

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NATIONAL AIR TOXICS MONITORING PROGRAM

COMMUNITY ASSESSMENTS

NOTICE OF SOLICITATION # OAR-EMAD-03-08

AMENDMENT 002

GRANT APPLICATION

ON BEHALF OF

LOUISVILLE-JEFFERSON COUNTY, KENTUCKY
METRO AIR POLLUTION CONTROL DISTRICT

1. LOUISVILLE AIR TOXICS MONITORING AND REDUCTION PROJECT

2. APPLICANT: Louisville Metro Air Pollution Control District

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3. NARRATIVE WORK PLAN

The proposed work plan of the Louisville Metro Air Pollution Control District (APCD—is an air pollution control agency as defined under Section 302(b) of the Clean Air Act) is very consistent with and strongly supports the purposes of the grant. APCD understands and will follow all the requirements and obligations imposed on the grantee as set forth in the Notice of Solicitation, including all those in III.C of the solicitation and commits to uploading all analyzed data into EPS's Air Quality System (AQS).

The work plan follows on the substantial work done to date in the Louisville area to determine the concentration of air toxics in the community.

In 1996, the City of Louisville, responding to citizen concerns about possible adverse health effects from air toxics, helped obtain grant monies to support a multi-stakeholder group (citizens, industry, government—federal, state, local-academia and other non-profits) to develop an action agenda built around the concern of the citizens.

This group, since named and known as the West Jefferson County Community Task Force(Task Force), did develop an action agenda of key concerns. Prime among those concerns was the potential health effects from toxic air emissions, especially from an area of the community known as Rubbertown, an area of heavily-concentrated chemical facilities-most dating from around World War II, and essentially immediately upwind from the area where many of the concerned citizens live.

The area in which many of the residents live has been recognized by US EPA, Region 4 (Region 4) as an area with significant environmental justice issues and concerns.

In fact, soon after the Task Force was established, Region 4 identified Louisville as a Community Based Environmental Partnership area, in part because of the above concerns and has, since that time, invested significant resources in the area with grant support, technical assistance to the Task Force and community and numerous other types of assistance. By 1998, the Task Force had identified air toxics as the leading issue of concern and set about to marshal the resources to carry out a monitoring and assessment program.

The resources gathered has included approximately \$150,000 per year from the Commonwealth of Kentucky from 1998 to date to the University of Louisville.

These monies have supported the Task Force including a full time director, the acquisition of six air toxics monitors and related equipment and a new GC mass spectrometer, training for laboratory personnel, substantial analytical work and other contributions to the project.

Region 4 contributed six air toxics monitors and provided substantial laboratory support for analytical work. As importantly, over the course of the several years between about 1998 and 2002 Region 4 personnel frequently traveled to Louisville to meet with the Task Force to provide advice and guidance on conducting an air toxics project. That assistance has been invaluable.

Local government has played a key role on the project. Jefferson County Government through APCD and its Health Department has played active roles throughout the project time frame. APCD provided substantial in-kind support in attending almost all monthly and special meetings of the Task Force over the last seven years and APCD staff sited, operated and maintained the monitors during the primary monitoring project.

The Health Department offered substantial assistance through the regular attendance of its staff including significant involvement of an epidemiologist. The City of Louisville provided direct financial support of over \$50,000 and top environmental staff provided technical assistance and support.

Jefferson County and the City of Louisville merged their respective governments effective January 6, 2003 bringing together the local government resources described above and forming the 16th largest city in the US.

With the resources described, the Task Force first developed a Quality Assurance Program Plan and a technical Work Plan addressing the detailed steps to be followed in establishing an air toxics monitoring project including the chemicals to be monitored for and the protocols to be followed in the analytical procedures. Region 4 was of great assistance in this regard and provided several model QAPP's from similar projects.

After the plans were completed the Task Force then sited and operated 13 air toxics monitors at 12 locations from approximately April 2000 to April 2001. The monitors addressed a number of monitoring goals including providing an upwind background site, a further downwind site and then monitors that satisfied a need to provide both fence line and community-based or neighborhood scale monitors.

While the monitoring was underway, the Task Force formed two work groups-one to address the need to perform a risk assessment on the data and one to develop a risk management plan. The Risk Assessment Work Group developed a

Risk Assessment Work Plan to guide the risk assessment process including target risk levels and the health-based guidance upon which to base the risk assessment.

Following the completion of the Risk Assessment Work Plan, an RFP was issued for a contractor to perform a risk assessment. A contractor was selected and in the fall of 2003 the final Risk Assessment Report was delivered to APCD which served as the project manager. Region 4 grant monies largely supported this work.

Also, during this time period, Region 4 undertook a relative risk analysis for each of the 735 counties in Region 4 examining NATA data, CDC data, TRI data and census data. Based on this, Region 4 found that Jefferson County, Kentucky had the highest risk of exposure to airborne toxics of any other county in Region 4.

At the same time the Risk Assessment was being conducted but prior to it being finalized, the Task Force developed and adopted a Risk Management Plan. This Plan identified key steps to be taken if any chemicals were determined to be above target risk levels.

The Risk Assessment, Phase I, established two main categories of activity. The first is source identification—determining the sources for chemicals of concern. The second is option evaluation. The Risk Management Plan work group identified a range of options that could be adopted or applied to reduce toxic emissions that were above safe levels—from continues monitoring to more stringent regulations.

Against this backdrop, the Risk Assessment identified 18 chemicals of concern at levels above the target risk levels agreed to through the Task Force's processes—one in a million for cancer and 1.0 as a hazard index for non-cancer effects.

Both the Risk Assessment and the Risk Management Plan have been posted on APCD's web site at www.apcd.org. In addition, the Task Force has a long standing commitment to a very transparent process and has sponsored a number of community forums to provide community members with information about the monitoring and Risk Assessment projects.

The community, still working through the Task Force, has now embarked on implementing the Risk Management Plan to identify the sources of these 18 chemicals and to reduce their concentrations, where possible, to safe levels.

As mentioned above, the Risk Assessment was based on data from one year's worth of monitoring from about April 2000 to April 2001. At the end of that period, Region 4 decommissioned its monitors and the Task Force did likewise. However, in about October 2001, six of the monitors were reactivated and have been operated and maintained to date and are planned to continue to operate by the University of Louisville. During this time, the University has also been conducting the laboratory analysis on the samples but no additional risk assessments have been conducted.

The proposed work plan under this grant application builds on and leverages the substantial air toxics work described above.

Based on the findings of the Risk Assessment, APCD is now moving to develop a comprehensive air toxics regulatory program. Substantial impetus for this effort has come from the air toxics monitoring project.

The chemical that was found to be the most above the safe, target risk level was 1,3-butadiene. It was found at an average probability of risk of causing 138 cancers out of 1 million exposures and a similarly high non-cancer risk level.

In Louisville, there are three known stationary sources of butadiene plus mobile sources. Based on current emission inventories, it is believed that one source, American Synthetic Rubber Company (ASR--a unit of Michelin Tire Company) accounts for in the range of 50-60 percent of all butadiene emissions, the other two stationary sources in the range of 10 percent and the remainder from mobile sources. The total estimated inventory of butadiene emissions in the community is about 100-120 tons per year.

However, given the ubiquitous nature of mobile source emissions and the findings of a recent, short-term, air monitoring exercise that sampled at three monitors within two miles of ASRC every other day during its Fall 2003 regular two week shutdown it appears that ASR could be responsible for up to about 75 percent of the butadiene emissions in the areas of the community nearest that source. Disturbingly, this same report also found that over the last two years there appears to have been a 35 percent per year increase in butadiene levels.

Louisville Metro government, upon receipt of the draft Risk Assessment in May 2003 immediately began seeking butadiene emission reductions from the three stationary sources. That effort continues.

Additionally, following the release of the Risk Assessment, and at the further request of the Task Force and others, Region 4 has launched a year-long, intensive Work Plan focused on a comprehensive review of the compliance status of the Rubbertown sources and other activities to address the community's concerns about air toxics. Also, ATSDR is reviewing the Risk Assessment and has indicated that it will be conducting a health assessment on it. And, EPA's OAQPS has an air toxics residual risk project underway focusing on several of the Rubbertown industries and has invited APCD to participate in the process and has indicated it intends to use the results of the Risk Assessment in its work.

But, even with all this activity, more information is needed to advance the reduction efforts underway. This application seeks resources that would further these reduction efforts in several ways including providing support which would supplement the launch of the air toxics regulatory program.

APCD proposes to conduct the following activities under this grant with grants amounts for each project indicated:

- A. Carry out the scope of work described in the attachment which includes additional risk assessment on the monitoring data since the Fall of 2001, an analysis of all data to identify spatial and temporal trends for the 18 chemicals above target risk levels and a report that details the methodology, results and conclusions of the inhalation risk assessment and the statistical analysis for the spatial and temporal trends in the data. \$72,000.**
- B. Establish four fence line monitors (one to be co-located) around ASR and one upwind and one downwind monitor to monitor for butadiene plus the other 17 chemicals of concern chemicals of concern. Besides butadiene the other 17 chemicals are: chloroprene, chromium, acrylonitrile, chloroform, formaldehyde, ethyl acrylate, benzene, bromoform, carbon tetra chloride, 1,4 dichlorobenzene, methylene chloride, arsenic, trichloroethylene, tetrachloroethylene, vinyl chloride, nickel and cadmium. (The upwind and downwind monitors would be additionally useful as from the time of the monitoring for the Risk Assessment the community has ended its vehicle inspection/maintenance program and it would be beneficial, in particular to compare the levels of mobile source butadiene and other mobile source toxics before and after the I/M program). As a result of the more intensive, short term analysis that found butadiene levels increasing, APCD needs to launch a broad scale investigation and review to determine why this increase may be occurring. One area that has not been closely examined is the offloading from rail tank cars of about 300 million pounds of butadiene used by ASR per year. Comprehensive fence line monitoring around this major source could be critical to establish appropriate and effective reduction strategies. \$250,000.**
- C. Develop a model-to-monitor relationship based on the existing Risk Assessment. \$45,000.**
- D. Further demonstrate the use of an optical-based analytical technology targeted around the ASR source specifically focusing on the tank rail car operations and fence line emissions. Previously, the Task Force and APCD participated in a demonstration project jointly sponsored by the US Army and EPA to test out the effect of wind on the use of a FTIR (laser-based) system focusing on detecting pollutants in ambient air at the fence line of a cooperating Rubbertown source. This project would supplement an effort underway by APCD to test out two different types of hand-held and portable ambient air analytical devices which were approved for the agency to acquire this fiscal year and which have been**

ordered. (With these latter described devices, APCD is seeking to improve its ability to quickly respond to the periodic complaints received from residents downwind of the Rubbertown area. \$40,000.

E. Analyze and correlate speciated PM2.5 analytical results with the completed risk assessment. APCD has been operating three PM2.5 speciation monitors as part of its PM2.5 program. (Jefferson County has been recommended by the State's Governor, as required by the Clean Air Act, as in non-attainment of the standard [specifically the annual average]). However, much of the data has yet to be developed and examined. Several of the 18 chemical above the target risk levels could be present in the ambient air as PM2.5 and vice versa. This project proposes to leverage the PM2.5 speciation data to assist in interpreting air toxics source-receptor understanding and to improve the possibility of crafting successful emission reduction strategies. \$50,000.

4. APCD is seeking \$457,000 through this grant application.

5. The total cost of the project is estimated at approximately \$517,000. The difference between the amount sought in this grant and the total amount would be in-kind resources from APCD to administer the projects and translate the results of the projects into reduction opportunities.

6. A detailed budget is attached.

7. The project period would be from September 1, 2004 and continuing for 18 months. There would be a minimum monitoring period of 12 months.

January 15, 2004

SCOPE OF WORK FOR ADDITIONAL ANALYSES OF AIR TOXICS MONITORING DATA FROM THE WLATS PROGRAM

Sciences International, Inc. (Sciences) is proposing a three-phase program to provide additional analyses of air toxics monitoring data collected as part of the West Louisville Air Toxics Study (WLATS). The first phase would be an inhalation risk assessment using new monitoring data following the same methodology used in Sciences assessment of the April 2000 to April 2001 data from the same monitor locations. The second phase of the project would be an analysis of all validated monitoring data provided to Sciences to identify spatial and temporal trends for chemicals of potential concern (COPCs) identified in the risk assessments. The third and final phase would be development of a report that details the methodology, results and conclusions of the inhalation risk assessment, and the statistical analysis for spatial and temporal trends in the monitoring data. This analysis and report will identify air toxics of potential interest from a risk basis. The analysis may also identify populations or areas that are most at risk and important spatial and temporal aspects of the COPCs. The nature of the tasks for each Phase of the project is described below.

PHASE 1 - INHALATION RISK ASSESSMENT FOR ADDITIONAL WLATS MONITORING DATA

Task 1 – Develop an Air Risk Assessment Implementation Plan

This task will involve development of a risk assessment implementation plan that will provide details of the methodology to be applied for the risk assessment and the nature and schedule for deliverables that will be submitted. The "Implementation Plan, West Louisville Air Toxics Study" (Sciences 2002), which was approved for use by the West Louisville Air Toxics Task Force for our previous investigation, will serve as the primary guidance for development of the new implementation plan. The new plan will include precise timelines for all tasks. The implementation plan will be provided to the Project Officer within 20 days after receipt of the contract.

Task 2 – Evaluate Data from the Monitoring Program

This task will analyze the validated data from the monitoring program and present the data in summary tables, including calculation of exposure point concentrations. The air sampler locations considered for this proposal are the same twelve locations evaluated in our previous risk assessment (Sciences 2003). Accepted methods and procedures for data analysis and interpretation detailed in our previous risk assessment implementation plan (Sciences 2002) will be utilized. Summary statistics will include: frequency of detection and the proportion of measurements above sample quantitation limits, ranges of concentrations detected, and the statistical distribution of the data, including the median value (the 50th percentile), the 95th percentile upper confidence limit, and distributional analyses of the samples. Summary tables will be developed and provided to the Task Force for each monitor based on the same data

evaluation procedures outlined in our previous risk assessment implementation plan (Sciences 2002).

We will use the same methodology for the air toxics benchmarks as was done in the previous risk assessment (Sciences 2003), and provide the Task Force with a listing of the acute and chronic air toxicity values that we would propose to use for the risk characterization task. Task 2 will be completed and all interpreted data summarized and provided to the Project Officer within 45 days of receipt of the validated monitoring data.

Task 3 – Exposure Assessment

In this task, exposure point concentrations will be calculated for the annual median and 95th upper confidence limit of each chemical of potential concern at each sampling location. Subsequent estimates of risk will be prepared for cancer and chronic non-cancer endpoints. Maximum concentrations for each COPC at a monitor will be used to develop the acute risk estimates.

As in our previous risk assessment for the WLATS monitoring data, COPCs for each location will be selected based on detection in at least 10% of the samples. An uncertainty analysis will be conducted for all chemicals detected by at least one monitor, but not selected as COPCs, to evaluate their potential impact on the overall inhalation risk conclusions. The uncertainty analysis will use spatial and temporal statistical analyses of the monitoring data, along with local meteorological data and Geographical Information System (GIS) techniques to evaluate the potential emission sources and understand the transport of airborne chemicals in the area. For example, a figure showing the monitoring locations could serve as a base map upon which wind vectors would be plotted along with concentration data to facilitate analysis and discussion of the exposure and risk assessment.

Importantly, an identification and assessment of the uncertainties associated with deriving these exposures and risks will be conducted in this task. For example, comparisons to other recent assessments, including EPA's National Air Toxics Assessment (NATA), with which Sciences International has been involved, can be made because the NATA program has used human exposure models to estimate human exposure using ambient concentration measurements. Sciences could also provide information available from NATA relevant to the portion of outdoor air that infiltrates indoors. The results of this task will become part of the draft risk assessment to be submitted per Task 6 below.

Task 4 – Risk Characterization

The risk characterization will discuss the carcinogenic and non-carcinogenic risks at the median and 95th exposure concentrations using standard procedures. Acute risks also will be characterized. These results will be presented for each sampling location and the data more broadly demonstrated in graphical and tabular forms. A discussion of the uncertainties will be provided. The results of this task will become part of the draft risk assessment to be submitted per Task 6 below.

PHASE 2 - STATISTICAL ANALYSIS OF WLATS MONITORING DATA

Task 5 – Temporal and Spatial Analyses of WLATS Monitoring Data

Once the Risk Assessment for the second year of data has been completed, we propose to undertake Phase Two of the Scope of Work. Phase Two will focus on a statistical analysis of the multiple years of monitoring data available for the WLATS network. There are several goals for this Phase, which are reflected in tasks that will be conducted to provide the necessary statistical testing and analysis. One key goal is the identification of spatial concentration patterns for hazardous air pollutants in the metropolitan Louisville area, and the evaluation of the potential impact on human health due to inhalation exposures. Temporal trends also will be evaluated as part of the analysis, with respect to both the geographical locations of the monitors, as well as grouping monitors by the population type reflected by the monitor location. Ultimately, the analysis is designed to assist in characterizing the air toxic risks in the community. Details of the tasks to be conducted for this Phase of the Project are presented below.

The statistical analysis is basically composed of the following four subtasks.

1. Trend Analysis

The proposed analysis of trends is composed of a risk-based analysis and an analysis of seasonal trends for individual COPCs.

a. Emphasis of the Risk Based Analysis

i. Analysis and discussion of the change in potential human health impacts from inhalation over time for each location, including the following items:

1. Changes in overall cancer and noncancer risk estimates
2. Changes in COPCs identified as risk drivers.

b. Emphasis for Analysis of Seasonal Trends

Analysis based on application of Mann-Kendall statistical test.

i. Conduct testing to look for spatial and temporal trends in the data for:

1. Individual monitors
2. Monitors grouped by geographical location.

2. Population Analysis

The purpose of the population analysis is to look for hot spots in the data set or common factors in determining exposure and risks for monitors as a single group/population or logical subpopulations.

a. Analysis will consist of comparing populations using procedures for paired data by:

- i. Looking at all monitors as a single population; and,
- ii. Looking at monitors grouped by population exposure reflected by monitor location and type (i.e., general population monitors, maximum impact monitors, background monitors).

3. Spatial Analysis

This analysis will serve to identify monitors where chemical concentrations are correlated. Earlier analysis focused on the potential for trends based on seasons of the

year. This analysis will focus on spatial relationships for the monitors, but will include some aspect of seasonal variability, for example changes in the predominant wind direction based on the season of the year. The analysis will be presented in a graphical format based on risk and exposure point concentrations for monitors across the network. More quantitative analysis will be presented for the correlation testing to be conducted of the spatial aspects of monitors in the network. The activities in this analysis would consist of the following.

- a. Develop graphical contours across the entire WLATS monitoring network for each COPC risk driver that show:
 - i. The median and 95% UCL cancer risk estimate
 - ii. The median and 95% UCL Hazard Index
 - iii. The average air concentration
 - iv. The 95% UCL air concentration
 - b. Attempt to identify spatial trends based on the graphs produced in 3.a. This would include evaluation of meteorological data for monitoring period to identify trends associated with wind patterns and a review of monitors that may share a common source for the COPC.
4. Report on Methods, Results and Conclusions of Statistical Analyses.
The report will provide tables, graphics, and a discussion of the statistical analyses. This write-up would include:
- a. Description of the data included in the analysis
 - b. Discussion of the methodology used in the analysis
 - c. Presentation of the results and uncertainty
 - d. Discussion of overall conclusions

PHASE 3 - DEVELOPMENT OF REPORT ON ANALYSIS AND CONCLUSIONS FROM PHASES 1 AND 2

Task 6 - Submission of Draft Risk Assessment Report

A complete risk assessment report will be submitted in draft form to the Project Officer within 180 days of receipt of the validated monitoring data. The report will include all assumptions and uncertainties, and will compare the results of fence line and neighborhood concentrations to the control and background sites. An original and three copies will be provided as well as an electronic version in Microsoft Word. If a meeting with the Task Force is desired as part of the submission of the Draft Risk Assessment Report, then travel charges and associated labor hours would need to be added to the cost estimate provided below.

Task 7 - Final Risk Assessment Report

Within 30 days of receipt of comments on the draft report, Sciences will complete and submit a final report. Sciences recognizes that further minor changes may also be necessary thereafter. An original will be provided, as well as electronic copies in Microsoft Word and Adobe PDF.