Joint Air Toxics Assessment Project (JATAP) for the Maricopa/Pinal Urban Area, Arizona

Presented by:
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Phoenix Joint Air Toxics Assessment Project (JATAP)

- Joint effort between state, county, tribal and EPA officials to address the risk from air toxics in the greater Phoenix metropolitan area.
- The collaboration is guided by a steering committee
  - Undertakes planning and coordination of joint activities through a consensus based process
  - Logistical and technical support from the Institute for Tribal Environmental Professionals (ITEP)
JATAP Participants

• Agencies with JATAP funded projects:
  – Salt River Pima-Maricopa Indian Community
  – Fort McDowell Yavapai Nation
  – Gila River Indian Community
  – Arizona DEQ
  – ITEP

• Other participating and advisory agencies
  – Maricopa County Air Quality Department
  – Pinal County Air Quality Control District
  – EPA Region 9 Air Division
  – University of Arizona
  – City of Phoenix
  – Sonoma Technology, Inc (sub-contractor)
Key Issues and Challenges

- Complexity of project
- Resource issues
- Quality of monitoring data
- Risk communication
- Data sharing
- Funding
What is the Maricopa/Pinal Urban Area?
Annual Average Daily Traffic Volume (vehicles per day)

Legend
- AQ Monitoring Sites
- AADT
  - 0 - 10,000
  - 10,001 - 20,000
  - 20,001 - 35,000
  - 35,001 - 75,000
  - 75,001 - 125,000
  - 125,001 - 200,000
  - 200,001 - 266,000
- Park
- Airport
- Tribal Land Boundary
- City Boundary
- County Boundary

0 2.5 5 10 15 Kilometers
1999 National Scale Air Toxics Assessment (NATA)


- Limitations:
  - Diesel particulate matter not included in cancer risk assessment
  - Uncertainty in cancer risk potency for formaldehyde (1999 NATA used much lower number)
  - Only as good as National Emission Inventory data

- Data available at http://www.epa.gov/ttn/atw/nata1999
1999 NATA Results

- 694 census tracts are all or partly in JATAP study area
- Total 2000 census population in these tracts: 3.25 million
- Population weighted lifetime excess inhalation cancer risk: 43.8 per million inhabitants
Relative Contribution to Excess Cancer Inhalation Risk, 1999 Modeling Domain for the JATAP Area

- 54% Background
- 26% On-Road
- 10% Area Source
- 7% Non-Road
- 3% Major Source
JATAP Pilot Study

• As part of JATAP, air toxics data were collected between March 2003-March 2004 at three sites:
  – West 43rd (MCAZ)
  – South Phoenix (SPAZ)
  – St John’s (Gila River Indian Community) (SJAZ)

• Other ADEQ sites for comparison include:
  – Phoenix Supersite (PSAZ)
  – Queen Valley (QVAZ)
Some Conclusions from Pilot Study

• For a number of key air toxics the detection limits for our analysis techniques were too high to allow risk assessment at these sites.

• Annual average concentrations of formaldehyde, acetaldehyde, benzene and 1,3 butadiene were on the high end of the range reported in EPA funded assessments of other US cities.
2005 Monitoring Project

- Funded through a combination of:
  - Community Air Toxics Monitoring Grants to ADEQ, Salt River and Gila River
  - Ongoing National Air Toxics Trend Sites (NATTS) funding
  - Particulate Speciation Trends Network (STN) funding
  - Photochemical Air Monitoring Stations (PAMS) funding
  - Additional support from EPA Region 9 lab

- This supported a network of eight monitoring sites:
  - Monitoring effort ranged from 1 in 12 day sampling for VOCs alone at one site to a comprehensive effort at the NATTS site
Objectives for Monitoring

- NATA results indicate that, overall, VOCs and carbonyls are the biggest risk drivers
  - Particulate metals significant in some areas
- Additional monitoring needed to compare with model results
  - Annual average concentrations of key HAPs
  - Spatial gradients
  - Potential hot spots (near freeway environments)
  - Diurnal variability
  - Source identification through fingerprinting
  - Which HAPs contribute most to the risk?
Key Features of JATAP Monitoring and Analysis

• Lowered detection limits for VOC species to support risk assessment; included sample-specific MDLs.
• Sampled at a range of urban, rural, and tribal sites.
• Data validation and analysis were built into the program including strong QA program (collocated measurements, inter-laboratory comparison).
• Results of this study will be put in National context.
Current Status of Data Analysis

• Data validation is complete
• Analyses to be completed by end of year
Accomplishments of JATAP (2000-2006)

- Continuous involvement of all agencies during the project
- Bridged data gap to include tribal lands
- Leveraged existing monitoring resources
- Encouraged data sharing
- Enhanced tribal capacity
- Collected *quality* air toxics data
- Completed a detailed review of existing knowledge of Phoenix HAPs
- Developed a blueprint for a multi-year comprehensive study of HAPs in the Maricopa/Pinal Urban area
Future Use of JATAP Monitoring Data

- Critical for future risk assessment effort
  - Detailed emission inventory
  - Dispersion modeling
  - Human exposure modeling
  - Quantification of cancer and non-cancer risk due to inhalation exposure

- Monitor data provides key comparison for dispersion model output
  - Increased confidence in outcome of assessment
Continuing JATAP Monitoring Collaboration

- In September 2006, ADEQ and Salt River Pima Maricopa Indian Community installed a Differential Optical Absorption Spectrometer (DOAS) for continuous measurements of key VOC and carbonyl species.
- Complete data analyses by January 2007.
- Identify funding sources to continue efforts.
For More Information

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<table>
<thead>
<tr>
<th>Location</th>
<th>Measurements</th>
<th>Sampling Frequency</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix - JLG Supersite</td>
<td>VOCs, PAHs, carbonyls, continuous black carbon, continuous elemental/organic carbon, continuous NMHC, particulate metals</td>
<td>1 - 24 Hour Sample Every 6 Days</td>
<td>Population Exposure</td>
</tr>
<tr>
<td></td>
<td>Collocated VOCs, carbonyls, particulate metals</td>
<td>1 - 24 Hour Sample, Schedule Varies by Sample Type</td>
<td>QA</td>
</tr>
<tr>
<td>West Phoenix</td>
<td>VOCs, particulate metals</td>
<td>1 - 24 Hour Sample Every 6 Days</td>
<td>Population Exposure</td>
</tr>
<tr>
<td>South Phoenix</td>
<td>VOCs, carbonyls, particulate metals</td>
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</tr>
<tr>
<td>Gila River Indian Community, St. Johns</td>
<td>VOCs, particulate metals</td>
<td>Sampling Every 6 Days, Alternate 2 - 12 Hour Samples and 1 - 24 Hour Sample</td>
<td>Transport/ Gradient</td>
</tr>
<tr>
<td>Salt River Pima-Maricopa Indian Community, Senior Center</td>
<td>VOCs, particulate metals</td>
<td>Sampling Every 6 Days, Alternate 2 - 12 Hour Samples and 1 - 24 Hour Sample</td>
<td>Transport/ Gradient</td>
</tr>
<tr>
<td>Fort McDowell Yavapai Nation</td>
<td>VOCs</td>
<td>1 – 24 Hour Sample Every 12 Days</td>
<td>Transport/ Gradient</td>
</tr>
<tr>
<td>Greenwood, SW Corner of I-10/I-17</td>
<td>VOCs, carbonyls, particulate metals</td>
<td>1 - 24 Hour Sample Every 6 Days</td>
<td>Maximum Concentration</td>
</tr>
<tr>
<td>Queen Valley</td>
<td>VOCs, elemental carbon, particulate metals</td>
<td>1 - 24 Hour Sample Every 6 Days</td>
<td>Background</td>
</tr>
</tbody>
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