incorporated in the District's Title V operating permit program. The second was a toxicity-weighted level of emissions using the Tier 1 dilution factors from Regulation 5.22. The third recognized the difficulty of the owner or operator of a small surface coating process including a list and maximum amounts of coating solvents in a construction permit application, although the de minimis exemption would expire 18 months after beginning operation of the new or modified process or process equipment. The fourth recognized the similarity of emissions from motor vehicle fueling or refueling processes and process equipment which the District intends to assess pursuant to Regulation 5.30.

¹⁵ See, for example, *Gaming the System, How Off-the-Books Industrial Upset Emissions Cheat the Public Out of Clean Air*, Environmental Integrity Project, August 2004. This document is available on the Internet at [http://www.environmentalintegrity.org/pubs/EIP_upsets_report_FULL.pdf].

Regulation 5.11 and 5.12 - Regulations 5.11 and 5.12 are being retained only to the extent that current permit conditions are based upon compliance with these regulations. After the adoption of the STAR Program, no new or modified source would be newly subject to the requirements of Regulation 5.11.

Regulation 5.20 - This regulation establishes the procedure for determining the acceptable level of a toxic air contaminant. Other regulations in the STAR Program establish the ambient goals and the companies and TACs for which compliance with these goals will be required. The regulation sets a priority sequence for the basis of the acceptable level, starting with a level already determined by certain national or state agencies, and if that is not available, then using established health and toxicological data. If no toxicological data exist for a chemical, then a default value is set which provides a high degree of confidence that this level is protective of public health. Using the sources of acceptable levels, or a default value, for TACs specified in this regulation minimizes the work and expense at the local level associated with independently evaluating a chemical to establish an acceptable level.

Regulation 5.21 - The basic approach for reducing emissions is to establish the level of risk that is acceptable and then require emissions to be reduced to the level necessary to comply with that risk level. Because ambient concentrations are dependent upon emission release specific factors, such as stack height, building height, exhaust gas volume and temperature, and distance to the point of maximum ambient concentration, in addition to the mass of the emission, any required emission reductions will need to be determined on a case-by-case basis. If the maximum ambient concentration is required to be reduced, then any approach, including pollution prevention measures, could be used.

The basic goal of meeting a one-in-one-million risk for a single carcinogen from a single process is a common goal established in many air pollution control agency toxics programs. It is the goal identified by the Kentucky DAQ. As in many of these air toxics programs, there is an allowance for a higher risk level to be approved. However, in recognition that many companies may have more than one process that emits a carcinogen, and the company may emit more than one carcinogen, a goal reflecting the total cumulative risk was deemed necessary to protect public health from multiple emissions of multiple carcinogens. Increasing the total cumulative risk by one order of magnitude (a factor of 10) is proposed. Given that there are many situations for which there are two companies next to each other, a goal of three-fourths of the total cumulative risk for an individual company will minimize the situations in which a more restrictive limit would be needed so that the maximum risk of the two companies when modeled together would not exceed the total cumulative goal of 10 in one million.

In recognition that the best time to design pollution prevention and control measures into a process or process equipment is before the process equipment is constructed, a goal for the cumulative risk from new and modified sources of one-half of the total risk allowed for an individual company was established. A process is included that would allow these goals to be exceeded provided that there is an opportunity for public review and comment. In deciding whether to approve a request to exceed one or more of these goals, the allowed emissions from the process or process equipment must reflect the application of the best available technology for toxics (T-BAT) and, if a request to exceed the 7.5×10^{-6} goal is made, then the District shall

consider, among other factors, land use and demographic factors to determine whether there is an ample margin of safety to the exposed population.

A similar scheme for goals for environmental acceptability of chronic noncancer risks had been proposed. However, because a hazard quotient (HQ) of 1.0 for a TAC is the level below which adverse health effects are not expected to occur, the District is recommending that all EA goals for noncancer risk in sections 2.2, 2.5, and 2.8 be set at an HQ of 1.0, applicable to an individual TAC. Unlike the treatment of the additive risk of carcinogens, the hazard quotients of individual TACs are not being added because different target organs may be affected by different TACs, and the risk of an adverse effect would only be additive for TACs that affect the same target organ. While, in theory, hazard quotients for TACs that affect the same target organ could be added, it is not certain that the health effects data would be available for all of the affected TACs, and, for the time being, such an approach was considered to be too complex for effective implementation.

As explained for Regulation 1.06, the enhanced reporting of the Category 1 and 2 TACs by the Group 1 and 2 stationary sources, with the limitation of reporting Category 2 TACs by only the Group 1 and 2 stationary sources that reported emissions of those TACs to the EPA's TRI Program in 2002, was determined to be most efficient because these TACs are of the greatest local concern and these stationary sources are responsible for the vast majority of the stationary source emissions of these TACs. Therefore, a demonstration of environmental acceptability for existing processes and process equipment would be required for only the TACs and stationary sources that were required, pursuant to Regulation 1.06, to develop and submit the enhanced emission reports. The proposed schedules for submitting environmental acceptability determinations and, if necessary, compliance plans, and the schedules for implementing approved compliance plans, reflect the most expedient schedules that were considered reasonable, with greater emphasis placed on quickly reducing the emissions of the 18 chemicals that were monitored at unacceptable concentrations (the Category 1 TACs).

Without the detailed stack and fugitive emission release parameters required by Regulation 1.06, the District would not have the information to determine the environmental acceptability of the emissions of existing processes and process equipment and thus the level of emission reductions needed for an individual process or process equipment.

The purpose of reviewing the toxic air emissions from new and modified sources is to prevent the occurrence of unacceptable risks from future emissions. The resulting emission reductions will depend on the number and nature of new or modified sources that will be proposed for construction in Louisville. The District encourages all new and modified sources to include pollution prevention measures. The most effective time to include pollution prevention and control measures into a process is while the process or process equipment is being designed, rather than as a retrofit to an existing process or process equipment. The applicability of a required demonstration of environmental acceptability for various TACs and groups of permitted new and modified stationary sources were considered. The chosen criteria were considered to be the most effective in addressing the emissions of concern.

The Category 1 TACs were chosen because of the high concentrations, and associated risk,

monitored in the West Louisville Air Toxics Study. 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 District notes that the use of these two screening analyses does not result in a requirement to reduce emissions of the Category 1 and 2 TACs. The requirement is for a more detailed analysis of the allowed ambient concentrations resulting from the emission of these TACs. It is only if this more detailed analysis demonstrates that the allowed emissions would not be environmentally acceptable that there is a requirement to reduce the allowed emissions. The Category 3 TACs are listed by the EPA because these hazardous air pollutants "... present the greatest threat to public health in the largest number of urban areas ..." [Clean Air Act Section 110(k)(3)(B)(i)]. The Category 4 TACs are listed pursuant to Section 112(b) of the Clean Air Act 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)]. Likewise, the requirement applicable to the Category 3 and 4 TACs is to perform a more detailed analysis of requested new or increased emissions of these TACs pursuant to the construction permit application review.

Regulation 5.22 - This regulation establishes a procedure for determining the maximum ambient concentration of a TAC. Four methods are provided, with the Tier 1 method involving a simple table that does not require the use of building height, stack height, distance to the closest property line, or other emission release parameters. Each succeeding method requires more detailed emission release parameters, but encompasses less conservative assumptions, resulting, in simple terms, in a greater amount of dilution, and thus, a smaller maximum ambient concentration and a smaller risk. The maximum ambient concentration of a TAC thus determined is used to develop a level of risk pursuant to Regulation 5.21. The resulting risk from various TACs can then, as appropriate, be compared to the ambient risk goals. The tables for Tier 1 and Tier 2 were developed using the EPA's SCREEN3 model, and the Tier 3 and Tier 4 models are EPA dispersion models.

As is common in many of the air pollution control agency toxics programs around the country, compliance with the goals is determined at the closest property line, because a company does not control the use of properties adjacent to the company's property. Likewise, as is common in many of these programs, consideration of factors such as demographics and land use may be taken into account.

Regulation 5.23 - The toxic air contaminants listed were considered to be the most likely compounds for which there may be environmental acceptability concerns. The Category 1 TACs were chosen because of the high concentrations, and associated risk, monitored in the West Louisville Air Toxics Study. The Category 2 TACs were chosen because of their role in the high

level of risk determined for Jefferson County by EPA Region 4¹⁶. The Category 3 TACs are listed by the EPA because these hazardous air pollutants "... present the greatest threat to public health in the largest number of urban areas ..." [Clean Air Act Section 110(k)(3)(B)(i)]. The Category 4 TACs are listed pursuant to Section 112(b) of the Clean Air Act 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)].

It is important to note that the Clean Air Act specifically mandates that the hazardous air pollutants listed pursuant to Section 112 of the Clean Air Act include chemicals that cause many adverse health effects besides cancer. Further, the EPA, in establishing the Integrated Urban Air Toxics Strategy, stated that in addition to reducing the incidence of cancer attributed to the emissions of stationary sources by not less than 75%, the strategy would include requirements to "significantly reduce the risk to the public of ... other serious adverse health effects caused by airborne toxics" [64 FR 38708 2nd column].

Regulation 5.30 - The District intends to assess and address the environmental acceptability of TAC emissions from these other source sectors as additional components of the STAR Program after the initial phases are implemented. Adopting a regulation requiring the District to develop a proposed report and plan of action provides certainty that these additional components are developed.

Estimated Costs and Savings:

Regulation 1.02 - Definitions, in general, do not establish substantive requirements. Any cost or savings would occur through the use of the terms in other regulations.

Regulation 1.06 - The approximately 475 gasoline dispensing facilities, including 325 facilities subject to both the Stage II and Stage I requirements and 150 facilities subject to only the Stage I requirements, (section 3.2), 100 automobile body repair shops (section 3.3), and 90 perchloroethylene dry cleaners (section 3.4) in Louisville are currently required to keep material usage or throughput records. The cost of submitting these records to the District is minimal.

The enhanced TAC emissions data requirements would apply to the 43 Title V companies (Group 1) and approximately 130 companies that either have submitted Federally Enforceable District Origin Operating Permit (FEDOOP) applications or have actual emissions of 25 or more tons per year individually of sulfur dioxide, particulate matter, volatile organic compounds (VOCs), or oxides of nitrogen (NO_x) (Group 2), with the limitation of reporting Category 2 TACs by only the Group 1 and 2 stationary sources that reported emissions of those TACs to the

¹⁶ *RSEI Full Model Relative Risk Score and Total Pounds for Chemicals Released to Air in Jefferson County, KY* is included as Attachment #2.

EPA's TRI Program in 2002. Because the Category 1 and 2 TACs are all either hazardous air pollutants (HAPs) or chemicals subject to the reporting requirements of the federal Toxics Release Inventory (TRI) program, plant-wide annual total emissions of these chemicals have been required to be reported for at least ten years, and, for the TRI chemicals, those totals are required to be differentiated between stack and fugitive emissions. The District acknowledges that the emissions of some of these HAPs may have been considered too small to report to the District and the emissions of some of these TRI chemicals may have been below the applicable reporting threshold. However, in some cases, a certain level of information would have been necessary for the owner or operator of the stationary source to conclude that the emissions were low enough not to be reported. Unless plant-wide emissions have been determined using total material usage, it is likely that the total emissions have been determined by summing the emissions from individual processes, and perhaps even from individual emission points. Thus, the District considers that much of the enhanced emissions data are already being tracked. Further, the affected companies are already required to report criteria pollutants (sulfur dioxide, particulates, VOC, and NO_x) at the process level, pursuant to the existing Section 3 of Regulation 1.06. The methodologies for developing emissions inventory report data for the current reporting system have been moved to a new Section to emphasize that these methodologies are also applied to the Section 5 enhanced emissions data requirements. Further, the physical parameters of the release points should be available from information developed when the equipment was installed. The District notes that, except for changes, this is a one-time requirement.

The work effort needed to develop the annual enhanced emissions data required by Section 5 would vary by company, depending upon the specific processes and number of processes at a company and the records that the company currently maintains. Thus, the incremental cost to a specific company would vary, but is estimated to be from 0.1 to 0.2 Full-Time Equivalent (FTE). The District notes that this estimate is lower than that identified in the PRIA because the District is recommending that the requirement for reporting uncontrolled (for Category 1 stationary sources), average hourly and daily, and maximum hourly and daily emission rates be removed from Section 5, and the required annual emission rate not be specified at the emission point level.

Regulation 1.07 - All companies are currently required to report to the District when emissions from startups, shutdowns, and malfunctions exceed an applicable emission standard and to provide follow-up information. Therefore, the draft changes, while more specific, do not significantly increase the amount of information that is required pursuant to the current Regulation 1.07. The number of required reports will depend upon not only the number of processes at an individual company, but also on the number of times that a company has emissions that exceed an applicable emission standard. Over the last five years, an average of 32 companies per year have reported to the District pursuant to the requirements of Regulation 1.07. The District estimates that the incremental cost from the revised regulation to a specific company will vary from no cost, for a company that maintains its emissions in compliance with the applicable emission standards, to 0.1 or 0.2 FTE, for a company that has many significant exceedances of emission standards.

Regulation 1.20 - This regulation does not automatically apply to any company. For a company

to be subject to this regulation, either the company had reported a malfunction, the District determined that a malfunction may have occurred, or the company has the potential for a malfunction that may become harmful to public health or welfare, and the District determined that the development and implementation of a malfunction prevention program is appropriate. The cost to an individual company would depend upon the number of processes and the complexity of the equipment. The District estimates that the incremental cost over current malfunction prevention requirements would vary from 0.1 to 0.3 FTE, but would not apply to a company unless the District made a determination that this requirement is appropriate.

Regulations 3.01 to 3.05 - The ambient standards in revised Regulation 3.01 identify the current federal and state standards. Therefore, no applicability or cost beyond that required by federal or state regulation would be imposed.

Regulation 5.01 and 5.03 - District regulations currently contain provisions patterned after Kentucky 401 KAR 63:020 that a person shall not allow any process or process equipment to emit a toxic air contaminant in a quantity or duration that could be harmful to the health and welfare of humans, animals, and plants.

Regulation 5.11 and 5.12 - Upon adoption of the STAR Program regulations, only currently applicable requirements pursuant to these regulations would apply. No new requirement would be established, and the existing requirements would be removed once an emission standard pursuant to Regulation 5.21 is established. Therefore, there is no additional cost associated with the changes to these regulations.

Regulation 5.20 - This regulation establishes the methodology for determining the benchmark ambient concentration (BAC) for a TAC, which is then used in Regulation 5.21 to establish the ambient levels to be met. The costs of compliance with these ambient levels is addressed pursuant to Regulation 5.21. While there is some effort required to use the methodology in Regulation 5.20 to determine the BAC for an individual TAC, the District intends to develop the BAC for the TACs that are to be reviewed pursuant to the STAR Program and make these BACs publicly available, both on the District's web site (www.apcd.org) and in hard copy available from the District. Thus, there will be no cost to the public or affected sources. The BACs for the Category 1 and 2 TACs are now posted on the District's web site.

Regulation 5.21 - Section 4 requires the Group 1 and Group 2 stationary sources to demonstrate compliance with the environmental acceptability (EA) levels in Section 2. There are 43 companies in Group 1 and approximately 130 companies in Group 2.

To accurately determine whether the TAC emissions comply with the EA goals in Section 2 using the procedures in Regulation 5.22 and Regulation 5.21, the enhanced emissions data (Section 4 of Regulation 1.06) are needed. These data will be developed over the next three years. However, based upon the HAP emissions data for the Category 1 and 2 TACs reported by the Group 1 and 2 stationary sources and general knowledge about the processes, the District estimates the following:

1. Of the 43 Group 1 stationary sources, 34 (79%) reported the emission of at least one of

the 37 Category 1 and 2 TACs. Of these 34 Group 1 stationary sources, approximately three-fourths may have the potential for exceeding an EA goal for at least one TAC. This is approximately three-fifths of all of the Group 1 stationary sources.

2. Of the approximately 130 Group 2 stationary sources, 66 (51%) reported the emission of at least one of the 37 Category 1 and 2 TACs. Of these 66 Group 2 stationary sources, one-third may have the potential for exceeding an EA goal for at least one TAC. This is approximately one-fifth of all of the Group 2 stationary sources.

Some of the stationary sources may have a potential for exceeding an EA goal for more than one TAC. However, in some of these cases the same process would be involved, thus modeling done for one TAC would be applicable to any other TACs emitted by that process. It is estimated that modeling will be necessary for approximately 60 processes, with screening (Tier 3) modeling sufficient for one-fourth of these processes and full (Tier 4) modeling necessary for three-fourths of these processes. Additional modeling may be necessary to confirm that the existing level of emissions is environmentally acceptable. This may involve a similar number of processes, but screening modeling may be sufficient for a higher percentage of these situations.

In formal comments, Kentuckiana Engineering Company, Inc. submitted the following:

We estimate there will be over 300,000 dispersion modeling analyses required by the proposed regulations. This estimate is based on the following calculation:

$173 \text{ Title V and FEDOOP Facilities} \times 10 \text{ Emission Points/Facility} \times 100 \text{ MSDS/Facility} \times 2 \text{ TACs/MSDS} = 346,000 \text{ single point single TAC compliance demonstrations} + 173 \text{ Facilities} \times 100 \text{ MSDS} \times 2 \text{ TACs/MSDS} = 34,6000 \text{ Facility-wide all TACs compliance demonstrations} = 380,600 \text{ total compliance demonstrations due by December 31 for Category 1 and 2 TACs.}$

Screening modeling for a single, simple emission point will require approximately one hour of time by an experienced modeler, full modeling will require two to six hours of time by an experienced modeler. It is assumed that modeling for a process would need to consider, on average, three different points of emission, e.g. two different stacks and one area of fugitive emissions, but that some of the more detailed information for full modeling, such as property lines and building dimensions and locations, will have to be developed only once. Thus, for a typical environmental acceptability demonstration, a total of three hours of time by an experienced modeler will be required for screening modeling, and a total of ten to twelve hours of time by an experienced modeler will be required for full modeling. The District notes that these time estimates have been provided by employees of State air pollution control agencies. Consultants have indicated that the time for modeling is significantly longer.

In formal comments, Kentuckiana Engineering Company, Inc. submitted the following:

If it only takes four hours for each emission point/TAC permutation to go through the facility's MSDSs (most Title V and FEDOOP sources have several hundred to keep up with), tabulate maximum hourly and annual emissions for each TAC from each emission point, determine exemptions, input Tier 1, 2, 3 and/or 4 dispersion modeling parameters including building dimensions, run the models and prepare the submittal to LMAPCD, that is

1,522,400 person hours of effort due by December 31, 2005 for Category 1 and 2 TACs. If consultants only charge \$100 per compliance demonstration, that would be \$38,060,000 in fees between now and December.

Each Tier 4 dispersion model generates roughly 400 pages of output to be reviewed. That would be 152,240,000 pages of dispersion modeling outputs. Plus of course, the write-ups that would be required to explain the modeling outputs and how the emission point/TAC permutation either complies or not with the risk goals and standards.

To estimate the cost of reducing the TAC emissions from a particular process or process equipment, one would first need to consider, among other factors, what the individual process is, what process equipment is involved, the chemical and physical characteristics of the TAC, what opportunities for control already exist at the stationary source, and by how much the emissions of the TAC will need to be reduced. Costs would typically fall into one of the following categories:

1. Less than \$5,000 per ton: Control strategies in this category would likely include material substitution, process modifications, reasonable dispersion enhancements, using existing control equipment, and very cost-effective control equipment. While not endorsing the “dilution is the solution to pollution” concept, the District recognizes that existing process equipment may have been designed without consideration of reasonable dispersion-related characteristics. For example, a horizontal discharge, a vertical discharge that is obstructed (stack cap), an extremely low exit velocity, or a stack height that is not significantly taller than the building (or nearby buildings) (a reasonable minimum stack height is 1.5 times the building height; a “tall stack” as defined by the EPA is, in simple terms, 2.5 times the building height) would represent dispersion-related characteristics that should be allowed to be modified.
2. \$5,000 to \$10,000 per ton: Control strategies in this category would likely include most pollution control equipment designed to reduce criteria pollutants (for example, VOCs) to attain and maintain compliance with the national ambient air quality standards. Some control equipment required to meet federal requirements for best available control technology (BACT) or lowest achievable emission rate (LAER) may also be included in this category.
3. \$10,000 to \$20,000 per ton: In areas with pervasive air pollution control problems (such as not meeting the 1-hour ozone standard), costs in this range are considered to be reasonable and are thus required. For example, the Bay Area Air Quality Management District (San Francisco) identifies \$17,500 as the upper cost-effectiveness end of required VOC controls. It is noted, however, that the Bay Area agency has not instituted a cost-effectiveness cap for the control of air toxics that pose an unacceptable risk. This focus on meeting an acceptable level of risk and not on cost effectiveness is consistent with other toxics programs such as New York’s and New Jersey’s.

Of those processes for which the current level of emissions are found not to be environmentally acceptable, the District estimates that more than half could employ pollution prevention

measures, reformulations, relatively inexpensive equipment changes, or very cost-effective control equipment, i.e., measures with a cost effectiveness of less than \$5,000 per ton, to comply with the draft requirements. The District estimates that environmental acceptability could be achieved for most of the other processes by using control equipment that would have a cost effectiveness in the \$5,000 to \$10,000 per ton range. The District notes, however, that to control a small amount of a particularly toxic air contaminant, such as hexavalent chromium, the dollars-per-ton cost effectiveness may be extremely high, even exceeding the \$10,000 to \$20,000 range, but the total dollars spent may be reasonable for a specific stationary source.

Additional air toxics control cost information from other State programs¹⁷ and the EPA¹⁸ were reviewed and found to be consistent with the costs as discussed herein.

The following comments were submitted pursuant to the formal public review process:

The District consistently underestimates the impact of these regulations on the regulated community. With the proposed parameters, it is expected that we will have to conduct even more complex and expensive monitoring than Level 4. Our experience is that the effort required will be as much as 10x that estimated by the District. (DuPont Dow Elastomers)

[E]valuation, modeling, and permit application costs aside, if Caldwell Tanks were required to install control devices on its paint booths to meet the EALs, such as a thermal oxidizer, potential capital and operating costs (easily as high as \$ 1 million and \$ 500,000 per year, respectively), would likely be too high for us to continue painting tank components in Louisville. The cost to reduce regulated TACs to the proposed EALs could easily reach \$50,000 per ton, significantly more than the reasonable cost ranges quoted in the PRIA. (Caldwell Tanks)

As submitted by the Louisville Chemistry Partnership, Inc.:

¹⁷ Wisconsin, Final Regulatory Flexibility Analysis, Ch. NR 445 Revised Rule Package, Attachment 3, available on the Internet at [http://www.dnr.state.wi.us/org/aw/air/HOT/NR445rev/NRBadoption/attach3_final_regulatory_flex_analysis.pdf].

Oregon Memorandum Agenda Item D, Rule Adoption: Oregon Air Toxics Rules, October 9-10, 2003 EQC Meeting, September 18, 2003, available on the Internet at [<http://www.apcd.org/star/oregoneqcstaffreport.pdf>] and Attachment G Fiscal and Economic Impact Statement, available on the Internet at [<http://www.apcd.org/star/oregonfiscal.pdf>].

Vermont Economic Impact Statement, 6 pages, paper copy available from the District upon request.

¹⁸ Residual Risk Report to Congress, Section 4.1.2 Available Methods and Costs of Reducing Residual Risks, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-453/R-99-001, March 1999, available on the Internet at [http://www.epa.gov/ttn/oarpg/t3/reports/risk_rep.pdf].

- a. DuPont Dow Elastomers estimates that its lowest cost for emission reductions under the STAR proposal will be \$35,000 per ton. That cost is estimated to increase to \$150,000 per ton for incremental reductions in emissions of TACs under STAR.
- b. In order to reduce emissions from point sources, Rohm & Haas anticipates that it would have to install add-on pollution controls, in the form of a thermal oxidizer. Comparing the capital cost of a thermal oxidizer to the amount of TAC emissions reduction, the cost of reduction is estimated to be \$500,000/ton.
- c. As written, the proposed STAR regulations would require the Zeon Chemicals - Kentucky Plant to reduce emissions of acrylonitrile (AN) and 1,3-butadiene (BD) by an additional 97%. This reduction is in addition to the 71% reduction in emissions of these two chemicals since Zeon took ownership of this facility in 1989. Using an EPA estimating tool, possible control technologies were explored for their associated costs on two of the plant's six main finishing lines. Of the three technologies worthy of further consideration, i.e. catalytic incineration, regenerative oxidation and thermal oxidation, costs per ton per year of controlled AN and BD ranged from \$94,000 to \$775,000 on one line and \$271,000 to \$1,610,000 on the other line. (These costs per ton include amortized capital costs and annual operating costs.) Multiplying by the controlled tons per year for each of these lines yields total costs of \$790,000 to \$6,400,000 per year for one line and \$530,000 to \$3,100,000 per year for the other line.

We estimate that for our 3 facilities, the initial cost to identify all TAC sources, model, and establish tracking mechanisms will be approximately \$450,000, with ongoing costs for recordkeeping and monitoring to be as much as twice the initial cost. This is based on the number of TACs (including insignificant amounts contained in hand solutions, lab chemicals, inks, degreasers, etc.), the number of potential emissions points, the tremendous data collection effort as little to none of the modeling information is currently compiled, etc. (Brown-Forman)

Under the regulations as proposed, we estimate that it will cost \$20 million to \$700 million dollars to control sulfuric acid on our units. (Louisville Gas & Electric)

Although we are in full compliance with current emission standards, we project that the STAR Program will require us to invest an estimated \$15-20 million in additional redundant pollution control devices. Beyond this capital investment, there would be ongoing personnel and operating costs estimated in the hundreds of thousands of dollars. (Süd-Chemie, Inc.)

To model the fugitive and stack emission of a single TAC, if we were able to demonstrate compliance after running the Tier 3 model, our cost could be approximately \$1,000. If modeling results do not meet EALs, Tier 4 modeling will be required. The estimated cost for this modeling would be an additional \$7,000. If the limit can not be met after running both Tier 3 & 4 models, we will then be required to develop a compliance plan, which could cost an additional \$ 4,000. The costs of plan implementation and equipment to comply with the regulation can not be determined until all the modeling has been completed. (The Solae Company)

At best, we are facing tens of thousands of dollars each year for multiple years of repeated

modeling and calculation exercises that might show compliance. The STAR Program is a strong incentive for them to seriously consider closing or relocating their fabrication shop, which would result in the loss of hundreds of skilled labor jobs and millions of dollars for this community. (Susan Logsdon, Caldwell Tanks)

The annual cost for the Center to do fuel switching would add \$6 million to the fuel costs. It would quadruple the Center's energy cost from the \$2 million now spent on coal to \$8 million on gas. One of the unintended consequences of the regulation is that it is going to affect the cost of health care in the community. Of the \$6 million added cost, 2/3 is attributable to the hospitals and 1/3 to the research and educational buildings. If \$4 million is divided by 1,500 patient beds, that is \$2,700 a year in extra costs per bed. (Edward Dusch, Louisville Medical Center)

The District has not attempted to develop the cost savings to the public resulting from the reduction in TAC emissions from establishing the STAR Program. However, reports by the EPA¹⁹ demonstrate that monetized benefits of Clean Air Act programs greatly outweigh direct compliance expenditures. The Clean Air Act requires a reduction in the incidence of cancer attributed to the air emissions by not less than 75% and a significant reduction in the risk to the public of other serious adverse health effects caused by airborne toxics.

The new Section 3 requirement for demonstrating environmental acceptability for emissions of Category 1, 2, 3, and 4 TACs from new or modified processes or process equipment would apply to only those Group 1 and 2 stationary sources that apply for a construction permit. Historically, the District has received approximately 250 construction permits per year. Of those, approximately 150 are from Group 1 or 2 stationary sources and approximately 100 would include Category 1, 2, 3, or 4 TACs.

In formal comments, Kentuckiana Engineering Company, Inc. submitted the following:

The above estimates do not include, of course, all of the compliance demonstrations that will be triggered by changes in raw materials and equipment modifications throughout the county each year that would apply to all 1400 or so permitted sources. With at least 100,000 MSDS floating around the community, the new and modified process requirements may be even more burdensome to administer than the initial compliance demonstrations.

District regulations currently contain provisions patterned after Kentucky 401 KAR 63:020 that a

¹⁹ *The Benefits and Costs of the Clean Air Act: 1970 to 1990*, Page ES-8, EPA 410-R-97-002, United States Environmental Protection Agency, Office of Air and Radiation, October 1997, available on the Internet at [<http://www.epa.gov/air/sect812/copy.html>].

The Benefits and Costs of the Clean Air Act: 1990 to 2010, Page iii, EPA 410-R-99-001, United States Environmental Protection Agency, Office of Air and Radiation, Office of Policy, November, 1999, available on the Internet at [<http://www.epa.gov/air/sect812/1990-2010/chap1130.pdf>].

person shall not allow any process or process equipment to emit a toxic air contaminant in a quantity or duration that could be harmful to the health and welfare of humans, animals, and plants. The Kentucky Division for Air Quality has begun implementing risk-based review within the construction permit process, identifying a goal of a 1×10^{-6} increased risk of cancer as meeting the provision of 401 KAR 63.020. The detailed procedures for determining environmental acceptability that are contained in Regulation 5.20, 5.21, and 5.22 provide a methodology for demonstrating compliance with the requirements of 401 KAR 63:020.

Additionally, all of the TACs in Categories 1, 2, 3, and 4, with the exception of diesel particulate and glycol ethers as a group, are currently identified as toxic air pollutants (TAPs) pursuant to Regulation 5.12, and thus must be identified, the emissions determined, and compliance with Regulation 5.12 demonstrated. While Section 4 requires, for Category 1 and 2 TACs, and allows, for Category 3 and 4 TACs, the use of the methodology in Regulation 5.21 for determining environmental acceptability, which is different than the methodology in Regulation 5.12, both Regulations require an estimation of emissions, non-source-specific computer modeling methodologies, and source-specific computer modeling if compliance is not demonstrated using the other allowed approach.

The incremental cost, beyond that required to submit a complete construction permit application, to a company for a specific application would vary, based upon the complexity of the process and the magnitude of the emission of a specific TAC relative to its benchmark ambient concentration, but is estimated to be from 4 hours to 40 hours per permit application. Additionally, it would be expected that more computer dispersion modeling will be required to establish environmental acceptability. Of the approximately 100 construction permit applications per year that would involve a listed TAC, it is estimated that half would require additional modeling, with one-third needing only screening (Tier 3) modeling and two-thirds undergoing full (Tier 4) modeling. Screening modeling for a single, simple emission point would require approximately one hour of time by an experienced modeler; full modeling would require two to six hours of time by an experience modeler. It is assumed that modeling for a process would need to consider, on average, three different points of emission, e.g, two different stacks and one area of fugitive emissions, but that some of the more detailed information for full modeling, such as property lines and building dimensions and locations, will have to be developed only once. Thus, for a typical construction permit application, a total of three hours of time by an experienced modeler would be required for screening modeling, and a total of ten to twelve hours of time by an experienced modeler would be required for full modeling. The District notes that these time estimates have been provided by employees of State air pollution control agencies. Consultants have indicated that the time for modeling is significantly longer.

If additional emission reductions are needed to meet the goals established in Regulation 5.21, then the costs would be similar to the costs described for controlling existing processes and process equipment, with the caveat that it would, especially for the case of using add-on control equipment or process equipment modification, be more efficient, and thus, less costly, to include this equipment in the original design of process equipment rather than adding as a retrofit to existing process equipment.

Regulation 5.22 - This regulation establishes the procedures for determining the maximum

ambient concentration of a TAC, which is then used in Regulation 5.21 to establish environmental acceptability and the allowed emissions to be met. The costs for compliance are addressed pursuant to Regulation 5.21.

Regulation 5.23 - This regulation establishes the various categories of TACs. The requirements related to these various categories of TACs are included in Regulations 1.06 and 5.21 and the associated costs are discussed under those regulations.

Report on Public Outreach Efforts:

The District posted the draft STAR Program regulations on the District’s web page, making them available to the regulated companies, EPA Region 4, the Kentucky Division for Air Quality (DAQ), and the general public for informal review and comment. To date, the District’s STAR Program web page has received 1430 visits.

The Strategy Committee held four meetings to discuss the STAR Program and the draft regulations, on September 23, 2004, October 4, 2004, October 11, 2004, and October 15, 2004. The public was invited to all of these Strategy Committee meetings.

The District participated in over 50 meetings and public forums to discuss the STAR Program and the draft regulations. The following is a list, by date, of those meetings and the number of people in attendance:

September 1	Ky. Ch. Haz. Mat. Mgrs.	50
September 9	Mayor's Press Conference	20
September 9	Rub. Com. Adv. Council	60
September 14	Ky. Paint Council	15
September 15	APCD Board	45
September 16	REACT	9
September 16	Jim Bruggers	1
September 17	Greater Louisville Inc.	65
September 21	W. Jeff. Co. Com. T. F.	14
September 23	APCD Bd. Strategy Comm.	30
September 24	REACT	3
September 25	Air Quality Task Force	20
September 30	Public Forum	20
September 30	Ky. Air Toxics Workgroup	15
October 4	APCD Bd. Strategy Comm.	20
October 9	LM Planning College	25
October 11	APCD Bd. Strategy Comm.	20
October 14	Ford	6
October 14	Ky. Asphalt Council	12
October 14	Rub. Comm. Adv. Council	50
October 14	Metro Libertarian Party	20
October 15	APCD Bd. Strategy Comm.	20
October 15	Ky. Chamber of Commerce	25

October 16	UofL Conf. on Health/En.	50
October 19	Ford	2
October 19	LM Health Dept. Env. Comm.	10
October 19	W. Jeff. Co. Comm. T.F.	18
October 20	Poly One	4
October 20	Rubbertown Companies	25
October 20	Rohm & Haas	2
October 21	Technical Workgroup	50
October 22	Nat. Mun. Waste Asso.	20
October 22	Technical Workgroup	25
October 25	REACT	2
October 26	LM Bd. of Health	20
October 26	Ky. Gov. Conf. Env.	150
October 26	Englehard	4
October 27	Rubbertown Companies	8
October 28	Assoc. Ind. of Ky.	15
October 28	Arkema	3
October 28	Univ. of Lou.	4
October 30	Technical Workgroup	16
November 2	Technical Workgroup	25
November 5	Justice Resource Center.	5
November 6	LM Neighborhood Summit	20
November 10	Rohm & Haas Adv. Council	20
November 11	Greater Louisville Inc.	25
November 18	GE	3
November 29	GE	1
November 30	Greater Louisville Inc.	7
December 2	Ky. Air Toxics Workgroup	20
December 14	Ky. Air/Waste Mgt. Assoc.	40
January 4	LG&E	2

The District provided an opportunity for informal written comments on the draft STAR Program regulations. The District received written over 40 written comments. These comments are available on the Internet at [<http://www.apcd.org/star/comments>]. The District summarized these comments and has provided a written response for each comment²⁰.

Based on discussions at these meetings and public forums, the informal comments, and additional District staff discussion of the issues raised, the District developed a second draft of the STAR Program regulations and summarized the significant changes at a Board Committee of the Whole on January 13, 2005. A formal public comment period was held from

²⁰ The document *STAR Program Informal Comments, Draft #1 - External, September 16, 2004*, is available on the Internet at [<http://www.apcd.org/star/comments/draft1comment-response.pdf>].

January 14, 2005, until February 14, 2005.²¹ A Public Hearing was held on February 16, 2005.²² The document *Strategic Toxic Air Reduction (STAR) Program, Formal Public Review* lists the commenters providing comments pursuant to the formal public review process. The District developed two documents, *STAR Program Formal Comment/Response Document* and *Preliminary Regulatory Impact Assessment, Comments and Responses*, that summarize and provides responses to the comments made pursuant to the formal public review process. The substantive changes, and the basis for the change, are identified in the *STAR Program Formal Comment/Response Document*. These comment/response documents are herein incorporated by reference.

In addition, the District hosted a public informational meeting on February 3, 2005, at which representatives of Greater Louisville, Inc. and the District provided information on the four tiers of modeling identified in proposed Regulation 5.22.

On April 11, 2005, the District received a letter dated April 7, 2005, from John S. Lyons, Director, Kentucky Division for Air Quality granting prior concurrence of the STAR Program regulations, contingent upon the inclusion of the Kentucky ambient air quality standards for gaseous fluorides, hydrogen sulfide, and total fluorides.

²¹ Information regarding the written formal comments is available on the Internet at [<http://www.apcd.org/star/comments2/>].

²² Minutes of the February 16, 2005, Public Hearing will be posted on the District's website when approved by the Board.