

Emission Inventory Conference:

## One Atmosphere, One Inventory, Many Challenges



Courses: April 30, 2001  
Conference: May 1 - 3, 2001  
Adams Mark Hotel - Denver, Colorado

Sponsored by:



Emission Factor and Inventory Group  
Emissions Monitoring and Analysis Division  
Office of Air Quality Planning & Standards

## Conference Synopsis

<b>Tuesday May 1, 2001</b>	<b>Session</b>	<b>Title</b>
8:00 am - 11:30 am	*	Keynote Address and Plenary Session
1:00 pm - 5:00 pm	1	Ammonia
1:00 pm - 3:30 pm	2	Area Sources
1:00 pm - 4:30 pm	3	Inventory Validation
6:00 pm - 8:00 pm	*	Exhibit/Poster Session/Reception

### Wednesday May 2, 2001

8:30 am - 12:00 pm	4	Data Management
8:30 am - 12:00 pm	5	Particulate Matter
8:30 am - 12:00 pm	6	Mobile Sources
1:00 pm - 4:30 pm	7	Integrated Emission Inventory Issues
1:00 pm - 4:30 pm	8	Preparation for Modeling
1:00 pm - 5:00 pm	9	Greenhouse Gases

### Thursday May 3, 2001

8:00 am - 12:00 pm	10	Preparation for Modeling
8:00 am - 11:30 pm	11	Air Toxics
8:00 am - 12:30 pm	12	Fugitive Dust

### Keynote Speaker - Christine L. Shaver

Chris is the Chief of the National Park Service's Air Resources Division. She manages the NPS's national air quality program, which included operation of an extensive monitoring network in parks throughout the U.S.

### Plenary Session: "New Initiatives in Regional Collaboration"

Panelist include:

David Mobley, U. S. Environmental Protection Agency  
 Patrick Cummins, West Regional Air Partnership  
 Bill Grantham, National Tribal Environmental Council  
 Larry Byrum, Central States Air Resources Agencies Assoc  
 Mark Janssen, Lake Michigan Air Directors Consortium  
 Bruce Carhart, Ozone Transport Commission  
 Phil Brantley, Southeastern States Air Resources Managers/The Southeastern Assoc of Local Air Quality Management Agencies

## Courses

April 30, 2001

### 8:00 am - 5:00 pm

<b>Course</b>	<b>Instructor</b>	<b>Location</b>
Basic Emission Inventory Preparation	Anne Pope and Douglas Solomon, U.S. EPA	U. S. EPA Region VIII Office (Within Walking Distance)
EPA's Emission Estimation Tools	Dan Mussati, Roy Huntley, Dennis Beauregard, David Misenheimer, U.S. EPA	U. S. EPA Region VIII Office (Within Walking Distance)
EPA's Emission Estimation Tools	Dan Mussati, Roy Huntley, Dennis Beauregard, David Misenheimer, U.S. EPA	Colorado Department of Public Health (Shuttle Service Available)

### 8:00 am - 12:00 pm

<b>Course</b>	<b>Instructor</b>	<b>Location</b>
MOBILE6	David Brzezinski, U. S. EPA	Columbine Room
Natl Emission Inventory (NEI) Input Format (NIF)	Lee Tooly, U.S. EPA	Terrace Room
Emission Inventory Preparation for Modeling	Gregory Stella, U.S. EPA	Vail Room

### 1:00 pm - 5:00 pm

<b>Course</b>	<b>Instructor</b>	<b>Location</b>
Emission Inventory Quality Assurance	Rhonda Thompson, U.S. EPA	Columbine Room
PM Fine Emission Inventory Preparation	Tom Pace, U.S. EPA	Vail Room

Tuesday PM  
Session 1 Ammonia

May 1, 2001  
Vail Room

- 1:00 *Comparison of Ammonium in USA West Deposition to Ammonia Emission Estimates.* G. J. Stensland, V. C. Bowersox, B. Larson, R. D. Claybrooke, Illinois State Water Survey
- 1:30 *Ammonia Emission Factors from Swine Finishing Operations.* D. B. Harris, R. C. Shores, L. G. Jones, U.S. EPA
- 2:00 *DOAS Measurement of Atmospheric Ammonia Emissions at a Dairy.* G. H. Mount, B. P. Rumburg, B. L. Lamb, J. R. Havig, H. Westberg, K. A. Johnson, R. L. Kincaid, Washington State University
- 2:30 Break
- 3:00 *Ammonia Emissions from Light-Duty Vehicles.* T. Durbin, J. Norbeck, W. Miller, R. Wilson, H. Tao, S. Rhee, University of California
- 3:30 *Current and Future Emissions of Ammonia in China.* Z. Klimont, International Institute for Applied Systems Analysis, AUSTRIA
- 4:00 *Development of an Updated Gridded Ammonia Emission Inventory for the South Coast Air Basin.* G. E. Mansell, ENVIRON International Corp; J. Koizumi, Parsons Engineering Science
- 4:30 *Next Generation Ammonia Inventory for the San Joaquin Valley of California.* S. Roe, E. H. Pechan, Inc.; G. E. Mansell, ENVIRON International Corp.

Tuesday - PM  
Session 2 Area Sources

May 1, 2001  
Columbine Room

- 1:00 *Improvements in Emissions Modeling for Source Categories with Significant Ozone Precursor Emissions.* J. H. Wilson, S. S. Roe, K. B. Thesing, E. J. Laich, E. H. Pechan & Assoc, Inc; J. W. Havens, Pennsylvania Dept of Environmental Resources; C. Loomis, Alpine Geophysics, LLC.
- 1:30 *Analysis of Air Toxics Emission Inventories for Area Sources in the Great Lakes Region.* C. Y. Wu, C. Nelson, Minnesota Pollution Control, O. Cabrera-Rivera, J. Quan, Wisconsin DNR, D. Asselmeier, Illinois EPA; J. Bates, S. Moore, Indiana DEM; G. Baker, D. McGeen, Michigan DEQ, R. McDonough, R. Sliwinski, New York DEC; R. Altenburg, Pennsylvania DEP
- 2:00 *Update of Area Source Solvent Emissions and Methods.* R. Tooly, U.S. EPA; D. L. Jones, W. Battye, J. S. Fudge, EC/R;
- 2:30 Break
- 3:00 *A Recommended Procedure for Compiling Emission Inventory National, Regional and County Level Activity Data for the Residential Wood Combustion Source Category.* J. E. Houck, OMNI Environmental Services, Inc; J. Mangino, U. S. EPA; G. Brooks, Eastern Research Group; R. Huntley, U.S. EPA
- 3:30 *Development of the Area Source Model (ASEM).* Thompson G. Pace, U. S. EPA; R. P. Strait, C. C. Monroe, E. H. Pechan & Assoc., Inc.

Tuesday PM  
Session 3 Inventory Validation/QA

May 1, 2001  
Terrace Room

- 1:00 *AIRPACT: A Real-Time Air Quality Forecast System for the Pacific Northwest.* J. Vaughan, B. Lamb, T. Strand, Washington State University; R. Wilson, U.S. EPA; C. Bowman, C. Figueroa-Kaminsky, S. Otterson, M. Boyer, Washington Dept of Ecology; C. Mass, M. Albright, J. Koenig, University of Washington; N. Maykut, Puget Sound Clean Air Association
- 1:30 *Correlating An Upwind Source Footprint with Urban Emissions Data Using the MM5/CALMET/CALPUFF Modeling System.* S. M. O'Neill, B. K. Lamb, J. Chen, S. Napelenok, E. J. Allwine, D. Stock, Washington State University; J. B. McManus, J. H. Shorter, C. E. Kolb, Aerodyne Research Inc.
- 2:00 *Demonstration of the Quality Assurance (QA) Software Specifically Developed for the National Emission Inventory (NEI).* R. Thompson, U.S. EPA
- 2:30 Break
- 3:00 *Evaluation of PM<sub>2.5</sub> Chemical Speciation Samplers Used in the Implementation of a National Trends Monitoring Network.* J. B. Homolya, J. Rice, S. V. Nizich, M. Wisdom, U. S. EPA
- 3:30 *Improved Point Source Inventory Through Validation and Audit of the Reported Data.* M. A. Nazemi, Z. Pirveysian, E. Chang, South Coast Air Quality Management District; N. Meskal, Ecotek MST Solutions, Inc.
- 4:00 *Supporting Real-Time Air Quality forecasting Using the SMOKE Modeling System.* J. M. Vukovich, J. N. McHenry, C. J. Coats, A. Trayanov, MCNC-Environmental Programs.

Tuesday 6:00 - 8:00 pm  
Poster Session

May 1, 2001  
Majestic Ballroom

- Inverse Modeling to Estimate Seasonal Ammonia Emissions.* A. B. Gilliland, T. E. Pierce, R. L. Dennis, S. Roselle, U.S. EPA
- Bronzeville Air Quality and Public Health Partnership - Community-Scale Air Quality Monitoring Project in Chicago, Illinois.* J. E. Clougherty, Center for Neighborhood Technology
- Facilitating the Use of EPA's PART5 Model for Computing Particulate Matter Emissions Using a Graphical User Interface.* K. Black, Federal Highway Administration
- St. Louis Community Air Project (CAP) Toxics Emission Inventory Development.* M. Freebaim, C. Ku, T. Kruse, C. Flowers, N. Holm, Missouri Dept of Natural Resources
- Historic and Future SO<sub>2</sub> Emissions Analysis - 9 State Western Region.* J. H. Wilson, M. Salhotra, E. J. Laich, E. H. Pechan & Assoc., Inc.
- A Potential Error Associated with Using Chemical and Equipment Sales Data to Estimate Greenhouse Gas Emissions from Long-Lived, Pressurized Equipment.* D. O. Schaefer, U.S. EPA
- Observation of Carbonaceous Aerosol and Carbon Monoxide at a Suburban Site: Implication for a New Emission Inventory.* L. A. Chen, B. G. Doddridge, R. R. Dickerson, University of Maryland
- Shipyards Welding Emission Factor Development.* W. C. Mener, P. L. Rosen, LFR Levine Fricke; D. M. Austin, Dana M. Austin Environmental Consulting; W. S. Holt, Atlantic Marine Inc
- Reevaluation of Unpaved Road Emission Factor Model.* G. E. Muleski, C. Cowherd, Midwest Research Institute; G. Brooks, Eastern Research Group
- Processing the NET96 Version 3.11 Inventory with SMOKE.* Z. Adelman and M. Houyoux, MCNC
- PM<sub>2.5</sub> Speciation Profiles and Emission Factors from Petroleum Industry Gas-Fired Sources.* S. Wien, G. England, GE Energy and Environmental Research, K. Loos, Equilon Enterprises LLC; K. Ritter, American Petroleum Institute; D. Gurney, U.S. DOE; J. McCarthy, Gas Technology Institute, B. Liebowitz, J. Joseph, New York State Energy Research and Dev Auth; G. Franco, California Energy Commission
- Lombardia Region (Italy) Emission Inventory: Methodologies and Results.* S. Caserini, A. Fraccaroli, M. Moretti, A. Monguzzi, A. Giudici, Fondazione Lombardia per L'Ambiente
- Second Version of EDMS.* C. Hall, T. Thresher, CSSI
- PM<sub>10</sub> Emission Inventory Development Using Satellite Imagery.* P. DeNee, D. Catlin, T. Sumers, D. Jenkins, R. Sedlacek, Arizona Dept of Environmental Quality

Wednesday AM  
Session 4 Data Management

May 2, 2001  
Vail Room

- 8:30 *A PC-Based Emission Database System for the Auckland Region.* Y. L. Ng, R. C. Joynt, Environmental Protection Authority, AUSTRALIA
- 9:00 *Global Emissions Inventory Activity (GEIA) Overview.* P. Middleton, RAND Environment
- 9:30 *How Can I Participate in the Development of the 1999 National Toxics Inventory?.* A. Pope, D. Misenheimer, U.S. EPA; D. Wilson, Eastern Research Group
- 10:00 Break
- 10:30 *Emission Inventory Reporting through EPA's Central Data Exchange.* R. Tooly, S. Dombrowski, J. Wells, C. Clark, U. S. EPA; R. Chaudet, Logistics Management Institute
- 11:00 *The Emission Inventory and Air Quality Home Page.* F. Divita, M. Salhotra, P. Horch, S. Connolly, E. H. Pechan & Assoc, Inc.; B. Gilbert, U.S. EPA
- 11:30 *Managing EPA's Emission Inventory Databases.* D. Solomon, A. Pope, R. Tooly, U.S. EPA

Wednesday AM  
Session 5 Particulate Matter

May 2, 2001  
Columbine Room

- 8:30 *Estimating Travel Activity on Unpaved Roads for PM10 Conformity.* J. Morey, D. Niemeier, University of California-Davis
- 9:00 *A Comprehensive Research Plan for Developing PM 2.5 Emission Inventories.* P. Gaffney, California Air Resources Board
- 9:30 *Application of the Canadian Emissions Processing System, Version 1.1 to Estimate Organic Aerosol Composition for North America.* P. A. Makar, M. D. Moran, Environment Canada; M. T. Scholtz, A. W. Taylor, Canadian ORTECH Environment, Inc.
- 10:00 Break
- 10:30 *Open Burning and Construction Activities; Improved PM Fine Emissions Estimation Techniques in the National Emission Inventory.* K. B. Thesing, E. H. Pechan & Assoc., Inc; R. Huntley, U. S. EPA
- 11:00 *Estimating the Impacts of Agricultural Best Management Practices in the Maricopa County PM10 Non-Attainment Area.* P. G. Fields, M. E. Wolf, Eastern Research Group; V. Sadeghi, URS Corporation; M. George, Arizona Department of Environmental Quality
- 11:30 *Review of Wood Heater and Fireplace Emission Factors.* J. E. Houck, OMNI Environmental Consulting, Inc; J. Crouch, Hearth Products Assoc; R. Huntley, U.S. EPA

Wednesday AM  
Session 6 Mobile Sources

May 2, 2001  
Terrace Room

- 8:30 *MOBILE5-Mexico: An Emission Factor Model for On-Road Vehicles in Mexico.* A. Burnette, S. Kishan, M. E. Wolf, Eastern Research Group
- 9:00 *PART5-TX1: TNRCC's In-House Tool for Estimating PM-10 From In-Use Vehicles.* A. Burnette, S. Kishan, Eastern Research Group; B. Ubanwa, TNRCC
- 9:30 *A Fuel-Based On-Road Motor Vehicle Emission Inventory for the Denver Metropolitan Area.* S. S. Pokharel, G. A. Bishop, D. H. Stedman, University of Denver.
- 10:00 Break
- 10:30 *Development of On-Road Mobile Source Emission Inventories for Rural Counties.* G. B. Dresser, D. G. Perkinson, Texas Transportation Institute
- 11:00 *A Waterborne Commerce Inventory Integrating Economic, Transportation and Emissions Data.* J. J. Corbett, University of Delaware
- 11:30 *Weekday vs. Weekend Mobile Source Emissions Activity Patterns in California's South Coast Air Basin.* T. H. Funk, D. L. Coe, L. R. Chinkin, Sonoma Technology, Inc.

Wednesday PM  
Session 7 Integrated Emission Inventory Issues

May 2, 2001  
Vail Room

- 1:00 *Off-Road Motorcycles, ATV and Personal Watercraft Activity-Data Collection and Test Cycle Development.* R. D. Wilson, M. R. Smith, T. D. Durbin, H. Galdamez, University of California; J. Jones, M. Moore, California Environmental Engineering
- 1:30 *Geogenic Inputs to the Northern Gulf Mexico Airshed.* T. Marse, U.S. EPA; S. Tsoflias, Minerals Management Service
- 2:00 *Practical Constraints and Limitations That Discourage States from Attaining Total Compliance with Federal Guidance and Requirements for Emission Inventory Data.* J. H. Southerland, North Carolina Dept of Environmental Natural Resources
- 2:30 Break
- 3:00 *Training Tribal Environmental Professionals: Using a Project, Not a Projector – An Update.* P. Ellsworth, A. M. Allison, Institute for Tribal Environmental Professionals; T. E. Baxter, North Arizona University, B. B. Ramirez, Salt River Pima-Maircopa Indian Community
- 3:30 *Estimating and Reducing Emissions from Within National Parks.* D. Sheperd, National Park Service
- 4:00 *Non-Registration Rates for On-Road Vehicles in California.* T. Younglove, C. Malcolm, H. Galdmez, T. D. Durbin, M. J. Barth, M. R. Smith, University of California

Wednesday PM  
Session 8 Preparation for Modeling

May 2, 2001  
Columbine Room

- 1:00 *The Implementation of the SMOKE Emission Data Processor and SMOKE Tool Input Data processor in Models-3.* W. G. Benjey, U.S. EPA; M. Houyoux, MCNC; J. Susick, Science Applications Intl Corp.
- 1:30 *EMS-2001.* G. Judson, Wisconsin Department of Natural Resources; M. Janssen, LADCO
- 2:00 *Quality Assurance Enhancements to the SMOKE Modeling System.* M. Houyoux, Z. Adelman, MCNC
- 2:30 Break
- 3:00 *Development of an Anthropogenic Emissions Inventory for Annual Nationwide Models-3/CMAQ Simulations of Ozone and Aerosols.* N. Possiel, G. Stella, R. Ryan, T. Pace, B. Benjey, U. S. EPA; A. Beidler, E. Kinnee, DynTel; M. Houyoux, Z. Adelman, MCNC
- 3:30 *BioME3.0.* J. Wilkenson, Alpine Geophysics; M. Janssen, LADCO
- 4:00 *Incorporating Biogenic Hydrocarbon Emission Inventories into Mesoscale Meteorological Models.* S. Pressley, B. Lamb, H. Westberg, University of Washington

Wednesday PM  
Session 9 Greenhouse Gases

May 2, 2001  
Terrace Room

- 1:00 *Non CO2 Greenhouse Gas Emissions and Projections from Developed Countries.* E. Scheehle, U. S. EPA
- 1:30 *Experiences with a National Greenhouse Gas Inventory System.* J. Brunner, K. Radunsky, Federal Environment Agency AUSTRIA
- 2:00 *Methods to Analyze Interactions Between Emission of Air Pollutants in Europe.* A. Ignaciuk, C. Kroeze, Wageningen University NETHERLANDS
- 2:30 Break
- 3:00 *Findings from the U. S. Greenhouse Gas Inventory.* M. Gillenwater, U. S. EPA; M. Martin, K. Peterson, E. Sussman, J. Casola, K. Raby, R. Freed, ICF Consulting
- 3:30 *Decomposing Trends in U.S. Greenhouse Gas Emissions.* P. McArdle, U. S. Department of Energy
- 4:00 *State Greenhouse Gas Inventories - Tools for Streamlining the Process.* R. Freed, J. Casola, A. Choate, ICF Consulting; M. Gillenwater, D. Mulholland, U.S. EPA
- 4:30 *Greenhouse Gas Emissions from Aviation and Marine Fuel Use.* W. Barbour, U.S. EPA; G. Bruss, U. S. Navy

Thursday - AM  
Session 10 Preparation for Modeling  
May 3, 2001  
Vail Room

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- 8:00 *Activity Data Acquisition for Emission Inventory Preparation in the State of Mississippi.* M. E. Barnes, E. Bickerstaff, Mississippi Dept of Environmental Quality
- 8:30 *Steps in Conducting an Urban Air Toxics Assessment-Methodology for Converting Emission Inventories into Model-Ready Input Files.* G. W. Thomas, M. Dudley, Denver Dept of Environmental Health
- 9:00 *Revised Methodology for the Spatial Allocation of VMT and Mobile Source Emissions Data.* E. Kinnee, A. Beidler, DynTel; N. Possiel, G. Stella, U.S. EPA
- 9:30 Break
- 10:00 *Incorporation of SPECIATE 3.0 into EMS-2001.* M. Janssen, Lake Michigan Air Directors Consortium (LADCO)
- 10:30 *Economic Growth Analysis System (EGAS) Version 4.0.* A. D. Bollman, E. H. Pechan & Assoc; G. M. Stella, U.S. EPA
- 11:00 *The SMOKE Emission Processor and Community Multi-Scale Air Quality Model (CMAQ) Applied to Southern Ontario.* X. Qui, M. Lepage, M. Van Altena, Rowan William Davies & Irwin Inc.
- 11:30 *Comparison of Emissions Processing by EMS95 and SMOKE Over the Midwestern US.* A. Williams, M. Caughey, H. Huang, X. Liang, K. Kunkel, Illinois State Water Survey; Z. Tao, S. Larson, D. Wuebbles, University of Illinois

Thursday AM  
Session 11 Air Toxics  
May 3, 2001  
Columbine Room

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- 8:00 *A Modeling Assessment of the Impact of Pesticide Application Methods and Tilling Practices on Emission to the Atmosphere.* M. T. Scholtz, B. Van Heyst, Canadian Global Emissions Interpretation Centre
- 8:30 *Community Scale Estimation of Toxic Air Pollutants from Stationary Sources.* L. T. Smith, T. Sax, R. D. Bode, D. Shimp, California Air Resources Board
- 9:00 *Development of Gridded Air Toxics Emission Inventories for California's South Coast Air Basin.* M. Nazemi, X. Zhang, T. Chico, J. Cassmassi, H. Hogo, E. Chang, South Coast Air Quality Management District
- 9:30 Break
- 10:00 *Colorado Air Toxics Inventory Improvements for the National Toxics Inventory.* L. Silva, D. Wells, Colorado Department of Public Health and Environment
- 10:30 *RAPIDS Evolution.* J. Wagemakers, Great Lakes Commission; O. Cabrera, Wisconsin DNR; C. Y. Wu, Minnesota Pollution Control Agency; D. Asselmeier, Illinois EPA; G. Baker, Michigan DEQ; T. Velalis, Ohio EPA; S. King, U. S. EPA; R. McDonough, New York DEC; J. Bates, Indiana DEM; P. Wong, Ontario Ministry of the Environment; R. Emigh, M. Young, S. Strasser, Windsor Technologies
- 11:00 *Developing a National Emissions Inventory for 4, 4' - Methylene Diphenyl Diisocyanate.* W. Robert, BASF Corp; D. Miller, American Chemistry Council; J. Holmstead, S. Schang, Latham & Watkins, A. Pope, U. S. EPA; S. Finn, Eastern Research Group



- 8:00 *Field Emission Measurements of Barge Loading and Unloading.* G. E. Muleski, C. Cowherd, Midwest Research Institute; T. O'Connor, National Grain and Feed Association
- 8:30 *Simulation of a Recent Regional Windblown Dust Event on the Columbia Plateau.* T. Strand, B. Lamb. C. Claiborn, Washington State University; K. Saxton, D. Chandler, USDA/ARS
- 9:00 *Effects of Prescribed Grass Fire on Wind Erosion Rates from Surface Soil at Rocky Flats, Colorado.* P. Haines, S. Templeman, URS/Radian; M. Hyder, Wind River Environment Group, LLC; C. Cowherd, M. Grelinger, Midwest Research Institute
- 9:30 Break
- 10:00 *Development of Vacant Land Emission PM-10 Factors in the Las Vegas Valley.* D. James, J. Pulgarin, J. Becker, S. Edwards, T. Gingras, G. Venglass, University of Las Vegas; C. MacDougall, Clark County, NV
- 10:30 *Evaluating Soil Particulate Matter Potential.* C. MacDougall, Clark County, NV, Dept of Comprehensive Planning; G. Desart, R. Thomsen, A. Chamberlain, Geotechnical & Environmental Services; T. Hildreth, ENVIROCON
- 11:00 *Effect of Dust Source Clay and Carbonate Content on Fugitive Dust Emissions.* T. M. Zoebeck, USDA, A. Amnate-Orozovo, Colegio de Postgraduados
- 11:30 *Methodology for Estimating Fugitive Windblown and Mechanically Resuspended Road Dust Emissions Applicable for Regional Air Quality Modeling.* R. Countess, Countess Environmental; W. Barnard, Harding ESE; C. Claiborn, Washington State University; D. Gillette, NOAA; T. Pace, U.S. EPA; J. Watson, Desert Research Institute
- 12:00 *Relating Road Dust Emissions Surrogates to Average Daily Traffic and Vehicle Speed in Las Vegas, Nevada.* H. Kuhns, V. Etyemezian, Desert Research Institute; P. Shinbein, Clark County Comprehensive Planning

### **SPEAKER'S CHECK-IN**

All speakers should check-in with their session chairs the morning of your presentation. Check in will be from 7:30 - 8:00 am in the Terrace Room. Don't forget a copy of your bios.

### **U. S. EPA'S REGIONAL OFFICE MEETING**

U. S. EPA will be holding a breakfast meeting with representatives from their regional offices on Wednesday morning at 7:00 am in the Columbine Room.

## The Smart Sign

Using input from the public, a new type of vehicle emissions information system has been developed which integrates an innovative variable message sign with an on-road vehicle emissions sensing system to display individual vehicle emissions information to passing drivers. The Smart Sign was successfully operated from May 1995 to August of 1996 in Denver Colorado as part of a Federal Highway Administration Intelligent Transportation System operational test. During that time more than 4 million readings were provided to more than 250,000 individuals at a cost of \$0.02/test.

The original deployment was permanently located in Denver at the intersection of Speer Blvd. and Interstate 25. The system operated 7 days a week 24 hours a day in conditions that ranged in temperature from -20 to 100 degrees F. The more than 4 million readings were distributed as 86% 'Good', 10% 'Fair' and 4% 'Poor'. Using vehicle information the National Center for Vehicle Emissions Control and Safety conducted a follow-up phone survey which showed that 76% of the weighted population had a favorable impression of the sign. Sixteen percent of the poor's (1.6% of the overall fleet) reported to have already taken corrective action as a result of the Smart Sign.

Come visit the Smart Sign, in action, outside the main entrance to the Adam's Mark Hotel on Tuesday, May 1 from 8:30 am until 4:00 pm. For additional information, please visit their web site at [http://www.feat.biochem.du.edu/smart\\_sign.html](http://www.feat.biochem.du.edu/smart_sign.html).



## Exhibitors Sponsored by Windsor Technologies

E. H. Pechan & Assoc., Inc.	Springfield, VA
Measurement Technologies Laboratories	Crosswicks, NJ
Colorado Air Pollution Control City and County of Denver	Denver, CO
Pacific Environmental Services	RTP, NC
Emission Inventory Improvement Program (EIIP)	RTP, NC
Windsor Technologies	Lafayette, CO
LGS Group	Alberta, CANADA