

4.10. Air Quality

4.10.1. Introduction

The following information includes a summary of air quality, as presented in the January 2006 EA and Draft Section 4(f) Evaluation for the Bigelow Gulch/Forker Road Urban Connector (Jones & Stokes 2006), as well as clarification of impacts and mitigation measures for the proposed action. Additional clarification of impacts and mitigation measures is presented below to address public comments received on the proposed Urban Connector Alignment as presented in the January 2006 EA.

Spokane County received nine public comments regarding air quality (Appendix 3, category 60.0). Concerns regarding air quality were that air quality would deteriorate with the addition of more vehicles and not improve in quality as stated in the January 2006 EA, and that such changes would directly affect residents.

This air quality section also includes a discussion of Mobile Source Air Toxics (MSATs) as related to the FHWA Interim Guidance on Air Toxic Analysis.

4.10.2. What is air quality like in the project area?

Portions of Spokane County are designated Maintenance Areas for carbon monoxide (CO) (serious Nonattainment) and fine particulate matter (PM10). The maintenance area boundaries near the project vicinity were shown in Figure 20 in the January 2006 EA and not repeated here. The Spokane area is currently in attainment for ozone (O₃), sulfur dioxide (SO₂), and nitrogen dioxide (NO₂).

Approximately 0.5 mile of the western end of Bigelow Gulch Road and approximately 0.2 mile of the eastern end are within the maintenance area for CO, meaning that those segments are subject to transportation conformity requirements. The entire project area is within the PM10 maintenance boundary.

4.10.3. What regulations apply to air quality?

Federal Regulations

National Ambient Air Quality Standards

This air quality evaluation focuses on air pollutants that are most commonly emitted from construction projects and transportation systems (i.e., criteria pollutants): CO, O₃, NO₂, SO₂, PM10, and particulate matter with a diameter less than or equal to 2.5 microns (PM2.5). Since O₃, a photochemical oxidant, is not directly emitted into the air from sources, emissions of O₃ precursors, oxides of nitrogen and volatile organic compounds, are regulated with the aim of reducing ground-level O₃.

Three agencies have jurisdiction over ambient air quality in the project area: Spokane County Air Pollution Control Authority (SCAPCA), Ecology, and EPA. These agencies establish and enforce regulations that govern both the concentrations of pollutants in the outdoor air and contaminant emissions from air pollution sources, with the objective of protecting public health and welfare. Although their regulations are similar in stringency, each agency has established its own standards. Unless the state or local jurisdiction has adopted more stringent standards, EPA standards apply.

EPA and Ecology have established regulations designed to limit emissions from air pollution sources and to minimize concentrations of pollutants in the outdoor ambient air. The National Ambient Air Quality Standards (NAAQS) consist of primary standards designed to protect public health and secondary standards designed to protect public welfare (e.g., preventing air pollution damage to vegetation).

Mobile Source Air Toxics

The federal Clean Air Act identified 188 air toxics, also known as hazardous air pollutants. Most air toxics originate from human-generated sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). EPA has assessed this expansive list of 188 air toxics and identified a group of 21 as MSATs, which are set forth in an EPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 CFR 17235).

The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. The EPA also extracted a subset of this list of 21 total MSATs that it now labels the six “priority MSATs.” These are benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene.

The EPA has recently issued a number of regulations that will dramatically decrease MSATs through cleaner fuels and cleaner engines. EPA’s MSAT rules were issued under the authority in Section 202 of the Clean Air Act. In its rules, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. According to an FHWA analysis, even if vehicle miles traveled (VMT) increases by 64%, reductions of 57 to 87% in MSATs are projected from 2000 to 2020 (FHWA 2006).

4.10.4. How were effects evaluated?

The analysis of impacts was a process of reviewing background information (particularly related to transportation), conducting CO modeling at the Sullivan Road and Wellesley Avenue intersection, and calculating future air quality conditions.

It was important to consider potential impacts including air pollutant emissions during construction or operation. These emissions can cause ambient concentrations beyond the proposed Urban Connector to exceed the NAAQS and fugitive dust or tailpipe emissions causing ambient impacts detrimental to the public welfare.

Air quality impacts were evaluated qualitatively by considering the best management practices (BMPs) required by SCAPCA during construction and considering the relatively small emission increases generated during operation of the Urban Connector Alignment.

4.10.5. What impacts would the Urban Connector Alignment have on air quality?

Proposed Action

How would construction affect air quality?

Operating construction machinery will result in exhaust emissions within the construction zones for the project. Grading and excavating activities will also generate dust and loosen soils, temporarily increasing particulate matter levels in the immediate vicinity of the project. Dust caused by construction would be short-term and limited to the duration of the construction activity. Traffic delays due to construction activities would also slow the flow of traffic, temporarily increasing air emissions associated with idling vehicles.

Construction could also include activities that would potentially generate odors. Paints used on the roads and shoulders, as well as asphalt fumes, may be perceptible for a brief period during construction. These impacts are expected to be slight and of short duration; therefore, beyond implementation of BMPs, no specific mitigation measures are proposed at this time.

How would operation of the project affect air quality?

Traffic projections indicate that the number of cars traveling on the Urban Connector Alignment would increase considerably over time. However, the project would increase capacity, improve the overall flow of traffic, and decrease traffic delays. In addition, due to the more stringent emission requirements and phase-out of older vehicles over time, emissions from individual vehicles have been steadily decreasing and will continue to decrease in the future as older cars are replaced by new, cleaner vehicles. This ongoing reduction in emissions from each vehicle will offset the

projected increase in vehicle traffic volumes through the corridor. Therefore, as described below the proposed action would satisfy the Transportation Conformity requirements. The project is included in the Transportation Improvement Plan that was approved by Ecology. As indicated in Section 4.9 *Transportation*, none of the intersections within the CO maintenance area will exhibit LOS D or lower.

State and federal Transportation Conformity regulations require CO hot-spot modeling to evaluate CO impacts adjacent to each signalized intersection within a CO maintenance area. Since only the western and eastern termini of the corridor are within the CO maintenance area, only the following two intersections near the termini are subject to Transportation Conformity:

- At the west end of the action area, there is no new signal where the new Bigelow Gulch Road, which becomes Francis Avenue inside the City of Spokane, intersects Havana Street. Because this intersection will not be signalized, it is not considered further.
- At the east end of the action area, the only intersection subject to conformity evaluation is the current stop-sign-controlled intersection at Sullivan Road and Wellesley Avenue. That stop sign will be replaced with a signal. A hot-spot analysis was conducted at this intersection and was presented as Appendix C in the January 2006 EA (Jones & Stokes 2006).

The intersection of Sullivan Road and Wellesley Avenue was modeled for CO concentrations using MOBILE5B emission factors and US EPA's CAL3QHC air quality dispersion model. Modeling was done for the Build Year 2006, Year 2025 (No Action), and Year 2025 (proposed action). The original CO hot-spot modeling evaluated a 2006 Build Year, but the current plans for the Project include a 2010 Build Year. The original modeling for 2006 produced a calculated result that is conservatively higher than modeling would indicate for a 2010 Build Year, so the original CO hot-spot modeling has been retained for the revised EA.

The modeled CO concentrations for the Year 2025 (proposed action) were slightly higher than those for either the Build Year or Year 2025 (No Action). However, all of the modeled CO concentrations were well below the NAAQS limits.

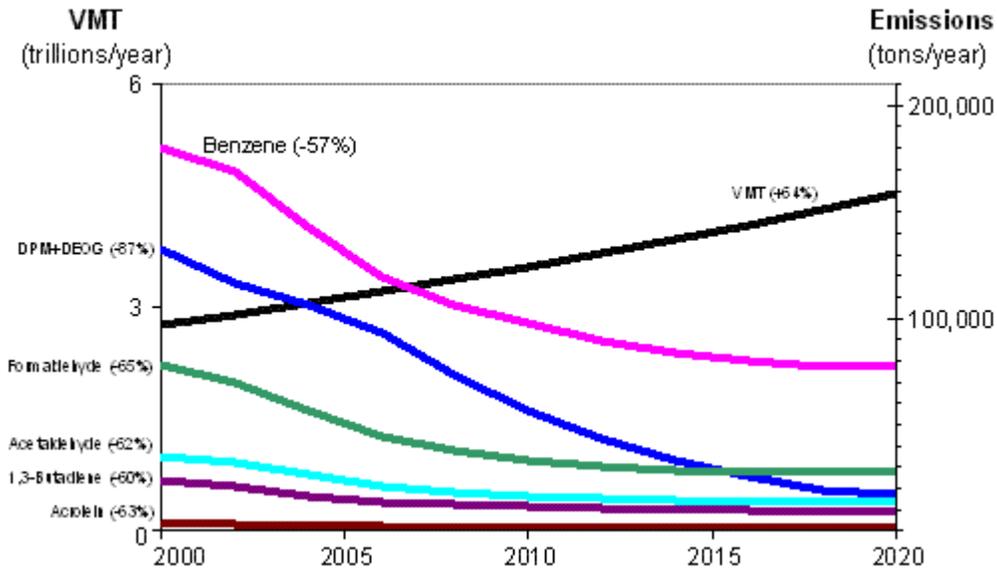
Mobile Source Air Toxics

Nationwide Emission Reduction Trends

As described previously, for its MSAT rules EPA examined the benefits of existing and newly promulgated mobile source control programs, including its reformatted gasoline program, its National Low Emission Vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a

64% increase in VMT, these programs will reduce nationwide on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 to 65%. In addition, it will reduce on-highway diesel particulate matter (PM) emissions by 87%, as shown in Figure 4.10-1.

Figure 4.10-1. Benefits of EPA’s Nationwide MSAT Regulations



Project-Specific MSAT Emissions and Impacts

For each alternative, the amount of MSATs emitted would be proportional to the VMT and would depend on the vehicle mix for each alternative (e.g., the percentage of heavy duty diesel trucks). As described in Section 4.9 *Transportation*, Average AADT volumes for the proposed action will be higher than for the No Action Alternative, and the proposed action would also increase the percentage of trucks using the corridor. However, regardless of the alternative chosen, future MSAT emissions in the design year will likely be lower than present levels as a result of EPA's national control programs that are projected to reduce nationwide MSAT emissions by 57 to 87% from 2000 to 2020 (FHWA 2006). Local conditions may differ from these national projections in terms of fleet mix, 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 at virtually all locations.

Because of the specific characteristics of the project alternatives, there may be localized areas where VMT would increase and other areas where VMT would decrease. Therefore, localized increases and decreases in MSAT emissions may occur. Localized increases in MSAT emissions would likely be most pronounced along the east of North Argonne Road, where the AADT increase would be highest.

However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

Under the proposed action in the design year, it is expected that MSAT emissions would be reduced in the immediate area of the project relative to the No Action, due to the reduced VMT associated with more direct routing and EPA's MSAT reduction programs. In comparing project alternatives, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases will cause region-wide MSAT levels to be significantly lower than today.

Unavailable Information for Project Specific MSAT Impact Analysis

This Revised EA includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable prediction of the project-specific health impacts of the emission changes associated with the alternatives in this EA. Due to these limitations, the following discussion is included in accordance with Council of Environmental Quality (CEQ) regulations (CFR 1502.22(b)) regarding incomplete or unavailable information.

As discussed below, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of project-level MSAT emissions and site-specific ambient effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented above is derived in part from a study conducted by the FHWA (Claggett and Miller 2006).

Information that is unavailable or incomplete. Quantitatively evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling 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.

1. **Emissions.** The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While 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. It 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 the 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. Also, the emissions rates used in MOBILE 6.2 for both PM and MSATs are based on a limited number of tests of mostly older vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE 6.2 as an obstacle to quantitative analysis. These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE 6.2 is an adequate tool for projecting emissions trends and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. **Dispersion.** The tools to predict how MSATs disperse are also limited. The 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 CO to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time and 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. FHWA is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will 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.
3. **Exposure levels and health effects.** Finally, 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 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 unsupported assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. Considerable uncertainties are 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 between alternatives 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, a variety of studies show that some MSATs either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals 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 to Spokane County level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the National Air Toxics Assessment database best illustrate the levels of various toxics when aggregated to a national or state level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) (EPA 2006) is a database of human health effects that may result from exposure to various substances found in the environment. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database (EPA 2006) and represents the EPA's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- Benzene is characterized as a known human carcinogen.
- Acrolein may be a carcinogen. Its potential carcinogenicity cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- Formaldehyde is a probable human carcinogen, based on limited evidence in humans and sufficient evidence in animals.
- 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 coughing, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

Other studies address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit 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. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable performance of a more comprehensive evaluation of the health impacts specific to this project.

Relevance of unavailable or incomplete information to evaluating reasonably foreseeable significant adverse impacts on the environment, and evaluation of impacts based upon theoretical approaches or research methods generally accepted in the scientific community. Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow a reasonable prediction of relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. As noted previously, the current MOBILE 6.2 emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have “significant adverse impacts on the human environment” related to MSATs.

In this document, FHWA has provided a quantitative analysis of MSAT emissions relative to the various alternatives (or a qualitative assessment, as applicable) and has acknowledged that the proposed action may result in increased exposure to MSAT emissions in certain locations. However, the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

What are the indirect effects?

Indirect effects are those caused by the proposed action that are later or farther removed in distance, but still reasonably foreseeable.

The air quality analysis for the project included background growth in the area. No adverse impacts have been identified; consequently, no indirect impacts related to air quality are anticipated.

What measures are proposed to minimize effects on air quality?

Construction

- Spokane County will require the construction contractor to implement BMP control measures for County review and approval, as required under SCAPCA regulations for fugitive dust.
- Spokane County will require the construction contractor to specify BMPs (for County review and approval) to minimize MSAT impacts during construction, including but not limited to the following:
 - locate stationary diesel-powered equipment as far as practical from structures occupied during the construction period;
 - to the extent practical, minimize idling of mobile construction equipment while not in active use; and
 - park mobile construction equipment that must be kept idling as far as practical from structures occupied during the construction period.

Operation

- No mitigation measures will be necessary, because analysis indicates that CO concentrations with the project would remain well below the NAAQS limits, and EPA's MSAT regulations and nationwide programs for emission reductions will prevent future air toxics impacts.

Analysis of the proposed action's effects on air quality in the project vicinity indicates that none would rise to a level of significance. Both the mitigation measures for construction listed in this section and those listed in Section 4.10.3, Bigelow Gulch Road EA dated January 2006 were considered in reaching this conclusion.

No Action

How will construction affect air quality?

There would be no impacts since no construction would occur under No Action.

How will operation affect air quality?

Without the proposed improvements, vehicle emissions would increase as a function of increased traffic traveling at reduced speeds because of congestion.