AIR TOXICS MONITORING NEWSLETTER

A PUBLICATION OF THE STAPPA/ALAPCO–USEPA SAMWG AIR TOXICS MONITORING SUBCOMMITTEE
April 2004

The Air Toxics Monitoring Steering Committee was established in 1999 for the purpose of assisting USEPA in preparing recommendations for a national air toxics monitoring network. In 2003, the role and responsibility of the Steering Committee changed and it was re-constituted as the Air Toxics Monitoring Subcommittee of the Standing Air Monitoring Workgroup (SAMWG). 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). Recent activities related to the national network are discussed in this quarterly newsletter.

FY04 and FY05 Grant Funds

On August 15, 2003, USEPA issued final guidance for the allocation of $10 million in FY2004 money to support national air toxics monitoring activities. $6.2M was identified for community gradient monitoring studies.

For FY05, USEPA expects to award another $10 million for national air toxics monitoring activities. Final grant guidance was issued in April covering the National Air Toxics Trends Stations (NATTS), quality assurance, data analysis, and follow-up work for the high resolution CO and continuous formaldehyde projects from FY2004. Further community monitoring project guidance will be issued later this year.

Data Analysis Workshop

Please mark your calendar for June 2 – 3 for the next air toxics data analysis workshop. The workshop will be held at the Sheraton Gateway Suites (Chicago O'Hare Airport) in Rosemont, Illinois. The workshop will begin at 10:00 am CDT on June 2 and conclude June 3 at 4:00 pm CDT. Agenda topics include:

- Overview of data analysis project
- Database overview, including data cleaning, averaging, and flagging
- Background concentrations and trends
- Comparison of MDL, benchmarks, and annual average concentrations
- Spatial and temporal variation
- Case studies
- Source apportionment analyses
- Air quality modeling results
- Data validation and analysis tools
- Lessons learned

The workshop will feature presentations by the current data analysis contractor (Sonoma Technology, Inc.). In addition, several state and local agencies wishing to make short presentations on how they are using their data. To register, please send your name, address, phone number, and e-mail address to Susan Menconi or Winnie Leva, Lake Michigan Air Directors Consortium, 847-296-2181 (leva@ladco.org). There is no registration fee.

Data Analysis

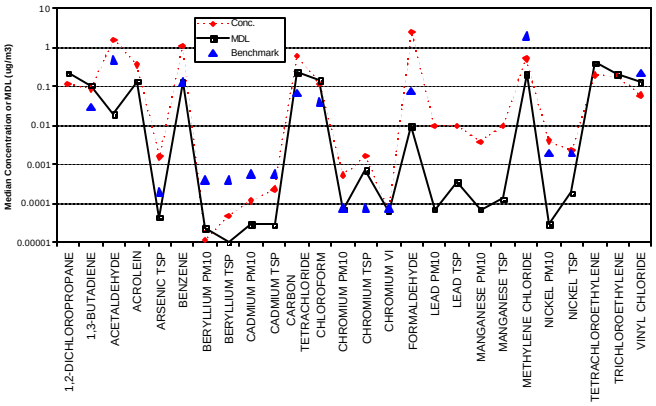
Sonoma Technology, Inc, under contract to LADCO, is conducting the latest phase of air toxics data analysis. The objectives for the study are as follows:

- Provide a comprehensive "look" at the existing air toxics data. This "look" should provide both a broad national assessment of air toxics data, and a detailed local examination in a few select areas.
- Present a clear message to policy makers about air toxics concentrations across the country from both national-level and local community-level perspectives.
- Provide guidance and tools to enable state and local agencies collecting air toxics data to look at and use their own data.
- Support USEPA's new air toxics web site.
- Perform limited modeling analyses, including model-to-monitor comparisons.

An early work product is a review of what we've learned from previous analyses of air toxics monitoring data (i.e., analysis of historical state and local data collected between 1980 and 2000, and analysis of the 10-city pilot city data collected during 2001-2002). This review is summarized below.

How good are the data (i.e., data quality)?

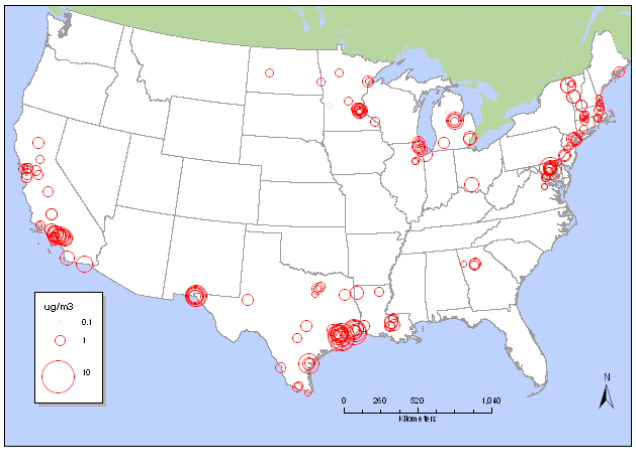
Our confidence in air toxics measurements varies by pollutant, with high confidence for some compounds, such as acetaldehyde, benzene, formaldehyde, lead, manganese, methylene chloride, and nickel (i.e., those compounds with median concentrations well above detection limits, as seen below), and low confidence for others, such as acrolein, beryllium, chromium VI, and vinyl chloride (i.e., those compounds with median concentrations close to detection limits, as seen below).



Comparing the minimum detection limits to cancer benchmarks shows that, for example, chromium measurement techniques need improvement in order to quantify cancer risk levels (i.e., the benchmark concentrations are at or below the current MDLs).

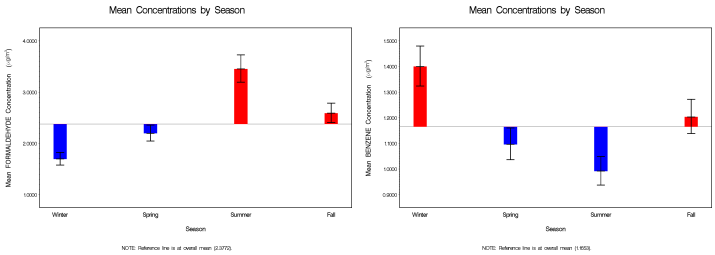
What are the air toxics concentration levels nationally and locally?

Air toxics levels for many species are comparable on a national scale (see example below for benzene), although some local variation may exist within a given city. This intra-city variation can be attributed to local sources (e.g., roadways, industrial point sources, and small stationary emission sources).



Benzene Concentrations, Summer 1999

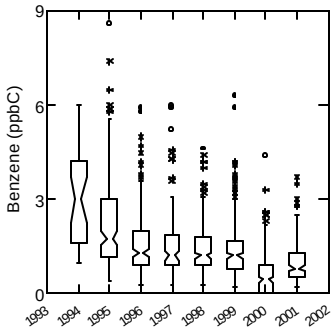
In addition to benzene, we can say that carbon tetrachloride, formaldehyde, and acetaldehyde are fairly similar across the country, but may vary locally. Further information on the variation of air toxics concentrations from a national and local (urban) perspective will be provided as part of the new data analysis study. Air toxics levels also vary seasonally (e.g., acetaldehyde and formaldehyde are higher in the summer, and benzene is higher in the winter – see figures below), day-of-week (e.g., lower weekend concentrations for diesel particulate-related compounds), and hour-of-day (e.g., formaldehyde is higher midday because of secondary production, while benzene follows traffic patterns).



Air toxics concentrations may include impacts from local and regional sources, as well as global background. Global or regional background levels for some compounds are thought to be fairly high (i.e., approaching or exceeding the cancer benchmark values), although there is considerable uncertainty for some of these estimated concentrations. Background concentrations will be investigated further in the new data analysis study.

What do air toxics data say about the effectiveness of various control programs?

Air quality improvements due to emission reductions have been measured. For example, benzene concentrations have declined in response to the use of reformulated gasoline (see figure below).



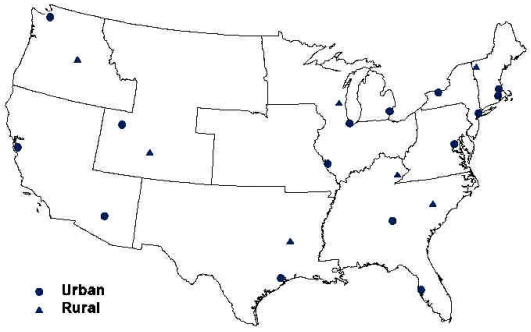
Several community assessment projects are underway across the country to characterize air toxics levels, and provide information to support new control programs and track their effectiveness (e.g., West Louisville Air Toxics Study, Cincinnati Air Toxics Study (see story below), St. Louis Community Air Project, Mobile County (Alabama) Air Quality Study, and the Phoenix and Gila River Joint Air Toxics Assessment Project.

Monitoring Projects: Updates

In previous editions of the newsletter, reports were provided on the NATTS and the Cincinnati-Dayton

community monitoring study. An update on the status of these monitoring projects is provided below.

All 22 NATTS sites are in operation as of March 2004 (see figure below). Efforts are underway to maintain consistency among the sites so that adequate trends analysis can be accomplished through the years. For instance, a comprehensive quality assurance program begins this summer. Bi-yearly performance evaluation sampling, as well as quarterly round-robin audits will be performed. In addition, methods are continually discussed among the NATTS federal and local staff to assure consistency among the cities. The NATTS Technical Assistance Document (TAD) is also in use by all NATTS participants. This document will be posted to AMTIC as a final draft in June 2004.

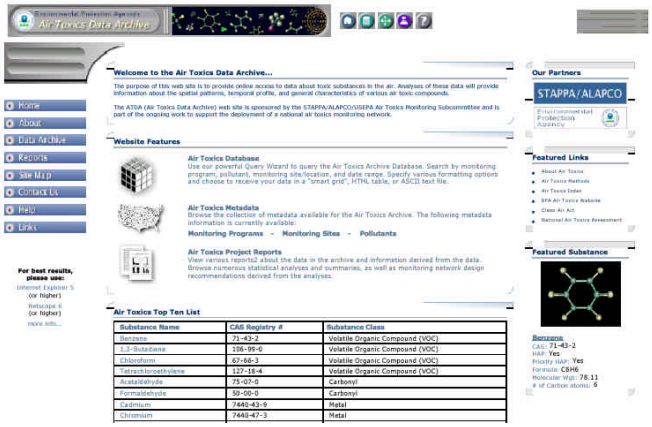


The Air Toxics Study in Cincinnati, which is being conducted by the Hamilton County Department of Environmental Services (HC DOES) in collaboration with the University of Cincinnati Center for health Related Aerosol Studies (U-Cincinnati CHRAS) and analytical group at University of California at Davis (UC-Davis), is more than half-way through. Three monitoring stations were established in residential area of Montgomery (northern suburb of Cincinnati, Ohio). All three sites are located close to a major interstate highway (I-71) at 50, 200, and 400 m from the highway, and are equipped with volatile organic compounds canister samplers, DRUM particle samplers, $PM_{2.5}$ Harvard impactors, and meteorological sensors. Significant amount of data was generated with respect to the total and fractional aerosol concentration and particle size distribution of $PM_{2.5}$ (U-Cincinnati CHRAS) and volatile organic compounds (HC DOES). A rich amount of data have also been collected for chemical (elemental) analysis of 8 specific particle size fractions, including fine and ultra-fine sizes, which is being performed by the UC-Davis group. The high time resolution data (1.5 hours) on particulate mass and elemental concentrations are collected. This allows exploring dispersion and transport of highway-related air pollutants in a more detailed manner than using the standard 24-hour integrated samples. Overall, three two-week sampling campaigns have been completed, which addressed the seasonal variability. One more such sampling campaign is scheduled to be conducted next month. All the data will be analyzed by the end of September. A final report and a manuscript for a peer-review journal will be prepared.

The Dayton area sampling consists of TO-15 canister VOC sampling at two sites in Montgomery County and TO-17 passive sorbent tube sampling at nine sites in Montgomery County and one site in Hamilton County. (Note, TO-14A canister VOC sampling for a 12-month period is also being collected at two other sites in Montgomery County, as part of another grant.) These data will be used, along with those in Cincinnati, to characterize air toxics concentrations in southwest Ohio, and will be used to support an ISC modeling and inventory enhancement study for the Dayton area.

USEPA Air Toxics Website

Colorado State University's Cooperative Institute for Research in the Atmosphere (CIRA), under contract to USEPA, has developed a preliminary version of a new web site with air toxics data from the pilot city program and the historical air toxics data archive.



The web site is available for inspection at http://vista.cira.colostate.edu/atda/. Please note that access to raw measurement data (through the Query Wizard) is password protected. The necessary log in information is: Username = epa, Password = airtoxics. Comments from interested users are welcome. Please direct any comments to James Hemby, USEPA (hemby.james@epa.gov).

For information on national air toxics monitoring, please contact Sharon Nizich, USEPA, OAQPS, nizich.sharon@epa.gov , 919-541-2825. For information on the data analysis projects, 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.