USEPA Final Report for
Urban Community Air Toxics Monitoring Project, Paterson City, NJ (UCAMPP)

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A) Abstract/overview of project along with completed work plan activities.

The overall objective of the Urban Community Air Toxics Monitoring Project, Paterson City, NJ (UCAMPP) was to characterize local air toxics related to different land use patterns in a highly industrialized urban community. Air monitoring stations were set up on the roof tops/upper floor of three buildings in Paterson with the aim of capturing industrial, commercial and mobile source dominated emissions over a one year period. A ground level background site was situated in Chester, NJ, about 58 km WSW of Paterson. UCAMPP set out to 1) characterize the spatial resolution and 2) concentration gradients of monitored air toxics; 3) identify source signatures from various land use(s); 4) evaluate modeling results using monitoring data; 5) field test new sampling and analyses techniques for air toxics that are currently difficult to quantify; 6) characterize the concerns of an Environmental Justice (EJ) community; 7) provide information and develop tools so that the New Jersey Department of Environmental Protection (NJDEP) and the local community could better address exposure and risk issues related to air toxics; and 8) identify risk reduction strategies, and 9) implement those that we could. This study serves as a pilot project to provide valuable information that can be applied to other communities around the state and the nation.

UCAMPP measured the same analytes at all four sites. One of the most valuable lessons learned from this project was that a detailed emissions microinventory should be completed before selecting analytes and monitoring locations and that a detailed emissions inventory requires site visits and those site visits provide an excellent opportunity for identifying risk reduction strategies, outreach and education.

A total of 132 air pollutants were measured during UCAMPP: 60 Volatile Organic Compounds by TO-15 at ERG, Inc; 48 Metals by X-Ray Fluorescence and EC & OC by thermal/optical transmittance carbon analyzer at RTI, 4 Carbonyls by PAKS (DNSH) at EOHSI and at 1 site DNPH; 16 PAHs by EOSHI Method; Hexavalent Chromium by EOHSI method; PM_{10} mass by EOHSI.

Sampling frequency was planned for one in every six days. Our target was 44 weekday and 16 weekend measurements, for a total of 60 measurements at each site totaling 240 samples plus duplicates and blanks. UCAMPP achieved approximately 90% collection

efficiency for samples. Greater than 90% (around 220 for each sample type) of the collected samples were considered valid and included in the data analysis.

Field blank subtracted data were used for data analysis. All reported values, even if they were below the detection limit (DL), were used in the data analysis. For those measurements that were reported as non detect (ND), the following protocol was followed: if ND was between less than 15% of all samples from all sites, 1/2 the DL was used as a replacement value; if ND were greater than 15% and less than 50%, 0 and the full mdl were substituted separately and results compared (There were no substantial differences in the outcomes of any of the results for the different substitutions. This was done to be sure to cover the full range of possible values); if the ND were 50% or more, than no substitution, locational or temporal analysis was done and only the relevant percentiles were calculated.

1) Characterize the spatial resolution and 2) Concentration gradients of monitored air toxics; 3) Identify source signatures from various land use(s); and 4) Temporal analysis (weekday/weekend & season)

Since the measurements obtained from the study are highly skewed to the right (Shapiro-Wilk test; $p<0.05$), non-parametric approaches were used for comparison of site, season, and day of the week. Differences in season and day of the week (weekday vs. weekend) were examined because sources and or intensity may vary. To examine the spatial and temporal differences, Wilcoxon two-sample or Kruskal-Wallis tests (two-sided) were used. If a significant difference ($p<0.05$) was found among sampling sites, seasons, or weekday/weekend, Bonferroni adjusted Wilcoxon rank-sum tests ($\alpha=0.0083$) were conducted for multiple comparisons.

<u>Volatile Organic Compounds (VOCs)</u>

Out of 60 VOCs that were measured, the following thirteen were not detected at any of the sites: 1,1,2,2- tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1,-dichloroethene, 1,2-dibromoethane, bromochloromethane, bromodichloromethane, bromoform, ethyl acrylate, ethyl tert-butyl ether, cis-1,3-dichloropropene, trans-1,2-dichloroethylene, trans-1,3-dichloropropene. An additional eight VOCs were detected less than 50% of the time so only percentiles were calculated. The remaining VOCs (n=39) were detected more than 50% of the time so locational and temporal analysis could be performed.

Out of the remaining 39 compounds, no differences were observed between the background site and each of the Paterson sites; bromomethane, carbon tetrachloride, chloromethane and dichlorotetrafluoroethane.

The following compounds were observed to have significantly lower annual averages in Chester than in Paterson (the reported Paterson value is the highest annual average at one of the 3 sites in Paterson) and no significant differences between the Paterson sites. Acetylene (0.52 vs. 1.76 $\mu g/m^3$ @ the C site), dichloromethane (0.33 vs. 1.31 $\mu g/m^3$ @ the I site), chloroform (0.08 vs. 0.33 $\mu g/m^3$ @ the C site), methyl-tert-

butly-ether (0.08 vs. 0.73 μg/m^3 @ the C site) tetrachloroethylene (0.13 vs. 0.75 μg/m^3 @ the C site), toluene (0.70 vs. 8.07 μg/m^3 @ the M site) and n-octane (0.07 vs. 0.33 μg/m^3 @ the C site). These results indicated the significant impact of emissions from traffic, commercial activities and the operation of industrial facilities located in Paterson.

Interesting, acetonitrile was higher at the background site than at each of the Paterson sites. However, since the annual average is 2 orders of magnitude less than the reference concentration (for noncancer health impacts) no further investigation is warranted.

There were no weekday/weekend differences in any of the VOCs measured at the background site. The following compounds exhibited weekday/weekend differences in Paterson: chloromethane (1.17 vs. 1.09 μg/m^3), dichloromethane (1.33 vs. 0.81 μg/m^3), methyl ethyl ketone (2.62 vs. 1.31 μg/m^3), tetrachloroethylene (0.72 vs. 0.46 μg/m^3), toluene (8.03 vs. 6.05 μg/m^3), methyl isobutyl ketone (3.57 vs.0.28 μg/m^3) and methyl tert butyl ether (0.72 vs. 0.42 μg/m^3). These results indicated the significant impact of emissions from traffic, commercial activities and the operation of industrial facilities located in Paterson.

The following represents the results from the locational and temporal analyses for the VOCs that were targeted by EPA in the original Request For Proposal. 1,2-dichloropropane was not detected at all of the sites except for one sample at the mobile site. This value was reported but under the detection limit.

For 1,3-butadiene, there were no significant differences between any of the sites, weekdays or weekends. There were significant differences between summer & winter, summer & fall, and spring & winter with higher values in the winter. e.g. for Paterson, winter annual average was 0.4 μg/m^3 and summer was 0.13 μg/m^3 , spring was 0.03 μg/m^3 and fall was 0.20 μg/m^3 . This chemical is ubiquitous because it is emitted from car and truck exhaust, incinerators and wood smoke. Since it breaks down quickly in sunlight, it would be expected to exhibit seasonal differences.

For acrolein by TO-15, there were significant differences observed between B& C and C & M, with the C site having the highest average concentration (C @1.1 μg/m^3, B @ 0.6 μg/m^3 and M@ 0.8 μg/m^3). Since acrolein is formed from cooking oils and grease, it is not unexpected that the C site would be the highest since there is a Wendy's located across the street from the site. There were no differences between weekdays or weekends. Seasonal differences varied and no pattern was observed. Acrolein is emitted from mobile sources and reacts with other chemicals and sunlight to form other compounds.

Benzene had variable differences between sites with no emerging pattern. No differences were observed between weekends and weekdays, but were observed between winter (2.37 μg/m^3) & summer (1.11 μg/m^3) and winter (2.37 μg/m^3) & spring (0.39 μg/m^3) in Paterson. For the background sites, there were significant differences between every season except spring & summer. Benzene is emitted from numerous industrial operations as well as mobile sources and heating which may explain the seasonal variation.

Carbon tetrachloride was detected every time and no significant differences were observed by site or weekday/weekends. There were some seasonal differences observed which was unexpected because carbon tetrachloride is rarely emitted these days and has a very long 1/2 life in air.

There were no differences for chloroform between the Paterson sites but there were significant differences between Paterson and Chester, 0.07 vs. 0.33 $\mu g/m^3$ respectively. No significant differences for weekday to weekend. There was variation in the seasonal differences that were observed.

Dichloromethane (also known as methylene chloride) was detected in almost every sample except for a couple times at the background site. Annual average concentrations of dichloromethane were higher in Paterson than the background site by an order of magnitude (0.33 vs.1.31 $\mu g/m^3$). No weekday/weekend differences at the background site but there were in Paterson (1.33 vs.0.81 $\mu g/m^3$). No seasonal differences were observed at the background site. Spring was different than all other seasons in Paterson. Since dichlromethane is widely used as an industrial solvent/degreaser, paint stripper, aerosols, and pesticides, these relationships reflect the industrial nature and the anthropogenic activities which occur in urban centers such as Paterson.

Significantly higher levels of tetrachloroethylene were monitored in Paterson vs. the background site (0.75 vs. 0.13 $\mu g/m^3$). No significant differences were observed between the Paterson sites. There was a weekend/weekday difference in Paterson but not at the background site. No seasonal differences were observed. Since tetrachlorethylene is a solvent used for degreasing and in the dry cleaning industry, these results reflect the industrial nature and the anthropogenic activities which occur in urban centers such as Paterson.

Trichloroethylene was not detected more than 50% of the time so no locational or temporal analysis was done. The maximum measured concentration was at the C site and exceeded the benchmark concentration for cancer but was 3 orders of magnitude beneath the reference concentration.

Vinyl chloride was not detected more than 80% of the time so no locational or temporal analysis was done. The maximum concentration that was measured was at the benchmark concentration for cancer but was 3 orders f magnitude beneath the RfC.

<u>Polycyclic Aromatic Hydrocarbons (PAHs), Elemental Carbon (EC), Organic Carbon (OC) and Elements.</u>

For most elements, PAHs, EC and OC, significantly higher concentrations were observed in the 3 sites in Paterson than in Chester. For metals, the mean Al concentrations were 194, 176, and 163 $\eta g/m^3$ at the commercial, industrial, and mobile sites in Paterson, and only 106 $\eta g/m^3$ at the Chester site, the mean Pb concentrations were 6.58, 6.48, and 5.61 $\eta g/m^3$ at the commercial, industrial, and mobile sites in Paterson, and 2.95 $\eta g/m^3$ at the Chester site, the Zn concentrations were 34.0, 22.7, 22.9 $\eta g/m^3$ at the commercial, industrial, and mobile sites in Paterson, and 10.6 $\eta g/m^3$ at the Chester site, the EC concentrations were 0.91, 0.72, 0.76 $\eta g/m^3$ at the commercial, industrial, and mobile sites in Paterson, and 0.34 $\eta g/m^3$ at the Chester site, the phenanthrene concentrations were 19.2, 18.4 and 27.3 $\eta g/m^3$ at commercial, industry and mobile sites in Paterson, and 5.16 $\eta g/m^3$ at the Chester site, and the BaP concentrations were 0.08, 0.09, and 0.09 $\eta g/m^3$ at the commercial, industrial, and mobile sites in Paterson, and 0.04 $\eta g/m^3$ at the Chester site. Only a few analytes showed significant difference among the 3 sites in Paterson, e.g. Cu and pyrene. The site difference for most species was also found when stratified by season and day of the week, and the difference was often more significant during the winter season and weekdays. These results indicated the significant impact of emissions

from traffic, commercial activities and the operation of industrial facilities located in Paterson. In contrast, the site differences for Cr-VI and aldehyde concentrations among the 4 sites were not found to be statistically significant ($p > 0.05$). For example, the ambient mean concentrations measured at the 4 sites ranged from 0.23 to 0.26 ng/m3 for Cr-VI, 9.94 -11.26 $\mu g/m^3$ for formaldehyde, and 0.28 – 0.37 $\mu g/m^3$ for acrolein. These observations may suggest photo-oxidation plays an important role in the concentrations of these species in ambient air.

A significant seasonal variation was observed for Cr-VI concentrations measured in Paterson ($p = 0.0008$) and Chester ($p = 0.0042$). Multiple comparisons for seasons showed that the summer measurements were significantly higher than other seasons, indicating the formation of Cr-VI through photo-oxidation during the summer season. A similar trend was observed for acrolein, i.e. higher summer ambient acrolein concentrations were observed than other seasons ($p = 0.0022$). Different seasonal patterns were observed for EC, OC, many elements (e.g. Br, Cl, Cu, Pb, Mg, Ni, Se, Na, Sr, Ti, Zn), and most PAHs. For these species, higher concentrations were observed in winter than in summer. These observations suggest higher emissions from combustion sources, e.g., heating, during the winter season. In addition, winter time meteorological factors i.e., lower photo-activity, lower mixing height, stagnation, inversion, may also contribute to the higher winter pollutant concentrations that were observed.

The differences in pollutant concentrations measured during weekday and weekend were investigated to assess the contribution from industrial operations and vehicular emissions, which are typically higher during weekdays than weekends. Significant differences were found for PM_{10} mass, elemental carbon and many elements (e.g. Al, Ca, Cu, Fe, Mg, Mn, Si, Na, S, Ti, V). The concentrations of these species measured in Paterson were higher during weekdays than weekend days. However, the weekday weekend differences for these pollutants were not observed in Chester. These observations again revealed the contribution of anthropogenic sources to ambient air pollution of these species in an urban environment. Surprisingly, the weekday/weekend difference was only found for acrolein among the 4 target aldehydes and fluoranthene and pyrene among the 16 target PAHs.

Additional Spatial and Temporal Analysis:

Modern geostatistical methods will be used to analyze the data for both spatial and temporal trends. This method integrates spatial, temporal, and Bayesian equations; while simultaneously treating the data as a regionalized variable having both deterministic and random behaviors. The Bayesian equations allow one to mix "hard" and "soft" data sets in a single analysis. Hard data is a typical data set of concentration values from sampling stations. Soft data can be a data set of different quality, upper limits, lower limits, distribution characteristics, professional judgments and other "soft" information. These very advanced methods are superior for finding spatial and temporal trends in the data which can be used to identify practical and effective risk reduction strategies. An example is trichloroethylene, which has been shown to have a concentration gradient that increases from the southwest to the northeast, regardless of the overall severity of the air concentration.

5) Field test new sampling and analyses techniques for air toxics that are currently difficult to quantify

During UCAMPP, EOSHI starting working on a new method for measuring Cr-VI in ambient air. Air samples were collected on pre-treated sodium bicarbonate impregnated cellulose filters. The samples were extracted with 5 mL pH=4 nitric acid solution and sonicated for 40 minutes at 60ºC, separated by IC, and detected by ICPMS. The analytical detection limit was 0.12 ppb (ηg/mL), which is equivalent to 0.05 ηg/m^3 air concentration for a sampling volume of 24 m^3. The method detection limit was calculated from the field blanks at 0.16 ηg/m^3, and the average %difference determined from the duplicate samples (n=13) was 25%. NIST 1648 urban particulate matter was spiked with Cr-VI and Cr-III isotopes to evaluate the recovery of Cr-VI and inter-conversion rate between Cr-VI and Cr-III. The conversion of Cr-VI to Cr-III was found to be low (<20%) but conversion of Cr-III to Cr-VI was more significant (<40%). The recovery of Cr-VI was >70% during lab and field evaluation for the Cr-VI spiked on the NIST 1648 particles and air particulate matter collected during the UCAMPP.

Based on the results from UCAMPP, an additional study, the 'Development and Optimization of a Sampling and Analytical Method to Measure Hexavalent Chromium in Ambient Air' is being conducted to further improve the method (i.e. reduce the filter blank level of Cr-VI, finalize the inter-conversion rate), to characterize the effect of environmental conditions on the Cr-VI stability during sampling, e.g., aerosol type and composition, relative humidity, temperature, ozone, sulfur dioxide and nitrogen dioxide. This project is currently in the first year of a two year project period. In addition, the 'Evaluation of Two Analytical Methods and Sampling Trains for the Measurement of Hexavalent Chromium in Ambient Air' is expected to be underway by the end of 2008. This study will compare the EOHSI analytical method to the current EPA approved method and compare two different sampling trains. This will include an inter-laboratory comparison of the sampling and analytical methods.

UCAMPP also field tested the Passive Aldehydes and Ketones Sampler (PAKS) Method and compared it to the current EPA method, TO-11A. PAKs was developed not only to have a passive air sampling method but also because it is widely accepted that TO-11A is not adequate for the measurement of acrolein. In addition, a recent study (Herrington et al., 2007) showed that acetaldehyde was significantly underestimated by the TO-11A when the sampling time was 6 hours and longer. The PAKS method has good sensitivity and selectivity and appears to be a reliable method for the measurement of acrolein. In addition, the use of a passive sampler for ambient air monitoring does not require a power supply, provides more flexibility for field sampling, minimizes the loss of sample due to power or sampling pump failures and is lightweight which makes it more easily worn by subjects for personal air sampling.

The sampling duration was 48 hours for PAKS since it was not feasible to automate the start of passive sampling. Besides PAKS, formaldehyde, acetaldehyde, and propionaldehyde were simultaneously measured by the TO-11A method at the Chester site as part of the NJDEP air toxics monitoring program. The sampling duration was 24 hours beginning at 12 AM. Acrolein was also measured by the TO-15 method at 4 sites with a sampling duration of 24 hours. The method precision, field blank concentrations, and concentrations measured by each method were compared.

The mean field blank concentrations of formaldehyde, acetaldehyde, and propionaldehyde determined by the TO-11A method (< 0.1 μg/m^3) were low but were high for PAKS (0.66-7.6 μg/m^3). This may have occurred because the PAKS samplers are not air tight and small leaks can occur when the field blank samplers were placed in the field. The field blank concentrations of acrolein with a PAKS sampler were low, with a median value of 0.04 μg/m3 and mean of 0.17 μg/m^3. The MDLs of formaldehyde, acetaldehyde, and propionaldehyde were < 0.05 μg/m^3 for the TO-11A method and <0.3 μg/m^{3}for PAKS. The MDL for acrolein was 0.2-0.27 μg/m^{3}for PAKS, comparable to TO-15 method (0.07-0.25 μg/m^3).

Good precision was obtained by the TO-11A method, with mean absolute %diff < 20% for formaldehyde, acetaldehyde and propionaldehyde. For PAKS, good precision was obtained for acrolein, with mean %diff of 13%. The precision for formaldehyde measured by PAKS was reasonable, with mean and median %difference of 30%. However, a greater variability was observed for acetaldehyde and propionaldehyde, with an average %difference of ~50%. The precision of acrolein measured by TO-15 was acceptable, with mean %difference <30%.

The concentrations of formaldehyde, acetaldehyde, and propionaldehyde measured by TO-11A were found to be ~4-5 times lower than those determined by PAKS. The discrepancy may be partially attributed to the low collection efficiency of the TO-11A method for a sampling duration > 6 hours. For acrolein, the average concentration measured by TO-15 was 2-3 times higher than those determined by PAKS, which may suggest a potential positive artificial formation of acrolein in canister.

Further, we examined the site (spatial) and seasonal variations for all the data obtained by each method. Similar seasonal patterns were reported by each method for some species. For example, the results from the TO-11A method showed that the formaldehyde concentration measured in Chester was higher in summer than other seasons, and no seasonal difference was observed for acetaldehyde or propionaldehyde. However, the results from PAKS showed no seasonal difference for all three compounds. For acrolein, both TO-15 method and PAKS showed higher concentrations in summer, however, PAKS did not detect any site difference while TO-15 reported higher acrolein concentration at the commercial site. The reasons for the different patterns reported by the 3 methods cannot be determined based on the information obtained in this study. In summary, we would conclude that PAKS is a sensitive sampling method for the measurement of aldehydes, and the method precision was good for acrolein. However, the background and method variability for formaldehyde, acetaldehyde, and propionaldehyde were larger compared to TO-11A method. Further investigation is needed to reduce the background and variability of PAKS. Second, the TO-15 method may have a positive artifact for acrolein measurement during sample storage, which requires further evaluation. Third, the method precision of the TO-11A method is very good but the collection efficiency of aldehydes for sampling time > 6 hours needs to be fully evaluated. Finally, the concentrations reported by the 3 methods are not comparable, thus, these 3 sampling methods need to be compared and evaluated side-by-side using a standard dynamic gas system in the laboratory as well as in the field to determine the accuracy of each method for the measurement of aldehydes.

4) Evaluate modeling results using monitoring data;

The CALPUFF model was chosen because of its ability to predict high-resolution concentrations at near source locations and its ability to use concurrent three-dimensional wind fields for 2006 that could characterize the terrain surrounding Paterson. CALPUFF is a non-steady state Gaussian puff model. It is an EPA-approved model for sources over 50km from the study area. The wind fields used by CALPUFF are generated by a meteorological model CALMET.

The source categories modeled in CALPUFF were 1) industrial point sources 2) area sources 3) on-road mobile sources. Mobile emissions from local roads and highways were modeled in CALPUFF as area sources.

The CALPUFF model predicts pollutant concentrations at a series of model receptors (n=2907) Model receptors were placed alongside the UCAMPP monitors to enable model: monitor comparisons which are part of the model verification process.

Benzene, p-dichorobenzene and toluene were modeled to evaluate the model using the monitoring data. Good agreement occurred for benzene and p-dichlorobenzene. Toluene modeling results were very different from the monitoring data. This is being further investigated to determine possible reasons why

Figure 1 (below) is an example of the output from the modeling effort.

MAXIMUM PREDICTED ANNUAL BENZENE CONCENTRATIONS

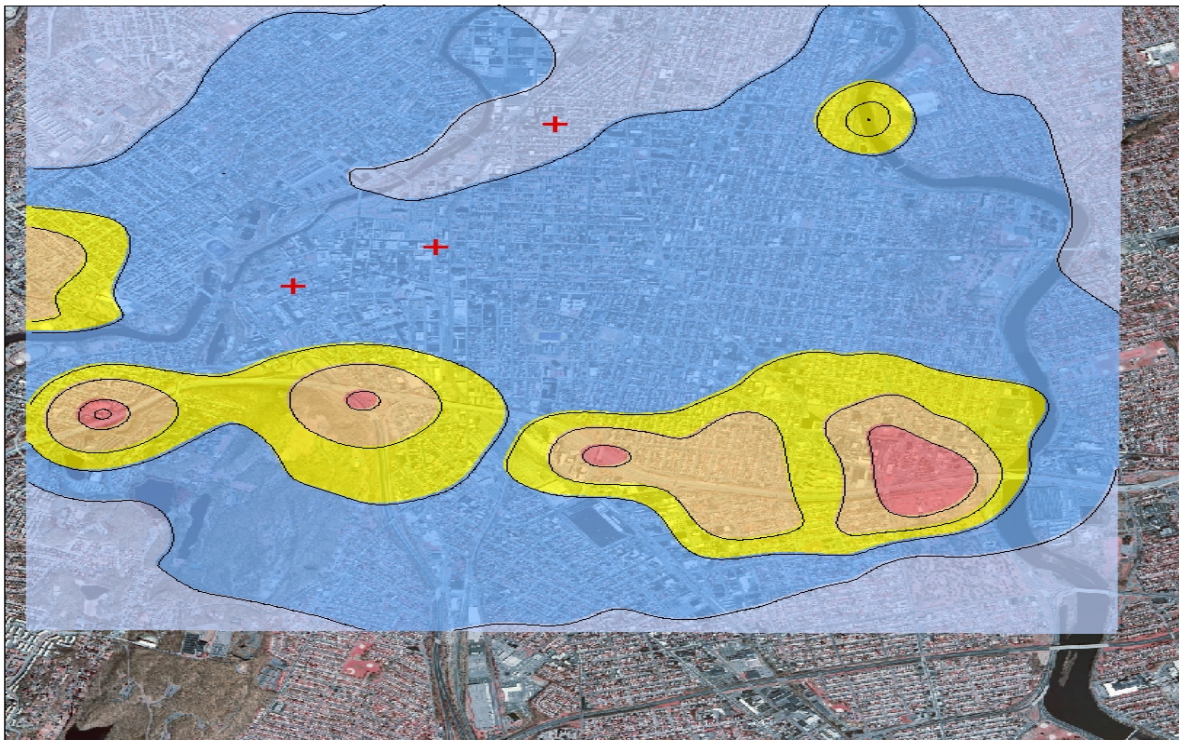

Table 1: Maximum predicted annual benzene concentrations at three Paterson monitors compared to observations

Monitor	Observed	Predicted (including background)
Mobile	1.4	2.9
Commercial	1.8	2.7
Industrial	1.1	2.3

Table 2: Maximum predicted annual dichlorobenzene concentrations compared to observations at three Paterson monitors

Monitor	Observed	Predicted (including background)
Mobile	0.03	0.07
Commercial	0.04	0.07
Industrial	0.04	0.07

Table 3: Maximum predicted annual toluene concentrations compared to observations at three Paterson monitors

Monitor	Observed	Predicted (including background)*
Mobile	8	5586
Commercial	8	5018
Industrial	6.5	1728

6) Characterize the concerns of an Environmental Justice (EJ) community; 7) provide information and develop tools so that the New Jersey Department of Environmental Protection (NJDEP) and the local community could better address exposure and risk issues related to air toxics;

Initial outreach efforts were not able to identify community concerns related to exposure to ambient air toxics. Additional outreach efforts with the results of this study are planned for the summer and fall and concerns may become more apparent at that time.

Risk Assessment:

For the compounds that were targeted in the original RFP, risk based numbers were compared to the annual average. The following compounds may pose a health risk based on the comparison of the annual average concentration to the NJDEP health benchmark concentrations for either carcinogenic or noncarcinogenic risks. For 1,3 butadiene, manganese, tetrachloroethylene, only the background site was below the carcinogenic health based #. For the following compounds, all the sites were above the health benchmark: acetaldehyde, acrolein, benzene, arsenic, carbon tetrachloride, chloroform, hexavalent chromium and formaldehyde.

8) Identify risk reduction strategies, and 9) Implement those that we could.
To date, risk reduction strategies include but are not limited to: identify which industrial processes would benefit from a pollution prevention audit (during site visits); education on anti idling legislation/1-800-WARN DEP#; placement of anti-idling signs; identification of facilities that warranted further investigation; identify fleets that may be eligible for retrofits, e.g., waste hauler, bus company; identify illegal auto body shops; initiate modeling effort in conjunction with a stack test for a grandfathered facility which emits lead; identify location where a lead monitor might be warranted; educate hospital on dangers and legal implications of crushing mercury containing light bulbs on site resulting in the hospital ceasing those activities; and handed out EPA pamphlets 'Reducing Air Pollution From….' during site visits.

Additional risk reduction strategies may be developed based on time series analysis. This will help to characterize any patterns which may lead to additional site visits by enforcement and or pollution prevention. For instance, initial observations indicate that there may have been a release in Paterson on 2/16/07 because concentrations of toluene, MEK, m,p-xylene and PM_{10} at all or some Paterson sites were some of the highest measured concentrations throughout the monitoring project. It was also observed that during the fall of 2006, p-dichlorobenzene appears to have its highest measured concentrations (by 2 orders of magnitude for about 6 samples at the C site). All episodes will be discussed with the emissions inventory person, modeler, pollution prevention and enforcement through a collaborative working group at NJDEP, the Air Toxics Steering Committee.

As progress was made, it became evident that the name of the project really should have been 'Identification of Risk Reduction Strategies for Air Toxics in an Urban Community Through Emissions Inventory, Site Visits, Outreach & Education, Modeling & Monitoring'.

B) Comparison of actual accomplishments with the anticipated outputs/outcomes specified in the assistance agreement work plan;
1. The data has not yet been uploaded to the AQS site.
2. A final report has not been uploaded onto the NJDEP website. Please check http://www.nj.gov/dep/dsr/ in fall of 2008.

C) Reasons why anticipated outputs/outcomes were not met:
1. The data has not been uploaded because of time constraints caused by other projects. It is anticipated that the data will be uploaded before the end of 2008.

2. Same as above.

D) Other pertinent information, including, when appropriate, analysis and explanation of cost overruns or high unit costs.

There were no actual cost overruns. NJDEP and UMDNJ donated considerable time and resources for project completion.

E) The methods to be used to effectively disseminate project information and/or continue the benefits of this project:

Information on UCAMPP was disseminated in multiple ways 1) during site visits 2) while seeking permission from the school board to site monitors on school roof tops 3) presentations to the Paterson Environmental Revitalization Committee, the Clean Air Council, Paterson school nurses, NESCAUM meetings, USEPA national meetings, National Air and Waste Management annual meeting, Commerce and Industry of New Jersey conference, during the student intern module, meetings with ACORN, the Hispanic Multipurpose Center, Kamau Khalfani, and the Paterson Community Health Center. During the summer and fall of 2008, it is planned to present results to the Paterson School District, Green Faith, etc. There have been and will continue to be presentations/posters at local, regional and national meetings.

F) Materials generated in connection with project activities (e.g., workshop announcements, newspaper/newsletter announcements, articles or releases, press packets, pamphlets, etc.).

There was 1 press release at the beginning of the study by the Herald on Wed Jan 19, 2005. Multiple journal articles will be submitted, a report will be posted on the NJDEP website along with a research project summary. There have been and will continue to be presentations/posters at local, regional and national meetings.

References

Herrington et. al., Low Acetaldehyde Collection Efficiencies for 24-Hour Sampling with 2,4-Dinitrophenylhydrazine (DNPH)-Coated Solid Sorbents. Environ. Sci. Technol., 41 (2), 580 -585, 2007.