Technical Air Quality Memorandum

Woodburn Interchange Improvements and Transit Facility
Marion County, Oregon

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<th>Abbreviation</th>
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<tbody>
<tr>
<td>Carbon Monoxide</td>
<td>CO</td>
</tr>
<tr>
<td>Environmental Protection Agency</td>
<td>EPA</td>
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<td>Federal Highway Administration</td>
<td>FHWA</td>
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<td>Levels of Service</td>
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<td>Mobile Source Air Toxics</td>
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<td>National Ambient Air Quality Standards</td>
<td>NAAQS</td>
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<td>National Environmental Policy Act</td>
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<tr>
<td>Oregon Department of Environmental Quality</td>
<td>ODEQ</td>
</tr>
<tr>
<td>Oregon Department of Transportation</td>
<td>ODOT</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>PM$_{10}$</td>
</tr>
<tr>
<td>Parts Per Million</td>
<td>ppm</td>
</tr>
<tr>
<td>Parts Per Billion</td>
<td>ppb</td>
</tr>
<tr>
<td>Statewide Air Quality Report</td>
<td>SAQR</td>
</tr>
</tbody>
</table>
Summary

This air quality memo is provided to re-assess the potential impacts of the Woodburn Intersection Improvements and Transit Facility Project since it was first proposed in 2006. The Woodburn region of western Oregon is considered to have good air quality and is in attainment of the National Ambient Air Quality Standards, with no monitored exceedances of the federally monitored pollutants over the last ten years. No hot-spot modeling of carbon monoxide is required in attainment areas but a qualitative analysis was performed.

Existing land uses are primarily commercial near Interstate 5, changing to residential east and west of the freeway. The Woodburn Interchange Project revised Environmental Assessment (November 2006) states that “The EA demonstrates that the project would have only minor impacts on air quality, noise levels, visual landscape, and land use.” Impacts to air quality from the Woodburn Transit Facility project are expected to be minimal. The project received a Finding of No Significant Impact (FONSI) from the Federal Highways Administration on December 8, 2006. This Air Quality Memo identified no air quality impacts and no additional mitigation is necessary. The project will not cause any new violations of the National Air Quality Standards, nor worsen any existing violations. Finally, because the current and future traffic volumes will be far below the 140,000 daily trips where a more detailed analysis of mobile source air toxics (MSATS) is warranted, this project is exempt from quantitative analysis for MSATS and no MSAT related issues are projected.

The greatest chance for temporary air quality impacts is during construction, when the earth moving required for road building will generate fugitive dust and other pollutants from the use of heavy machinery. Spraying of water on the work site will help to control the temporary air quality impacts related to fugitive dust during earth moving and grading.

Project Description

The Woodburn Interchange is located at Milepost 271.85 on Interstate 5 (I-5). The proposed project consists of reconstruction of the northbound and southbound highway ramps and widening of the overcrossing, as well as related improvements along the OR 214 and OR 219 approaches to accommodate the reconfigured interchange. The project also includes construction of a public transit center at the northwest corner of OR 214 and Evergreen Road.

The Woodburn Interchange Project (Key No. 15739 (OR 214 @ Evergreen Rd. Transit Facility) Key No. 12518 (I-5 @ OR 219/214)) is intended to address existing operational and safety deficiencies which are anticipated to worsen with continued growth in Woodburn and the Willamette Valley as a whole. Safety deficiencies are characterized by high crash rates at six intersections and inadequate queuing storage at the southbound off-ramp, leading to traffic queues that occasionally back on to the shoulder of southbound I-5. Road grades that exceed acceptable standards are present on the eastbound and westbound approaches to the overcrossing bridge, resulting in poor sight-distance for drivers and creating delays. To help alleviate these issues and enhance overall function of the interchange area, geometric and capacity
improvements to the road network are proposed, as well as enhancements to pedestrian/bicycling facilities, and multi-modal connectivity. The project area is shown in Figure 1.

Figure 1. Project Area Overview
Description of Pollutants

The primary impacts to air quality generated by highway projects occur during construction and when a future facility is operational. During construction, dust particles become airborne as earth is excavated and graded. These dust emissions are known as "fugitive dust." Other pollutants include fine particulate matter, carbon monoxide, oxides of nitrogen, hydrocarbon and sulfur dioxide emissions from the diesel and gasoline engines of trucks and construction machinery.

Objectionable odors are another form of air pollution and are caused by a great variety of compounds emitted by the diesel exhaust of heavy machinery and asphalt paving. In addition, motor vehicles emit a variety of toxic compounds, known as mobile source air toxics (MSATS) from the combustion of diesel and gasoline fuels.

Once the highway is operational, motor vehicles emit carbon monoxide, fine particulate matter, mobile source air toxics, and oxides of sulfur and nitrogen. The following is a more detailed discussion of the pollutants emitted by motor vehicle and construction equipment.

**Particulate Matter**

Particulate matter consists of particles of wood smoke, diesel smoke, dust, pollen, or other materials. It has traditionally been measured in two forms: PM\(_{10}\) (respirable or fine particulate matter) and PM\(_{2.5}\), depending upon the diameters of the particles. The former is defined as all matter smaller than 10 micrometers in diameter; the latter is only that material smaller than 2.5 microns in diameter. Due to concerns about the effect of very fine particulate matter—such as that found in wood smoke and combustion engine exhaust—in 1997, the EPA established separate regulations for particulate matter smaller than 2.5 microns in diameter (PM\(_{2.5}\)).

Coarse particles greater than 10 micrometers, such as fugitive dust from earth-moving, settle out of the air fairly close to where they are produced. PM\(_{10}\)—and to an even greater degree PM\(_{2.5}\)—remains suspended in the air for long periods of time and is readily inhalable deep into the smaller airways of human lungs. High ambient concentrations of PM\(_{10}\) and PM\(_{2.5}\) contribute to impaired respiratory functioning. Fine particulate matter is primarily responsible for haze that impairs the visibility of distant objects.

The diesel engines of trucks and heavy equipment are a significant source of particulate matter. Particulate matter from diesel engines and other sources has come under increasing scrutiny as a significant source of hazardous air pollutants.

**Ozone**

Ozone (O\(_3\)) is a pungent-smelling, colorless gas. It is a pulmonary irritant that affects lung tissues and respiratory functions and, at concentrations between 0.15 and 0.25 PPM, causes a feeling of lung tightness, coughing, and wheezing.

Ozone is produced in the atmosphere when nitrogen oxides and some hydrocarbons chemically react under the effect of strong sunlight. Unlike carbon monoxide, however, ozone and the other
reaction products do not reach their peak levels closest to the source of emissions, but rather at downwind locations affected by the urban plume after the primary pollutants have had time to mix and react under sunlight.

**Sulfur Dioxide**

Sulfur dioxide (SO₂) is a colorless, corrosive gas with a bitter taste. It has been associated with respiratory diseases. Sources of sulfur dioxide include diesel engines, power plants, paper mills, and smelters. It reacts with atmospheric moisture to form sulfuric acid.

**Nitrogen Dioxide**

Nitrogen dioxide (NO₂) is a brownish, poisonous gas, which reacts with water vapor to form nitric acid. It has been associated with respiratory diseases and is one of the essential precursors in the formation of ozone. Nitrogen dioxide is formed from the high temperature combustion of fuels (such as diesel engines) and subsequent atmospheric reactions. It reacts with atmospheric moisture to form nitric acid, which together with sulfuric acid, falls as “acid rain” damaging vegetation and freshwater marine ecosystems.

**Carbon Monoxide**

Carbon monoxide (CO) is a toxic, clear, and odorless gas. CO interferes with the blood's ability to absorb oxygen and impairs the heart's ability to pump blood. It is the primary criteria pollutant associated with motor vehicle traffic. CO monitoring is performed throughout the urbanized portions of the state by the Oregon Department of Environmental Quality. The highest concentrations of CO are found immediately adjacent to large urban intersections and congested arterials. Concentrations rapidly decrease as the distance from these sources increases.

**Mobile Source Air Toxics**

Mobile source air toxics (MSATS) consist of a wide variety of pollutants emitted by gasoline and diesel powered motor vehicles; particularly formaldehyde, benzene, acrolein, naphthalene, 1-3 butadiene, and diesel particulate matter. Health effects include potential cancer risks and pollution of groundwater supplies. Useful mitigation measures have been undertaken on a regional basis, such as the phase-out of lead in gasoline, the introduction of low-sulfur diesel fuel, and the installation of particulate traps on diesel buses. The particulate matter emissions from diesel engines have been shown to contain several types of MSATS. Figure 2 shows the trends in MSATS emissions as estimated by the Federal Highway Administration. Future emissions of the other vehicle-generated pollutants such as CO, SO₂, and NO₂ are predicted to follow the same downward trends.
Regulatory Issues

The EPA established National Ambient Air Quality Standards (NAAQS) for a limited number of pollutants with the enactment of the Clean Air Act (CAA) of 1970 and the Amendments of 1975 and 1977. These six compounds are termed "criteria pollutants." There are two categories of standards for them; "primary standards" to protect human health and "secondary" standards to protect human welfare and the environment. These standards—known as the National Ambient Air Quality Standards or NAAQS—are defined in terms of maximum allowable concentrations. For example, the NAAQS for carbon monoxide is 9 ppm averaged over 8 consecutive hours, and 35 ppm for a one-hour period. The NAAQS for PM$_{10}$ is 150-micrograms/cubic meter as the 24-hour limit. For PM$_{2.5}$, the 24-hour standard is 35-micrograms/cubic meter with an annual standard of 15-micrograms/cubic meter.

The EPA has three designations for air quality for any given area; attainment, maintenance, and non-attainment. Areas of the country exceeding the NAAQS for a given pollutant are classified as non-attainment. Maintenance areas are those geographic areas that had a history of nonattainment, but are now consistently meeting the National Ambient Air Quality Standard (NAAQS). Maintenance areas have been re-designated by EPA from "nonattainment" to "attainment with a maintenance plan." Non-attainment areas are required to continue to maintain air quality by adhering to a maintenance plan developed as part of the re-designation process.
Areas of the country, such as the City of Woodburn, that do not exceed the NAAQS for any of the criteria pollutants are in attainment. Highway projects in attainment areas are considered to be in conformity with the Clean Air Act and are not required to perform detailed micro-scale air quality modeling or regional air quality analysis. Table 1 summarizes the Federal and State standards for the criteria pollutants.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Federal Standard</th>
<th>State Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inhalable Particulate Matter (PM$_{10}$) ($\mu g/m^3$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-hour Average ($\mu g/m^3$)</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM$_{2.5}$) ($\mu g/m^3$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Arithmetic Mean ($\mu g/m^3$)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>24-hour Average ($\mu g/m^3$)</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM$_{10}$) ($\mu g/m^3$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-hour Average ($\mu g/m^3$)</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td><strong>Carbon Monoxide (CO)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-hour Average (ppm)</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>1-hour Average (ppm)</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td><strong>Ozone (O$_3$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-hour average (ppm)</td>
<td>0.075</td>
<td>0.075</td>
</tr>
<tr>
<td><strong>Nitrogen Dioxide (NO$_2$)</strong></td>
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<td></td>
</tr>
<tr>
<td>Annual Average (ppb)</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>1-hour Average (ppb)</td>
<td>100</td>
<td>100</td>
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<tr>
<td><strong>Lead (Pb)</strong></td>
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<tr>
<td>Quarterly Average ($\mu g/m^3$)</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Rolling 3-month Average ($\mu g/m^3$)</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>Sulfur Dioxide (SO$_2$)</strong></td>
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<td></td>
</tr>
<tr>
<td>Annual Average (ppm)</td>
<td>Revoked</td>
<td>0.02</td>
</tr>
<tr>
<td>24-hour Average (ppm)</td>
<td>Revoked</td>
<td>0.10</td>
</tr>
<tr>
<td>1-hour Average (ppb)</td>
<td>75</td>
<td>75</td>
</tr>
</tbody>
</table>

Source: ODEQ 2011 Air Quality Data Summary ($\mu g/m^3$) = micrograms per cubic meter; ppm= parts per million; ppb= parts per billion

**Existing Air Quality**

There are no air quality monitors near the Woodburn Interchange area. The closest is approximately 15 miles away and measures particulate matter (PM$_{2.5}$ and PM$_{10}$) and air toxics in the Salem area. This air station is too distant to provide relevant data for the Woodburn Project.

**Impacts from Operation**

**Direct Impacts**

The Woodburn Interchange Project is located in an area that meets Federal and State air quality standards. The 2007 Statewide Air Quality Report (SAQR) provides a qualitative process for assessing the potential impacts of transportation projects in such areas based upon their Average Daily Traffic (ADT) volumes. The Woodburn Interchange ADT volumes along with a comparison to the SAQR are provided in Table 2.
As shown in Table 2, ADTs on the portions of Newberg Highway adjacent to residential land uses are far less than the volumes cited in the SAQR as being likely to create violations of the 8-hour CO standard now or in the future. Based on the estimated ADT, the Project will not generate CO levels reaching or exceeding the NAAQS.

### Mobile Source Air Toxics (MSATS)

The amount of MSATS emitted from the Woodburn Interchange Project would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative is higher than that for the No-Build Alternative because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 model, emissions of all of the priority MSATS except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Even though the estimated VMT (based on the ADT) under each of the alternatives vary by up to 40 percent, it is expected that emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The purpose of the Woodburn Interchange Project is to improve safety in the rapidly growing Woodburn Interchange area and improve transit service by creating a transit center. The project will result in increases in roadway capacity and vehicle volumes that would cause an increase in emissions relative to the No-Build Alternative. NBA However, the current and future traffic volumes will be far below the 140,000 daily trips cited by the Federal Highway Administration (FHWA) as the level where a more detailed analysis of MSATS is warranted (see Table 2). Therefore, this project will generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special MSATS concerns. Consequently, this project is exempt from quantitative analysis for MSATS.
Regardless of the alternative (No-Build or Build) chosen, future emissions will likely be lower than present levels in the design year as a result of the EPA’s national control programs that are projected to reduce MSATS emissions by 57 percent to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, vehicle miles traveled (VMT) growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great—even after accounting for VMT growth—that MSATS emissions in the study area are likely to be lower in the future in nearly all cases. Moreover, EPA regulations for vehicle engines and fuels will cause overall MSATS to decline significantly over the next 20 years as shown in Figure 2. Even after accounting for a 64 percent increase in nation-wide VMT, FHWA predicts MSATS will decline in the range of 57 percent to 87 percent from 2000 to 2020 based on regulations now in effect. This will reduce the background level of MSATS as well as the MSATS emissions from this project.

**Indirect Impacts**

The forecast traffic volumes used to analyze the air quality impacts of the project alternatives are based on future expected land use and employment information for the project area. These analysis methodologies include expected traffic from development in the region and project area and traffic related air quality impacts shown in this report include expected development. The project will have no significant indirect effects.

**Cumulative Impacts**

The forecast traffic volumes used to analyze the air quality impacts of the project alternatives include traffic from all sources. Background concentrations representing the cumulative emissions of other sources in the area are added into the predicted local concentrations for CO at intersections. Because of these inclusive analysis methodologies, the impacts shown throughout this report represent cumulative air quality impacts.

**Impacts from Construction**

The construction phase of the project will include numerous tasks, each generating a variety of pollutants. Table 3 summarizes these tasks and emissions.
Table 3. Pollutants Generated by Construction Activities

<table>
<thead>
<tr>
<th>Construction Task</th>
<th>Source of Emissions</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing existing concrete &amp; paved surfaces</td>
<td>Track /wheel loaders, bulldozer, haul trucks</td>
<td>CO, PM₁₀, PM₂.₅, NOₓ, SO₂, fugitive dust, MSATS</td>
</tr>
<tr>
<td>Removing of concrete debris</td>
<td>Haul trucks, primary crusher, aggregate screens, dump trucks</td>
<td>Same as above</td>
</tr>
<tr>
<td>Re-grading of roadbed, laying the aggregate base</td>
<td>Track /wheel loaders, bulldozer, grader</td>
<td>Same as above</td>
</tr>
<tr>
<td>Building a wider overpass</td>
<td>Cranes, concrete trucks</td>
<td>Same as above</td>
</tr>
<tr>
<td>Rebuilding freeway ramps</td>
<td>Bulldozer, haul trucks, dump trucks, concrete trucks</td>
<td>Same as above</td>
</tr>
<tr>
<td>Trenching for new utilities</td>
<td>Backhoe, gravel trucks</td>
<td>Same as above</td>
</tr>
<tr>
<td>Paving roads</td>
<td>Concrete trucks, asphalt trucks, asphalt rollers</td>
<td>CO, PM₁₀, PM₂.₅, NOₓ, SO₂, MSATS</td>
</tr>
<tr>
<td>Painting lane markers</td>
<td>Paint spray equipment</td>
<td>Odorous compounds, MSATS</td>
</tr>
</tbody>
</table>

**Construction Mitigation Measures**

Construction contractors are required to comply with Division 208 of OAR 340 which addresses visible emissions and nuisance requirements. Subsection 210 of OAR 340-208 places limits on fugitive dust that causes a nuisance or violates other regulations. Violations of the regulations can result in enforcement action and fines. The regulation provides a list of reasonable precautions be taken to avoid dust emissions:

- Use of water or chemicals, where possible, for the control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;
- Application of asphalt, oil, water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts;
- Full or partial enclosure of materials stockpiles in cases where application of oil, water, or chemicals are not sufficient to prevent particulate matter from becoming airborne;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Adequate containment during sandblasting or other similar operations;
- When in motion, always covering open-bodied trucks transporting materials likely to become airborne;
- The prompt removal from paved streets of earth or other material that does or may become airborne.
- In addition, contractors are required to comply with ODOT standard specifications. Section 290 of the specifications has requirements for environmental protection, which include air pollution control measures. These control measures include vehicle and equipment idling...
limitations and are designed to minimize vehicle track-out and fugitive dust. These measures would be documented in the pollution control plan that the contractor is required to submit prior to the pre-construction conference. To reduce the impact of construction delays on traffic flow and resultant emissions, road or lane closures should be restricted to non-peak traffic periods when possible.

References


EPA (US Environmental Protection Agency) *National Ambient Air Quality Standards (NAAQS).* http://www.epa.gov/air/criteria.html

Oregon Department of Environmental Quality 2010 Regional Air Quality Data Summaries. 2011

Oregon Department of Transportation *Air Quality Manual.* 2008.

Oregon Department of Transportation *Statewide Air Quality Report.* 2007.
Appendix A: FHWA Interim Guidance of MSAT Analysis

Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA - Appendix C

Sec. 1502.22 INCOMPLETE OR UNAVAILABLE INFORMATION

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

a. If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

b. If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:
   1. a statement that such information is incomplete or unavailable;
   2. a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
   3. a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and
   4. the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

c. The amended regulation will be applicable to all environmental impact statements for which a Notice to Intent (40 CFR 1508.22) is published in the Federal Register on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.
The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National...
Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.