HONOAPIʻILANI HIGHWAY IMPROVEMENTS PROJECT,
WEST MAUI: UKUMEHAME TO LAUNIUPOKO

Appendix 3.15 – Air Quality and Energy – Supplemental Information

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Honoapiʻilani Highway Improvements

Contents

Appendix 3.15 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

The following analysis of incomplete or unavailable information for project-specific mobile source air toxic (MSAT) health impacts analysis was taken from Appendix C of the Federal Highway Administration's (FHWA's) January 2023 *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.[1]

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 (USEPA) 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 USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects."[2] 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). Appendix D of FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* summarizes a number of HEI studies. Adverse health effects linked to MSAT compounds at high exposures include cancer in humans in occupational settings, cancer in animals, and irritation to the respiratory tract (including the exacerbation of asthma). Less obvious are the adverse human health effects of MSAT compounds at current environmental concentrations[3] or in the future as vehicle emissions substantially decrease.

The stepwise methodologies for forecasting health impacts include emissions modeling, dispersion modeling, exposure modeling, and then final determination of health impacts—each step in the

1 Federal Highway Administration. January 2023. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_memorandum_2023.pdf

2 U.S. Environmental Protection Agency, https://www.epa.gov/iris/)

3 HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects

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 (that is, 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, and this 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 due to factors such as low-dose extrapolation and translation of occupational exposure data to the general population—a concern expressed by HEI.[4] 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 USEPA 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."[5]

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA 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 USEPA 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 USEPA'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.[6]

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

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4 HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects

5 U.S. Environmental Protection Agency IRIS database, Diesel Engine Exhaust, Section II.C. https://iris.epa.gov/static/pdfs/0642_summary.pdf)

6 https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf.

uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers. The decision makers would need to weigh this information against project benefits—such as reducing traffic congestion, accident rates, fatalities, and improved access for emergency response—which are better suited for quantitative analysis.