Highlights from the 2014 FHWA-EPA
Northern Transportation and Air Quality Summit

Each year, the Federal Highway Administration (FHWA) and U.S. Environmental Protection Agency (EPA) jointly sponsor a transportation and air quality summit to assess the progress in improving the air quality related to the emissions of highway vehicles. The summit covers policies, programs and technical issues confronting transportation and air quality agencies as they try to improve their local air quality. In addition to the sponsorship by FHWA and EPA, these summits are co-sponsored by local agencies. The co-sponsors for the 2014 summit included the Pennsylvania Department of Transportation and the Southwestern Pennsylvania Commission. The meeting was held in the Southwestern Pennsylvania Commission’s offices located in Pittsburgh, PA, August 19 and 20. Highlights from the summit are summarized on the following pages.
Current Regulatory Issues

The meeting opened with a presentation discussing the FHWA version of a transportation reauthorization bill, titled “Grow America”. This bill is the FHWA’s proposal for replacing the current legislation known as Moving Ahead for Progress in the 21st Century (MAP-21), enacted July 2012. Elements that specifically address highway-generated emissions were briefly discussed, including changes to metropolitan and statewide planning practices and environmental review reform. It was noted that the popular funding program, known as the Congestion Mitigation and Air Quality Improvement Program (CMAQ), will likely continue although some modifications may be made.

EPA’s Advance Program and Tier 3 Rule were also discussed. The Advance Program encourages areas in attainment of the U.S. National Ambient Air Quality Standards (NAAQS) for ozone and particulate matter to adopt practices and programs that will help them maintain their attainment status. Information on measures and programs that could be instituted included educational awareness, voluntary measures, mandatory ordinances, and supporting mechanisms, such as webinars and grant programs. A critical element for all areas—both in attainment and nonattainment—was the introduction of EPA’s Tier 3 Rule, which tightens the emission standards of newly manufactured light- and medium-duty vehicles and further limits sulfur content in gasoline. This rule assumes an operational vehicle life extending to 150,000 miles and significant emission reductions following engine start-up achieved by technologies, such as catalysts, new technologies, and reduced gasoline sulfur.

Pennsylvania’s implementation of the 2012 annual PM$_{2.5}$ NAAQS was discussed. The presentation provided information on the designation process, State Implementation Plan (SIP) requirements, emissions inventory, motor vehicle emission budgets, and the process by which areas demonstrate their compliance with the transportation conformity requirements. Pennsylvania expects vehicle activity (as measured by vehicle miles traveled, or VMT) to increase, since Pennsylvania is an important crossroad for diesel traffic. Increasing VMT could represent challenges for areas that have not attained the standards.

Mobile Source Air Toxic Compounds

Mobile source air toxic compounds (MSATs) are a concern in many areas. FHWA’s guidance document addressing MSATs was discussed and it was noted that several research studies have also been conducted and a research report recently published, “National Cooperative Highway Research Project (NCHRP) 25-25 Task 70,” outlining the

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requirements for performing an MSAT analysis. The report noted that projects can lead to increases or decreases in emissions, but that the differences between build and no-build is generally low. Figure 1 illustrates that although traffic volume is increasing, MSAT emissions are expected to continue to decline through 2030.

The Downtown Pittsburgh Diesel Study was discussed with its purpose to better understand the diesel emissions, their distribution around the city, the sources, and emission reduction strategies. The project involved rotating monitors during a sampling period—consisting of two summer and two winter periods—and analyzing the difference chemical species and time intervals to tease out sources. Preliminary analysis concluded that diesel emissions are not evenly distributed throughout the city and not attributable to a single source.

The Pennsylvania Department of Transportation and Metropolitan Planning Organization’s implementation process for linking planning requirements and National Environmental Policy Act (NEPA) requirements were described. The planning and environmental linkage (PEL) concept defined by FHWA (referred to as LPN—Linking Planning and NEPA) defines the relationship between planning and environmental analysis as provided for in the Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation. The PEL/LPN process was explained using the Southwestern Pennsylvania Commission’s Transportation Improvement Program (TIP) as an example.

Climate Change and Energy
Climate change and energy efficiency issues remain important topics for those working in the air quality field. Presentations on several tools for analyzing

What Is the Travel Efficiency Assessment Method?
A methodology to assess multi-pollutant emission reductions from TE strategies at the local, state, and national level

Traditional Modeling:
- Local data and strategies
- 4-Step Transportation Model
- Change in VMT, trips, fleet mix
- MOVES Emissions Assessment

Traditional 4-Step models are insensitive to many TE strategies

TEAM:
- Local data and strategies
- TRIMMS Sketch Model
- Change in VMT, trips, fleet mix
- MOVES Emissions Assessment

Sketch models, like TRIMMS, are a cost-effective way to assess the travel activity effects of TE strategies
the impact from transportation systems on climate change were described, including FHWA’s Greenhouse Gas (GHG) Analysis Toolbox and EPA’s Travel Efficiency Assessment Method (TEAM). FHWA’s GHG Analysis Toolbox includes the GHG Planning Handbook, the Performance-Based Planning Handbook, the Construction and Maintenance GHG Calculator, and the Energy Emission Reduction Policy Analysis Tool (EERPAT). Although there is no uniform approach to analyzing GHG emissions, these tools provide options for those needing to conduct climate and energy impact analysis related to highway projects.

EERPAT is a strategic policy tool for quantifying GHG reduction potential and is based on the GreenSTEP model developed by Oregon Department of Transportation. It has been pilot tested by four states, including the Vermont Agency of Transportation (VTRANS). Vermont projected changes using policies such as electrical vehicle penetration and a VMT tax. The strengths and weaknesses of the pilot were discussed as were VTRANS plans for evaluating future GHG policy considerations.

The session concluded with a discussion of EPA’s TEAM tool, which estimates GHG and criteria pollutant reductions from travel efficiency strategies. EPA’s TEAM approach is illustrated in Figure 2. Strategies including employer-based travel demand programs, land use policies, transit projects and policies, and pricing policies were evaluated using case studies conducted in Tucson, Kansas City, and Boston.

The CMAQ Program
Federal and local perspectives on the Congestion Mitigation and Air Quality Improvement Program (CMAQ) were presented. The CMAQ program’s purpose is to reduce air pollution and traffic congestion from transportation-related activities. The federal overview described an evolving program resulting from Moving Ahead for Progress in the 21st Century (MAP-21) legislation enacted in July 2012 and extended until through May of 2015. Elements include an emphasis on diesel retrofit programs, eligibility for natural gas and electric vehicle refueling infrastructure, and a PM$_{2.5}$ set-aside program. An overhaul of the CMAQ project database and public access system, development of project cost-effectiveness tables, a CMAQ assessment study, and project performance measures were discussed as additional efforts to meet the requirements of MAP-21.

The Southwestern Pennsylvania Commission presented the regional perspective on their CMAQ program describing their selection process, including project eligibility, the CMAQ evaluation committee, advertising, determining a project’s benefit, project prioritization, recommendations, and selections. Each step was described conveying the Commission’s understanding of CMAQ funding and how these projects support their TIP process. Fund matching restrictions were noted as was the Commission’s decision not to fund diesel retrofits, since contractors can move their equipment out of state.

Near-Road Monitoring and Travel Forecasting
Two presentations were made on EPA’s near-road monitoring network—one from the national program perspective and a second from the local experience perspective. In 2010, EPA initiated the development of this network in conjunction with revisions to the NAAQS for NO$_2$, CO, and PM$_{2.5}$. The network is designed to collect air quality data adjacent to major highways. Among the factors for determining the sites were population, traffic volumes, and diesel truck volumes. Specifics about the selection criteria outlined in EPA’s Technical Assistance Document (TAD) were discussed, including distance from the road, monitor probe inlet heights, traffic volume, and traffic types. A document describing several “pilot” site studies was briefly mentioned as was the data collection effort initiated in January 2014. Figure 3 is an illustration of siting and preliminary data from one location.

The local perspective on this network was provided for the Pittsburgh site. The Allegheny County Health Department maintains the monitor and described their selection process for siting the monitor. This included ranking the site by annual average daily traffic (AADT), heavy-duty vehicle counts and fleet equivalent AADT (which adds
weight to heavy-duty vehicle counts), and criteria for safety, unobstructed air flow, and utilities.

Traffic data are a major input in air quality analysis, so finding a method for acquiring accurate traffic data is essential. One method employed by Delaware Department of Transportation is known as the Tax Parcel Travel Modeling Process. The presentation described three levels of resolution for traffic analysis zones (TAZs)—peninsula, micro, and parcel—and noted that parcel-scale provided more accurate information about the travel in the TAZ. An example was presented showing how traffic volumes can be estimated using this method for Smyrna Delaware.

FHWA’s Travel Model Improvement Program (TMIP) provides research, training, and technical assistance to the public on travel models. The program provides this information through webinars, reports, the Travel Analysis Toolbox, a website for information exchange, and a community of practice. Information-sharing is provided by Workshops on the Web (WOW), Web Knowledge and Information Exchange (WKIE), and the Peer Review Program among others. Other travel and traffic issues focused on the linkage between traffic modeling, air quality modeling, and the integration of these two processes.

**Regional Emission Analysis**

Having covered the source of mobile emissions, traffic, the presentations shifted to the emissions generated by the traffic and EPA’s MOVES model. The MOVES 2014 model was released just before the summit meeting and so new elements of the MOVES2014 were described. Features included new science on vehicle emissions (e.g., fuel effect, temperature, and activity), new EPA rules (e.g., HD GHG Rule, LD GHG Rule, and Tier 3), and functional improvements to the model (e.g., interface with SMOKE Model, NONROAD Model, tool to convert MOVES 2010 files, starts, fuel wizard, local inputs, hoteling trucks, and idling). Changes resulting from modifications to traffic data and for processing input and output data using the MySQL program were also highlighted.

Information was presented on the sensitivity of the input variables. Preliminary results from an NCHRP project (NCHRP 25-38) described the variables and the influence they have on the model results. This project investigated the previous version of MOVES, but the findings are believed to hold true for the newly released version. Inputs for both regional and project applications were included. Some preliminary results are shown in Figure 4.

Additional information was provided on inputting data into MOVES as a prelude for explaining a tool for manipulating the data in the MOVES input database. The presentation covered input data requirements, creating spreadsheets for the required data and using an automated tool to insert the spreadsheet data into the MOVES input database, and bypassing the County Data Manager (CDM) input processor.

Emissions from truck traffic associated with drilling for natural gas are increasing throughout the country. Information was presented on the truck traffic emissions related to natural gas drilling in Pennsylvania, specifically in the Marcellus Shale region. Slightly more than half of the counties in Pennsylvania have active drilling and the associated truck traffic is playing an increasing role in mobile source emissions. Although the emissions associated with this additional truck traffic may not directly cause a violation of the NAAQS, emissions from related sectors may have an influence, and may result in decreasing the mobile source emission budget. Pennsylvania’s VMT forecasting process for SIPs includes special adjustments for shale drilling.
Project Emission Analysis
As noted in an earlier presentation, the sensitivity of some variables were evaluated to determine their impact on the emissions. This presentation focused on the emission factors generated by the MOVES model when MOVES was used in project level mode; it did not investigate the sensitivities of the dispersion models. The test studied the same variables as had been studied using MOVES in the regional analysis mode and included age distribution, vehicle age, and fleet mix. Some influencing factors included fuel economy, the use of the average speed method rather than operating mode method for vehicle speeds, the speeds tested (25 mph, 35 mph, and 45 mph), intersections, and level of service (LOS) B, D, and E.

Although not intended to be a comparison between the two difference dispersion models, the session included a presentation on the use of the CAL3QHCR model and a presentation using the AERMOD model. The CAL3QHCR model was used to evaluate the Elgin O’Hare-West Bypass Project, while the second study used EPA’s AERMOD model for a project on I-69. Either model could have been used for both projects, but familiarity with the models by the modelers was the reason each model was selected.

An important element of any project analysis is the selection of the background concentrations of existing pollutants. Since the goal in performing an analysis is to accurately predict how emission generated by the project will influence the ambient concentration of the existing air, determining the existing background concentration is critical. Two methods of determining the background concentrations—using historical ambient data and chemical transport modeling—were noted, however the historical ambient data method was described since this method is more frequently used.

Stakeholders Roundtable
The summit concluded with a panel of staff members from several state Departments of Transportation and Metropolitan Planning Organizations outlining the issues that they face and the support they would like from federal agencies tasked with resolving transportation-related air pollution. Topics included the expanded use of managed lanes its and its impact on air quality; the CMAQ program and its reporting requirements and availability of funds, allowing states to “self-certify” their CMAQ projects; the new MOVES model; excessive run times; travel model needs; and control strategies impact estimation using tools. The new O3 NAAQS to be released in December was noted as was the need for closer cooperation between the federal, state, and local agencies for resolving the issues discussed.

Summary
In closing, it is worth noting some new items were introduced in this year’s meeting. Posters were accepted allowing those limited by travel restrictions to provide input to the meeting during breaks between sessions. This year’s meeting was also conducted in the offices of a public agency permitting greater control over certain arrangements, such as web-based interactions and webcasting of presentations. This also provided a method for those with travel restrictions to make presentations, albeit with limited interaction with participants. In testing some new options, the Northern Transportation and Air Quality Summit continues to provide a forum for sharing information on transportation-related air quality issues.