AIR TOXICS MONITORING NEWSLETTER

A PUBLICATION OF THE STAPPA/ALAPCO/USEPA AIR TOXICS MONITORING STEERING COMMITTEE

January 2003

The STAPPA/ALAPCO – USEPA Air Toxics Monitoring Steering Committee was established in 1999 for the purpose of overseeing the development of a national air toxics monitoring network. Members include representatives from several states and local agencies (Vermont, New Jersey, Texas, Oregon, California, Puget Sound), multi-state organizations (LADCO), and USEPA (OAQPS and some Regional Offices). The Steering Committee decided in early 2000 that the national air toxics monitoring network should be "rolled-out" over a several year period. Recent activities related to the national network are discussed in this quarterly newsletter.

Allocation of FY03 Funds

A total of $9.5M is available in FY03 for air toxics monitoring: $6.5M from the redirection of Section 105 money from implementation of National Ambient Air Quality Standards, and $3M in Section 103 money from USEPA. On June 12, 2002, USEPA issued guidance on the $6.5 million. (This money will be allocated on a pro-rata basis within each Region.)

The Steering Committee is still working on the guidance for the allocation of the $3 million. The current draft guidance calls for:

$1.3 M for continuation of the initial 13-site trends network (see list below)

$0.9 M for establishment of 9 new trends sites (see sites in bold in the list below)

$0.08M for aethelometers at the new urban sites

$0.12M for completion of the pilot city data analysis work (see story below)

For the remaining $600K, several options are under consideration, including:

additional data analysis (e.g., model evaluation, trends analyses, and air quality characterization)

additional monitoring activities (e.g., portable sampling platforms, and sampling in accordance with the final network recommendations), and

workshop on air toxics monitoring methods (see story below).

Final guidance will be presented to the STAPPA/ALAPCO Board of Directors for approval in early February 2003.

National Air Toxics Trends Stations

The first step in establishing the national air toxics monitoring network began in CY02 with the deployment of 13 initial trends sites. As noted above, an additional 9 trends sites have been identified. The 22-site network is as follows:

Region	***Urban***	***Rural***
I	E. Providence, RI	**Chittendon, VT**
	Boston, MA	
II	New York, NY	
	Rochester, NY	
III	Washington, DC	
IV	Decatur, GA	Hazard, KY
	Tampa, FL	**Chesterfield, SC**
V	Detroit, MI	**Mayville, WI**
	Chicago, IL	
VI	Houston, TX	**Harrison Cty, TX**
VII	St. Louis, MO	
VIII	Bountiful, UT	Grand Junction, CO
IX	San Jose, CA	
	Phoenix, AZ	
X	Seattle, WA	**Bend, OR**

(Note: the 9 new sites are identified in bold above)

Map of National Air Toxics Trends Sites

To support the National Air Toxics Trends Stations (NATTS), USEPA recently prepared the following documentation:

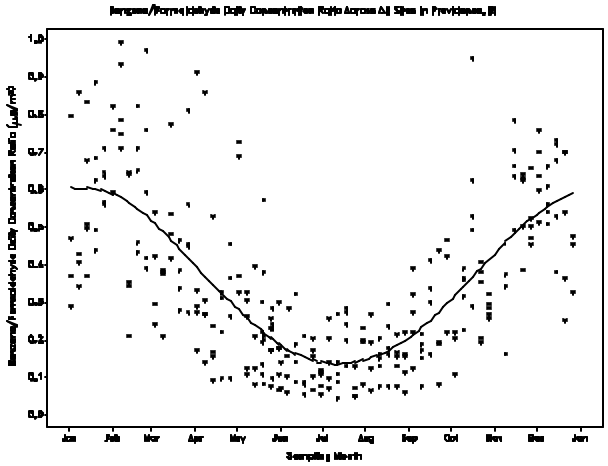
- "Quality Management Plan for the National Air Toxics Trends Station Monitoring Program", December 2002, EPA-454/R-02-006
- "Quality Assurance Guidance Document: Model Quality Assurance Project Plan for the National Air Toxic Trends Stations", December 2002, EPA-454/R-02-007

These documents are available on USEPA's TTN web site (http://www.epa.gov/ttn/amtic/airtxfil.html).

Analysis of Pilot City Data

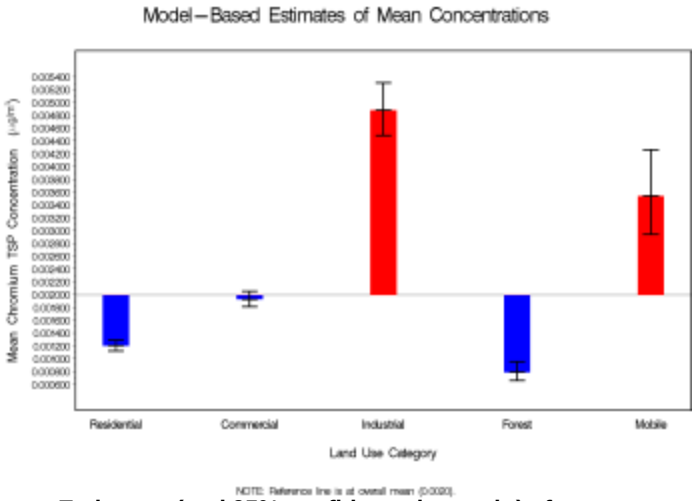
With a near complete pilot city database, Battelle and STI have conducted a number of analyses over the past few months, including efforts to understand some of the measurement uncertainties observed in the pilot data and to quantify the spatial and temporal variability observed within and between pilot cities.

For example, cluster analysis techniques were used to group days according to their multi-pollutant profiles (or fingerprints). Among other inferences, these analyses highlighted a strong seasonal pattern for benzene and formaldehyde at all sites in Providence, RI. Since the tendency is for benzene concentrations to be high in the winter and formaldehyde concentrations to be high in the summer, the figure below shows the Providence seasonality as a time series scatter plot of benzene/formaldehyde ratios versus date. While the formaldehyde seasonality is likely explained by increased photochemical reactions during the summer, the benzene seasonality may be explained by a combination of inversions (lower mixing heights) and a higher percentage of benzene in overall fuel consumption during the winter. Comparisons to other pilot cities are underway to determine the implications for sampling frequency and other network design aspects for the overall network.



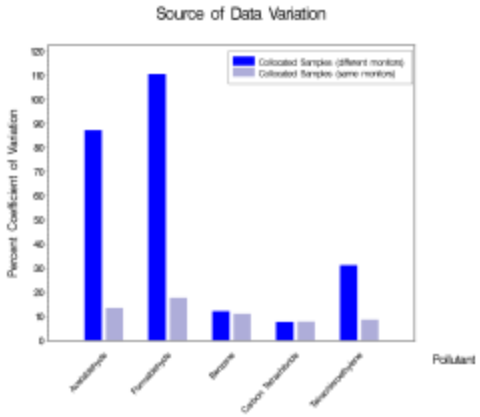
Time series scatter plot of the benzene/formaldehyde daily concentration ratio versus day across all sites in Providence, RI

As another example, additional META data such as land usage and meteorology were obtained in order to conduct regression analyses to explain some of the spatial and temporal variability observed in the pilot data. Preliminary pilot data analyses revealed a relatively large amount of spatial variability in chromium TSP concentrations. The next figure shows average chromium TSP concentration levels by land usage category relative to an overall average concentration levels. As might be expected, chromium TSP concentrations tend to be highest in industrial areas and relatively low in residential or forest areas. Similar results were obtained for benzene and formaldehyde, which may have ramifications for site selection for the overall network.



Estimates (and 95% confidence intervals) of chromium TSP concentration for each land use category

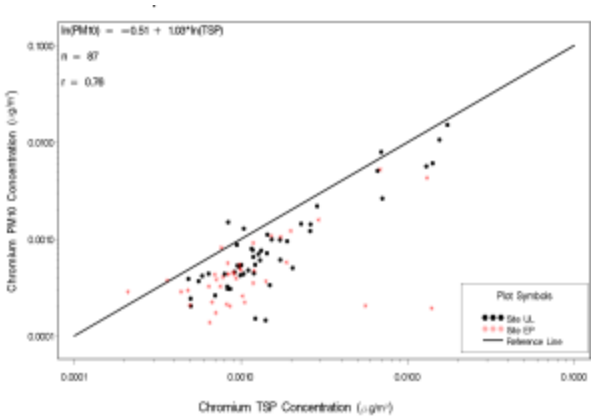
As a final example, the relative richness of duplicate sample and replicate analysis data from the pilot city study were exploited to obtain a more refined understanding of some of the measurement uncertainties associated with the pilot monitoring methods. In particular, for a number of pollutants, the pilot study provided a reasonably large number of collocated samples collected from a single monitor (dual manifolds), as well as collocated samples collected from side-by-side monitors (dual monitors). For a number of carbonyls and VOCs, the next figure shows percent relative error (coefficient of variation) between collocated samples collected from dual manifolds versus those collected from dual monitors. Notice that carbonyls exhibit dramatically larger sampling uncertainty based on dual monitor collocated samples compared to dual manifold collocated samples. These results may have implications for the design of the QA/QC system for the overall network.



Pilot city data sampling uncertainty estimates grouped by pollutant

NATTS: PM10 v. TSP

Previous grant guidance for the National Air Toxics Trends Stations recommended that toxics metals be measured based on total suspended particulate (TSP). Information on trace metal concentrations by particle size is now available from the pilot city program. Battelle prepared a summary of PM10 v. TSP concentrations for cadmium, chromium, lead, manganese, and nickel for two sites in Providence, RI. In general, the PM10 and TSP metals concentrations are strongly related, with the PM10 values being on average 50 – 80% of the TSP values (see, for example, the PM10 v. TSP comparison for chromium below).



Comparison of Chromium PM10 and TSP

The Steering Committee recently discussed the particle size issue for toxics metals and felt that only PM10 measurements should be required at the NATTS. (Other particle size measurements are optional.) The Steering Committee also thought it would be prudent to hear from the USEPA risk assessors before a final decision is made.

Archive to AQS

On September 12, 2002, USEPA issued a memo entitled "Transition from the Air Toxics Data Archive to Air Quality System (AQS)". As explained in the memo, USEPA has worked over the past several years to create (and maintain) a comprehensive air toxics database called the Air Toxics Data Archive. This data repository consists of data taken from AQS (and its predecessor, AIRS) and includes data from states, locals, tribes, and academia studies.

For the past year or so, USEPA has encouraged (and, in some cases, required) states, locals, and tribes to submit their air toxics data to AQS. As such, there is no longer a need for the Archive. In the September memo, USEPA stated its intent to discontinue support of the Archive. After February 2002, no further data will be added to the Archive. Also, USEPA will not add data to AQS from the Archive, unless requested to do so. To help states, locals, and tribes with this transition from the Archive to AQS, USEPA requested feedback on the need for training for inputting air toxics to AQS and for enhancements to AQS.

Air Toxics Data Website

As part of the original data analysis work by Battelle, an initial version of an air toxics data website was developed. The purpose of the website was to provide a web-based query interface to the Air Toxics Data Archive capable of producing tabular and graphical summaries, maps, and downloadable files. Unfortunately, user feedback on the website was mixed and there was limited use of the site.

Even though USEPA intends to discontinue the Archive as noted above, there is still a need for a data analysis tool to work with air toxics data. As such, USEPA is planning a significant make-over of the site so it is more user-friendly and helpful. The new website will be modeled after the VIEWS (Visibility Information Exchange Web System) website (http://www.cira.colostate.edu/VIEWS). A preview of the new website will be available soon.

Air Toxics Workshops

Two air toxics monitoring-related workshops are planned for this year. First, a workshop will be held to review the results of the pilot city data analysis work. The workshop is tentatively scheduled for May 13 – 14 in the Chicago area. The workshop will feature presentations by Battelle and STI on their data analyses. A formal announcement for this workshop will be issued soon.

Second, a workshop will be held to discuss monitoring methods for air toxic compounds. The purposes of the workshop are to provide state and local agency monitoring personnel with an opportunity to share their experiences with air toxics monitoring and to develop recommendations on effective, practical air toxics monitoring methods. A formal announcement for this workshop will be issued later this year.

For information on the national monitoring pilot project and national network, please contact Sharon Nizich, USEPA, OAQPS, nizich.sharon@epa.gov , 919-541-2825. For information on the data analysis project, please contact Michael Koerber, LADCO, koerber@ladco.org, 847-296-2181. This newsletter is issued on a regular (quarterly) basis to provide status reports on air toxics monitoring activities.