18th International Emission Inventory Conference

"Comprehensive Inventories – Leveraging Technology and Resources"

Conference April 14-17, 2009
Courses April 16-17, 2009
Baltimore, Maryland – Baltimore Hilton

Sponsored by:
Emission Inventory and Analysis Group
Air Quality Assessment Division
Office of Air Quality Planning and Standards

Welcome to the 18th Annual Emissions Inventory Conference

Thank you for joining us for this year's conference here in the City of Baltimore. We hope you will have a productive workweek and enjoy some time exploring the city's harbor-side attractions. Baltimore is home to a significant national monument – Fort McHenry, where events of 1814 inspired a poem that later became the U.S. national anthem 'The Star Spangled Banner'. Technology, politics, economy, and geography are some of the important factors that kept Baltimore as an early and historical center of defense – some of the same factors that influence the evolution of the emissions inventory business!

The theme of this conference emphasizes the leveraging of technology and resources to develop comprehensive and useful, good quality data. The opening plenary on Tuesday morning April 14 includes a panel discussion that illustrates successful collaborations among regional groups to share resources for developing and improving the quality of emissions information to support attainment of national ambient air quality standards. The discussion topics will cover some of the practical and significant technical issues that are being resolved, and give a prospective viewpoint on collaborative process components that may guide future successes in completing the emissions inventory work. The discussion panel representatives will include:

- Jim Hodina, National Assoc of Clean Air Agencies (NACAA), Emissions & Modeling Committee
- Doug Solomon , US EPA OAQPS Emissions Inventory & Analysis Group
- Julie McDill, Mid-Atlantic Regional Air Management Association (MARAMA)
- Mark Janssen, Lake Michigan Air Directors Consortium (LADCO)
- Tom Moore, Western Regional Air Partnership (WRAP)

Following the plenary panel presentations, the EPA will provide a status report on air emissions data collection programs. The host of the plenary session will be Chet Wayland, Director of the EPA's Air Quality and Assessment Division in the Office of Air Quality Planning and Standards (OAQPS).

Conference week highlights

The technical sessions with paper presentations begin Tuesday afternoon. On Tuesday evening, there will be the Poster Session and Exhibitor Reception. Attending the reception is a great way to connect with other conference attendees and to discuss your air quality program needs with several exhibitors. Authors will be available for the poster presentations to explain their work and answer your questions. An Emissions Inventory Showcase will occur at various times during Tuesday and Wednesday. Those involved in developing and using software for emissions inventory applications will give demonstrations and share ideas and solutions. Training courses will commence on Thursday afternoon and will continue Friday morning. The courses cover different aspects of inventory preparation and use, and the new national emissions inventory system for data collection. Pre-registration is required.

This is a great opportunity to keep abreast of developments in the world of emissions data and to share your experiences with other emission inventory professionals from federal, state, local, and international regulatory agencies, tribal governments, industry and academia.

Welcome to the 2009 Emissions Inventory Conference!
US EPA Conference Organizers - Emissions Inventory and Analysis Group, OAQPS

Remembrance

In Memory of Joe Pedelty
1954-2008

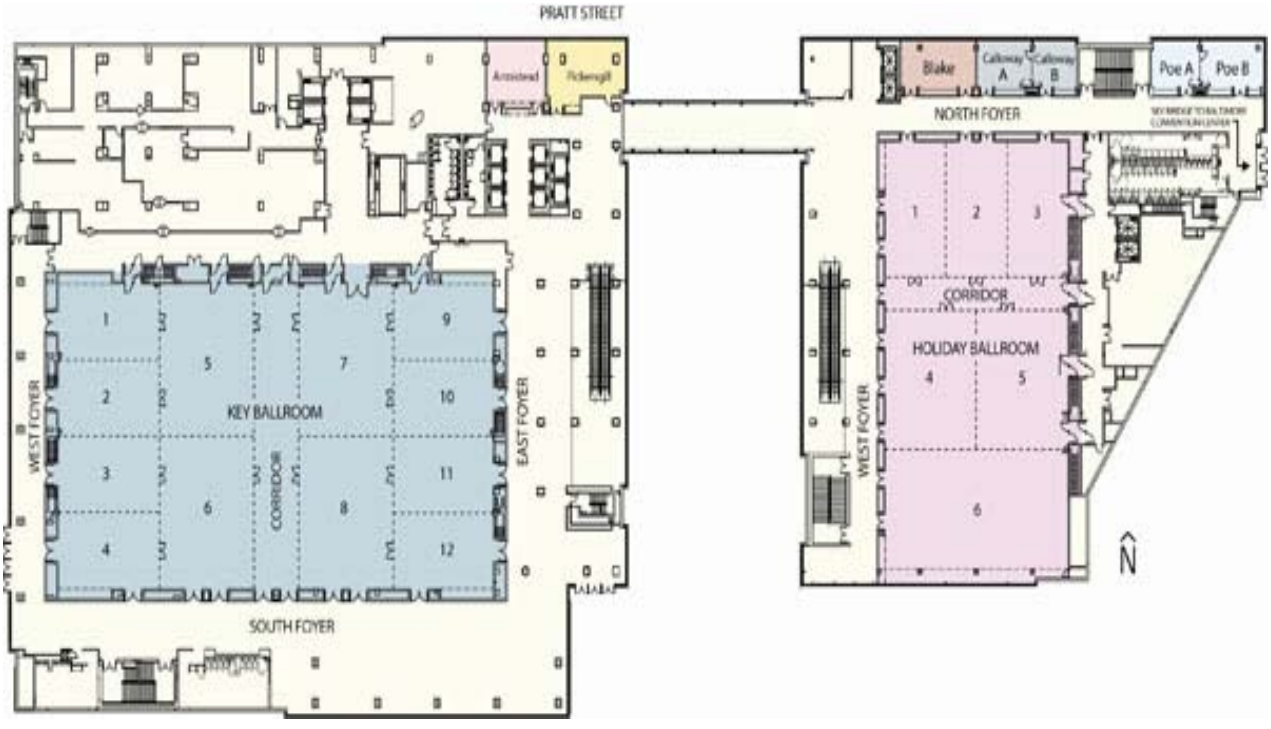
Joe Pedelty, a beloved friend and member of the emissions inventory community, died this past October from injuries received during a bicycle accident. Joe worked for eight years with the US EPA's Office of Transportation and Air Quality and was a valued participant in these emission inventory conferences, including advocate and co-chair for sessions concerning mobile sources. We miss Joe – his quick and easy smile, his sense of humor, and his natural interest in providing people what they needed – information, data, spirited conversation, or a funny story. We celebrate his friendship and contributions to this community and extend to his family peace and joy in memories.

Schedule at a Glance

Date/Time	Session	Room
Tue. April 14		
9:00 - 12:00	Welcome Discussion Panel: Leveraging Technology and Resources – Regional Collaborations • Regional/Multi-jurisdictional Planning Organizations • US EPA ***Break*** US EPA Report: Status of emissions data collection programs	Key Ballroom (5, 6)
12:00 – 1:30	***Lunch (On Your Own)***	
1:30 - 2:45	- Session 1 – Tools – Leveraging Technology for Better Inventories	Key Ballroom 2
	- Session 2 – Global/International Issues	Key Ballroom 3
	- Session 3 – EI Preparation for Modeling	Key Ballroom 4
2:45 - 3:15	***Break –*** *Software Showcase*	Armistead
3:15 – 4:55	- Session 1 – Continues	Key Ballroom 2
	- Session 2 – Continues	Key Ballroom 3
	- Session 3 – Continues	Key Ballroom 4
5:00 – 5:30	*Software Showcase*	Armistead
6:00 – 8:00	- Poster Session and Exhibitors' Reception	Key South & West Foyer
Wed. April 15		
8:00 – 8:30	*Software Showcase*	Armistead
9:00 – 10:15	- Session 4 – Innovative EI Development Methods	Key Ballroom 2
	- Session 6 – Mobile Sources	Key Ballroom 3
	- Session 7 – Greenhouse Gases	Key Ballroom 4
10:15 – 10:45	***Break –*** *Software Showcase*	Armistead
10:45 – 12:00	- Session 4 – Innovative EI Development Methods s	Key Ballroom 2
	- Session 6 - Continues	Key Ballroom 3
	- Session 7 - Continues	Key Ballroom 4
12:00	***Lunch (On Your Own)*** *Software showcase* *EPA HQ/RO Mtg*	Armistead Blake
1:30 - 2:45	- Session 5 – Stationary Sources/Emissions Factors	Key Ballroom 2
	- Session 6 – Continues	Key Ballroom 3
	- Session 7 – Continues	Key Ballroom 4
2:45 - 3:15	***Break –*** *Software Showcase*	Armistead
3:15 - 4:55	- Session 5 - Continues	Key Ballroom 2
	- Session 6 - Continues	Key Ballroom 3
	- Session 7 – Continues	Key Ballroom 4
5:00 – 5:30	*Software Showcase*	Armistead

Schedule at a Glance (continue)

Date/Time	Session	Room
Thurs April 16		
9:00 – 10:40	- Session 8 – Air Toxics	Key Ballroom 2
9:00 – 11:10	- Session 9 – EI Data Analysis and Validation	Key Ballroom 3
12:00 – 1:30	**Lunch (On Your Own)**	
1:30 –5:00	Training Courses	
	- The Emissions Inventory System Process	Key Ballroom 2
	- Introduction to EPA's MOVES	Key Ballroom 3
	- Greenhouse Gases Inventory 101	Key Ballroom 4
Fri April 17		
9:00 – 12:00	Training Courses	
	- The Emissions Inventory System Process	Key Ballroom 2
	- Introduction to EPA's MOVES	Key Ballroom 3
	- Quantifying Greenhouse Gas Emissions	Key Ballroom 4



Emissions Inventory Software Showcase

Armistead Room

We are hosting an emissions inventory 'software showcase' for both private sector software developers and public entities to demonstrate their wares to Conference attendees. The following lists the expected participants and software demonstrations. Demonstrations will be available during breaks, lunch and at the conclusion of each conference day on both Tuesday and Wednesday.

Tuesday, April 14

2:45 pm **Marine Emission Inventory Tool** - Klym Bolechowsky, ClearSkyEngineering
The Marine Emission Inventory Tool estimates emissions from commercial marine vessels operating in coastal and inland waters. This includes domestic and internationally flagged vessels used for international and domestic freight and passenger transport, workboats, fishing vessels, and government vessels to support defense and regulatory activities. The application consists of a SQL Server database back-end with a user interface to enable importing activity data, generating emission estimates, and production of reports. The application includes routines that calculate underway, maneuvering and dockside emissions. The calculations facilitate development of an emissions inventory that can be spatially allocated within a gridded emissions file.

5:00 pm **MAIRIS** – Jeff Heatwole, Perrin Quarles Associates
MAIRIS is the State of Maine's Emissions Inventory Data Collection and Reporting System and includes a function to export data in the format of the Consolidated Emissions Reporting Schema (CERS) format for submission to the US EPA's new Emissions Inventory System (EIS).

Wednesday, April 15

8:30 am **CAMD's Interactive Mapping** -Michael Cohen, EPA, CAMD
The EPA's Clean Air Market Division (CAMD) has created maps that display geo-spatial data on an interactive 3D platform such as Google Earth. The maps are downloaded directly to the user's computer as kmz files (compressed Keyhole Markup Language (kml)). It is easy for users to add and display CAMD maps using new or existing 3D platforms. CAMD's map layers include emissions, concentration, and deposition data and display as points, area outlines, and isopleths; and contain metadata at both the point and layer level. Users can combine CAMD map layers with data from other EPA offices, federal agencies, and the public domain.

CAMD uses Interactive Mapping for several purposes. Google Earth initially was used for quality control, visually checking every regulated facility in CAMD's air emission reduction programs (Acid Rain Program and NOx Budget Trading Program). CAMD has also created kmz files for visualizing data as part of analyses and for creating graphics for presentations. More recently, CAMD has

used Google Earth to create public kmz files to supplement our annual environmental progress and compliance reports and as stand-alone projects. Through this approach, CAMD has enabled both technically savvy and less knowledgeable public users to interact with our data in ways that were previously impossible.

10:15am **Emissions Inventory Exchange Network (EIEN) Desktop Client** - Jason Bunker, Windsor Solutions, Inc

The EIEN Desktop Client provides users with a simple and intuitive way to view and share emissions inventory data. The software can be used to import emissions inventories from a variety of data sources (e.g., MS Access, flat files, XML, RDBMS, etc.). The EIEN application can also be used to prepare emissions inventory data for submission to the EPA's NEI system via the Exchange Network.

In addition, the EIEN client can easily navigate and review emissions inventory data. In future releases, the EIEN application will also be compatible with the new EPA EIS and Consolidated Emissions Reporting Schema (CERS) formats and support greenhouse gas emissions data reporting and exchanges.

12:00pm **Emissions Mapping & Information Tool (EMT) -** Wayne Boulton, RWDI

The Emissions Mapping & Information Tool (EMIT), is a Toolbar extension to ESRI's ArcMap platform that can be used to load, query, map, and report on pre-compiled Canadian and US national emissions data at a number of geo-political levels using a simple query wizard. Air pollutant emissions are mapped down to the Census Subdivision (CSD) level in Canada (large cities, municipalities, etc.), and at the County level in the US. Query results are generated as new map layers and plotted in ArcMap. Once generated, these GIS layers (personal geodatabases) can then be manipulated to produce custom maps and support subsequent analyses such as the comparison of emissions data with ambient pollution concentrations and Air Quality Health Indices (AQHI).

2:45 pm **State Air Emissions Inventory System** - Maria Marcella, CIBER, Inc

CIBER designs, develops and implements web-based emissions inventory reporting systems that are used to manage industry-to-state and state-to-EPA reporting and processing of point, area and mobile emissions. In 2004, we implemented the point source Air Emissions Inventory System for Pennsylvania DEP. That system includes extensive XML reporting. We are now in process of implementing the Air Emissions Inventory System for Connecticut DEP, a system that has been developed with Microsoft .NET and SQL Server technologies, web services and XML. Connecticut's Air Emissions Inventory System will manage the reporting and processing of point, area and mobile emissions and will also include a greenhouse gas inventory and reporting to The Climate Registry and regional partners. As a reporting and management tool, it will serve the state's attainment planning goals and reduce costs by eliminating burdensome paper-based processes. Connecticut's new Air Emissions Inventory System will serve as a model for other states.

5:00 pm **Emissions Reporting and Inventory Center** -Vivian Aucoin, Louisiana Department of Environmental Quality

ERIC is a web-based portal for which point sources in the state of Louisiana report their annual emissions inventory data. ERIC offers facilities the ability to create new inventories based on prior year submittals, to edit those inventories online using simple data entry forms, or to download their entire inventory to a Microsoft Excel workbook where they can enter and edit inventory data offline and later upload the data to ERIC. It is also the database for the LDEQ EI staff to use in accessing the point source emissions inventory data.

Exhibitors

Key Ballroom - Lobby

MACTEC Engineering & Consulting (MEC) - MACTEC is an industry-leading consulting firm that provides engineering, environmental, and construction services to public and private clients worldwide. Based in Atlanta, the MACTEC team includes 3,000 employees representing 50 disciplines in 80 locations. MACTEC professionals help clients achieve success through uncompromising quality, technical excellence, safety, and local, personal service. This commitment has enabled MACTEC to achieve and maintain a position in the top 10% on Engineering News-Record list of Top 500 Design Firms. MEC provides a wide array of engineering, environmental, facility life cycle management, sustainable design, and construction consulting services to public and private clients. Special services include emergency preparedness and response, comprehensive force protection, and design/redesign for LEED certification.

Eastern Research Group – Eastern Research Group (ERG) offer clients the full spectrum of technical services required to achieve successful air quality management. Our staff of over 330 strong consists of engineers and atmospheric scientists with over 25 years of experience addressing air quality needs at all project scales for stationary and mobile sources. The bulk of our experience rests with public agencies in the federal, state, local, and tribal government sectors. ERG performs nationally recognized research in areas such as greenhouse gas emissions and controls, air permitting, air toxics, emissions assessments, emissions projections, air regulation development, inventory management and ambient air quality monitoring. We can assist you with defining and quantifying problems and determining the most technically effective and cost-beneficial solutions for all stakeholders. Our conference exhibit booth will have materials available documenting the breadth of this experience, and key staff from these programs will be on hand to meet you and provide more detailed information and insight on how our capabilities can address your needs.

E. H. Pechan & Associates, Inc - E. H. Pechan & Associates, Inc. (Pechan) provides air pollution and climate change consulting and information technology services to EPA and other public sector clients. Pechan is an employee-owned company with its headquarters in Springfield, VA. Pechan has regional offices in Durham, NC and Celebration, FL. Pechan celebrated its 25th anniversary in April 2006.

The firm has been responsible for preparing many of the large-scale regional emission databases that have been used by the states in major policy decisions. Pechan is experienced in delivering emission data files to clients that can be used readily as inputs to urban or regional scale photochemical grid-based models. This means complete and accurate information for emissions (annual, seasonal, and daily), coordinates, and stack parameters. Pechan has demonstrated its ability to deliver model-ready data sets for EPA's Second Section 812 Prospective Study and for a number of studies sponsored by Regional Planning Organizations.

Staff at Pechan have a wealth of experience in engineering and cost assessment of pollution control strategies. This experience cuts across all air pollution-emitting source sectors and criteria pollutants. This allows us to efficiently analyze the types of multi-pollutant, multi-sector control strategies that are likely to be needed to bring ozone and PM 2.5 nonattainment areas into attainment. The most recent Pechan work product that addresses air pollution control measure

costing is AirControlNET. The EPA-sponsored database provides a comprehensive set of information about criteria pollutant control measure costs, efficiencies, and applicability. In addition, the database software allows users to examine potential emission reductions and cots when the control measures are applied to sources in the National Emission Inventory.

For the past 3 years, Pechan has also been active in providing facilitation and technical assistance to States in climate action plan development. These efforts have included base year greenhouse gas emission inventory development, emission forecasts for mid- and long-rang forecast years, and mitigation strategy evaluation. These skills are expected to be particularly valuable in supporting efforts to evaluate and coordinate greenhouse gas, criteria and toxic air pollutant programs.

Windsor Solutions, Inc. - Windsor Solutions, Inc. (Windsor) is an information technology consulting firm providing industry-specific information systems for environmental and health related government agencies. As a specialist in the environmental and health field, Windsor offers information and business expertise across all media and many program areas. The company is now one of the leading technology consultants in the environmental field and is a leading participant in the evolution of the Exchange Network.

Recently Windsor managed a custom Air Contaminant Management System project that won a Project Management Institute "award for excellence" and the Windsor Network Node was recently selected as part of a competitive bid process as the single Open Source Node sponsored by the Environmental Council of States. Windsor has brought its new EI Desktop Client for demonstration at the conference. This client will simplify national NEI and EIS emissions inventory reporting through the Exchange Network.

U.S. EPA, Emission Inventory and Analysis Group (EIAG) – Staff will be available to answer your questions on the Emission Inventory System (EIS), the Emissions Modeling Framework (EMF), mobile models, the Risk Technology Rule, the Air Emissions Reporting Rule (AERR), and analysis of the National Emission Inventory data. A schedule of when specialist will be available will be displayed at the booth.

CIBER, Inc - Founded in 1974, CIBER is a superior consultancy that serves customers around the world from over 60 U.S. offices, 22 European offices and 5 offices in Asia. With offices in 18 countries, annualized revenue run rate of $1 billion and approximately 8,000 employees, CIBER specializes in building, integrating and supporting information technology solutions.

Over the past ten years, CIBER has worked in partnership with the Pennsylvania Department of Environmental Protection, Bureau of Air Quality to develop various web-based solutions. In 2008, CIBER began a 6 year contract with the Connecticut Department of Environmental Protection to implement a new web-based Air Emissions Inventory System for the reporting and management of stationary, area and mobile source data. The system also features a greenhouse gas inventory.

The systems that CIBER has developed and implemented for states fully support a continuum of interrelated business processes and a variety of stakeholders, including industry facilities, state administrators and policy makers, EPA and other Air Quality policy organizations and networks. Pennsylvania DEP and Connecticut DEP rely on these systems to manage:

Air Permitting
Emissions Inventory
Emissions Fees
Continuous Emissions Monitoring
Management Reporting and Quality Assurance
Compliance and Enforcement
Data Exchange and EPA/NEI Reporting

CIBER's reputation for designing, developing and implementing software applications of the highest quality and reliability is unparalleled. Beyond system implementations, we also provide application support and maintenance, training and outreach services. Our team members are well respected for their critical subject matter expertise regarding the business of collecting, reporting and managing data for air quality programs. We are presenting our web-based emissions inventory systems in the Software Showcase at the 2009 National Emissions Inventory Conference. Please visit us at our booth to learn more about our web-based air quality solutions and to see a system demonstration.

RWDI Air Inc – Drop by the RWDI booth where Wayne Boulton will be happy to answer your questions about the unique and in-depth services that RWDI has to offer in the fields of:

-Emission inventory preparation and processing
-Environmental and engineering software and integrated systems development
-Airshed modeling and real-time forecasting (meteorological, emissions inventory, and regional photochemistry/dispersion modeling)

RWDI Air Inc is part of the RWDI Group of Companies. From our offices in Canada, the U.S. and abroad, our consultants meet the world's most complex challenges with experience, knowledge and superior service. By focusing on client needs, RWDI strives to develop creative, viable, and cost-effective solutions to technical challenges at all scales. We look forward to seeing you at the conference.

The Exchange Network/The Climate Registry – The Exchange Network is a secure internet- and standards-based approach for exchanging environmental data and improving environmental decisions. The U.S. Environmental Protection Agency, State environmental departments, and U.S. tribes and territories are partnering to build the Exchange Network to increase access to environmental data and make the exchange of data more efficient.

The new Emission Inventory System was designed to accept data using the Exchange Network. Drop by the Exchange Network table to learn more about how to get started with the Network, and how the Network is making connections between Greenhouse Gas data management and traditional emissions inventory reporting. A representative will be at the table from both the Exchange Network and The Climate Registry.

Perrin Quarles Associates (PQA) - Founded in 1979, PQA is a privately held, interdisciplinary environmental consulting firm located in Charlottesville, Virginia, approximately 115 miles southwest of Washington, DC. PQA specializes in environmental program development and implementation, including information technology solutions, with a major focus on air quality and climate change. PQA clients include EPA and U.S. state and local environmental agencies. Since 2006, PQA has worked for EPA to reengineer business processes and information systems supporting the National Emissions Inventory, and PQA is currently working with the State of Maine to design and implement an emissions inventory system capable of reporting to EPA's Emissions Inventory System. Also, in recent years, PQA has expanded into international markets, supporting environmental initiatives undertaken by the European Commission, the United Nations Framework Convention on Climate Change Secretariat, Canada, New Zealand, and Australia.

T3 - T3 ®, a division of Trinity Consultants, helps businesses operate more efficiently and cost-effectively, while improving EH&S performance. T3's range of solutions includes handheld Pocket Solutions™ for collecting and managing field data, custom compliance solutions for recordkeeping and reporting requirements, and implementation of third-party multimedia, enterprise software.

Tuesday - April 14, 2009

Session 1: Tools – Leveraging Technology for Better Inventories

Chairs: Alice Chow, US EPA
Wayne Boulton, RWDI

1:30 "Applying the Software as a Service Model to Air Emissions Inventory Collection," D. Derby, MACTEC

Current Air Emissions Inventory data collection methods generally fall into two categories, paper or electronic systems that require manual importation into the agency databases, or agency hosted data collection systems that feed directly into the databases. As agencies try to streamline operation by moving away from the first methodology, they are confronted with significant cost and infrastructure issues associated with the second option. Many agencies will not have the budgets and/or internal IT structures to enable them to make this move. For those agencies the Software as a Service model may be the optimal solution. Software as a Service is a model of software deployment where an application becomes a service provided to customers across the Internet. In this model, software is hosted and maintained by a vendor on hardware outside the agency - eliminating the need to install and run the application on the agency's own computers. Software as a Service alleviates the agency's burden of software maintenance and operational support, thus reducing the infrastructure and staffing requirements, and can reduce the up-front expense through less costly, on-demand pricing. From the point of view of the facility users, this model will appear identical to the agency-hosted system. From the agency's point of view, they can dedicate more resources to the actual inventory work since the software operation has been off-loaded to the service vendor. Our paper will describe how the Software as a Service model is implemented and used to enhance the data collection capabilities of an agency.

1:55 "A GIS-based Emission Mapping and Information Tool (EMIT)," J. W. Boulton, P. Joynt and M. V. Altena, RWDI AIR Inc., Canada; D. Jutzi, D. Herod, Environment Canada; P. Smith, D. Ratte and D. Neimi, Environment Canada

For most, comprehensive air pollutant emission data for Canada are currently only available at a provincial/territorial and national level. However, demands from scientists, policy analysts, and the general public for up to date emissions information and emissions maps are ever increasing. To facilitate custom querying and mapping of emissions data, Environment Canada's Air Emissions Priorities division retained RWDI AIR Inc. to develop the Emission Mapping and Information Tool (EMIT). EMIT, written as a Toolbar extension to ESRI's core ArcMap platform, can be used to load, query, map, and report on pre-compiled Canadian and US national emissions data at a number of geo-political levels using a simple query 'wizard'. Air pollutant emissions can be queried and mapped down to the Census Subdivision (CSD) level in Canada (large cities, municipalities, etc.), and at the County level in the US. Query results are, by default, generated as new map layers and plotted in ArcMap. Once generated, these GIS layers (personal geodatabases) can then be manipulated to produce custom maps and support subsequent analyses such as the comparison of emissions data with ambient pollution concentrations and Air Quality Health Indices (AQHI).

2:20 "'Comprehensive Data Management of Western Regional Air Partnership (WRAP) Emissions Data," T. Moore and L. Gribovicz, Western Governors' Association; E. V. Hoek, J. Adlhoch and B. Davis-Noland, Air Resource Specialists Inc.; D. Randall and M. Mavko, Air Sciences Inc.

The Western Regional Air Partnership (WRAP) is comprised of representatives from cooperating western states, tribes, and federal agencies. One of WRAP's primary goals is to develop technical and policy tools to assist its stakeholders in development of State Implementation Plans (SIPs), Tribal Implementation Plans (TIPs) and meeting requirements of the U.S. EPA's Regional Haze Rule (RHR). An important component of this process is the ability to track pollutant emissions over time. WRAP has approached analysis of emissions data via two integrated avenues. The Emissions Data Management System (EDMS) is a central repository of emission inventory data. The inventories contained within the EDMS consist of multiple

pollutants from Point, Area, Mobile, Biogenic and Fire inventory sectors for 2002 and 2018 (addition of 2005 data is in progress). This, and addition of future inventories, will allow for tracking trends in air quality control across WRAP. The Technical Support System (TSS), designed as a web-based portal to comprehensive technical data and analytical results, houses SMOKE-processed emissions data. TSS-designated emissions sectors and inventory years are similar, though not identical, to those in the EDMS. Integration of the EDMS and TSS is currently underway. The EDMS remains as an independent warehouse of detailed emissions data. Enhancements to the TSS data presentation tools allow users access to EDMS data, and the ability to compare native emission inventories and emissions modeling data. This paper will describe the methods for obtaining emissions data using the newly integrated EDMS and TSS data management systems.

2:45 BREAK

3:15 "The Development of a Global Maritime Emissions Inventory Using Electronic Monitoring and Reporting Techniques," D. Neef, Ph.D., DNA Maritime LLC

Emissions from maritime shipping are a significant source of airborne pollution. Recent studies have estimated that ocean-going ships produce at least 15% of the world's NOx, between 2%-3% of greenhouse gasses, and between 3%-7% of global SOx output. Many partial maritime emissions inventories compiled in the last decade use both fuel-based and energy-based survey methods. Without accurate data on load factor, engine speed, and fuel type - data that must be taken directly from the ship's onboard systems - these surveys remain as high-level estimates; not precise enough to use as a basis for assigning emissions credits in an emissions cap-and-trade mechanism. The Port Emissions Reduction Credit Scheme (PERCS) is the first comprehensive program to provide the maritime shipping community with a mechanism for creating a global ship emissions inventory by ship type and size. Based on data captured electronically from a ship's onboard navigation/control, fuel, and emissions monitoring systems, emissions performance information is sent to the PERCS database. Data will be collected automatically and electronically from ships anywhere, and at any time, and will provide a more complete and accurate snapshot of current emissions output in coastal routes, in ports, or in open seas around the world. The emissions data will then be used both to norm performance expectations at an industry-level, and calculate emissions allowances at a company level - both necessary steps before the maritime industry can participate in wider emissions cap-and-trade schemes.

3:40 "Your Output is My Input: Collaborative Technologies for an Emissions Cyber Infrastructure", S. Falke and E. Fialkowski, Washington University

This paper presents the use of Web 2.0 technologies to achieve new interoperability among emissions data sources and data visualization and analysis tools. Web standards, such as KML and other Open Geospatial Consortium (OGC) web interface standards, have made emissions and activity data more accessible. Web tools provide means of visualizing and analyzing emissions data. Web portals and catalogs offer consolidated discovery and access of data and tools. While these standards and technologies have advanced the way we work with emissions data they have yet to achieve the broader objective of interoperability that many envisioned. Part of the challenge is that, in many cases, web tools and portals serve as end points rather than intermediate components whose outputs can be used as inputs for other tools and portals. In this paper we describe how we can use web services, RSS feeds and other Web 2.0 technologies, such as Yahoo Pipes and del.icio.us, to increase the interoperability among web tools and portals. Examples of implementation and use of these technologies for air emissions related data and information are illustrated in the NEISGEI and GEOSS Architecture Implementation Pilot Air Quality Community portals.

Session 2: Global/International Issues

Chairs: Paulette Middleton, GEIA Center
Vance Wagner, MEP China

1:30 "GEIA - Enhancing Communications on Global Emissions 2009," P. Middleton, Panorama Pathways, C. Granier, NOAA and UPMC and CNRS, Paris; A. Guenther, NCAR; A. Mieville, UPMC and CNRS, Paris

GEIA (Global Emissions Inventory Activity) is an integrating project of the AIMES (Analysis, Integration and Modeling of the Earth System). AIMES is part of the International Geosphere Biosphere Program (IGBP) that brings together people, analyses, data, and tools to: Quantify the anthropogenic emissions and natural exchanges of trace gases and aerosols that drive earth system changes; and to facilitate use of this information by the research, assessment and policy communities. This presentation provides an overview of some of the latest global emission efforts and discusses how to make this information more readily available. Highlights include: Databases that are currently accessible through the GEIA portal, including new information on IPCC emissions past and future and other international efforts on emissions; Reviews - upcoming updated overviews of state-of-the-science for man-made and natural sources; Catalogues - planned creation of a data base of papers and reports publicly available concerning emissions; New studies - improved understanding of biogenic emissions; Assessments - strategies to better integrate data from multiple countries; and E-learning/E-working - initiation of wiki-based system for emission information exchange.

1:55 "Developing Mexico National Emissions Inventory Projections for the Future Years of 2008, 2012 and 2030," M.E. Wolf, P.G. Fields and G. K. Manne, Eastern Research Group Inc.; M.T. Villegas, V.G. Garibay Bravo, and R. Iniestra Gomez, Mexico National Institute of Ecology

The 1999 Mexico National Emissions Inventory (MNEI) was the first comprehensive municipality-level emissions inventory developed for the country of Mexico. Future year emissions inventory projections in Mexico are essential to evaluate the future benefits of air quality control measures and to support various modeling analyses. The Western Governors' Association (WGA) has continued its support of Mexico's National Institute of Ecology (INE - Instituto Nacional de EcologÃ-a) through the development of future year emissions inventory projections. Additional support has been extended by the National Renewable Energy Laboratory (NREL) to evaluate the co-benefits of air quality control measures in Mexico at the national level. This paper discusses the development of municipality-level emissions inventory projections for the future years of 2008, 2012, and 2030 based upon the 1999 MNEI. Adjustments made to the 1999 base year inventory due to municipality divisions are presented. The development of sector-specific point source growth factors for electricity generating units, refineries and other petroleum-related sources, primary metal facilities, manufacturing facilities, miscellaneous industrial facilities, and service facilities is described. The development of area source and nonroad mobile source growth factors based upon surrogate projections (e.g., population, fuel use, gross domestic product [GDP], etc.) is also presented. The results of a detailed analysis of the projected effects of Mexico's future low-sulfur fuel standards and new vehicle emission standards on on-road motor vehicle emissions are also incorporated are also described. In addition to the development of the future year emissions inventor projections, this paper also discusses the interactions between this project and ongoing projects related to greenhouse gases that are currently being conducted in Mexico.

2:20 “Developing a First-ever National Mobile Source Emissions Inventory for China,” D. Tang, Y. Ding, H. Yin and D. V. Wagner, Ministry of Environmental Protection, China

The Chinese Ministry of Environmental Protection (MEP) recently initiated a first-ever national pollution source census to be completed in 2009. The Vehicle Emission Control Center of MEP (VECC-MEP) is responsible for the mobile source emissions component of the pollution census. VECC-MEP has undertaken the project in three stages. The first stage, data collection, was completed over the fall and winter of 2007-2008, and entailed the detailed surveying of vehicle population and activity data in 345 cities in China. The second stage, emission factor model development, was completed in December, 2008. VECC-MEP surveyed existing emission factor models, including COPERT, MOBILE, the IVE model, and more, to determine the most appropriate structure and methodology for a China-specific model. The new model is called CVEM, the China Vehicle Emissions Model. Key considerations included Chinese data availability and reliability as well as how to model China's unique populations of 2 and 3-wheelers and heavy duty vehicles. The third and final stage of the project, completion of the total inventory, is estimated to be completed in late spring, 2009. In this presentation, we introduce the key project accomplishments of data collection and model development in China as well as remaining challenges.

2:45 BREAK

3:15 “A Comparison Between the Dutch Emission Registry and the Revised EMEP/ CORINAIR Guidebook,” J.J.P. Kuenen, R. DrÃge and D.C. Heslinga, TNO Built Environment and Geosciences, The Netherlands

This study compares an inventory compiled using the revised Guidebook's default methods to a complex inventory system as used in the Netherlands for the year 2005. The recent revision process of the Guidebook has facilitated this comparison, since both the Guidebook and the countries' submissions to LRTAP now use the same source definitions. Guidebook emission factors are combined with relevant activity statistics and compared directly to the emissions resulting from the Netherlands’ complex inventory system. The results of this comparison in general show that emissions calculated by using the Guidebook are higher than in the Dutch Emission Inventory, which is expected because of the relatively high level of abatement applied in the Netherlands compared to the international average. Keeping this in mind, for the major pollutants such as NOx and NMVOC the comparison shows reasonably good agreement. For the less known pollutants such as POPs and heavy metals the two datasets are much less similar. The comparison also shows some 'missing sources': sources that are significant in one dataset but negligible or even zero in the other. Sources may indeed be missing, but also country specific activities may cause the differences, since the Guidebook represents only the average situation. We conclude that the comparison enhances credibility of country specific inventories and may help to unravel specific gaps that still exist between emission-based air quality modeling and measurements.

3:40 “Developing Emissions for Multi-pollutant Air Quality Modeling in the Middle East,” Z. Adelman, B. H. Baek, U. Shankar, UNC Institute for the Environment; D. Streets, Argonne National Laboratory

Preparing emissions for modeling local and regional air quality in parts of the world where inventory data are sparse is a challenge. The modeling grid scale resolutions used in regional air quality modeling (2 - 50 km) require emission inventories as country totals at a minimum. Alternatively, pre-gridded inventories for regional applications are required at resolutions commensurate with the air quality modeling grid. Spatial, temporal, and chemical data describing the local emission sources are also required to characterize the local air quality problems. This paper presents a case study of building a multi-pollutant emission database for the Middle East. The issues addressed include the development and preparation of the list of inventories for capturing the range of emissions sectors in the region, preparing spatial, temporal, and chemical information for representing the local emission patterns, and methods to evaluate the air quality-model ready emissions for a part of the world where comparable data are sparse. Particular challenges in this work included developing accurate emissions for a modeling domain that covers over 50 countries on three continents, integrating spotty localized inventories with global emissions datasets, and evaluating the accuracy of the model-ready emissions. We present the operational emissions modeling system that we

used to develop emissions for CMAQ. The system includes SMOKE version 2.4 with a set of utilities for converting pre-gridded inventories of natural and anthropogenic emissions into vertically-resolved emissions for simulating ozone, PM2.5, SOA, air toxics, mercury, and wind-blown dust.

4:05 Panel: "Expanding the Dialogue on Inventory Harmony and Best Practices"

This panel discussion will provide both a concrete view of specific emissions inventory developments in regions outside the United States, and a sense for international harmonization and global inventory efforts. Whether quantifying greenhouse gas emissions or modeling emissions and transport of air pollutants, scientists are increasingly dependent on international experience, cooperation, and sharing of data sets and methodologies. Common inventory challenges and how to work together to overcome them, will be discussed with the audience. Some key topics may include: Emissions inventory software models being adapted and/or used internationally; Current international efforts aimed at harmonizing emissions inventories; Key steps for countries in the early stages of inventory development; Proxy data being used by countries and regions when data is unavailable; International best practice data quality assurance programs; and Emissions information transfer between United States and developing countries. International attendees as well as U.S. experts with a keen interest in understanding, affecting, and participating in global international emissions work, are encouraged to attend.

4:30 "Panel continues"

Session 3: EI Preparation for Modeling

Chairs: Rich Mason, US EPA
Serpil Kayin, US EPA

1:30 "Preparing Control Case Emission Inventory Projections with EPA's Control Strategy Tool,"
D. Misenheimer and D. Weatherhead, US EPA

EPA is developing the Control Strategy Tool to support the preparation of future base case or control case emission inventories. This tool is a client-server system that allows the user to select a base year emissions inventory, select a target year (e.g., 2030), apply emission reductions from known control programs or from a database of control measure options, and generate a future base case or control case emission inventory. The resulting inventory will reflect emission changes to multiple pollutants, depending on the co-impacts of the control programs or control measure options, and can be used as an input to air quality modeling of future control case scenarios. This paper will describe the tool, the control programs and control measure databases which are critical inputs to the tool, and discuss its role in multi-pollutant control strategy analyses.

1:55 "Preparation of a Spatialised Emission Inventory as Input for Modeling," G. Triacchini,
C. Pastorello, A. Gzella and P. Dilara, European Commission - Joint Research Centre, Italy

A collaborative research project between the European Commission's Joint Research Center and the Lombardy Region, both located in Northern Italy, aims to identify the best pollution reduction strategies in this area and to set a framework solving such complex problem for whichever area in Europe. Advanced numerical air quality models (AQMs) have become an essential tool for analyzing the effect of the implementing emission abatement strategies and for the integrated assessment modeling. Spatialized emission inventories compatible with the requirement of Eulerian chemical transport model (CTM) represent one of the most crucial issues for performing reliable air quality simulations. Therefore, a spatialized atmospheric emission inventory concerning major pollutants (CO, NOx, SO2, CH4, PM10, PM2.5, NH3 and VOC) was developed for regions of Northern Italy by putting together information collected from the institutions in charge of emission inventories at regional and national scale. This paper will address the methodology, the steps followed and the difficulties encountered to prepare a high quality spatialized emission inventory as input to AQMs. In the case presented here, the major challenge was to include, as much as possible, bottom-up emissions information elaborated by the regional authorities. All the problems of data collection, homogenization and merge had to consider that each of the 10 Regions in Northern Italy is in charge of its own air quality plan and emission inventory. For the area of interest

(570x390 km2), emission data from the regional and the Italian national emission inventories were consolidated. The European emission inventory (EMEP) was used for the countries outside of Italy. In general, two kinds of emissions data sets with different aggregation level were acquired and merged as input to the spatialized emission inventory of Northern Italy: 1) INEMAR (INventario EMissioni ARia) – a database created for an implementation of high-quality regional emission inventory estimating the emissions of several pollutants at municipal level mainly with a bottom-up approach. INEMAR is currently used by most of the regions in Northern Italy; and 2) Italian national emission inventory – a database that collects and calculates all the emissions at national level and provides an estimation at provincial level applying a top-down disaggregation. Priority was given to the INEMAR emissions data at municipal level where available (i.e. fully completed for three of the Northern Italian regions and partially completed for the other regions). The rest of the data were covered by the use of the national emission inventory at provincial level, which was further disaggregated at municipal level using various proxies. The resulting emission inventory has been spatially allocated on a 3x3 km grid.

2:20 "Improving the Temporal Resolution of Emission Data for Atmospheric Modeling," S. Reis, M. Lang and M. Vieno, Centre for Ecology & Hydrology, United Kingdom

Atmospheric transport models (ATMs) are applied in a variety of areas, ranging from basic research into processes of atmospheric transport, chemical transformation and deposition to ex-ante and ex-post evaluations of air quality related policy decisions. In a policy context, the drive for an accurate quantification of the uncertainties of model output is strong. These models are typically evaluated during model inter comparisons, both assessing the relative performance in reproducing selected atmospheric parameters and comparing model results to atmospheric measurements conducted on the ground, airborne or by remote sensing. To a certain extent, sensitivity analyses have been conducted to identify the key drivers of the models' output, for instance looking into the quality of meteorological input data such as wind speed and direction, ambient temperature, and spatial and temporal distribution of rainfall. While emission inventories have been subject to significant improvements over the last decades with efforts to both quantify and reduce the uncertainties of inventory datasets, both the sensitivity to, and the processing of emission input data in currently applied atmospheric transport models, has not been investigated in sufficient depth. This is in particular the case for the temporal resolution of emissions, which may have a significant impact on the match between model results and measurement data in particular when applying ATMs with exceptionally high spatial resolution on a national or below scale (5Ã—5 or 1Ã—1 km, in the case of the UK). This paper aims to analyze the sensitivity of atmospheric transport models based on data for the UK to make a case for the improvement of temporal resolutions of emission input data in state-of-the-art models. Further to that, the authors would like to derive recommendations and priorities for the improvement of emission processing routines in the view of limited resources.

2:45 BREAK

3:15 "Development of Cross-Border Inventories in the Midwest for the US and Canada," M. Janssen, Lake Michigan Air Directors; S. Edick, Michigan DEQ.

This paper will describe methods used by LADCO and our states to convert the Canadian NPRI inventory into a high quality modeling inventory. It will explore the problems with other NPRI conversions and the consequences for regional modeling. This will include Point, Area, and Nonroad portions of the inventory. Particular attention will be given to the differences between the methods used by EPA and Environment Canada to develop their modeling inventories. The second half of the paper will examine the inventories used by Environment Canada based on US EPA's National Emissions Inventory and the modeling inventories used by Midwest States. Particular attention will be given to the temporal differences between the inventories.

3:40 “Integration of the Model of Emissions of Gases and Aerosols from Nature (MEGAN) into the CMAQ Modeling System,” G. Pouliot and T. Pierce, US EPA

Biogenic emissions play a central role in the chemistry of the polluted and unpolluted (natural) atmosphere and therefore needs to be estimated accurately for use in chemical transport models. The Model of Emissions of Gases and Aerosols from Nature (MEGAN) was converted into FORTRAN computer code that is compatible with the Community Multiscale Air Quality (CMAQ) modeling system. The current release of CMAQv4.7 includes the temporal allocation of emissions from the Biogenic Emission Inventory System (BEIS) as an in-line module. This presentation illustrates the differences between the MEGAN and BEIS models and the integration of both models as optional in-line modules in CMAQ. We will examine model performance with respect to either BEIS or MEGAN for selected modeling episodes. Disclaimer: Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy.

4:05 “Implementation of MOVES-Based PM2.5 Emissions Approach for Onroad Gasoline Sources using Hourly, Gridded Temperatures,” M. Houyoux, M. Strum, R. Mason, H. Michaels and D. Brzezinski, US EPA; J. Beidler and C. Allen, Computer Sciences Corporation

The impending release of the Motor Vehicle Emissions Simulator (MOVES) has prompted interest in using these emissions in air quality modeling. The MOVES PM2.5 emissions are significantly higher for onroad gasoline mobile sources due to temperature dependencies built into MOVES. Thus, these emissions are expected to be different from emissions based on the Mobile Source Emission Factor Model, version 6(MOBILE6). These differences are important for modeling applications and include (1) higher overall values, (2) greater daily and hourly variability, and (3) greater spatial variability, with colder regions experiencing significantly higher emissions. The computationally intense nature of MOVES makes it difficult to run MOVES directly for all temperatures needed using gridded, hourly temperatures. The work reported here defines a methodology for using MOVES-based emissions without running MOVES for all temperatures in all counties. The approach described differs significantly from a “lookup table” approach (used previously for VOCs) or the use of county-monthly emissions that has worked for MOBILE6-based processing using the National Mobile Inventory Model (NMIM). The approach relies on adjustments of start and running emissions from 72 degrees F for all modeling hours and grid cells predicted by the meteorology data to be below 72 degrees F, down to a maximum adjustment at -20 degrees F. Implementation of this approach demonstrates that it is a relatively efficient manner for including these emissions improvements. Results from this work show that in some areas, PM2.5 emissions from onroad gasoline sources can be many times higher than previously estimated using a MOBILE6-based approach, created with NMIM. We show the impact on temporal and spatial variability of the emissions from using this approach. Further, we show that our approach can provide significantly a different emission estimates from both a NMIM/MOBILE6-basedapproach and a MOVES-based approach that uses state-month temperatures for air quality modeling.

Poster Session and Exhibitors' Reception

Tuesday - April 14, 2009 **6:00 - 8:00 pm**

1. "e-DMA and the IKS eeM System," M. B. García, IKS eeM-Environmental Data Information Management System Responsible, Environmental Quality Directorate, Basque Country

2. "Emissions Processing Methodology For The Canadian Air Quality Model GEM-MACH," M. Sassi1, L-P. Crevier1, S. Ménard, Air Quality Modeling Applications Section, Meteorological Service of Canada; G. Morneau, Science Division, MSC Operations – Quebec Environment Canada; D. Niemi, Pollution Data Division, Science & Technology Branch, Environment Canada; P. Makar and W. Gong, Air Quality Research Division, Science & Technology Branch, Environment Canada; D. Fox, Prairie and Northern Environmental Protection Operations Division, Environment Canada

3. "Local-Scale Emissions Information for High Resolution Air Quality Modeling: Detroit Multi-Pollutant Pilot Project," R. L. Tooly and K.Wesson, U.S. EPA

4. "Integrate Emission Inventory in Environmental Governance Information Systems," C. Trozzi, R. Vaccaro, E. Piscitello and A. Ruggiero, Techne Consulting

5. "The Air Emissions Reporting Requirements Rule (AERR)," D. Beauregard, US EPA

6. "Submitting Data to the Emission Inventory System," M. Husk and S. Dombrowski, US EPA

7. "The Emission Inventory System (EIS) Bridge Tool," M. Husk and S. Dombrowski, US EPA

8. "The Use of Portable Emission Measurements (PEMS) for the Validation of Emission Factors for Heavy Duty Vehicles," P. Dilara, M. Muntean, P. Bonnel and J. Kubelt, European Commission, Joint Research Centre, Ispra, Italy; S. Hausberger, Institute for Internal Combustion Engines, University of Technology Graz, Austria

9. "EPA NONROAD Model Updates of 2008," C. Harvey and P. Carey, US EPA

10. "A GIS-based Emission Mapping and Information Tool (EMIT)," J. W. Boulton, P. Joynt and M. V. Atena, RWDI AIR Inc., Canada; D. Jutzi, D. Herod, Environment Canada; P. Smith, D. Ratte and D. Neimi, Environment Canada

11. "Compilation of a Province-Wide Air Emissions Inventory for Alberta," J. W. Boulton, D. Devine, R. Chapman and D. Cherneski - RWDI AIR Inc., Canada; R. Bioletti, R. Melick, and D. Niemi, Environment Canada

12. "Total, Non-baseload, eGRID Subregion, State - Guidance on the Use of eGRID Output Emission Rates," S. S. Rothschild, E.H. Pechan & Associates; A. Diem, US EPA OAP

Wednesday - April 15, 2009

Session 4: Innovative EI Development Methods

Chairs: Janet Kremer, US EPA
Orlando Cabrera, CEC

9:00 "Spatiotemporal Variations in Burned Areas and Biomass Burning Emissions Derived from Multiple Satellite-based Active Fires across the USA," X. Zhang, S. Kondragunta and M. Ruminski, NOAA

Biomass burning releases a significant amount of trace gases and aerosols into the atmosphere. These emissions affect air quality and carbon budget. This study estimates burned areas from multiple satellite-based active fires provided through Hazard Mapping System (HMS) developed at NOAA. HMS is an operational system that consolidates automated fire detections from Geostationary Operational Environmental Satellite (GOES) Imager, Advanced Very High Resolution Radiometer (AVHRR), Moderate Resolution Imaging Spectroradiometer (MODIS), and manually checked for quality. Specifically, burned areas are derived from the diurnal pattern of fire size and fire duration. The fire size is obtained from the GOES fire product and the fire duration is determined using active fire observations from all the instruments. These burned areas, combined with fuel loadings developed from MODIS land products and fuel moisture retrieved from AVHRR data, are used to quantify emissions of PM2.5 (particulate mass for particles with diameter < 2.5), CH4, CO2, N2O, NH3, NOX, and TNMHC every half hour from 2003-2007. Analysis of variations in burned areas and biomass burning emissions in different climate regions and ecosystems will be presented.

9:25 "Crustal Matter: Exploring the Differences between Ambient Air Samples and Emissions Inventory," J. James, C. Clark and J. Rice, North Carolina State University

Fine particulate matter (PM fine) is a complex mixture of tiny particles in the air. PM2.5 consists of particles that measure 2.5 micrometers in diameter or less, and is composed of sulfates, metals, crustal matter, and other elements. The main source of PM2.5 comes from the combustion or burning of fuels, and scientific studies have identified various health problems associated with PM2.5 exposure as severe as premature death. National emissions inventory has been using 31.4% to describe the ratio of crustal matter to total PM2.5, while ambient air samples suggest a lower ratio. This study is being conducted to better understand this discrepancy, as well as improve the accuracy of the current ratio. Ambient air samples are taken from both urban and rural areas across the US, with the highest ratios identified in the western US and in the spring months. Current work shows that taking the log of the crustal matter and PM2.5 measurements, as well as their ratio, normalizes the data and meets the assumptions associated with regression. We are furthering this analysis by incorporating meteorology and harvest data with the transformed data. This work will result in recommendations on how to 'adjust' the emissions inventory so that it more closely agrees with ambient air samples, which may improve the air quality management process. It is critical to explore this discrepancy so that US EPA, along with other environmental agencies, will take necessary action to use the most accurate ratio.

9:50 "Global Energy Observatory: A One-Stop Site for Information on Energy Systems, Infrastructure and Emissions," R. Gupta, Los Alamos National Lab, New Mexico

This talk will describe the OpenModel project to create a Global Energy Observatory (GEO) to build, with public participation, a comprehensive picture of the world's static energy systems and their emissions. The alpha version of this framework and database are available at http://openmodel.newmexicoconsortium.org/. This open web based tool will facilitate an understanding of regional variations, choices, and needs with respect to energy production, transmission and use. It will be possible to track the full cycle: from sources to generation to use and impacts. Its role in facilitating monitoring, measuring and validating emissions needed for formulating enforceable environmental treaties, will also be discussed. We will also describe emerging GIS and information science tools, and issues of trust and quality in synthesizing heterogeneous data obtained partly as Volunteered Information by the public and experts (citizen sensors), in building and maintaining such a global database.

10:15 BREAK

10:45 "Using a Recreational Marine Survey to Improve Spatial and Temporal Allocations in the Houston-Galveston-Brazoria Area," T. Kosub, Texas Commission on Environmental Quality; R. Anderson, K. B. Thesing, and J. H. Wilson Jr., E.H. Pechan & Associates, Inc.

The purpose of this project was to update the recreational marine emission inventory in the Houston/Galveston/Brazoria (HGB) 8-county ozone nonattainment area with a primary focus on improving the temporal and spatial allocation of recreational marine activities in that area. This paper describes the approach used to improve the temporal and spatial allocations of HGB recreational marine emissions, the methodology and results of a boating activity survey, the input and results of emissions modeled in TexN (the Texas NONROAD model), and recommendations for the Texas Commission on Environmental Quality for further improvement of the HGB recreational marine emissions inventory. This paper should be of interest to State and local agencies who might be interested in performing a similar field survey.

11:10 "Analysis of Historical Emission Changes to Inform New Emission Projection Analysis," J. H. Wilson, A. Bollman, V. Glenn and J. Schreiber, E.H. Pechan & Associates; A. Cuclis, Houston Advanced Research Center; K. Pendleton, Texas Commission on Environmental Quality

One of the critical issues in achieving the National Ambient Air Quality Standard (NAAQS) in future years is to understand the relative importance of different source categories at and beyond the attainment years. This analysis will help improve the performance of forecasting models and help explain key variables likely overlooked in current forecasting methods. The bulk of the work in this project will entail two efforts: (1) performing a review of Texas Commission on Environmental Quality (TCEQ) emission projection methods/data for all source categories and (2) conducting a more detailed analysis of point source emission projection methods identify improvements to TCEQ point source emission projection methods/data. The primary focus of this paper is evaluating recent historical emissions and air pollution-related activity information for priority point source categories in the State of Texas to determine the primary factors influencing emission changes in this period (1990 to 2005, or the equivalent), and to use this information to develop improved emission forecasts for future years. Priority point source categories evaluated include electric generating units, petroleum refining, chemical manufacturing, and oil and gas production.

Session 5: Stationary Sources/Emission Factors

Chairs: Dennis Beauregard, US EPA

1:30 "Upstream Oil and Gas Emissions Measurement Project," R. Segall, J. DeWees, and D. Mikel, USEPA OAQPS; E. Thomas, US EPA ORD; C. Beeler, US EPA, Region 8

EPA Region 8 and, in particular, Colorado is home to numerous upstream oil and gas operations. In recent years, Colorado has seen ozone levels that exceed national ambient air quality standards with levels increasing at several sites. Volatile organic compound (VOC) emissions from these upstream oil and gas operations may contribute in part to these exceedences. In early 2008, EPA Region 8 contacted OAQPS to express a critical need to quantify VOC emissions from oil and gas production facilities. Oil and gas fields provide unique and very challenging testing issues due to their large variety and quantity. Emissions points include separators, dehydrators, generators, natural gas powered pneumatic devices, injection wells, heaters, compressors/engines, storage tanks, and produced water ponds and in addition, the variety of activities such as well drilling, well completion, well work over, and loading/unloading of oil/produced water into trucks which can generate organic emissions. There is little or no data regarding the emissions from most of these sources and activities. A project team with representatives from EPA OAQPS, EPA ORD and their contractors, Region 8, Region 6, and the states of Colorado and Wyoming are working to define and execute a multi-phased research effort to address this important issue. Phase I of the effort addressed an immediate need of Region 8 and its states to quantify VOC emissions from oil and gas produced water evaporation ponds using an optical remote sensing-based measurement approach at two

facilities. This presentation will describe the measurement approach and present preliminary data from the field testing program.

1:55 "Emission Factors for Abrasive Materials," M. Serageldin, US EPA

Abrasive blasting materials such as coal slag garnet, and copper slag are often used for cleaning metal surfaces to remove rust and to prepare a surface before the application of a coating. The pre-blast and post-blast (spent) abrasive materials contain traces of heavy metal constituents such as Cr, Mn, Ni, Pb Fe, and Ba. Hence, the health risk associated with the resultant particulate emissions is a source of concern. Emission factors are often use to estimate emissions from such industrial operations. Since the development of the emission factors for uncontrolled abrasive blasting operations (using sand), prepared for US EPA in 1995, several attempts were made to derive emission factors for particulates. This paper will provide an overview of several relevant studies where emission factors were proposed and / or could be used to determine particulate emission factors. The studies reviewed include wind tunnel pilot-scale studies, which simulate open-air activities such paint removal of bridges and vessels. The studies, also, include semi-enclosures (similar to spray booths with open ends). Lastly, the paper will propose new emission factors for several abrasive blasting materials based on analysis of airborne experimental data rather than pre-blast data.

2:20 "Preparation of the 2005 Point Sources National Emissions Inventory for Risk and Technology Review," R.G. Oommen and D.L. Wilson, Eastern Research Group, Inc.; A. Pope, US EPA

Every three years, the U.S. Environmental Protection Agency (EPA) prepares the National Emissions Inventory (NEI), an air quality emissions inventory dataset that serves numerous stakeholders, including federal, regional, state, local, and tribal agencies. Uses of the NEI data include: evaluating emission trends; preparing inputs for air quality modeling; and evaluating the need for additional control technology standards. The NEI consists of stationary, mobile, and biogenic emission sources. Stationary sources are classified as point or nonpoint area sources, whereas mobile sources are categorized as onroad or nonroad sources. At present, the NEI houses criteria and hazardous air pollutants. Over the last two years, the EPA has been actively engaged in its Risk and Technology Review (RTR) Program. The RTR Program is a combined effort to evaluate both risk and technology after the application of maximum achievable control technology (MACT) standards, as required by the 1990 Clean Air Act Amendments. RTR evaluates the effectiveness of technology-based standards, using cancer and non-cancer risk as metrics, and determines the need for implementing additional and/or more stringent control requirements on specific source categories to reduce cancer and non-cancer risk. A number of data sources, augmentation techniques, and quality assurance checks were used to prepare the point sources inventory. This paper describes recent efforts in the preparation of the 2005 NEI for RTR purposes.

2:45 BREAK

3:15 "Total, Non-baseload, eGRID Subregion, State - Guidance on the Use of eGRID Output Emission Rates," S. S. Rothschild, E.H. Pechan & Associates; A. Diem, US EPA OAP

The purpose of this paper is to dispel the uncertainty surrounding the various Emissions & Generation Resource Integrated Database (eGRID) emission rates, in particular the output emission rates, and to answer the questions posed by many users. It is anticipated that as a result of this paper, future misuse of the eGRID data for carbon footprinting and emissions reductions projects will be prevented. eGRID, developed by E.H. Pechan & Associates, Inc. for the Climate Protection Partnership Division's State and Local Branch, is the preeminent source of data on the environmental attributes of virtually all of the electric power generated in the United States, linking air emissions to electricity generated. The most recent data, the sixth edition of eGRID, eGRID2007, can be downloaded from the eGRID website, http://www.epa.gov/egrid.This paper discusses how total output emission rates, combustion output emission rates, and non-baseload output emission rates are calculated. Names of specific plants that would or would not be included in the calculations of these rates for some particular examples will illuminate the differences among the methodologies for estimating these output rate values. The paper also relates how the eGRID plant data are aggregated to the different eGRID levels. Recommendations and reasons for the

appropriate selection of the type of eGRID output emission rate and aggregation level for different purposes are offered.

3:40 "Benefits, New Features, and Overview of the Electronic Reporting Tool (ERT)," R. Myers, US EPA; P. Baker, MACTEC

The Measurement Policy Group (MPG) in EPA's Office of Air Quality Planning and Standards has been working for many years to improve the quality of emissions factors by incorporating emissions data collected during well conducted and well documented source tests. MACTEC Federal Programs, Inc. (MACTEC) has been working with MPG to develop the Emissions Reporting Tool (ERT) to facilitate the collection, quality assurance, and reporting of source test results. ERT provides a method to electronically create and submit stationary source sampling test plans to a regulatory agency, and, after approval, to calculate and submit the test results as an electronic report to the regulatory agency. ERT also provides a way for the regulatory agency to send an export file to EPA for import into webFIRE for use in calculating emission factors. We will present an overview of ERT's new features and the benefits to the users. The benefits to States include: 1.) Standardized Reporting. Reports from different testers are currently in different formats. ERT will standardize all reports to allow for easier review; 2.) Step Through QA. ERT steps the reviewer through the QA process. This provides a standard way of reviewing all reports and greatly reduce the QA review time; and 3) Better Emission Factors. Because the purpose of the ERT is to provide data for webFIRE emission factor calculations, the more ERT is used, the more data will be available and the more representative and complete the factor calculations. Benefits to the source testers and industry include: 1.) Streamlined Test Plans. Standardized Test Plans will shorten the State review and approval time allowing for quicker start for the source test; and 2.) Standard reports for all States. Source testers working in different States can use ERT for Test Plans and Test Reports, eliminating the need for different report formats and requirements for each State.

4:05 "What's New in SPECIATE 4.2," Y. Hsu and F. Divita Jr., E.H. Pechan & Associates; J. D. Mobley and L. L. Beck, US EPA

SPECIATE is the U.S. Environmental Protection Agency's (EPA) repository of volatile organic compounds (VOC) and particulate matter (PM) speciation profiles for emissions from air pollution sources. The profiles are key inputs to photochemical air quality modeling, source-receptor analysis applications, and have also supported air toxic inventory assessments. Given the importance of SPECIATE to the process of air quality management, a team was organized to continuously update the Database. The latest SPECIATE 4.2 database and its comprehensive documentation have been peer reviewed and for release in 2009. The scope of the current efforts include: (1) Update the database with profiles from the literature and EPA source test data; (2) Add new category called Other Gases that contains speciated mercury, nitrogen oxides, and semivolatile organic compounds which do not fall into VOC and PM profiles categories; (3) Assign any new species to reactivity classes; (4) Update the air quality models to use the new information; and (5) Develop a beta version of web-based SPECIATE tool for broader user access to the database. SPECIATE 4.2 includes 5,187 PM, VOC, and Other Gases profiles.

4:30 "Sources of Lead Air Emissions and Status of the NEI for Lead," T.G. Pace and A. Pope, US EPA

The Lead emissions inventory is the starting point to locate ambient air monitoring networks in support of the newly revised Pb NAAQS. This paper will provide background on the development of the 2002 and 2005 NEI for Lead. It will summarize and compare the 2002 and 2005 NEI and compare the 2002 NEI and Toxics Release Inventories. The nature of the lead sources across the US that emit greater than 1 ton of Pb per year are characterized, and States and Tribes are required to undertake ambient monitoring near these sources. Other sources of lead air emissions will be discussed and the issue of re-suspension of lead-contaminated soil around highways and both active and closed lead-emitting facilities will be explored.

Session 6: Mobile Sources

Chairs: Laurel Driver, US EPA
Harvey Michaels, US EPA

9:00 "Air Pollution Emissions from Highway Vehicles: What MOVES Tells Us," M. Beardsley, D. Brzezinski, J. Koupal and J. Warila, US EPA OTAQ

The U.S. Environmental Protection Agency is developing the Motor Vehicle Emission Simulator (MOVES) to estimate air pollution emissions from cars, trucks and other mobile sources. When complete, MOVES will replace EPA's MOBILE and NONROAD models. The EPA has created a draft version of MOVES that incorporates extensive new data and advanced algorithms to better estimate highway vehicle emissions of greenhouse gases, criteria pollutants and selected air toxics. This presentation will summarize how MOVES differs from MOBILE6 in terms of inputs, capabilities and results.

9:25 "European Road Transport Emission Trends Linked to Policy Developments," V. Vestreng, Department of Climate and Industry, Norwegian Pollution Control Authority, Oslo, Norway; L. Ntziachristos, Lab of Applied Thermodynamics, Aristotle University Thessaloniki, Greece; A. Semb and L. Tarrasón, Norwegian Institute for Air Research, Kjeller, Norway; S. Reis, Centre for Ecology & Hydrology, Edinburgh, Scotland; I. S. A. Isaksen, Department of Geosciences, University of Oslo, Norway

The implementation of strict measures to control NOx emissions from road transport is demonstrated here to be a main reason for the continued Western European emission reductions. The results indicate that even though the effectiveness of European standards (EURO 1-4) is hampered by a slow vehicle turnover, loopholes in the type-approval testing, and an increase in diesel consumption, the effect of such technical abatement measures is traceable in the evolution of European road traffic emissions over the last 15 years. Transport emissions increase in line with the growth in economy in large parts of Eastern Europe. As a result of the recent development in road transport emissions, the emission levels in Eastern and Western Europe are now rapidly approaching each other.

9:50 "The ARTEMIS European Tools for Estimating the Pollutant Emissions from Road Transport and their Application in Sweden and France," M. Andre, Transport and Environment, France, INRETS; M. Keller, Infras, Bern, Switzerland; A. Sjodin, Swedish Env. Research Institute, Sweden; M. Gadrat, CETE - Nord-Picardie, France; I. McCrae, Transport Research Laboratory, Great Britan; Panagiota Dilara, European Commission, Joint Research Center, Ispra, Italy

The international engagements as well as the impact studies require accurate and agreed methods for assessing the pollutant emissions from the road transports. This ARTEMIS project - with 40 European research laboratories and a budget of about 9 M - was initiated for the setting-up and improvement of the European inventorying tools for application at different spatial and temporal scales and which should enable objectives comparisons and evaluations. These tools rely on consequent experimental works and integrate most of the European related knowledge. They concern all transports modes in Europe, their pollutant emissions and fuel consumption, their characteristics of use. The ARTEMIS project resulted in many important scientific results and in a unique state of the art on the topic in Europe. We recapitulate the main lines of the project and its results: emission measurements, principles of the modeling, street-scale approach based on the definition of traffic situations, and the resulting tools. The tools application requires detailed and reliable data describing the traffic (vehicle fleets and activity, driving conditions, etc.). We highlight this aspect through the ARTEMIS application in Sweden - the first country to implement the tools for emissions reporting, and through a road network-based approach envisaged in Lille for impact studies at a city level.

10:15 BREAK

10:45 “Mobile Source Emission Estimates Using Remote Sensing Data from Mexican Cities,”
J.A. Aguilar-Gómez, V. Garibay-Bravo, G. Tzintzun-Cervantes, I. Cruz-Jimate and G. Echániz-Pellicer, National Institute of Ecology, Mexico

In Mexico, mobile source emission inventories are traditionally calculated using emission factors and deterioration rates developed by the US-EPA for the US vehicle fleet, fuels and driving conditions. While this method might prove useful to obtain rough estimates of mobile source emissions, it is assumed that these inventories entail a high (and still unidentified) level of uncertainty, which makes it essential to enhance these inventories with the use of field data on vehicle characteristics, driving patterns and fuels prevalent in Mexico. During the past two years, the National Institute of Ecology in Mexico (INE) has worked to improve mobile source emissions inventory tools and information. As part of this effort, INE has performed several field campaigns (using remote sensing equipment and surveys) to gather local data on vehicle fleet characteristics and activity patterns in various cities along the US-Mexico Border and in other urban areas with large motor vehicle population. This paper focuses on how the analysis of the data obtained from these field campaigns has been used to: expand the International Vehicle Emission (IVE) Model for Mexican cities; estimate conventional pollutants and GHG emissions from mobiles sources in several cities; and provide local and federal environmental authorities with data on the environmental performance of the vehicle fleet in Mexico. This work offers information and analyses previously not available in urban areas outside the Mexico City Metropolitan Area. This will prove useful both to inventory developers and to policy makers at the local and federal levels.

11:10 “Particulate Organic Carbon and Semi-volatile Organic Compound Ambient Modeling,”
C. Lindhjem, ENVIRON; E. Fujita, DRI; M. Janssen, LADCO; D. Lawson, NREL

This work evaluated the impact of emission inventory adjustments expected based on recent emissions data for light and heavy-duty vehicles on predicted particulate matter (PM) concentrations and source contributions to the modeled ambient PM for comparison with results from source apportionments of ambient data. This work reviewed the recent test data of hydrocarbon and PM from light and heavy-duty data to provide a sensitivity analysis adjustment to the MOBILE6 modeled emission results. CAMx simulated a base year (2005) with and without the emission adjustments to the MOBILE6 emission rates to compare with recent source apportionment studies. The modeled source contributions were determined using the CAMx PM Source Apportionment (PSAT) probing tool. The PSAT apportioned source category contributions to primary OC, secondary OC, and primary EC using source categories that correspond to published source apportionments of ambient data. CAMx PSAT results were summarized for receptor locations and seasons that match the ambient source apportionment studies. The impact of emission inventory adjustments on CAMx-predicted PM concentrations was evaluated by calculating performance statistics at monitoring locations for EC and OC by region (RPO) and monitoring network (STN, IMPROVE)

12:00 LUNCH

1:30 “Challenges in Preparing a Mobile Source Emission Inventory for NAS JRB Ft. Worth,”
W. R. Barnard, MACTEC

This paper provides an overview of the challenges associated with preparing a mobile source inventory for Naval Air Station (NAS) Joint Reserve Base (JRB) Ft. Worth. The paper discusses the sources covered (on-road, non-road, planes), the activity data identification issues including avoidance of double counting and issues associated with over or under counting on-road vehicles, and challenges associated with obtaining data related to non-road engines. It also discusses the challenges associated with preparing an inventory as they relate to mission critical operations such as security and staff availability. The paper also discusses efforts to ensure compatibility with local planning groups, especially in the preparation of MOBILE6 input files. Finally, the paper provides recommendations for future inventories and conclusions based on the results of this work.

1:55 “Farming in the Lone Star State: Agricultural Equipment Survey for Texas,” K. Thesing and A. Bollman, E.H. Pechan; P. Ogbeide, Texas Commission on Environmental Quality

The Texas Commission on Environmental Quality (TCEQ) recognizes that nonroad sources are potentially important contributors to Texas air quality concerns, and is considering emission reduction strategies for these sources. Preparing both temporally and spatially representative nonroad sector inventories will support TCEQ analyses to accurately characterize the emission reductions needed to achieve and maintain compliance with air quality standards. One of TCEQ's goals is to improve current criteria pollutant emission estimates from agricultural equipment such as tractors, combines, mowers, and sprayers. Under contract to the TCEQ, E.H. Pechan & Associates, Inc. (Pechan) and its subcontractor (Ewald & Wasserman Research Consultants, LLC) conducted a telephone survey of agricultural equipment owners in Texas. The collected data will be used to refine equipment populations, annual hours of use, and seasonal, weekly and diurnal activity profiles for these equipment types. These activity inputs will replace the default data in the Texas NONROAD model (TexN) for preparing base year and select forecast year inventories. For the first phase of this project, Pechan requested the necessary data from agricultural equipment owners in Texas through a telephone survey conducted during July/August of 2008. The second phase of the project involves statistical analysis of the survey data and development of updated model inputs. This paper describes the survey effort, the analysis of the resulting data, and revised TexN inputs, including comparisons with model default values. The paper concludes with a discussion of study conclusions and insights that may assist other researchers in developing agricultural equipment emission inventories.

2:20 “ERTAC Rail: A Collaborative Effort in Building a Railroad-Related Emissions Inventory Between Eastern States Air Protection Agencies and Participation with the Railroad Industry,” M. Bergin, GA Environmental Protection Division; M. Harrell, IL EPA; J. McDill, Mid-Atlantic Regional Air Management Association (MARAMA); M. Janssen, Lake Michigan Air Directors Consortium (LADCO); L. Driver, US EPA; R. Fronczak, American Association of Railroads; R. Nath, CSX Transportation; and D. Seep, BSNF Railway

Air protection agencies from twenty-seven states, coordinated through the Eastern Regional Technical Advisory Committee (ERTAC), identified rail as an important yet poorly characterized component of their emissions inventories. Locomotives largely utilize diesel combustion engines, resulting in emissions of NOx, direct PM, hydrocarbons, and greenhouse gases (e.g. CO2), and emissions are sometimes concentrated in areas exceeding National Ambient Air Quality Standards. Inventory development tools for locomotive emissions estimation vary dramatically from state to state and generally lack detail. In addition, current inventories lack the spatial or temporal resolution needed to support air quality modeling. An ERTAC Rail Subcommittee established active representatives from twelve member states, three regional planning offices, and the US EPA. The committee's goals are to (1) standardize agencies' inventory development methods through a collaborative effort, (2) improve the quality of data received and the resulting emission inventories, and (3) reduce the administrative burden on railroad companies of providing data. The ERTAC Rail team has identified five major rail-related source categories of interest and is pursuing collaboration with the railroad industry to establish the methodology and collect supporting data for a 2008 regional or nationwide emissions inventory and to prepare a protocol for future inventory development. The Association of American Railroads has been coordinating active participation by its eight member Class I Railroads, and efforts to contact Class II and III Railroads are being made through their member associations. This paper discusses the progress ERTAC is making toward these goals.

2:45 BREAK

3:15 “FAA's EDMS Airport Air Quality Model - Inventories of Criteria and Hazardous Pollutants for the Aviation Sector,” R. Iovinelli and M. Gupta, Federal Aviation Administration

The Federal Aviation Administration (FAA) requires the use of the Emissions and Dispersion Modeling System (EDMS) for air quality analyses of emission sources from airport projects. Such an analysis may include an emissions inventory and/or a dispersion analysis for both aviation and non-aviation sources. The FAA considers aviation sources to include aircraft, auxiliary power units and ground support equipment. EDMS also offers the capability to model other airport emission sources that are not aviation-specific, such

as power plants, fuel storage tanks and ground access vehicles. This paper presents recent model development activities and those planned for the near future. The latest public available model version is EDMS5.1. It includes significant enhancements such as: replication of real aircraft movements; estimation of speciated TOG emissions (including known hazardous air pollutants) and PM2.5 emissions for all airport sources and CO2 emissions from aircraft activities within the landing and take off (LTO) cycle; interface to MOBILE version 6.2; databases and methodology for NONROAD source emissions; and the latest versions of AERMET, AERMOD and AERMAP. EDMS has also been configured to provide digital outputs for enhanced data analysis and tabulation. In the next 3 years, the FAA plans to replace EDMS with the Aviation Environmental Design Tool (AEDT), a comprehensive software compliance tool to assess the interdependencies between aviation-related noise, criteria/HAPs/GHG emissions, and fuel consumption. For this transition, FAA will work closely with EPA to ensure that MOBILE and NONROAD are replaced by the MOVES model for ground-based mobile source emissions and fuel consumption.

3:40 "Automatic Identification Systems (AIS) Data Use in Marine Vessel Emission Estimation," H. Perez, R. Chang, and R. Billings, ERG, Inc.; T. Kosub, Texas Commission on Environmental Quality

Eastern Research Group, Inc. (ERG) used Automatic Identification Systems (AIS) data to create a state-of-the-art inventory of 2007 commercial marine vessel emissions in Texas State waters. The AIS is a unique program that provides a means for ships to electronically broadcast ship data at regular intervals including: vessel identification, position, course, and speed. These and other data are transmitted continuously, providing a comprehensive and detailed data set of individual vessel tracking data that can be used to improve traffic pattern identification in Texas State waters. ERG used a Geographic Information System to map and analyze both individual vessel movements and general traffic patterns on inland waterways and within 9 miles of the Texas coastline. ERG then linked the vessel tracking data to individual vessel characteristics from Lloyd's Register of Ships, American Bureau of Shipping, and Bureau Veritas to match vessels to fuel and engine data, which were then applied to the latest emission factors to quantify criteria and hazardous air pollutant emissions from these vessels. The use of AIS data provides the opportunity for highly refined vessel movement and improved emissions estimation, and the strengths of this data set are outlined in detail. However, such a novel and detailed data set also provides singular challenges in data management, analysis, and gap filling, which are also examined in depth along with methods for addressing limitations.

Session 7: Greenhouse Gases

Chairs: Andrea Denny, US EPA
Leif Hockstad, US EPA

9:00 "Greenhouse Gas Inventories of Baltimore County and County Government 2002-2006," P. Brady and B. Fath, Towson University

Inventories of Greenhouse Gases (GHG) were conducted for Baltimore County and for County Government operations using The Clean Air and Climate Protection Software developed for the International Council for Local Environmental Initiatives. The inventory focused on carbon dioxide, methane, and nitrous oxide. The years inventoried were 2002 to 2006, and projections were made for business as usual conditions for 2012. Targets for 10% reduction of the base year (2006) emissions by 2012 were derived .In 2006, Baltimore County produced 11.5 million metric tons (MMt) eCO2. The Transportation Sector contributed the most with 4.9 MMt (42%), followed by Residential Sector with 3.2 MMt. Electricity is the greatest source of emissions (39.9%) followed by gasoline (35.0%). In comparisons with other jurisdiction, parallels were observed in emissions' sources and sectors. Variations in per capita comparisons may be due, in part, to the fuel mix used in local electricity generation. Baltimore County Government produced 1.24% of the total County emissions, 142.7 Thousand Metric tons (KMt) eCO2 in 2006, with Buildings contributing 39.6 KMt, followed by Waste Water pumping, 38.6 KMt. The largest sources of emissions for County operations were electricity (62.4%), then gasoline (30%). Baltimore County Government's pattern of energy use and emissions production shares similarities with other jurisdictions with Buildings, Waste Water pumping, and Vehicle Fleet contributing the highest emissions.

9:25 “Evaluation of Greenhouse Gas Emissions and Reduction Strategies Related to Waste Management by Local Government,” V. Thompson, R. Rosen Ph.D., B. Schuster, P. Groth, S. Hatcher and A. Choate, ICF International

Greenhouse gas (GHG) emissions from community waste generation can represent a significant portion of a city or county's GHG emissions inventory. At the national scale, the US EPA estimates that 2006 emissions from municipal solid waste landfills, municipal waste combustors, and centralized composting operations were 125.7 Tg CO2e, 20.9 Tg CO2e, and 1.6 Tg CO2e, respectively. Although direct emissions from waste management facilities comprise only 2.4 percent of national net emissions, these emissions represent a large fraction of those that can be effectively addressed at the community level. Waste management practices offer an opportunity to reduce emissions at the point of disposal and at upstream points through recycling and source reduction, as exhibited by our work with the City of Los Angeles and the County of Sacramento. We analyzed the GHG reduction benefits from Los Angeles' goal to recycle or compost 70 percent of its solid waste by 2015. We demonstrate how the protocols that we have developed to account for direct and indirect waste emissions from local governments and communities provide a straightforward tool for local leaders to evaluate the GHG reduction benefits associated with alternative waste management practices and landfill controls. We apply our Waste Reduction Model developed for US EPA to assist waste managers to estimate the GHG and energy benefits of different waste management options for 34 materials commonly found in the waste stream - to demonstrate the specific GHG reduction options available to local policy-makers.

9:50 “Conducting a Greenhouse Gas Emissions Inventory at the Metropolitan Level, Allocated to Municipalities and Counties,” R. Graff, Delaware Valley Regional Planning Commission; A. Choate and P. Groth, ICF International

The Delaware Valley Regional Planning Commission, the federally-designated Metropolitan Planning Organization (MPO) for the nine counties of Greater Philadelphia, recently completed a comprehensive regional greenhouse gas emissions inventory for 2005 as well as an emissions projection for 2035. This inventory was carried out in close consultation with the US EPA to assure the protocol used conforms where possible to the agency's current thinking on MPO-level inventories. DVRPC also consulted with both the Commonwealth of Pennsylvania and the State of New Jersey, as well as with ICLEI - Local Governments for Sustainability. The protocol used drew on the state inventories developed using the state inventory tool, as well as local data where available. This work was carried out with the assistance of ICF International. The inventory allocated emissions to the each of the 353 municipalities in the region. This allocation excluded several emissions categories which were not feasible to allocate with available data, including emissions from aircraft, through highway traffic, industry, and livestock. Nonetheless, 70 percent of all emissions in the region were allocated. Electricity and natural gas use information was collected at either the municipal or ZIP code level by customer class (residential, commercial, industrial) from each of the dozen or so utilities that serve the region. Vehicle miles traveled (VMT) in the region was allocated to municipalities by assigning half of each trip to the municipality of origin and half to the destination municipality. The results clearly demonstrate that municipalities with higher density tend to produce lower per capita emissions.

10:15 BREAK

10:45 “Development of an Integrated Criteria/Toxic Air Pollutant and GHG Emissions Inventory,” S. M. Roe, A. Bollman, M. Mullen and M. Salhotra, E. H. Pechan; M. Stein, Iowa Department of Natural Resources; L. Chappell, US EPA

The objective of this pilot project is to develop a combined state-wide emissions inventory covering criteria air pollutants (CAPs), toxic air pollutants (TAPs), and greenhouse gases (GHGs) at the county-level. The inventory will cover a 2005 base year and is designed to be used within a data framework that is capable of projecting inventory data for use in a wide variety of policy analyses. All emission sources and sinks will be covered and data files developed in EPA’s National Emissions Inventory (NEI) Format version 3.0 (NIF3.0). The work will involve integrating Iowa’s 2005 GHG inventory with existing CAP/TAP inventory data (grown to 2005, as needed). Detailed documentation of the procedures used to integrate the inventory

data on a sector by sector basis will be developed for future use by Iowa, other states, and the US EPA. Among the integration procedures/issues are: new source classification codes for GHG sources that do not have a direct analog in the CAP/TAP inventory structure; State to county-level allocation of GHG emissions for the nonpoint sectors; accounting for both emissions and sinks (including negative emissions) within the existing NIF data structure. The paper will present results of the project in the form of summary tables and graphs of GHG/CAP/TAP emissions, as well as lessons learned.

11:10 "Greenhouse Gas Emission Inventory Activities of NCDAQ," S. Masemore, North Carolina Department of Environment and Natural Resources - Division of Air Quality

The Division of Air Quality (DAQ) is in the process of amending its annual emissions reporting rule to add greenhouse gases (GHGs) to the list of pollutants that will be reported annually from Title V facilities. Along with reporting criteria and hazardous air pollutants, DAQ's current activity consists of instituting a baseline point source reporting requirement of GHG emissions from all permitted sources. The results of this effort will be useful for tracking performance of programs and assessing future priorities of DAQ. This paper discusses modifications of the 'Air-Emissions Reporting On-line' system that contains data input screens to report source operating parameters and emission rates for CO2, CH4, N2O, PFC, and HFCs. Additional resources provided to the reporting industries are also discussed. This includes the use of source specific guidance documents, emission calculation spreadsheets, education workshops, and reference to other useful documents. The paper also discusses a second major effort within the department to calculate its carbon footprint. As a Reporter to The Climate Registry, DENR will calculate, independently verify, and publicly report 2008 emissions associated with vehicle fuel use, electricity consumption, and stationary combustion. DAQ has been spearheading this effort, with representatives from 25 divisions forming the DENR Climate Change Work Group. This paper describes the contents of an inventory management plan, including data systems, calculation tools, and quality assurance procedures. The establishment and maintenance of an Internet based portal system, and a Jive Forum which serves as the primary communication and data management system, is described.

11:35 "Forecasting Wildfires and Examining the Impact of Global Climate Change," J. Leone, J. Pearce and K. Gore, North Carolina State University

The western region of the continental United States continues to see an increase in devastating fires, especially over the last decade. The US EPA is interested in this increase in wildfires and their emissions. The Northern Hemisphere has shown an increase in temperature anomalies steadily over the last thirty to forty years. Similarly, over the last forty years there has been a positive trend in national temperature as well as western and northwestern regional temperatures. At the same time, there has been an increase in the acres burned nationally and an increase in the acres burned per fire on average. This paper will discuss our model to forecast wildfires for the Western United States and examine the potential impact from future global climate change.

12:00 LUNCH

1:30 "Determining Adequate Greenhouse Gas Emission Estimation Methods for Mandatory Reporting Under the Western Climate Initiative Cap-and-Trade Program," P.G. Fields and M.E Wolf, Eastern Research Group, Inc.; B. Musick, New Mexico Environment Department

The Western Climate Initiative (WCI) is a collaboration among Western states and Canadian provinces to develop regional strategies to address climate change. Partners include the states of Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington, and the provinces of British Columbia, Quebec, Ontario, and Manitoba. A robust and credible emissions reporting system is the cornerstone of the WCI program, and it will need to ensure that greenhouse gas (GHG) emissions (i.e., carbon dioxide [CO2], methane [CH4], nitrous oxide [N2O], sulfur hexafluoride [SF6], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]) are quantified and reported in an accurate, consistent and transparent manner. This paper discusses the WCI's recent efforts to identify emissions estimation methods that will be used by industries when reporting GHG emissions to the WCI. The reporting requirements cover a wide range of source categories, including: general stationary combustion; aluminum, lead, and zinc production; nonroad

equipment; electric generating units; refineries and refinery fuel gas combustion; etc. Methods and protocols used by other mandatory and voluntary reporting programs, including The Climate Registry (TCR), the Intergovernmental Panel on Climate Change (IPCC), and the European Union-Emissions Trading Scheme (EU ETS), among others, are examined. The specific methods recommended for use in WCI mandatory reporting are summarized along with associated sampling, analysis, and measurement methods. The importance of stakeholder involvement in the selection of appropriate estimation methods is also discussed. Finally, the status of ongoing efforts to improve GHG emission factors for selected source categories is described.

1:55 "GHG Emission Verification in Alberta," K. Bolechowsky, P.Eng., ClearSky Engineering

Annual GHG emission inventory verification by a third party auditor has been a regulatory requirement for large final emitters in Alberta, Canada since 2007. Alberta is the first jurisdiction in North America to create a multi-sector regulatory-based demand for carbon reductions. Options available to facilities for compliance include demonstrated emission reductions, contributions to the Climate Change Fund, purchase of Alberta based offsets, and/or purchase of Emissions Performance Credits from another facility within the province. Third party verification is a key component of this Climate Change policy to enhance the overall assurance of the system by bringing additional expertise and scrutiny to bear. An overview of the policy and verification process will be presented along with an auditor's field observations and experiences. GHG Verification fundamentals will be discussed including levels of assurance, verification standards, materiality, independence, and reporting.

2:20 "Sectoral Guidance for Consistent GHG Assessments," K. Ritter, American Petroleum Institute, Washington DC; J. Keating, BP America, Inc., Naperville, IL; T. Shires, URS Corporation, Austin, TX; M. Lev-On, The LEVON Group, LLC, Thousand Oaks, CA

With the increased focus on greenhouse gas (GHG) emissions and potential policy measures for their mitigation, there is a growing need for accurate, reliable and transparent GHG emission characterizations. A myriad of mandatory reporting regulations and voluntary initiatives are emerging in the U.S. and globally with diverse protocols and methodologies. This poses a particular challenge to multinational companies, such as in the Oil and Natural Gas industry sector, which operate globally and in joint ventures with different peer companies. The American Petroleum Institute (API) and its member companies recognize this challenge and have responded through a multi-year initiative to develop guidance documents and tools that promote consistent and accurate emission quantification and reporting of GHG emissions, and emission reduction projects from oil and natural gas industry operations. This paper will discuss the range of activities undertaken by the industry sector to either update its existing guidance or provide new guidelines on emerging issues. The discussion will focus on the recent revision of the API methodology compendium; the proposed framework for quantification of GHG emission reductions that are associated with mitigation projects; and the new guidelines for addressing key sources of errors that have the largest impacts on GHG assessments and their overall uncertainty. The paper will provide an overview of these industry guideline documents emphasizing on their application to operations beyond the oil and natural gas industry, especially those industry sectors that rely on fossil fuels for their energy sources.

2:45 BREAK

3:15 "GHG Marginal Abatement Cost and Its Impacts on Emissions per Import Value from Containerships in United States," H. Wang, University of Delaware

Recent effort has made it clear that the marine shipping is an important contributor to world mission inventories. Of all cargo vessels that produce those emissions from international shipping, containerships are among the most energy-intensive. I investigate the total CO2emissions from containerships that carry exports to United States with a large database of more than 200,000 observations and calculate the CO2 emissions per dollar import in 2005. I identify more than 600 routes linking one domestic port and one foreign port with more than ten thousand callings from international containerships in 2005. My estimate shows that the CO2 emissions per dollar import vary by more than 40% across different routes depending on containerships, distances and commodity types. I aggregate commodities at one-digit Harmonized

System (HS) and find that the emissions per dollar import vary by more than 50% by commodity groups. It implies that if a cap-and-trade system were imposed on international containerships, the export countries and exported commodities would be influenced unequally. I then apply fundamental relationships between speed and energy consumptions of containerships, and compute the emissions reduction effect by slowing the fleet. I find that 10% speed reduction from the designed speed can reduce CO2 up to 20%. This effect, again, varies across different routes and commodity groups. This translates to CO2 reduction cost between $10 and $50. I also discuss the policy actions on CO2 reduction and its potential influence on bilateral trade with United States.

3:40 "The Vulcan Project: Methods, Results, and Evaluation," K. R. Gurney, D. Mendoza, Y. Zhou, C. Miller and S. Geethakumar, Department of Earth and Atmospheric Sciences, Purdue University; M. Fischer and S. de la Rue du Can, Lawrence Berkeley National Laboratory

Quantification of fossil fuel CO2 emissions at fine spatiotemporal resolution is emerging as a critical need in carbon cycle and climate change research. As atmospheric CO2 measurements expand with the advent of a dedicated remote sensing platform and denser in situ measurements, the ability to close the carbon budget at spatial scales of ~100 km2 and daily timescales requires fossil fuel CO2 inventories at commensurate resolution. Additionally, the growing interest in U.S. climate change policy measures are best served by emissions that are tied to the driving processes in space/time. Here we introduce the Vulcan inventory, a new data product that has quantified fossil fuel CO2 emissions for the U.S. and Canada at spatial scales less than 100 km2 and hourly timestep. This 2002 data product, includes detail on combustion technology, fuel, and economic sector. The Vulcan inventory, built from the decades of local/regional air pollution monitoring, complements these data with census, traffic, and digital road datasets. The Vulcan inventory shows excellent agreement with national-level Department of Energy (DOE) inventories, in spite of the different approach taken by the DOE to quantify U.S. fossil fuel CO2 emissions. Comparison to the 1Â°x1Â° fossil fuel CO2 inventory used widely by the carbon cycle and climate change community prior to the construction of the Vulcan inventory, highlights the space/time biases inherent in the population-based approach. The inventory has been placed onto Google Earth and subsets of the inventory are available to the public and policymakers.

4:05 "A Global Map of Anthropogenic CO2 Emissions Derived from Large Point Source Database," T. Oda and S. Maksyutov, Center for Global Environmental Research, National Institute for Environmental Studies

Towards long-term and high-resolution atmospheric inversion (CO2 inversion) of monthly fluxes, we proposed new anthropogenic CO2 emission map. CO2 inversion is a common tool to estimate surface CO2 exchange by integrating atmospheric CO2 measurements and atmosphere/land/ocean modeling. It requires a good approximation of true flux distribution of interest for robust estimation. Especially, anthropogenic emission map serves as a reference flux to see a balance of fluxes. In this study, we created a map of anthropogenic emission using database of large CO2 point sources developed by CARMA (Carbon Monitoring and Action). To reduce reliance on emission proxies such as population, we treat point sources and non-point sources separately. The CO2 emission coming from point sources was subtracted from country total emission and the rest of CO2 emission, which comes from non-point sources, was distributed into grids where people actually live. To identify the grids where people actually live, we used DMSP (Defense Meteorology Satellite Project) lights. It would be a good indicator of residential area and help to avoid underestimation of CO2 emission that occurs by distributing emissions with a coarse population map. We also parameterized seasonality of anthropogenic emission. Inter-annual variability was provided by BP world energy consumption statistics and seasonality was taken from temperature-energy demand relationship derived from model estimates of CDD/HDD-driven energy demand model that was calibrated by US energy sales statistics.

4:30 “Development of Greenhouse Gas Emissions Inventories and Forecasts in the Mexico Border States of Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, and Tamaulipas,”
J. A. Maldonado, S. M. Roe and C. Quiroz, E.H. Pechan & Associates, VA; R. Strait, T. Peterson and E. Ranger, The Center for Climate Strategies, Washington, D.C.

This paper presents the results of a successful collaboration between Mexico State agencies and the Center for Climate Strategies (CCS) to develop state-level greenhouse gas (GHG) emission inventories and forecasts for the States of Baja California, Sonora, Chihuahua, Nuevo León, Coahuila, and Tamaulipas. Final results will be showcased for the State of Sonora which completed an inventory and forecast in July, 2008. Preliminary results will be shared for the remaining States of Baja California, Chihuahua, Nuevo León, Coahuila, and Tamaulipas whose inventory and forecasts are in the process of development through July 2009. These inventories and forecasts cover the period from 1990 to 2020 and include emissions for each of the six gases recognized by the Intergovernmental Panel on Climate Change (IPCC). Both sources and sinks of carbon dioxide are included and reported in terms of their carbon dioxide equivalents (CO2e). State-level emissions are categorized into the following eight sectors: 1) electricity supply and use; 2) residential/commercial/industrial fuel combustion; 3) transportation; 4) industrial processes and product use; 5) fossil fuel industries; 6) agriculture; 7) waste management; and 8) forestry and land use. These inventories and forecasts may serve as the starting points in state-level planning projects. A complimentary objective is to supply training to build capacity within each state to prepare future updates to its GHG inventory and forecast.

Thursday, April 16, 2009

Session 8. Air Toxics

Chairs: Anne Pope, US EPA
Regi Oommen, ERG

9:00 "Enhancing EPA Region 4 Emission Inventory for Air Toxics," E. Louis and K. Mitchell, US EPA Region 4

The EPA Consolidated Emissions Reporting Rule (CERR) requires the collection and reporting of emissions from criteria air pollutants. However, no regulation requires state, local, and tribal (S/L/T) air agencies to collect and report air toxics or Hazardous Air pollutants (HAPs). Therefore, EPA Region 4's NEI, as elsewhere in the country, is compiled from voluntary information submitted by S/L/T air agencies and data developed in-house by EPA such Toxic Release Inventory (TRI) data. Yet, the air toxics emissions inventory (EI) is critical to develop and assess the national air toxics management program as well as local exposure scenarios. Users need data that are reported consistently and accurately from place to place, and with consistent QA/QC protocols. Our objective was to identify the status (data quality and collection/reporting consistencies) of the regional air toxics EI and to develop a strategy to enhance it over time. A workgroup from EPA and S/L/T air agencies was created to develop a survey of the status of HAPs EI collection and reporting and develop recommendations for improving the process. This paper reports on the results of the survey and recommendations to improve the consistency and enhance future HAPs NEI collection and reporting.

9:25 "Identifying Priority Hazardous Air Pollutants of Potential Concern: A Comparison of 2005 Toxicity-Weighted Emissions and Ambient Risk Screening Results," R.G. Oommen and J.M. Hauser, Eastern Research Group, Inc.; A. Pope and B. Driscoll, US EPA

Acute and chronic exposure to specific hazardous air pollutants (HAPs) can lead to cancer and/or non-cancer effects. Since the passage of the 1990 Clean Air Act Amendments (CAAA), the U.S. Environmental Protection Agency (EPA) has spent considerable time and resources establishing federal regulations, primarily through maximum achievable control technology (MACT) standards, to reduce emissions for hazardous air pollutants (HAPs). Identification of the most important individual emission sources and/or source categories significantly contributing to potential health risks is challenging for many air quality managers. Large reductions in HAP emissions may not necessarily translate into significant reductions in health risk because toxicity varies by pollutant. For example, acetaldehyde mass emissions are more than double than acrolein emissions on a national basis, according to EPA's 2002 National Emissions Inventory (NEI). However, according to the Integrated Risk Information System (IRIS), acrolein is 450 times more toxic in terms of respiratory non-cancer risk than acetaldehyde. Thus, it is important to account for the toxicity as well as the mass of the targeted emissions when designing reduction strategies to maximize health benefits. This paper uses the anthropogenic portion of the 2005 NEI, which is comprised of stationary and mobile sources for every county in the United States, to explore a toxicity-weighting approach for identifying pollutants that pose the greatest potential health risk. In addition, the results of this toxicity weighted emissions approach are compared to results from the 2002 NEI, as well as those from ambient monitoring risk screening results for select areas across the country

9:50 "Panel: Air Toxics Risk Characterization and the Regulatory Process"

This panel will consider the relationships between the ambient air measurement data, the modeled risk, and the emissions inventory estimates – the synergy between the information and how each may be used to inform the other. A practical example will also describe how the federal rulemaking and standard-setting process can inform the emissions characterization and use the results as guidance in the regulatory process. The panel of speakers will represent the following perspectives: the US EPA National Emission Inventory (NEI); National Air Toxics Trends Stations (NATTS ambient data network); National-Scale Air Toxics Assessment (NATA modeled risk exposure); and the Maximum Achievable Control Technology (MACT) regulatory process.

10:15 “Panel continues”

Session 9: EI Data Analysis and Validation

Chairs: Linda Chappell, US EPA
Bob McConnell, US EPA

9:00 “Multi-pollutant Emissions Inventories and Analysis for Key Industrial Sectors,” A. Pope, L. Hanle, T. Ndoh, and L. Chappell, US EPA

The National Emissions Inventory (NEI) is the United States Environmental Protection Agency's (EPA) central data repository for air emissions data. Emissions data reported by State, Local, and Tribal governments for the six common, or criteria, air pollutants and emissions that form them - nitrogen oxides, sulfur dioxide, ammonia, lead, carbon monoxide, particulate matter, and volatile organic compounds are used to develop the NEI. Many State, Local and Tribal government agencies also voluntarily report emissions of hazardous air pollutants that are used for developing the NEI. The EPA also develops greenhouse gas (GHG) inventories routinely that estimate carbon dioxide, methane, nitrous oxides and fluorinated gases emissions by major source category for the nation. This GHG inventory adheres to both (1) a comprehensive and detailed set of methodologies for estimating sources and sinks of anthropogenic greenhouse gases, and (2) a common and consistent mechanism that enables Parties to the United Nations Framework Convention on Climate Change (UNFCCC) to compare the relative contribution of different emission sources and greenhouse gases to climate change. The US EPA is also in the process of developing a GHG Reporting Rule that will require mandatory reporting of GHG gases above an appropriate threshold by sources in all sectors of the economy. This paper will analyze and evaluate facility-specific CO2 inventories developed by the EPA for key industries including petroleum refining, Portland cement, iron and steel, lime manufacturing, and glass industries and compare these inventories to CAP and key HAP inventories in the NEI. Multi-pollutant maps will be presented for these key stationary source emissions along with key geographical information such as current Particulate Matter and Ozone National Ambient Air Quality Standard non-attainment areas and key ecosystem regions such as Class I areas.

9:25 “Evaluation of GOES Biomass Burning Emissions using Modeled and Observed Carbon Monoxide (CO) during April - May 2007 Florida/Georgia Fires,” S. Kondragunta and C. Barnet, NOAA NESDIS; X. Zhang, ERT; E. Maddy, Perot Systems; E-S. Yang and S. Christopher, University of Alabama at Huntsville

Biomass burning emissions from prescribed and natural fires impact local and regional air quality. Accounting for these emissions in an air quality prediction model using satellite detected fires and emissions is expected to improve the accuracy of model predictions. However, satellite-derived biomass burning emissions often have large uncertainties and are not validated because of lack of independent insitu measurements. Community Multiscale Air Quality Model (CMAQ) simulations and Atmospheric Infrared Sounder (AIRS) observations of CO are used in this study to evaluate Geostationary Operational Environmental Satellite (GOES) biomass burning emissions. CO emissions from forest fires in Florida and Georgia, derived from GOES observations are used in the CMAQ model. For this study, CO is treated as a tracer in the model and its concentrations are compared to AIRS observed CO. Quantitative metrics such as root mean square difference, bias, and correlation coefficient are used to analyze the differences between AIRS and CMAQ CO to diagnose uncertainties in GOES emissions. Results from this analysis and relevant information on Florida/Georgia fires with respect to air quality impacts will be presented.

9:50 “Use of Atmospheric Observations and Forward Models to Verify Emission Inventory,” P. K. Patra, Frontier Research Center for Global Change/JAMSTEC, Japan

The atmospheric concentrations of trace gases depends on their surface emission, loss due to chemical reactions, transport processes, and troposphere-stratosphere exchange (STE). By using a forward chemistry-transport model (CTM; namely, the CCSR/NIES/FRCGC AGCM-based CTM; hereinafter ACTM; Patra et al., ACP, 2009), we show when the loss, transport and STE rates are realistically modeled in ACTM the surface fluxes can be constrained fairly well using the model-observation comparison of atmospheric concentrations near the source regions. An example of CH4 case will be shown as used for

constraining emission due to the rice paddies in the Indian subcontinent and boreal tundra emission in the northern hemisphere. We suggest similar methods be applied to the emission inventories of other long-lived gases, such as N2O,CFCs, HCFCs, Methyl Chloroform, Methyl Halides. Some future perspectives will be provided in this direction.

10:15 "Methods for Emission Projection Uncertainty Assessment", J, Lumbreras, J. Pérez, R. Borge, Encarnacion Rodríguez Laboratory of Environmental Modelling, Technical University of Madrid, Spain

Emission projections are important for environmental policy, both to evaluate the effectiveness of abatement strategies and to determine legislation compliance in the future. Moreover, including uncertainty is an essential added value for decision makers. In this work, projection values and their associated uncertainty are computed for emissions (both air pollutants and greenhouse gases) in Spain following two different approaches. The first one is based on a sensitivity analysis of emission projections to key inputs on a sectoral basis (both activity rate and emission factor-related parameters). Results from the baseline (or with measures) scenario have been compared with re-computed emission trends in a low economic growth perspective, providing a good test of the method. The second approach consists of the application of advance statistical techniques to the most significant activities in terms of emissions. Uncertainty bands have been derived for the Business As Usual (or without measures) scenario through autoregressive integrated moving average (ARIMA) models. As for the baseline scenario re-sampling techniques (bootstrap) were applied as an additional non-parametric tool, which does not rely on distributional assumptions and is thus more general.

10:45 "Using CAPECAB to Process Emission Data in the National Air Emissions Monitoring Study," E. Cortus, K. Wang, T. Lim, J. Ni and A. Heber, Purdue University; M. Eisentraut and P. Eisentraut

CAPECAB (Calculation of Air Pollutant Emissions from Confined Animal Buildings) is customized software used in the National Air Emissions Monitoring Study (NAEMS) as an efficient data processing tool that reduces data storage space, provides the user with an interface to review and process data, and most importantly, aids in producing quality-assured emission data from livestock facilities. CAPECAB was originally developed in 2003 through a cooperative effort between software engineer Matthew Eisentraut and the Purdue Ag Air Quality Laboratory. For the NAEMS, CAPECAB underwent significant changes to allow for multiple methods of data review and data validation/invalidation, as well as faster processing speed overall. CAPECAB stores all data for a site in a binary-type database, which greatly reduces the storage space compared to traditional methods (e.g. spreadsheet files) and enables the user to view one or multiple variables for time ranges spanning to minutes to over one year without manually opening several files. Each datum in the database has a flag value associated with it that designates whether the data is valid or invalid and is set by the data analyst. Because an emission value is a calculated parameter dependant on numerous input parameters, all input data must be valid to make a calculation and CAPECAB performs this data quality check when performing calculations. If the flag value of any input parameter is changed, or a calculation method is re-visited, calculations can be repeated quickly and efficiently because of the database-nature of the storage system.

Thursday – April 16, 2009

Training **1:30pm – 5:00pm**

Course Title: The Emissions Inventory System Process
Instructor: Martin Husk and Sally Dombrowski, US EPA

Course Description: The EPA has undertaken a project to redefine how the National Emissions Inventory is developed within the new Emissions Inventory System (EIS) process. The purpose of this course is to go through the new process, with an emphasis on the resources and tools EPA is making available to State, Local and Tribal agencies to help them report their emissions inventories, and to review the EPA procedures when the data are submitted. Prior to attending the course, you are encouraged to learn more about the new process by reviewing the 2008 NEI-EIS Implementation Plan at http://www.epa.gov/ttn/chief/net/neip/index.html.

The course will be split into two parts. The first part, on Thursday, April 16th, will focus on the new EIS process.

The second part of the course, on Friday, April 17th, will include a live demonstration of the EIS Gateway and of the tools used to convert data to the new EIS CERS XML file. This session will be followed by a general questions and answer session on emissions inventory and EIS topics.

Attendance priority is given to State, Local and Tribal agency staff.

Please note that this course does not cover basic emissions inventory characterization methods and data development processes, but rather the EIS process for reporting and sharing the data.

Course Title: Introduction to EPA's Motor Vehicle Emission Simulator (MOVES)
Instructor: David Brzezinski, US EPA Office of Transportation and Air Quality

Course Description: EPA's MOVES is an emissions modeling system that will replace MOBILE6 and NONROAD as EPA's tool for estimating air pollution emissions from mobile sources. A draft version of the model including criteria pollutants, greenhouse gases and energy consumption from highway vehicles is now available. Participants will learn how to use the draft highway vehicle version of MOVES on a Windows PC, including how to create a Run Specification, how to customize the data used by the model, how to run the model, and how to work with model output.

The course will be organized around hands-on exercises, but persons without computers are also welcome. Computers will not be provided, so PARTICIPANTS MUST BRING THEIR OWN LAPTOPS running Windows 2000 or newer operating systems (we have NOT yet fully tested MOVES with Windows Vista), with a CD drive, a minimum of 256 Mb of RAM, and a minimum of five free gigabytes of hard drive space. In order to participate in the hands-on portions of the training, participants will be expected to successfully install the draft version of MOVES and the MySQL Browser software on their machines prior to attending the course. This version of the model, including the browser, is available on the EPA web site at http://www.epa.gov/otaq/ngm.htm.

No unusual computer software skills are required, but participants will need to know how to locate files and open and edit spreadsheets and text files. A background in existing highway vehicle emission modeling terminology and techniques is not required, but will be helpful.

Class size will be limited to 50 students with laptop computers and 50 additional students without laptops. Organizations should limit the number of students sent to allow space for the maximum number of individual organizations to attend. This course will continue on Friday morning April 17.

Course Title: **Greenhouse Gases Inventory 101**
Instructors: Andrea Denny and Leif Hockstad, US EPA

Course Description: This lecture-style course will provide an introduction to greenhouse gas inventories. Topics covered will include:

- Overview of GHG emissions sources in the US
- Purpose and scope of a GHG inventory,
- Differences between traditional criteria pollutant inventories and GHG inventories
- Choosing a baseline year
- Quantification approaches (top-down vs. bottom up)
- Available software and methodologies
- Differences between inventories and registries
- Certification and reporting protocols
- Comparability
- Level of effort

Instructors will allow ample time for Q&A with the audience. This course is open to all conference attendees and laptops will not be used.

Self-paced Alternative:
A Web-based alternative is available and allows participants to preview this course prior to attendance or provides the option of remote self-paced training, in lieu of on-site training. A series of 3, 90 minute web-based trainings was recorded in Fall 2007. While aimed at state and local governments, much of the information is broadly applicable. The trainings can be viewed by visiting: http://www.epa.gov/climatechange/emissions/state_training.html

Friday – April 17, 2009

Training **9:00am – 12:00pm**

Course Title: The Emissions Inventory System Process
Instructor: Martin Husk and Sally Dombrowski, US EPA

Course Description: This course is continued from Thursday afternoon April 16. Please see April 16 course description. The second part of the course, on Friday, April 17, will include a live demonstration of the Emissions Inventory System (EIS) Gateway and of the tools used to convert data to the new EIS CERS XML file. This session will be followed by a general questions and answer session on emissions inventory and EIS topics.
Attendance priority is given to State, Local and Tribal agency staff.

Course Title: Introduction to EPA's Motor Vehicle Emission Simulator (MOVES)
Instructor: David Brzezinski, US EPA Office of Transportation and Air Quality

Course Description: This course is continued from Thursday afternoon April 16. Please see April 16 course description.

Course Title: Quantifying Greenhouse Gas Emissions
Instructor: Andrea Denny, US EPA

Course Description: This lecture style course will provide training on three greenhouse gas quantification tools that state/local governments can use to track emissions. Participants will learn how to access and use each tool, as well appropriate uses for each tool. Tools covered by this training will include:

- **The Emissions and Generation Resource Integrated Database (eGRID**), is a comprehensive inventory of environmental attributes of all U.S. electricity generating plants that provide power to the electric grid and report data to the U.S. government. eGRID contains air emissions data for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon dioxide (CO_2), mercury (Hg), methane (CH_4) and nitrous oxide (N_2O).
- **WAste Reduction Model (WARM)** helps solid waste planners and organizations track and voluntarily report greenhouse gas emissions reductions from several different waste management practices. WARM calculates and totals GHG emissions of baseline and alternative waste management practices—source reduction, recycling, combustion, composting, and land filling.
- **Portfolio Manager** is an interactive energy management tool that allows users to track and assess energy and water consumption and CO_2 emissions within individual buildings or across an entire portfolio of buildings.

Instructors will allow ample time for Q&A with the audience.
This course is open to all conference attendees and laptops will not be used.