APPENDIX D

Mobile Source Air Toxics

Introduction

The U.S. Environmental Protection Agency (U.S. EPA) regulates mobile source air toxics (MSATs) pursuant to the Clean Air Act. MSATs are compounds emitted from highway and off-road vehicles and equipment and are known to or suspected to cause serious health and environmental effects. FHWA’s *Updated Interim Guidance on Mobile Source Air Toxics Analysis in NEPA Documents* (FHWA 2016) recommends a multilevel approach for evaluating MSATs in National Environmental Policy Act (NEPA) documents, as follows:

- **Level 1**: No analysis for projects with no potential meaningful MSAT effects or exempt projects.
- **Level 2**: Qualitative analysis for projects with low potential MSAT effects.
- **Level 3**: Quantitative approach for projects with higher potential MSAT effects.

Because this Tier 1 EIS is a planning-level study that would not directly lead to construction, it would have no potential meaningful MSAT effects and no MSAT analysis is required. If constructed, the alternatives are anticipated to have design-year average annual daily traffic fewer than 150,000 vehicles and therefore would meet FHWA’s criteria for a qualitative (Level 2) analysis, which is detailed below.

Qualitative Analysis

For each Corridor Alternative in this EIS, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Build Alternative (2,362,031 miles) is higher than that for Corridor Alternative 1 (2,342,243 miles) or Corridor Alternative 2 (2,344,292 miles), higher levels of MSAT are not expected from either Corridor Alternative compared to the No Build Alternative. In addition, because the estimated VMT under both Corridor Alternatives is nearly the same, varying by less than 0.1 percent, it is expected there would be no appreciable difference in overall MSAT emissions between them. Also, regardless of the Corridor Alternative chosen, emissions will likely be lower than present levels in the design year as a result of U.S. EPA’s national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (FHWA 2016). 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 U.S. 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.

Under each Corridor Alternative, there may be localized areas where traffic volumes would increase, and other areas where traffic volumes would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT concentrations would likely be most pronounced adjacent to Corridor Alternative 1 and Corridor Alternative 2. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of U.S. EPA’s vehicle and fuel regulations.

In summary, under Corridor Alternatives 1 and 2 in the design year 2045, it is expected there would be reduced MSAT emissions relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to U.S. EPA’s MSAT reduction programs.
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.

U.S. 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. U.S. 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.” (U.S. EPA 2020) 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). A number of HEI studies are summarized in Appendix D of FHWA’s Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents (FHWA 2016). 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 2007), or in the future as vehicle emissions substantially decrease.

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.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

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 (2007). 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. U.S. EPA states that with respect to diesel engine exhaust, “[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (U.S. EPA 2003).

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by U.S.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 U.S. EPA to determine an “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 U.S. 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 deemed acceptable (United States Court of Appeals for the District of Columbia Circuit 2008).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

References


