Air Quality

Air quality impacts are closely tied to traffic impacts. Air quality was analyzed on both a local and regional basis for the SDEIS. The study area included existing roadways, planned new roadways, and local, poorly performing intersections where changes in traffic volumes would occur as a result of the project. The Environmental Protection Agency (EPA) is responsible for the establishment of National Ambient Air Quality Standards (NAAQS), national guidance, and guidelines for the uniform and scientifically reliable study of air pollutants.

Project Area Impacts

The Sunrise Project is located within the Portland carbon monoxide maintenance area and the Portland Air Quality Maintenance Area. The Portland Air Quality Maintenance Area is an attainment area for ozone, and a plan is in place to maintain compliance with the NAAQS. In the Portland metropolitan area, the primary pollutants from transportation projects are nitrogen oxides (NO_x), volatile organic compounds (VOCs), and carbon monoxide (CO). Other pollutants of concern for transportation projects can be fine and very fine particulates. Because a new roadway would be constructed where a road has not previously existed, areas in the immediate vicinity of the new road would receive increased emissions and increased concentrations of traffic-related pollutants.

The analysis of emissions is based on the number of vehicle miles traveled (VMT) under each alternative.

National Ambient Air Quality Standards are standards used to measure air quality, expressed as concentrations of pollutants averaged over fixed time periods.

Attainment and **maintenance areas** refer to a region's ability to meet the National Ambient Air Quality Standards and to maintain them over time.

Mobile Source Air Toxics refer to several hazardous air pollutants that cause or may cause cancer or other serious health effects.

The Air Quality Technical Report contains more details about the following:

- Federal and state laws and regulations, including the Clean Air Act, National Environmental Policy Act of 1969, National Ambient Air Quality Standards, control of emissions, Mobile Source Air Toxics, and impacts analyses.
- Discussion of emission estimates, dispersion, and exposure levels and health effects.
- Existing air quality including monitoring data, air quality trends, and air toxics assessment.
- Environmental consequences.
- Mitigation measures.

Alternatives 2 and 3

An emissions analysis performed for the study area concluded that emissions of CO and very fine particulates (PM_{10}) are expected to increase in the future under all alternatives. Area-wide emissions of nitrogen oxides, VOCs, and fine particulates ($PM_{2.5}$) are expected to decrease in the future relative to existing conditions. There is effectively no difference in VMT and corresponding pollutant emission levels between **Alternatives 2** and **3**.

VMT increases by nearly 20 percent for **Alternatives 2** and **3** over **Alternative 1–No Build** because of the additional capacity provided by the Sunrise Project. The different design options do not show a significant variance in VMT and, consequently, the design options do not result in different levels of air pollutant emissions. Therefore, only impacts from the build alternatives are discussed.

Alternatives 2 and **3** would result in more emissions compared to **Alternative 1–No Build**. Area-wide emissions of nitrogen oxides, VOCs, and fine particulates are expected to decrease in the future relative to existing conditions because of stricter EPA regulations while emissions of carbon monoxide and coarse particulate matter

increase because of the increase in capacity on the roadway and consequent predicted increase in traffic volume. Overall emissions would be greater with the Sunrise Project than without it.

The air quality analysis for the Sunrise Project included evaluation of localized impacts from carbon monoxide at the three worst-performing intersections affected by the project alternatives (OR 224 and SE Webster Road, SE 82nd Drive and SE Jennifer Street, and OR 212/224 and SE 82nd Drive). The results of the analysis showed that the NAAQS are not expected to be exceeded in the opening year after construction (2012) or by 2030 at any location for any alternative.

Preferred Alternative Project-Level Conformity Statement

The project is located in the Portland carbon monoxide maintenance area. The project must be included in a conforming RTP and Metropolitan Transportation Improvement Program with no substantive changes in design concept or scope, and a hot spot analysis must be completed to determine that local carbon monoxide impacts would not occur.

Clackamas County and ODOT have worked with Metro to determine the Sunrise Project improvements that comprise the Sunrise Project **Preferred Alternative**, and are included in the recently updated 2035 Regional Transportation Plan (RTP) financially-constrained system. The project is described as a six-lane, limited access highway with auxiliary lanes from I-205 to Rock Creek Junction with transition segments back to existing facilities at each end of the project (i.e., to SE Webster Road and OR 224 at the west end and SE 172nd Avenue at OR 212 at the east end). This project was modeled as part of the updated RTP air quality conformity analysis. Metro has confirmed its modeling of the entire Sunrise Project **Preferred Alternative** for air quality conformity as part of the 2035 RTP update (see Appendix D for Metro e-mail correspondence confirming conformity). The Joint Policy Advisory Committee on Transportation and the Metro Council approved final adoption of the air quality conformity determination and 2035 RTP on June 10, 2010. FHWA and FTA issued the USDOT air quality conformity finding on the 2035 RTP on September 20, 2010. The design concept and scope of the Sunrise Project in this NEPA document is consistent with the project as described in Metro's 2035 RTP and the assumptions in Metro's regional emissions analysis for the associated air quality conformity determination.

Appendix D contains documentation for the finding of conformity, including the September 20, 2010 USDOT finding, a project list and associated map. They show the approved, financially-constrained projects that together comprise the Sunrise Project subject of this EIS. Since issuance of the SDEIS, EPA revised the NAAQS for lead, nitrogen dioxide (NO_2), and ozone. The analysis for the **Preferred Alternative** applied the new standards. As with **Alternatives 2** and **3**, the **Preferred Alternative** will expand capacity for vehicular traffic. Future emissions of carbon monoxide and coarse particulate matter increase because of the increase in capacity on the roadway and consequent predicted increase in traffic volume. Future emissions of NOx, VOCs, and fine particulates will be lower than the existing condition, because of stricter EPA regulations.

Concentrations of CO in the Portland area do not currently exceed the NAAQS. The **Preferred Alternative** will not: cause or contribute to any new violations of any NAAQS; increase the frequency or severity of any existing violation of any standard; or delay timely attainment of any standard.

Mobile Source Air Toxics Impact Analysis

The Clean Air Act Amendments of 1990 identify 188 air toxics, also known as hazardous air pollutants. The EPA defines air toxics as pollutants that cause or may cause serious health effects. The EPA assessed this expansive list of toxics and identified a group of 21 as Mobile Source Air Toxics (MSATs), which are set

forth in an EPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235). From the list of 21 MSATs, EPA identified six toxics as priority MSATs: benzene, formaldehyde, acetaldehyde, diesel exhaust (particulate matter/diesel exhaust organic gases), acrolein, and 1,3-butadiene. Although these MSATs are considered the priority transportation-related toxics, EPA emphasizes that the lists are subject to change and may be adjusted in future rules.

To date, there are no NAAQS for MSATs, and there are no established criteria for determining when MSAT emissions should be considered a significant issue. In its February 2006 interim guidance for MSATs in NEPA documents, the FHWA identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects.
- Qualitative analysis for projects with low potential MSAT effects.
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Greater potential for MSAT effects typically occurs for roadways with an annual average daily traffic (AADT) volume of 140,000 to 150,000 vehicles or more in 2030 (design year). The average daily traffic (ADT) volume is forecast to be 93,500 for **Alternative 2** and 95,700 for **Alternative 3** in 2030, resulting in low potential for MSAT impacts. Because they are not adjusted for lower traffic volumes on weekends, ADT volumes are typically slightly higher than AADT volumes. Therefore, a qualitative analysis for the Sunrise Project SDEIS was recommended by FHWA. To provide additional information for decision-makers and the public, a simplified calculation method was used to estimate annual study area emissions of MSATs based on (1) vehicle miles traveled (VMT) for **Alternative 1–No Build** and the build alternatives, and (2) the study area average MOBILE 6.2 emission factors (see discussion below under "Emissions").

For each alternative, the amount of MSATs emitted would be proportional to the VMT, assuming that other variables are the same. The proposed Sunrise Project would add capacity, therefore VMT is higher and the study area emissions for the build alternatives relative to **Alternative 1–No Build** are higher. Overall, future MSAT emissions are predicted to be lower than existing emissions due to vehicle emission controls that are expected to come into effect over the next 25 years. **Alternatives 2** and **3** would result in higher emissions by 2030 than **Alternative 1**, but there is no difference between **Alternatives 2** and **3**.

The FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances (*Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents,* September 30, 2009. *http://www.fhwa.dot.gov/ environment /airtoxic/100109guidmem.htm*). The FHWA has identified three levels of analysis:

1. No analysis for projects with no potential for meaningful MSAT effects;

2. Qualitative analysis for projects with low potential MSAT effects; or

3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

The Sunrise Project falls within the second category.

The analysis of MSATs for **Alternatives 2** and **3** was based on the NAAQS for that time period. The **Preferred Alternative** was evaluated based on an updated list of toxics from 2009, which added naphthalene. Similar to impacts under **Alternatives 2** and **3**, the amount of change in MSATs depends on the pollutant and miles traveled. ADT volume for the **Preferred Alternative** is forecasted to be 90,700 in 2030, resulting in low a potential for MSAT impacts. Future MSAT emissions are predicted to be lower than or consistent with existing emissions due to vehicle emission controls that will come

into effect over the next 25 years, despite a tripling of the projected VMT.

Mobile source air toxics issues

This subsection provides a basic discussion of the issues associated with MSAT emission impact analysis for projects such as the proposed Sunrise Project. Available technical tools do not enable prediction of the project-specific health impacts resulting from the emission changes associated with the Sunrise Project. Because of these limitations, the following discussion is included in accordance with Council on Environmental Quality regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

Unavailable or incomplete information

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

Emissions

The EPA tools for estimating MSAT emissions from motor vehicles are not sensitive to key variables that determine emissions of MSATs in the context of highway projects. While the model MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model; emission factors are projected based on a typical trip of 7.5 miles and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. In its discussions of particulate matter under the conformity rule, EPA has identified problems with MOBILE 6.2 and how it is an obstacle to quantitative analysis.

These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. Although MOBILE 6.2 is an adequate tool for projecting emissions trends and performing relative analyses between alternatives for very large projects, it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

Dispersion

The tools to predict how MSATs disperse are also limited. EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at "some" time at "some" location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk.

The National Cooperative Highway Research Program is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work would focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public.

Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

Exposure levels and health effects

Even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult to perform, because it is difficult to accurately calculate annual concentrations of MSATs near roadways and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period.

There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts among alternatives or design options is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of existing credible scientific evidence relevant to evaluating the impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies which show that some types are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or by tests on animals that demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment in 1996 to evaluate modeled estimates of human exposure applicable at the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the study's database best illustrate the levels of various toxics when aggregated to a national or state level.

EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System is a database of human health effects that may result from exposure to various substances found in the environment. The Integrated Risk Information System database can be accessed at http://www.epa.gov/iris.

The following toxicity information for the prioritized MSATs was taken from the Integrated Risk Information System database Weight-of-Evidence characterization summaries. In September 2009, FHWA updated the MSAT guidance and modified the list of MSATs based on EPA recommendations. The updated list is presented below.

- Benzene is characterized as a known human carcinogen.
- Acrolein is a colorless or yellow liquid that can cause general respiratory congestion and eye, nose, and throat irritation and could be carcinogenic.
- Benzene is a colorless liquid with a sweet odor classified as a known human carcinogen.
- Formaldehyde is a colorless gas. Chronic exposure to inhaled formaldehyde is associated with respiratory symptoms and eye, nose, and throat irritation. EPA considers formaldehyde to be a probable human carcinogen.

- 1,3-butadiene is a colorless gas with a mild gasoline-like odor. EPA has classified 1, 3-butadiene as a probable human carcinogen. 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
- Acetaldehyde is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- Diesel exhaust is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- Diesel exhaust also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.
- Naphthalene occurs as a white solid or powder that is insoluble in water and evaporates easily. Naphthalene has a strong, mothball odor. EPA has classified naphthalene as a possible human carcinogen.
- Polycyclic organic matter (POM) is a group of compounds that are solids with high melting and boiling points, and are extremely insoluble in water. Oregon defines POMs as a set of 16 polycyclic aromatic hydrocarbons (PAHs). EPA has classified seven PAHs contained in POMs as probable human carcinogens. Sources of air emissions are diverse and include cigarette smoke, vehicle exhaust, home heating, tar laying, and meat grilling.

Other studies have addressed MSAT health impacts in proximity to roadways. The Health Effects Institute (a nonprofit organization funded by EPA, FHWA, and industry) has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes, particularly respiratory problems.[29] Much of this research is not specific to MSATs, instead surveying the full spectrum of criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more important, the studies do not provide information that would lessen the uncertainties listed above and make it possible to perform a more comprehensive evaluation of the health impacts specific to this project.

Portland air toxics assessment

The Portland Air Toxics Assessment (PATA) was published in 2006 by the Oregon Department of Environmental Quality (ODEQ, 2006, http://www.deq.state.or.us/aq/toxics/pata.htm). PATA is a computer modeling project designed to estimate and assess the risk from 12 air toxics in the Portland area. It is the first local-scale air toxics modeling project conducted in Oregon as part of the developing state air toxics program. It is based on the 1999 air emissions inventory for the Portland area. The purpose of the assessment is to provide more refined estimates of the most significant air toxics in the Portland area. Such estimates would enable ODEQ to better characterize the risks from air toxics, to better understand local patterns of air toxics exposure, and to identify locations with elevated risk. Finally, ODEQ can measure changes in emissions and develop emission reduction strategies from the information provided by PATA.

PATA results identify diesel exhaust, motor vehicles, and burning as important sources of air toxics in Portland. In general, the assessment

[29] *South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 studies on the relationship between health and air quality; NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.*

shows widespread risks from three MSATs—benzene, formaldehyde, and diesel exhaust—throughout the Portland region.

Regional Conformity for the Preferred Alternative

Clackamas County and ODOT have worked with Metro to determine the Sunrise Project improvements that comprise the Sunrise Project **Preferred Alternative**, and are included in the 2035 Regional Transportation Plan (RTP) financially constrained system. On June 10, 2010, Metro Council and JPACT approved final adoption of the 2035 RTP and the associated air quality conformity finding. FHWA and FTA issued the USDOT air quality conformity finding on the 2035 RTP on September 20, 2010. The design concept and scope of the Sunrise Project in this NEPA document is consistent with the project as described in Metro's 2035 RTP and the assumptions in Metro's regional emissions analysis for the associated air quality conformity determination.

The project is described as a six-lane, limited access highway with auxiliary lanes from I-205 to Rock Creek Junction (split between OR 212 and OR 224), with transition segments back to the existing facilities on each end of the project corridor (to SE Webster Road at OR 224 in the west, and SE 172nd Avenue at OR 212 in the east). This project was modeled as part of the 2035 RTP air quality conformity analysis. A 2035 RTP project list and an associated map of the **Preferred Alternative** together comprise the Sunrise Project which is the subject of this EIS. These documents can be found in Appendix D. Also included in Appendix D are the traffic model diagrams to show that the complete network associated with the **Preferred Alternative** is included in the Metro model.

Metro has confirmed its modeling of the entire Sunrise Project **Preferred Alternative** for air quality conformity as part of the 2035 RTP update. (See personal communication [email message dated September 26, 2009] from Thaya Patton, Metro, to Thomas Picco, ODOT in Appendix D and EMME/2 diagrams showing **Preferred Alternative** network in the Metro model.)

Indirect Effects

The forecast traffic volumes used to analyze the air quality impacts of the Sunrise Project alternatives and design options are based on the 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.

Mitigation Measures for the Preferred Alternative

Mitigation is not required for long-term project impacts. The Sunrise Project is located in an area that is currently a maintenance area for carbon monoxide. The hot spot analysis indicates that carbon monoxide concentrations adjacent to the poorest performing intersections affected by the **Preferred Alternative** are expected to be below the national standards. Future study area emissions of MSATs are projected to decrease relative to existing levels. Consequently, significant long-term, adverse air quality impacts are not expected from the project, and long-term mitigation is neither required nor proposed.

The primary air quality impacts of construction would be the generation of dust from site clearing, excavation, and grading activities, and impacts to traffic flow in the project area. Traffic congestion increases idling times and reduces travel speeds, resulting in increased vehicle emission levels. Construction of concrete structures may have associated dust-emitting sources, such as concrete mixing operations. Stationary sources such as concrete mix plants are generally required to obtain air contaminant discharge permits from the Oregon Department of Environmental Quality and to comply with regulations to control dust and other pollutant emissions. Construction contractors are required to comply with Division 208 of OAR 340 and ODOT standard

specifications, Section 290.30 (c) for air emissions during construction, including new 2008 controls on diesel-powered vehicles.