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# CONFERENCE PROCEEDINGS: MIDWEST TRANSPORTATION AIR QUALITY SUMMIT

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**ICT-R27-68**  
**Midwest Transportation Air Quality Summit**

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16. Abstract  The Midwest Transportation Air Quality Summit, held from October 27-29, 2009, provided federal, state, regional, and local transportation and air agency representatives with an opportunity to discuss topics affecting both transportation and air quality planning. Conference sessions included state implementation planning activities for new air quality standards, mobile source emission inventories, highway project-level analyses, current diesel engine programs, climate change, mobile source air toxics, and on-going mobile source-related research studies. Attendees included 64 representatives from federal, state, regional, and local transportation or air agencies in the Midwest. States represented included Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. A total of 42 presentations were made by 32 speakers. These conference proceedings summarize the presentations and major messages from the conference.			
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# CONFERENCE PROCEEDINGS: MIDWEST TRANSPORTATION AIR QUALITY SUMMIT



*A view from the top of the bluff at Pere Marquette State Park looking northwest  
(photo courtesy of Walter Zyznieuski, Illinois Department of Transportation)*

**October 27-29, 2009  
Pere Marquette State Park  
Grafton, IL**

## **ACKNOWLEDGEMENTS**

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## **DISCLAIMER**

The contents of this report reflect the view of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Illinois Center for Transportation, the Illinois Department of Transportation, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

## EXECUTIVE SUMMARY

The Midwest Transportation Air Quality Summit provided federal, state, regional, and local transportation and air agency representatives with an opportunity to discuss topics affecting both transportation and air quality planning. Conference sessions included state implementation plan (SIP) activities for new air quality standards, mobile source emission inventories, highway project-level analyses, current diesel engine programs, climate change, mobile source air toxics, and on-going mobile source-related research studies.

Major messages delivered at the conference included:

- Pursuant to the Clean Air Act, the U.S. Environmental Protection Agency (EPA) is reviewing the National Ambient Air Quality Standards (NAAQS) for transportation-related air pollutants.
- The Clean Air Act requires states to prepare SIPs which provide for attainment of the applicable NAAQS. Several Midwest States will need to prepare state implementation plans (SIPs) to address recently designated nonattainment areas for the fine particle (PM<sub>2.5</sub>) daily standard.
- The Clean Air Act also requires federal actions to conform to the SIP's purpose. EPA's transportation conformity rule requires a project level conformity determination, including, in some cases, a PM hot-spot analysis. A qualitative PM hot-spot analysis is currently required, but a quantitative analysis will be required in the near future.
- EPA has developed an improved emissions model for on-road mobile sources (i.e., MOVES), which will be released before the end of 2009. MOVES will produce higher emission estimates for some pollutants (e.g., nitrogen oxides [NO<sub>x</sub>] and PM<sub>2.5</sub>) and lower emission estimates for others (e.g., hydrocarbons [HC] and carbon monoxide [CO]). EPA will require the use of MOVES in the upcoming SIPs for PM<sub>2.5</sub> and ozone, and, with a grace period, for transportation conformity analyses. EPA will release three guidance documents with the final MOVES model.
- There is emerging interest in near-roadway air quality concentrations for pollutants such as NO<sub>2</sub> and PM<sub>2.5</sub>. EPA's proposed new NO<sub>2</sub> standards includes a provision for near-roadway NO/NO<sub>2</sub> monitors, and EPA and the Federal Highway Administration (FHWA) are working together on near-roadway measurement studies in Las Vegas and Detroit.
- Climate change is another emerging area affecting state and local planning agencies. In the absence of federal legislation, state and regional initiatives have begun to look at this environmental problem, with proposals for greenhouse gas (GHG) emission reduction goals. Federal, regional, state, and local agencies are evaluating both mitigation strategies and adaptation responses to deal with climate change.
- Millions of dollars in federal money is being used to achieve reductions in diesel particulate emissions from on-road and off-road mobile sources. The

importance of these emission reduction efforts was demonstrated by Jay Turner's presentation on high exposures to children on school buses.

Overall, attendees were pleased with the conference. On a scale from 1 to 5, the average conference rating was 4.4, with a rating of 5.0 from about half of the reviewers. Almost all reviewers recommended holding future transportation air quality conferences on an annual or every-other-year basis.

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## CHAPTER 1 INTRODUCTION

On October 27-29, 2009, the Illinois Department of Transportation (IDOT) and the Lake Michigan Air Directors Consortium (LADCO) hosted the Midwest Transportation Air Quality Summit at Pere Marquette State Park in Grafton, Illinois. The purpose of this conference was to discuss the current and upcoming challenges affecting both transportation and air quality planning in the Midwest. Conference sessions included SIP planning activities for new air quality standards, mobile source emission inventories (and the U.S. Environmental Protection Agency's (EPA) new MOVES emissions model), highway project-level analyses, current diesel engine programs, climate change, mobile source air toxics, and on-going mobile source-related research studies.

Attendees included 64 representatives from federal, state, regional, and local transportation or air agencies in the Midwest. States represented included Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. A total of 42 presentations were made by 32 speakers. Audience participation included question-and-answer periods in each session and two short open round-table discussions.

A summary of the presentations is provided in Chapter 2. Electronic versions (in pdf format) are available at: <http://transportationsummit.ladco.org/>. The major messages from the conference are reviewed in Chapter 3. Key websites with more information on the meeting topics are listed in the References section.

## CHAPTER 2 CONFERENCE PRESENTATIONS

During the three days of the conference (October 27 – 29), there were 10 sessions and 42 presentations. A summary of the sessions and presentations is provided in this section. Electronic versions of the presentations (in pdf format) are available at: <http://transportationsummit.ladco.org/>

### OCTOBER 27

#### Optional Sessions

Prior to the official start of the conference, two parallel, optional sessions were held in the morning.

##### 1. Overview of EPA's New MOVES Emissions Model

The purpose of this session was for EPA and FHWA experts to provide a technical understanding of the new MOVES model. Gary Dolce (EPA) started the session with an introduction to MOVES, including how MOVES compares to EPA's current emissions model (MOBILE6), how MOVES works, and how to transition from MOBILE6 to MOVES. Figure 1 shows that MOVES is expected to produce higher NO<sub>x</sub> and PM<sub>2.5</sub> emissions and lower (or similar) HC emissions compared to MOBILE6. Jeff Houk (FHWA) then provided a demonstration on running the MOVES model.

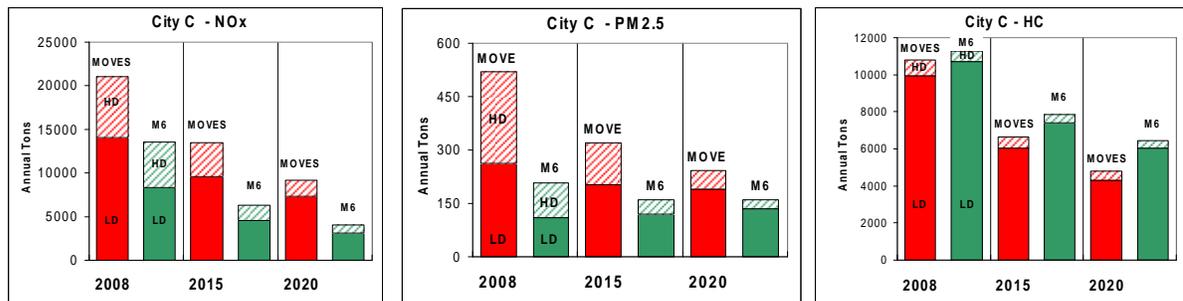


Figure 1. Comparison of MOVES and MOBILE6 emission estimates for NO<sub>x</sub> (left), PM<sub>2.5</sub> (center), and HC (right).

##### 2. Status of the Congestion Mitigation and Air Quality (CMAQ) Program

The purpose of this session was to review the latest developments in the CMAQ program. Elizabeth Tracy (Illinois Department of Transportation [DOT]), who chaired the session, opened the session by introducing the three speakers: Mike Koontz (FHWA), Jim Wild (East-West Gateway), and Ross Patronsky (Chicago Metropolitan Agency for Planning [CMAP]). The CMAQ program was established for transportation projects that contribute to the attainment or maintenance of the national ambient air quality standards (NAAQS) for ozone, carbon monoxide, or particulate matter. Mike Koontz reviewed the history of CMAQ and several success stories (e.g., more than \$21 billion awarded for 24,000 projects since 1992 – see Figure 2), efforts for reauthorization of the program, the role of the American Recovery and Reinvestment Act (ARRA), and examples of eligible

projects. Jim Wild and Ross Patronsky discussed how CMAQ has worked in their areas (i.e., St. Louis and Chicago).

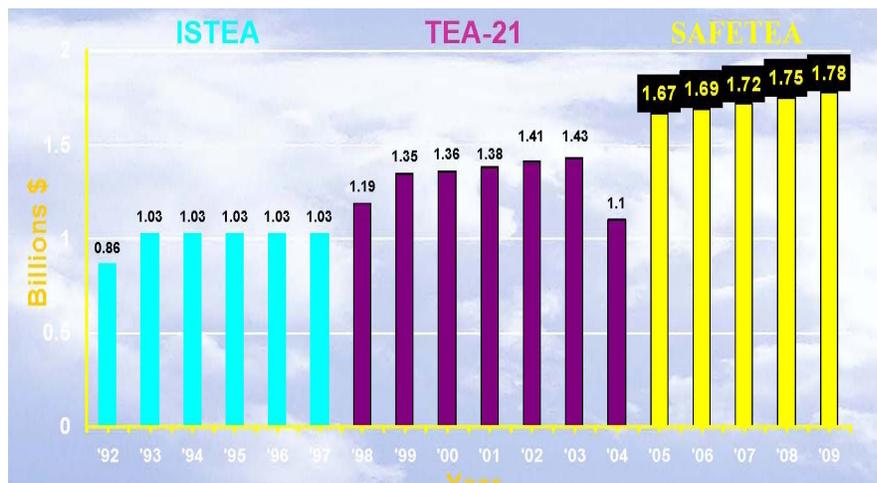


Figure 2. CMAQ authorization levels (since 1992).

### Opening Remarks

In the afternoon, Walt Zyznieuski (Illinois DOT) formally opened the conference by welcoming the participants and providing an overview of the planning process for the conference. He then introduced a panel of high ranking federal and state officials:

- Eric Harm, Deputy Director of Highways, Assistant Chief Engineer, Illinois DOT
- Glenn Fulkerson, Assistant Division Administrator, Illinois Division, FHWA
- Doug Scott, Director, Illinois EPA

These officials provided their perspectives on a number of items, including new NAAQS for ozone and PM2.5, state implementation plans (SIPs), transportation and air quality initiatives, the effect of programs, such as CMAQ and ARRA, and emerging issues, such as climate change.

### Federal Panel on Current Regulatory Priorities and Activities

Session Chair: John Donovan (FHWA)

Cecilia Ho (FHWA) reviewed recent air quality products and publications, and active air quality research projects at FHWA. The recent products include FHWA’s mobile source air toxics interim guidance, PM2.5 qualitative hot-spot analysis guidance, the CMAQ evaluation Phase II final report, and examples of transportation conformity. The research projects includes the Surface Transportation Environment Planning (STEP) Cooperative Research Program and 2009 transportation and air quality emissions analysis research, which is currently focused on four areas: testing, evaluation, and validations of new emissions models, research on conducting project-level analyses, air quality and

transportation conformity outreach and communication, and fleet data for on-road mobile source emissions inventories.

Gary Dolce (EPA) then discussed regulatory priorities and activities at EPA. Items covered include implementation of the 2006 PM<sub>2.5</sub> NAAQS (see Figure 3 below for the counties recently designated as nonattainment of this standard in the Midwest), updates to EPA's conformity rule with respect to the 2006 PM<sub>2.5</sub> NAAQS, development of MOVES guidance documents, development of guidance for a quantitative PM<sub>2.5</sub> hot-spot analysis, and EPA's plans to restructure several sections of the transportation conformity rule.

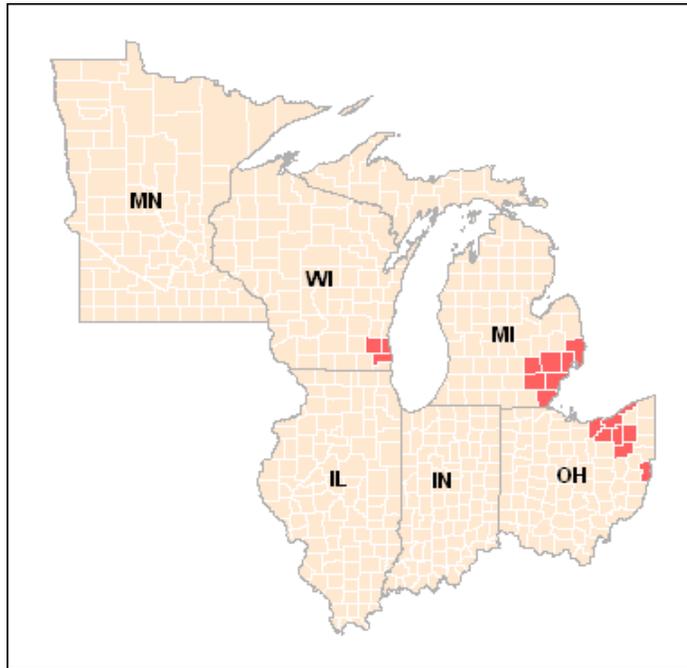


Figure 3. Counties in EPA Region V designated nonattainment of the PM<sub>2.5</sub> daily NAAQS (i.e., counties with dark shading).

### **State/MPO Panel On Current Air Quality And Transportation Issues**

Session Chair: Mike Rogers (Illinois EPA)

Rob Kaleel (Illinois EPA) reviewed the current ozone and PM<sub>2.5</sub> nonattainment problems in Illinois, trends in emissions and air quality (which demonstrate significant improvements over the past couple decades), and upcoming challenges. One such challenge is EPA's proposed new nitrogen dioxide (NO<sub>2</sub>) standard, which includes a requirement for near-roadway for major roads with >250,000 average daily traffic (ADT) counts. In Chicago, large sections of the Kennedy Expressway, which runs between O'Hare Airport and the downtown area, exceed this level (see Figure 4), indicating the possible need for multiple near-roadway NO<sub>2</sub> monitors.

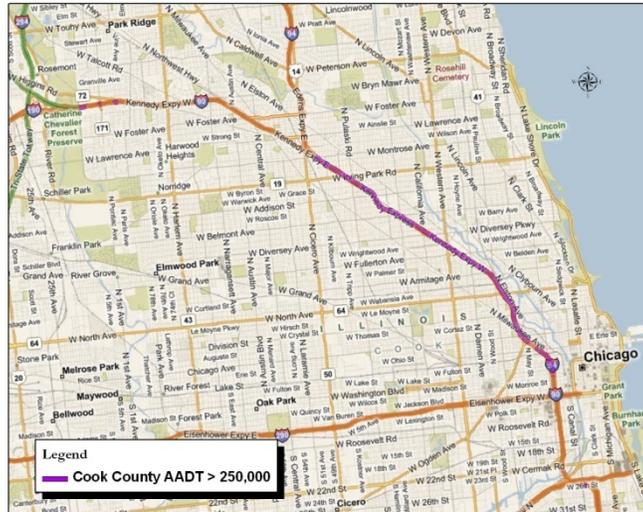


Figure 4. Sections of the Kennedy Expressway in Chicago which exceed 250,000 ADT.

Tom Hanf (Michigan DOT) discussed two projects in southeastern Michigan - Detroit Intermodal Freight Terminal (DIFT) and the Detroit River International Crossing (DRIC), see Figure 5 below - and Michigan DOT's role in working with local community organizations. The DIFT will consolidate three major railroad operations at one facility, with improvements in local roads and external rail in the area. The DRIC will provide a cross-boundary freeway to freeway connection, and will remove heavy-duty diesel truck queuing in Windsor, Ontario.

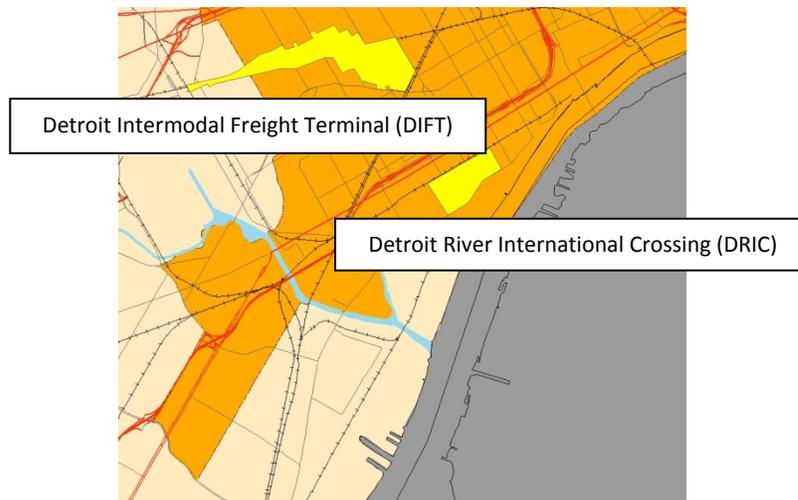


Figure 5. Location of DIFT and DRIC projects in southeastern Michigan.

Joan Weidner (SEMCOG) discussed the improvements in ozone and PM2.5 concentrations in southeastern Michigan in recent years due to federal and state control programs, as well as the severe downturn in the economy in the state. This new reality for southeastern Michigan must be taken into account in future air quality and transportation planning.

Mike Coulson (East-West Gateway) reviewed his organization's air quality planning activities and discussed a number of challenges, including the implications of the current VMT growth rate, which is only about 0.3% per year.

## **Diesel Engines**

Session Chair: Steve Marquardt (EPA, Region V)

Steve Marquardt reviewed Region V's Midwest Diesel Initiative and several EPA funding programs to reduce diesel emissions. EPA funding programs include:

FY2003-2007 National Clean Diesel Campaign

- \$32M nationally for school bus projects
- \$7.6M nationally for other projects

FY2008 National Clean Diesel Campaign

- \$49.2 nationally

FY2009 ARRA

- \$300M nationally
- \$26.5M awarded by Region V

FY2009 National Clean Diesel Campaign

- \$60M nationally (all sectors)

FY2010 National Clean Diesel Campaign

- \$60-75M nationally (all sectors)

Darwin Burkhart (Illinois EPA) and Michael Friedlander (Wisconsin Department of Natural Resources) then discussed diesel efforts in their states. In 2008 and 2009, Illinois received nine EPA, CMAQ, and other grants totaling more than \$15M. ARRA funds alone (\$4.1M from EPA plus \$2.6M in matching funds) will be used for 21 projects affecting 675 diesel engines. Wisconsin's diesel efforts include reducing idling (e.g., statewide idle ordinance), retrofitting school buses, off-road equipment, and trucks, repowering transit buses, engine replacements, and refueling (e.g., biodiesel).

## **OCTOBER 28**

### **Climate Change: Federal, Regional, State, and Local Activities**

Session Chair: Michael Koerber (LADCO)

Steve Hilberg (Midwest Regional Climate Center) reviewed climate trends in the Midwest. He emphasized the distinction between climate variability (year-to-year changes in the climate system) and climate change (longer term changes sustained over several decades). A time series plot of average daily temperatures in the U.S. shows this year-to-year variability since 1890, as well as a consistent upward trend since 1970 – see Figure 6. Associated with this temperature trend is an increase in carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere from about 280 ppm (up to about 1800) to the current level of about 380 ppm. Predictions of future climate change are based on the past record and climate models, which have some degree of uncertainty.

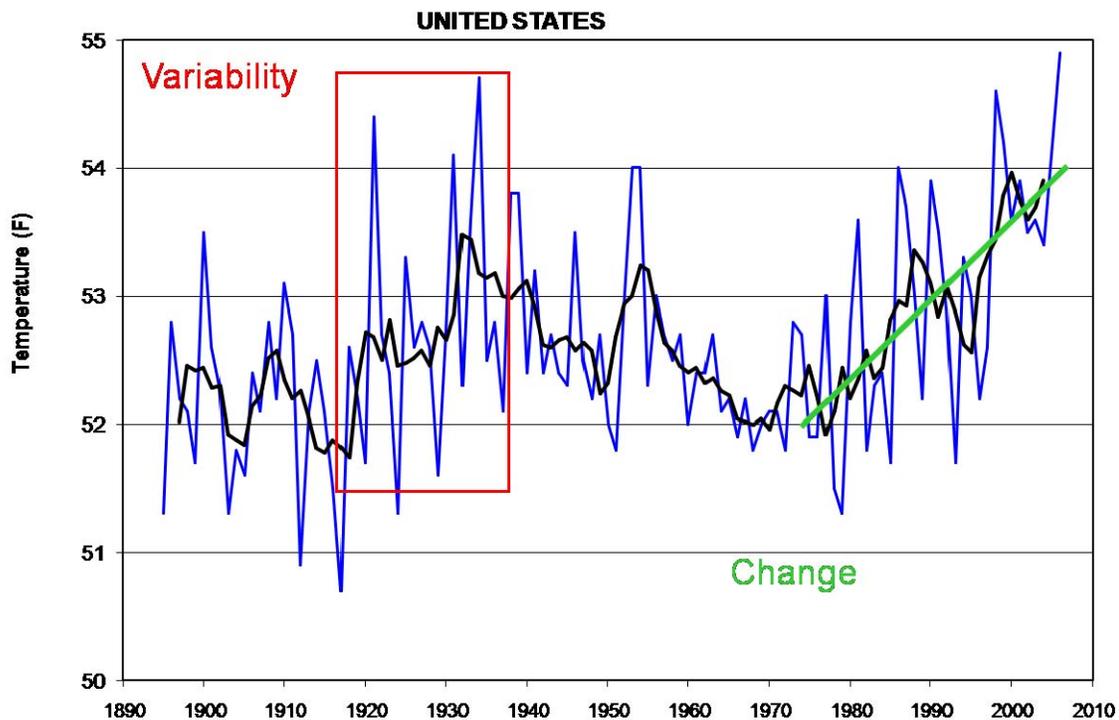


Figure 6. Time series of average daily temperature in the United States since 1890 showing the year-to-year variability and longer term trends.

Rob Kafalenos (FHWA) talked about what FHWA is doing concerning mitigation efforts for GHG emissions and adapting to the impacts of climate change. Transportation strategies to reduce GHG emissions include increasing fuel economy standards, lowering carbon content of fuels, improving vehicle/system efficiency and operations (e.g., congestion relief and idle reduction), and reducing growth in vehicles miles travelled (VMT). FHWA mitigation activities include working with stakeholders on reducing VMT growth, a carbon sequestration pilot program, and promoting livability and sustainability initiatives. FHWA also has a number of adaptation activities, which address changes in the way surface transportation infrastructure is planned, designed, constructed, operated, and maintained. Recent federal legislation on climate change includes the American Clean Energy and Security Act of 2009 (passed by the U.S. House on June 26, 2009) and the Clean Energy Jobs and American Power Act (passed by the U.S. Senate on September 30, 2009).

Nicholas Bianco (World Resources Institute) discussed the Midwest Greenhouse Gas Accord, which is a compact signed by 10 states and one Canadian province (see Figure 7) to establish GHG emission reduction targets of 20% below 2005 levels by 2020 and 80% below 2005 levels by 2050. The Accord was signed in November 2007, and program recommendations were issued in June 2009. Program commencement is scheduled for January 2012. Other regional GHG initiatives (e.g., in the Northeastern U.S. and Western U.S.) are also moving forward.

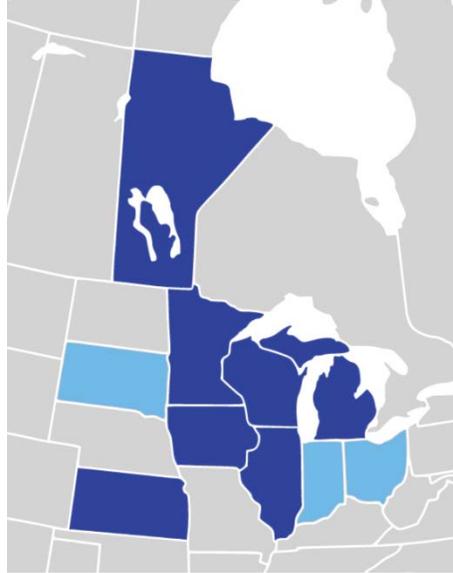


Figure 7. States and provinces which signed as participant (dark blue) or observer (light blue) to Midwest Greenhouse Gas Accord.

Lewison Lem (Center for Climate Strategies [CCS]) provided an overview of Midwest states' climate change activities. At least six Midwest states have recently developed climate and energy action plans – see Figure 8. These state efforts, along with regional initiatives such as the Midwest Greenhouse Gas Accord, may influence federal policies, as has happened in the past for acid rain, NOx emissions trading, and mercury control.



Figure 8. Midwest States undertaking and completing climate and energy action plans.

Bob Rusch (MDEQ), substituting for Vince Hellwig, discussed the Michigan Climate Action Council's (MCAC) report. The MCAC was established under Executive Order by the Governor of the State in 2007 and included 35 members from a variety of organizations in

the state. The final report, which was issued in March 2009, included a GHG emissions inventory and forecast, recommended policy positions, 54 final recommendations, and proposed goals for reducing GHG emissions (i.e., 20% below 2005 levels by 2020 and 80% below 2005 levels by 2050).

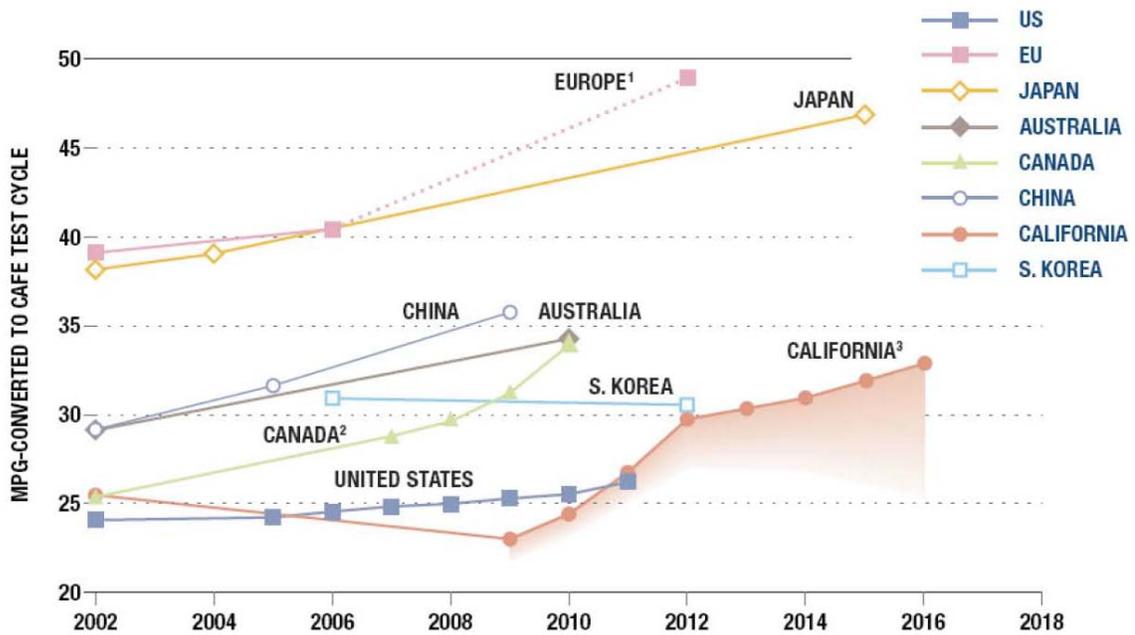
John Zamurs (New York DOT) discussed what the state of New York is doing to document GHG emissions in National Environmental Policy Act (NEPA) documents. Current FHWA guidance calls for a qualitative energy discussion for most projects. The state of New York's Energy Plan, which is currently undergoing public hearings and review, addresses climate change and GHG emissions. The state's Environmental Quality Review Act recently added GHG-specific guidance, which provides a framework for all environmental documents to address GHGs. Guidance thresholds for energy and GHG analysis have been established, with a requirement for project-level analyses of direct and indirect energy usage, and considerations for mitigation and adaptation.

John Posey (East-West Gateway) talked about what his organization and others in the St. Louis area are doing on GHG emissions. East-West Gateway's activities include monitoring transportation and energy bills, studying trends in VMT and analyzing effects of gas prices on VMT, and participating as a partner in regional efforts to address the problem. Some of the community organizations that are working on GHGs include a new group called Sustainable St. Louis, an organization called FOCUS that recently produced an environmental sustainability roadmap for local governments, and the St. Louis Regional Clean Cities Program which promotes commercial use of non-petroleum fuels.

Jesse Elam (CMAP) discussed his organization's efforts to compile a base GHG emissions inventory and examine transportation and energy strategies to reduce GHG emissions, such as VMT reductions. Their analyses indicate that vehicle fuel economy and alternative fuels (lower carbon content) may be more effective in reducing GHG emissions than VMT reductions, and that programs to reduce energy use in buildings may be important locally.

A short round-table discussion was held to allow other state and local agency to note what they are doing to address GHG emissions. The limited responses indicate that only a few agencies are analyzing for and taking action to reduce GHG emissions.

Finally, during lunch, Lewison Lem (CCS) provided an overview of the role of transportation and climate change. In the U.S., transportation contributes about 28% of GHG emissions and is the second largest sector, trailing only electric generation. Projections in GHG emissions, which take into account expected growth in VMT and new U.S. fuel economy standards, indicate little change in emissions from this sector out through 2020. (It was noted, however, that new U.S. fuel economy standards lag those in other parts of the world – see Figure 9.) A number of cost-effective measures for reducing GHG emissions from the transportation sector were identified (e.g., higher fuel economy standards, advanced biofuels, truck anti-idling, and increased transit ridership.)



([http://www.theicct.org/documents/ICCT\\_GlobalStandards\\_2007.pdf](http://www.theicct.org/documents/ICCT_GlobalStandards_2007.pdf))

Figure 9. Comparison of global fuel economy standards.

## Developing Better Mobile Source Emissions Inventories

Session Chair: Michael Koerber (LADCO)

Gary Dolce (EPA) talked about using MOVES for developing regional modeling inventories. EPA expects MOVES to be used for the next round of PM<sub>2.5</sub> and ozone SIPs, which will be due in 2012 and 2013, respectively, and for future conformity analyses, with a grace period of 3 – 24 months. He discussed new tools to assist in running MOVES (e.g., look-up tables for large scale applications) and forthcoming technical guidance.

Jeff Houk (FHWA) reviewed sensitivity analyses conducted by a contractor which showed that emission rates are very sensitive to speeds, and to source types and ages, suggesting the importance of developing reliable data, if possible for these model inputs.

Doug Lawson (NREL) discussed the accuracy of emission estimates for mobile sources. For example, although the trend in measured carbon monoxide (CO) data in southern California was noticeably downward since 1980, the local air agency's emission estimates indicate only a modest decline – see Figure 10. He also emphasized the importance of high emitting vehicles (i.e., a small percentage of the fleet contributes a large percentage of overall emissions) and the need to evaluate emission estimates with ambient measurements.

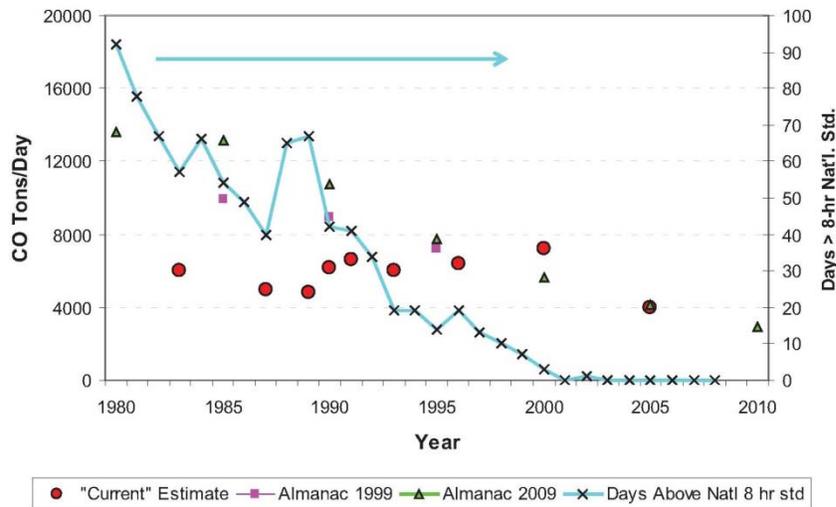


Figure 10. Trends in CO emissions inventory and ambient data in South Coast Air Basin.

Michael Koerber (LADCO) discussed an air quality modeling study using MOVES-like emission estimates. Previous modeling analyses using MOBILE6 showed substantial under-prediction for important PM<sub>2.5</sub> species, especially organic carbon. Despite the higher PM emissions from MOVES, model performance for organic carbon was still poor. In developing PM<sub>2.5</sub> SIPs, states will, therefore, need to consider other information (e.g., monitoring-based source apportionment studies) to support control strategy development.

Mark Janssen (LADCO) reviewed efforts to build regional emissions inventories for on-road mobile sources in the Midwest. In developing a 2005 base year emissions inventory, LADCO worked with state DOTs and MPOs throughout the upper Midwest to produce a highly spatially- and temporally-resolved on-road inventory using data from over 20 transportation networks – see Figure 11. For the upcoming round of PM<sub>2.5</sub> and ozone SIPs, LADCO intends to develop an updated (2008) base year inventory, and will focus on a handful of key networks: Cleveland, Detroit, and Chicago/Gary/Milwaukee.

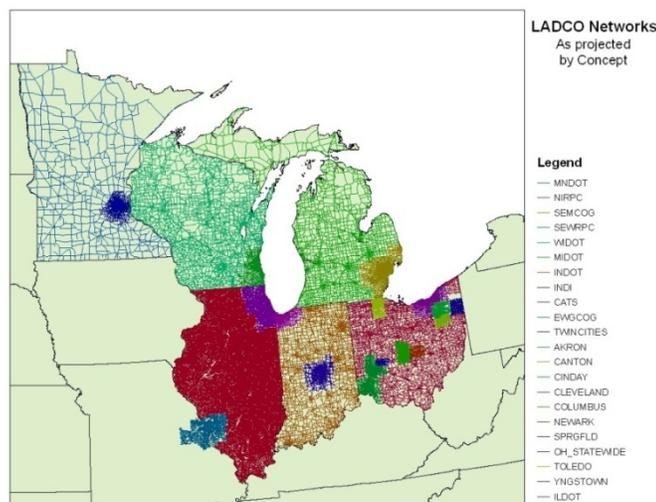


Figure 11. Midwest transportation networks included in LADCO's emissions modeling.

## Project-Level Analyses

Session Chair: Walt Zyznieuski (IDOT)

Cecilia Ho (FHWA) reviewed the project-level conformity requirements. A PM hot-spot analysis must be conducted under certain conditions. In 2006, EPA and FHWA issued guidance requiring a qualitative analysis. (As noted below, a quantitative analysis will soon be required.) Experience with qualitative analyses over the past several years was discussed.

Gary Dolce (EPA) discussed the development of PM hot-spot modeling guidance. EPA intends to release PM<sub>2.5</sub> and PM<sub>10</sub> hot-spot modeling guidance with the final MOVES model by the end of 2009. The guidance will describe how to do a PM hot-spot analysis (see, for example a flow diagram of the process in Figure 12), and will describe the components in completing a “build/no-build” analysis, including characterizing project emissions, selecting an appropriate air quality model, characterizing “background” contributions, and comparing results to the NAAQS.

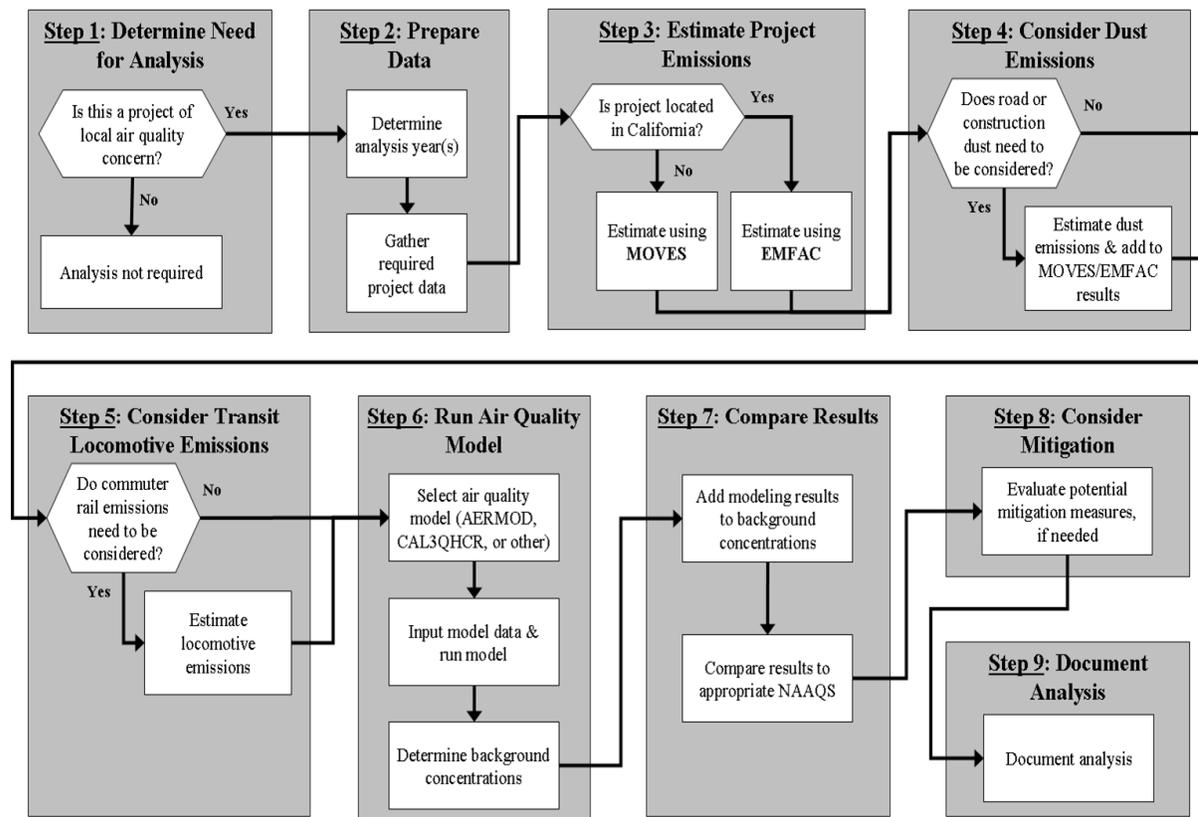


Figure 12. Overview of PM hot-spot quantitative analysis.

Jeff Houk (FHWA) talked about the important local data needed to run MOVES for project-level analyses, such as age distribution, fuel supply, meteorology, and link drive schedules.

Walt Zyznieuski (Illinois DOT) gave a presentation on the Carbon Monoxide Screen for Intersection Modeling (COSIM). This Windows-based screening model was developed for IDOT based on EPA's MOBILE emission factor model and CAL3QHC roadway dispersion model. IDOT uses COSIM for estimating conservative carbon monoxide concentrations at signalized intersections throughout the State.

A short round-table discussion was held in which each state reviewed what they are doing for CO hot-spot analyses.

## OCTOBER 29

### Mobile Source Air Toxics

Session Chair: Mike Claggett (FHWA)

John Zamurs (New York DOT) discussed the National Cooperative Highway Research Program Project No. 25-25 (Task 18): *Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process*. The report identifies five levels of analysis for mobile source air toxics (MSATs): (1) no analysis, (2) qualitative air toxic assessment, (3) quantitative emissions assessment, (4) quantitative air toxic risk assessment, and (5) quantitative exposure assessment. The report is intended to provide "suggestions to State DOTs on when and how to select and apply currently available techniques for analyzing and predicting the impacts of MSATs in the NEPA process based on current best practices."

Mike Claggett (FHWA) reviewed emission estimates for MSATs using the draft MOVES model, including future year projections, effect of vehicle speed, effect of congestion, and differences between MOVES and MOBILE6. Figure 13 compares emission estimates from MOBILE6.2 v. MOVES. Implications of using MOVES include higher diesel PM emissions (especially at lower speeds), lower benzene emissions, and lower total MSAT emissions from congestion mitigation.

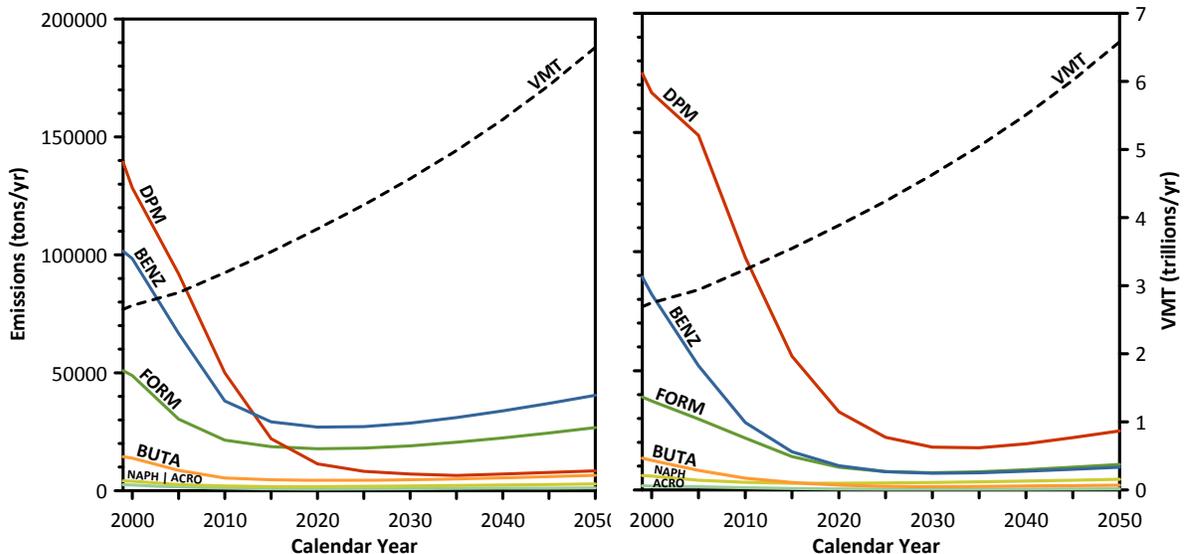


Figure 13. MOBILE6.2 (left) v. MOVES (right) emission projections for MSATs.

Jay Turner (Washington University) reported on a study in Sandy Valley, Nevada of in-cabin exposures on diesel school buses. Measurements were made for several diesel-related pollutants of concern, including black carbon (BC) and particle-bound polyaromatic hydrocarbons in front and back of bus cabins. The results shows significant “self pollution” (i.e., high concentrations of diesel-related pollutants on the bus), with noticeable effects related to location on the bus, run conditions, and ambient wind speeds (i.e., higher concentrations occurred at back of the bus, on hills, and under lower wind speeds).

## OTHER MOBILE SOURCE RESEARCH STUDIES

Session Chair: Mike Claggett (FHWA)

Victoria Martinez (FHWA) discussed EPA and FHWA efforts to conduct near-roadway ambient monitoring in Las Vegas and Detroit. The Las Vegas monitoring, which was required pursuant to a settlement agreement from a lawsuit, includes measurements for several gaseous (e.g., CO, NO<sub>x</sub>, and benzene) and particulate pollutants (e.g., PM<sub>2.5</sub>, BC, and diesel particulate matter) at four locations: 10 m (station #1), 100 m (#2), and 300 m (#3), and background (#4) – see Figure 14. Preliminary data show the highest concentrations at the closest monitor (10 m away), with concentrations approaching background levels within 300 m away.

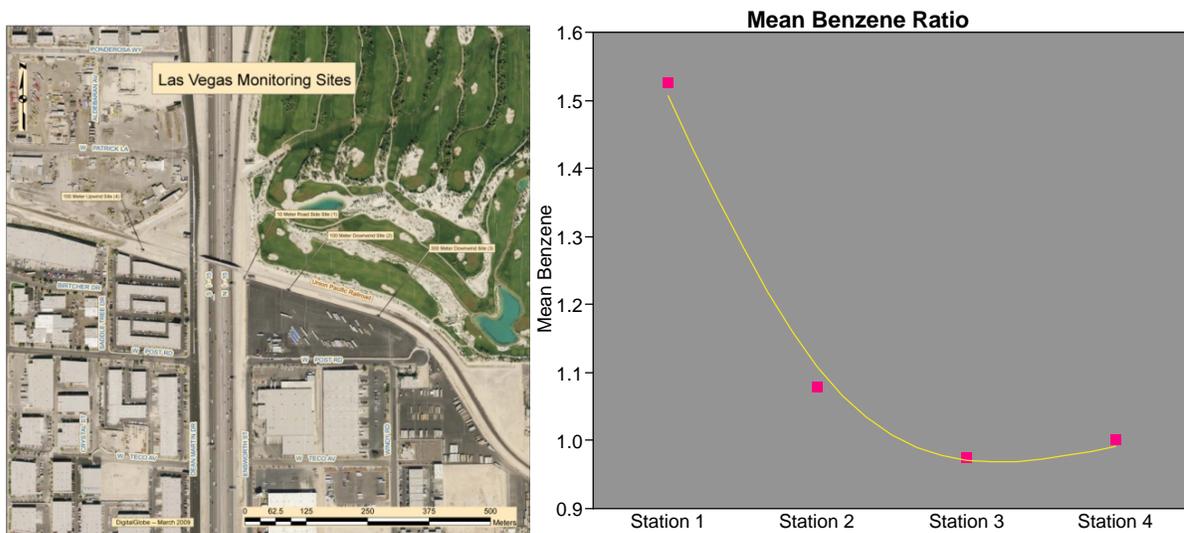


Figure 14. Monitoring sites in the vicinity of I-15 in Las Vegas, Nevada (left) and preliminary data showing the decrease in benzene concentration with distance from roadway – i.e., ratio of mean concentrations for each station relative to background station (right).

Scott Dileto (EDI) reported on air monitoring conducted during the reconstruction of a major highway in Chicago (i.e., the Dan Ryan Expressway) from 2004 to 2008. This monitoring included continuous and daily average measurements for PM<sub>10</sub>, PM<sub>2.5</sub>, lead, and several other pollutants at locations ranging from 15 to 800 m from the roadway (see Figure 15). Also, as part of the reconstruction project, there were significant efforts to mitigate construction-related emissions (e.g., use of ultra-low sulfur diesel fuel, idling restrictions, and installation of emissions control devices) and involve the local community. The monitoring recorded concentrations above project action levels only a handful of times, and were determined to not be directly related to reconstruction activities.

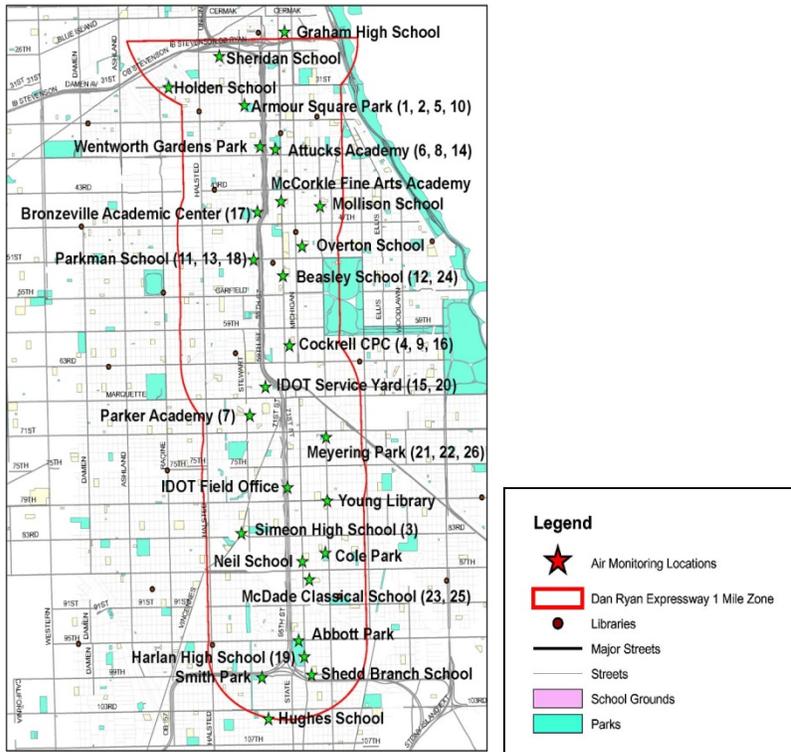


Figure 15. Air monitoring sites near Dan Ryan Expressway during reconstruction project.

Jay Turner (Washington University) presented results from the Midwest Rail Study. This study involved special field measurements within 100 – 200 m of a rail yard in Detroit, preparation of an emissions inventory, dispersion modeling, and data analysis. Based on the modeling and data analysis, the impact of the rail yard was estimated to be relatively small (e.g., on the order  $0.2 \text{ ug/m}^3$ ). Other nearby sources (e.g., a large iron and steel mill) were found to have a much larger impact.

Mike Claggett (FHWA) discussed three research studies by The Health Effects Institute: diesel emissions and lung cancer, mobile source air toxics, and traffic-related air pollution. The diesel emissions and lung cancer report examined two studies for possible use in support of quantitative risk assessments, and concluded that there was a need for enhanced exposure and epidemiological data for risk assessments. The mobile source air toxics report found that vehicles were the primary source for only a few of the 21 MSATs identified by EPA and that improvements in data analysis methods were needed. The traffic-related air pollution report found that the evidence was “sufficient” to infer a casual relationship between exposure to traffic-related air pollution and exacerbation of asthma.

## CHAPTER 3 SUMMARY

The Midwest Transportation Air Quality Summit provided federal, state, regional, and local transportation and air agency representatives with an opportunity to discuss topics affecting both transportation and air quality planning. Conference sessions included SIP planning activities for new air quality standards, mobile source emission inventories (and EPA's new MOVES emissions model), highway project-level analyses, current diesel engine programs, climate change, mobile source air toxics, and on-going mobile source-related research studies.

Major messages delivered at the conference include:

- Pursuant to the Clean Air Act, EPA must review federal air quality standards every five years. EPA's current schedule for reviewing transportation-related air pollutants is as follows:

<u>Pollutant</u>	<u>Action</u>	<u>Proposed Standard</u>	<u>Final Standard</u>
Ozone	Reconsideration of 2008 standard	Dec 2009	Aug 2010
NO <sub>2</sub>	Review of standard	July 2009	Jan 2010
CO	Review of standard	Oct 2010	May 2011
PM <sub>2.5</sub>	Review of standard	Jan 2011	Oct 2011

- The Clean Air Act requires states to prepare SIPs which provide for attainment of the applicable NAAQS. Although air quality concentrations for ozone and PM<sub>2.5</sub> in the Midwest have improved significantly over the past decade due to federal and state control programs, several cities are not in compliance with the current version of these standards (e.g., on October 8, 2009, EPA designated 31 areas, including five in the Midwest, as not meeting the 2006 version of the PM<sub>2.5</sub> daily standard).
- The Clean Air Act also requires federal actions to conform to the SIP's purpose; specifically, in ozone, PM, CO, and NO<sub>2</sub> nonattainment and maintenance areas, transportation plans, programs, and federally supported highway and transit project must not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. EPA's transportation conformity rule requires a project level conformity determination, including, in some cases, a PM hot-spot analysis. A qualitative PM hot-spot analysis is currently required, but a quantitative analysis will be required in the near future.
- Based on recent data, EPA has developed an improved emissions model for on-road mobile sources (i.e., MOVES). The MOVES model is expected to be released before the end of 2009. EPA will require the use of MOVES in the upcoming SIPs for PM<sub>2.5</sub> (2006 version of the daily standard) and ozone, and, with a grace period of, perhaps, 3 – 24 months, for transportation conformity analyses (e.g., PM<sub>2.5</sub> hot-spot quantitative analyses).

- EPA will release three guidance documents with the final MOVES model:
  - Technical MOVES guidance for SIPs and conformity analyses
  - Policy guidance for SIPs and conformity analyses
  - PM2.5 and PM10 hot-spot modeling guidance
- MOVES will produce, in general, higher emission estimates for NO<sub>x</sub>, PM2.5, and certain MSATs (e.g., diesel PM), and lower (or similar) emission estimates for HC, CO, and some MSATs (e.g., benzene) compared to MOBILE6. Despite the revised emission estimates, air quality model performance for certain key PM2.5 species still appears to be inadequate, suggesting that states planning PM2.5 SIPs will need to consider other information (e.g., ambient monitoring studies).
- The development of better mobile source emission inventories should consider use of local data (e.g., for vehicle speeds and age distribution) and link-level data from state/MPO travel demand models. In addition, emission estimates need to be evaluated using ambient measurements.
- There is emerging interest in near-roadway air quality concentrations for pollutants such as NO<sub>2</sub> and PM2.5. EPA's proposed new NO<sub>2</sub> standards includes a provision for NO/NO<sub>2</sub> monitors located within 100 m of a major road with high (>250,000) annual average daily traffic counts in cities with 350,000 or more, and EPA and FHWA are working together on near-roadway measurement studies in Las Vegas and Detroit.
- Climate change is another emerging area affecting state and local planning agencies. In the absence of federal legislation, state and regional initiatives have begun to look at this environmental problem, with proposals for GHG emission reduction goals. Federal, regional, state, and local agencies are evaluating both mitigation strategies and adaptation responses to deal with climate change.
- Millions of dollars in federal money is being used to achieve reductions in diesel particulate emissions from on-road and off-road mobile sources. EPA Region V's Midwest Diesel Initiative is an organized effort to impact 1M engines by 2010 (note: over 761,000 engines have been impacted to date). The importance of these emission reduction efforts was demonstrated by Jay Turner's presentation on high exposures to children on school buses, which showed trip average BC concentrations as high as 1.4 ug/m<sup>3</sup> (at the back of the bus) and 0.5 ug/m<sup>3</sup> (in the front of the bus), with notable effects of run conditions and ambient wind speed (e.g., average BC on hills of about 10 ug/m<sup>3</sup> and about 14 ug/m<sup>3</sup> under low wind speeds).

Overall, attendees were pleased with the conference. Of the 64 attendees, 26 completed and returned the meeting evaluation form. On a scale from 1 to 5, the average conference rating was 4.4, with a rating of 5.0 from about half of the reviewers. Average ratings for the individual sessions were as follows:

Federal Panel on Current Regulatory Priorities and Activities	4.0
State/MPO Panel on Current Air Quality and Transportation Issues	4.1
Diesel Engines	3.5
Climate Change: State, Regional, Local, and Federal Activities	4.2
Developing Better Mobile Source Emissions Inventories	3.5
Project-Level Analyses	4.0
Mobile Source Air Toxics	4.2
Other Mobil Source Research Studies	4.0

Based on the evaluation forms, the following points can be made:

- Almost all reviewers recommended holding future transportation air quality conferences on an annual or every-other-year basis.
- Most reviewers enjoyed the Lodge at Pere Marquette State Park, with comments on the beautiful location and excellent food.
- Constructive suggestions for improving future workshops included providing an attendee sheet in the conference packet, improving the sound system, reducing the number of presentations to provide more time for discussion and breaks, and selecting a meeting site with better cell phone and wireless service.

## REFERENCES

### **EPA Websites:**

Midwest Clean Diesel Initiative: [cleandiesel@epa.gov](mailto:cleandiesel@epa.gov)

MOVES: [www.epa.gov/otaq/ngm.htm](http://www.epa.gov/otaq/ngm.htm)

Transportation Conformity: [www.epa.gov/otaq/stateresources/transconf/index.htm](http://www.epa.gov/otaq/stateresources/transconf/index.htm)

### **Federal Highway Administration Websites:**

Air Quality and Transportation Conformity:

<http://www.fhwa.dot.gov/environment/aqupdate/index.htm>

<http://www.fhwa.dot.gov/environment/conform.htm>

Climate Change Website: <http://www.fhwa.dot.gov/hep/climate/index.htm>

CMAQ Evaluation Report:

<http://www.fhwa.dot.gov/environment/cmaqpgs/safetealu1808/index.htm>

Conformity Practices: <http://www.fhwa.dot.gov/environment/conformity/practices/index.cfm>

FHWA's Clarification to the Qualitative PM Hot-spot Analysis Guidance:

<http://www.fhwa.dot.gov/environment/conformity/tcgfinal.pdf>

Integrating Climate Change into the Transportation Planning Process, Final Report, July 2008 <http://www.fhwa.dot.gov/hep/climatechange/index.htm>

MSAT Guidance: <http://www.fhwa.dot.gov/environment/airtoxic/100109guidmem.htm>

Qualitative PM Hot-spot Analysis Guidance:

<http://www.fhwa.dot.gov/environment/conformity/pmhotspotguidmemo.htm>

Resource Center Air Quality Technical Services Team:

<http://www.fhwa.dot.gov/resourcecenter/teams/airquality/index.cfm>

STEP Research Program:

<http://www.fhwa.dot.gov/hep/step/plans.htm>

<http://knowledge.fhwa.dot.gov/cops/step.nsf/home/>

### **Other Websites:**

Illinois Center for Transportation

<http://ict.illinois.edu/>

Illinois State Water Survey Climate, Air Quality, and Impact Modeling System:

<http://www.isws.illinois.edu/atmos/modeling/caqims/>

Michigan Climate Action Council: <http://www.miclimatchange.us/index.cfm>

Midwest Regional Climate Center: <http://mrcc.isws.illinois.edu/>

Midwest Greenhouse Gas Reduction Accord: <http://www.midwesternaccord.org>

NCHRP Project No. 25-25 (Task 18) “*Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process*”

[http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25\(18\)\\_FR.pdf](http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(18)_FR.pdf)

The Health Effects Institute: [www.healtheffects.org](http://www.healtheffects.org)

Special Report – *Diesel Emissions and Lung Cancer: Epidemiology and Quantitative Risk Assessment*, June 1999 <http://pubs.healtheffects.org/getfile.php?u=282>

Special Report 16 – *Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects*, November 2007

<http://pubs.healtheffects.org/getfile.php?u=384>

Special Report 17 – *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects*, May 2009 preprint

<http://pubs.healtheffects.org/getfile.php?u=453>

U.S. DOT Transportation and Climate Change Clearinghouse:

<http://climate.dot.gov/index.html>

## APPENDIX A – MEETING AGENDA

Midwest Transportation Air Quality Summit  
October 27 – 29, 2009  
(note: all times listed are Central Daylight Time)

Pere Marquette State Park  
Grafton, Illinois

Purpose: Many federal, state, regional, and local groups deal with motor vehicles in some way as part of their planning and regulatory programs. This workshop will attempt to put these pieces together and provide a comprehensive picture of current and upcoming transportation and air quality issues.

### Monday, October 26 (for those arriving early)

4:00-6:00pm Early Registration and Reception

### Tuesday, October 27

7:00-8:15am Continental Breakfast

8:00 Registration Opens

9:00 Optional (Parallel) Sessions

#### **Session 1: Overview of EPA's New MOVES Emissions Model**

Session Chair: **Jeff Houk, FHWA**

Speakers: **Jeff Houk, FHWA and Gary Dolce, EPA**

The purpose of this session is for EPA and FHWA experts to provide a technical understanding of the new MOVES model – e.g., development of the model, differences between MOBILE6.2 and MOVES, and EPA's implementation guidance for MOVES. This will not be hands-on training.

#### **Session 2: Status of the Congestion Mitigation and Air Quality (CMAQ) Program**

Session Chair: **Elizabeth Tracy, IDOT**

Speakers: **Mike Koontz, FHWA; Jim Wild, East-West Gateway; and Ross Patronsky, CMAP**

The purpose of this session is to review the latest developments in the CMAQ program.

11:00 Adjourn

11:30 Lunch

1:00pm Welcome & Introductions: Walt Zyznieuski, IDOT, Michael Koerber, LADCO  
Opening Remarks

Speakers: **Eric Harm, Deputy Director of Highways, Assistant Chief Engineer, Illinois DOT; Glenn Fulkerson, Assistant Division Administrator, Illinois Division, FHWA; and Doug Scott, Director, Illinois EPA**

1:45 Federal Panel on Current Regulatory Priorities and Activities

Session Chair: **John Donovan, FHWA**

Speakers: **Cecilia Ho, FHWA and Gary Dolce, EPA**

2:45 Break

3:00 State/MPO Panel on Current Air Quality and Transportation Issues

Session Chair: **Mike Rogers, IEPA**

- Speakers: **Mike Coulson, East-West Gateway; Joan Weidner, SEMCOG; Rob Kaleel, IEPA, and Tom Hanf, Michigan DOT**
- 4:00 Diesel Engines  
 Session Chair: **Steve Marquardt, EPA, Region V**
- o Midwest Diesel Initiative: **Steve Marquardt**
  - o State-Level Diesel Programs: **Darwin Burkhart, IEPA and Michael Friedlander, WDNR**
- 5:00 Adjourn
- 5:30 Reception – Wine tasting (cash bar) and hors d'oeuvres (Winery)
- 6:30 Dinner – “Tour of Italy” Buffet (Great Room)

**Wednesday, October 28**

- 6:45-8:15am Continental Breakfast
- 7:00 Optional Hike (meet at the Lodge entrance for a short ride up to the top of the bluff, followed by a 45-minute hike back down to the Lodge)
- 8:15 Climate Change: State, Regional, Local, and Federal Activities  
 Session Chair: **Michael Koerber, LADCO**
- o Federal Level – EPA’s endangerment finding, GHG emission standards for light-duty vehicles, mandatory reporting rule, and renewable fuels: **Rob Kafalenos, FHWA**
  - o Regional Level  
 Midwest Greenhouse Gas Accord **Nicholas Bianco, WRI**  
 A Perspective on Midwest Climate, **Steve Hilberg, Midwest Regional Climate Center**
- 9:45 Break
- 10:00 Climate Change (continued)
- o State Level:  
 Michigan Climate Action Council’s Report **Vince Hellwig, Michigan DEQ**  
 Overview of Midwest States’ Activities **Lewison Lem, CCS**  
 State DOT role on documenting GHG emissions in NEPA documents **John Zamurs, NY DOT**
  - o Local Level  
 Cool Cities Program **John Posey, East-West Gateway**  
 MPO actions related to GHG emissions **Jesse Elam, CMAP**
  - o State/Local/MPO Roundtable – what are you doing in your area related to GHG emissions (and climate change)?
- 12:00 Lunch  
 Speaker: Climate change and the transportation sector **Lewison Lem, CCS**
- 1:30pm Developing Better Mobile Source Emissions Inventories  
 Session Chair: **Michael Koerber, LADCO**
- o EPA’s MOVES model (overview of implementation guidance) **Gary Dolce, EPA**
  - o FHWA’s MOVES sensitivity study **Jeff Houk, FHWA**
  - o LADCO’s mobile source emissions sensitivity study **Michael Koerber, LADCO**
  - o Evaluation of mobile source emissions inventories **Doug Lawson, NREL**

- Use of travel demand modeling in state emission inventories **Mark Janssen, LADCO**

3:15 Break

3:30 Project-level Analyses

Session Chair: **Walt Zyznieuski, IDOT**

- PM2.5 hot-spot guidance **Gary Dolce, EPA**
- Meeting EPA's PM hot-spot requirements qualitatively **Cecilia Ho, FHWA**
- Implications of MOVES for Project-Level Analysis **Jeff Houk, FHWA**
- Illinois DOT's COSIM model **Walt Zyznieuski, IDOT**
- State/Local/MPO Roundtable – do you have any issues related to recent project-level analyses

5:00 Adjourn

5:30 Reception – Cash bar and hors d'oeuvres (Great Room)

6:30 Dinner – Chuckwagon BBQ Buffet (Great Room and Terrace)

### Thursday, October 29

7:00-8:15am Continental Breakfast

8:00 Mobile Source Air Toxics

Session Chair: **Mike Claggett, FHWA**

- AASHTO Study **John Zamurs, NY DOT**
- Implications of MOVES for air toxics **Mike Claggett, FHWA**
- Exposure studies in St. Louis **Jay Turner, Washington University**

9:15 Break

9:30 Other Mobile Source Research Studies

Session Chair: **Mike Claggett, FHWA**

- Near-roadway measurements studies **Victoria Martinez, FHWA**
- Measurements during Dan Ryan reconstruction **Scott Dileto, EDI**
- Analysis of rail yards **Jay Turner, Washington University**
- HEI health effects studies **Mike Claggett, FHWA**

11:10 Wrap-Up/Review of Action Items

11:30 Adjourn

## APPENDIX B - ATTENDEES LIST

<u>Last Name</u>	<u>First Name</u>	<u>Organization</u>	<u>Phone</u>	<u>E-Mail</u>
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