AIR QUALITY STUDY

I-5 NORTH COAST CORRIDOR WIDENING PROJECT

Mobile Source Air Toxics (MSAT) Analysis

Caltrans District 11 Division Environmental Engineering Department

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INTRODUCTION

This Technical Addendum to the Air Quality Analysis for the Interstate 5 (I-5) Corridor Widening Project has been prepared in response to the *Interim Guidance on Air Toxic Analysis for National Environmental Policy Act (NEPA) Documents* by the Federal Highway Administration (FHWA) dated February 3, 2006 (Interim Guidance) and in an effort to evaluate and assess mobile source air toxics (MSAT) emissions impacts by "Build" and "No Build" Alternatives.

Due to the emerging state of the MSAT-related science and techniques, there are no established criteria for determining the relative significance of air toxics emissions. Given the state, however, the FHWA recommends a range of options deemed appropriate for addressing and documenting the MSAT issue in NEPA documents as described below.

No analysis required for projects with no potential for meaningful MSAT effects. Applicable for categorically excluded projects under 23 CFR 771.117(c); exempt projects under 40 CFR 93.126; or projects with no meaningful impacts on traffic volumes or vehicle mix.

Qualitative analysis required for projects with low potential MSAT effects. Projects that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that are likely to meaningfully increase emissions.

Quantitative analysis to differentiate for projects with higher potential MSAT effects. Projects that have the potential for meaningful differences among project alternatives.

In order to evaluate the potential for MSAT impacts by the project, the following alternatives for the I-5 North Coast Corridor widening Project have been reviewed:

Alternative 1: No Build Alternative with no roadway elements proposed.

Alternative 2: 8+4 Alternative

Caltrans is proposing to construct one additional managed lane (ML)/ high occupancy vehicle (HOV) lane in each direction from Genesee Avenue to Del Mar Heights Road and one ML/HOV lane from SR-78 to Harbor Drive on I-5. Adding two ML/HOV lanes in each direction from Del Mar Heights Road to Vandergrift Boulevard/Harbor Drive in Oceanside. The ML/HOV would be separated by a barrier with standard shoulder widths. The project also proposes Direct Access Ramps (DARs) and auxiliary lanes at various locations.

Alternative 3: 10+4 Alternative

Caltrans is proposing to construct one additional managed lane (ML)/ high occupancy vehicle (HOV) lane in each direction from Genesee Avenue to Del Mar Heights Road and one ML/HOV lane from SR-78 to Harbor Drive on I-5. Adding two ML/HOV lanes in each direction from Del Mar Heights Road to Vandergrift Boulevard/Harbor Drive in Oceanside and potentially one general purpose lane in each direction from Del Mar Heights Road to SR-78. The ML/HOV would be separated by a barrier with standard shoulder widths. The project also proposes Direct Access Ramps (DARs) and auxiliary lanes at various locations.

Alternative 1 has no significant roadway improvements proposed and plans to retain the existing lane configurations. Alternative 2 and 3, on the other hand, propose to increase capacity by adding two MF lanes as well as two HOV lanes in each direction. Based on the Caltrans Traffic and Vehicle Data System, the existing I-5 corridor within the project limits experiences annual average daily traffic (AADT) ranging from 425,497 (peak hour) to 1,865,272 (off peak hour) vehicles per day. Future AADTs along the same stretch of the I-5 are expected to increase.

The I-5 corridor within the project limits traverses the cities of La Jolla, Del Mar, Solana Beach, Encinitas, Carlsbad and Oceanside that are all classified as urbanized areas according to the United States Census Bureau. Residences and other sensitive receptors are located along the existing and proposed right-of-way boundaries.

Based on a review of the traffic data and project scope and settings, this project is expected to have meaningful differences in MSAT effects among project alternatives. In accordance with the Interim Guidance, therefore, this project requires a quantitative analysis in an effort to evaluate the level of emissions for the highest priority MSATs for the Alternatives over the years and differentiate and utilize as a basis of comparison among the project alternatives.

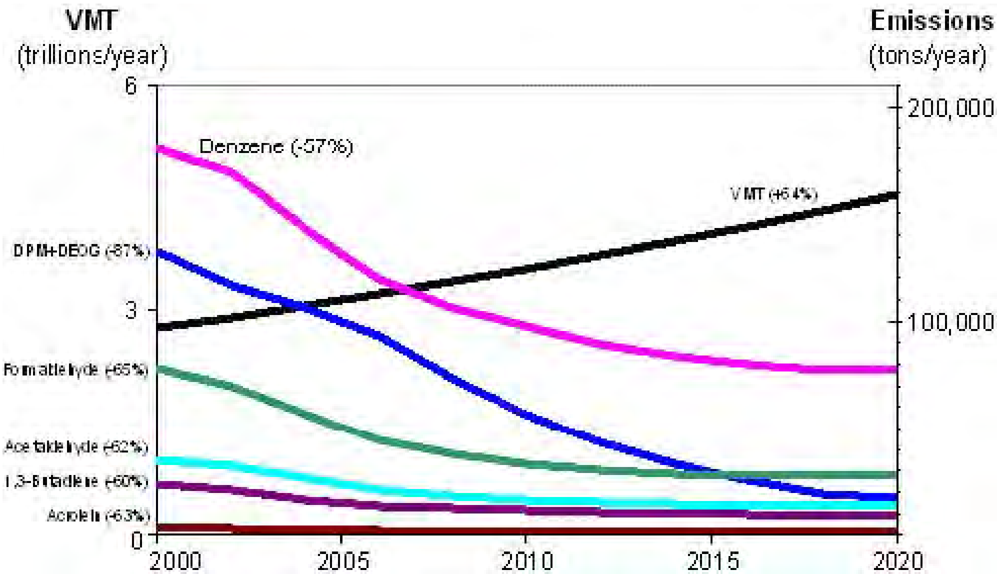
BACKGROUND

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), the United States Environmental Protection Agency (EPA) also regulates air toxics. Most air toxics originate from human-made 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).

MSATs are a subset of the 188 air toxics defined by the Clean Air Act (CAA). 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 is the lead federal agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low-emission vehicle (NLEV) 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 percent increase in vehicle miles traveled (VMT), these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent (to 65 percent), and will reduce on-highway diesel particulate emissions by 87 percent, as shown in the following graph:

U.S. Annual Vehicle Miles Traveled (VMT) vs. Mobile Source Air Toxics Emissions, 2000-2020



Notes: For on-road mobile sources: Emissions factors were generated using MOBILE6.2. Methyl tertiary-butyl ether (MTBE) proportion of the market for oxygenates is held constant, at 50 percent. Gasoline volatility (RVP) and oxygenate content are held constant. VMT: Highway Statistics 2000, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. Diesel particulate matter + diesel exhaust organic gases ("DPM + DEOG") is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.

As a result, the EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary 6 MSATs.

MSAT ANALYSIS METHODOLOGY

The basic procedure for analyzing emissions for on-road MSAT is to calculate emission factors using the new California-specific project-level analysis tool, CT-EMFAC V1.5 which is designed to model criteria pollutants, Mobile Source Air Toxics (MSATs) and carbon dioxide using the latest version of the California Mobile Source Emission Inventory and Emission Factors model, EMFAC2007. This model applies the emission factors to speed, peak and off-peak hour VMT data, travel times, and traffic volumes specific to the project, which calculates emission inventories for motor vehicles operating on roads in California. The emission factors information used in this analysis is from CT-EMFAC V1.5 and is specific to the San Diego County Air Basin.

This analysis focuses on six MSAT pollutants identified by the EPA as being the highest priority MSATs.[1] The six pollutants are: diesel particulate matter (DPM), acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene.

U.S. Environmental Protection Agency (2001) Control of Emissions of Hazardous Air Pollutants from Mobile Sources: Final Rule. *Federal Register*, Vol. 66, No. 61, pp. 17230–17273. March 29.

The types of emission processes modeled in this tool are:

1. Running exhaust– pollutants emitted from the vehicle tailpipe while it is traveling; and
2. Running losses– evaporative TOG emissions that occur when hot fuel vapors escape from the fuel system or overwhelm the carbon canister while the vehicle is operating.

The new version of CT-EMFAC also has the capability to calculate idling emissions – tailpipe emissions that occur while the vehicle is operating but not traveling. However, given that EMFAC2007 only provides idling emission factors for heavy-duty trucks, idling emission factors and emissions are currently not reported in CT-EMFAC output. This tool can be used to estimate project-level emissions for various regulatory requirements. For example, the tool can quantify emissions effects of Transportation Control Measures (TCMs), and evaluate build vs. no-build project alternatives for National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) assessments. CT-EMFAC can also be used to complete federally mandated CO and PM transportation conformity project assessments in CO and PM air quality non-attainment areas. In addition, CT-EMFAC can be used to meet U.S. Federal Highway Administration (FHWA) guidance to estimate project-level MSAT emissions impacts. The tool is also a planning resource; it enables project analysts to test the sensitivity of emissions to various transportation activity scenarios.

The Model applies the traffic activity data to the emission factors and estimates MSAT emissions for base case (with "No Build" alternative) and "Build" alternative scenarios. Results were produced for the base year (2006), the first operational year once the project is complete (2015), and the horizon year consistent with the Southern California Association of Governments (SCAG's) regional transportation plan (2030). 2015 and 2030 analyses compared No Build conditions to expected conditions resulting from implementation of the various Build Alternatives.

MSAT ANALYSIS RESULTS

The traffic activity data in Table A have been utilized in performing the analyses. The traffic activity data have been supplemented by available Caltrans data inventory systems for the base year (2006) values and also by Caltrans forecast modeling of the corridor for future year values.

As described above, emission factors for the six priority MSATs have been obtained for the San Diego County Air Basin using CT-EMFAC V1.5. The spreadsheet tool developed by the UCD was then utilized in applying the emission factors, speciation factors from ARB, and the traffic activity data. It should be noted that only those alternatives with physical improvements have been evaluated for the purpose of this analysis. Results of the analyses are tabulated in Tables B and C.

The analysis was refined to determine MSAT emission rates by segments of the I-5 freeway. Approximate segments for the northbound and southbound sides of the freeway are shown on Figure 1 and Figures 2-7. The segments are not equal length, varying from about 0.36 mile to 2.3

miles. Table D lists the segment extents and major land uses near the freeway along each segment.

Table A: Traffic Activity Data for I-5 Corridor Project

Year	Scenario		Peak Period (VMT) LDV	Peak Period (VMT) Trucks	Peak Period (VMT) Total	Daily Total (VMT) LDV	Daily Total (VMT) Trucks	Daily Total (VMT) Total	Average Speed (mph) Peak
Existing (2006)	Existing		1,069,290	68,253	1,137,543	5,228,788	333,752	5,562,540	50.5
Operational	No Build		889,325	56,765	946,091	5,926,505	378,288	6,304,793	32.7
Year (2015)	Alternative 1	(8 + 4) with barrier	1,241,187	7,9225	1,320,411	6,064,769	387,113	6,451,882	60.5
	Alternative 2	(10 + 4) with barrier	1,268,670	80,979	1,349,649	6,203,569	395,972	6,599,541	66.5
Horizon	No Build		709,360	45,278	754,638	6,624,221	422,823	7,047,044	19.5
Year (2030)	Alternative 1	(8 + 4) with barrier	1,313,047	83,812	1,396,859	6,890,497	439,819	7,330,316	39.3
	Alternative 2	(10 + 4) with barrier	1,468,049	93,705	1,561,754	7,178,348	458,192	7,636,540	54.7

Source: Caltrans Traffic Data
VMT = vehicle miles traveled
MF = mixed-flow lane
HOV = high-occupancy vehicle lane
MPH = miles per hour

Table B: 2015 Changes in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions (g/day)	No Build Alternative	8+4 Alternative (8 MF + 2 HOV)			10+4 Alternative (10 MF + 2 HOV)		
		(G/day)	(G/day)	△% from Existing	△% from No Build	(G/day)	△ % from Existing	△ % from No Build
Diesel PM	44,648	28,795	31,221	-30	+8	32,925	-26	+14
Benzene	42,281	22,044	23,212	-45	+5	24,340	-42	+10
1,3-Butadiene	7,823	3,605	3,942	-50	+9	4,234	-46	+17
Acetaldehyde	11,149	5,813	6,189	-44	+6	6,554	-41	+13
Carolina	1,775	816	894	-50	+10	960	-46	+17
Formaldehyde	34,295	17,316	18,586	-46	+7	19,767	-42	+14
Average Percent Change				**-44**	**+7.5**		**-40.5**	**+14**

Table C: 2030 Changes in Total Project MSAT Emission Rates

Toxic Air Contaminant	Existing Emissions (g/day)	No Build Alternative	8+4 Alternative (8 MF + 2 HOV)			10+4 Alternative (10 MF + 2 HOV)		
		(g/day)	(g/day)	△% from Existing	△% from No Build	(g/day)	△ % from Existing	△ % from No Build
Diesel PM	44,648	21,040	21,654	-52	3	24,898	-44	+18
Benzene	42,281	14,590	14,873	-65	+2	17,105	-59	+17
1,3-Butadiene	7,823	2,405	2,558	-67	+6	3,001	-62	+25
Acetaldehyde	11,149	3,685	3,709	-67	+0.7	4,255	-62	+15
Acrolein	1,775	543	579	-67	+7	680	-62	+26
Formaldehyde	34,295	11,161	11,445	-67	+3	4,255	-61	+19
Average Percent Change				**-64**	**+4**		**-58**	**+20**

Table D: Land Uses within I-5 Segments

Source: I-5 NSR

Segment No.	Major Intersection	Principle Land Use Along Segment
1	La Jolla Village Drive to Genesee Avenue	Residential, Retail & Commercial
2	Genesee Avenue to Carmel Mountain Road	Residential, Retail & Commercial
3	Carmel Mountain Road to Carmel Valley Road	Residential, Retail & Commercial
4	Carmel Valley Road to Del Mar Heights Road	Residential, Retail & Commercial
5	Del Mar Heights Road to Vía de la Valle	Residential, Retail & Commercial
6	Vía de la Valle to Lomas Santa Fe Drive	Commercial & Industrial
7	Lomas Santa Fe Drive to Manchester Drive	Commercial & Industrial
8	Manchester Drive to Birmingham Drive	Residential & Retail
9	Birmingham Drive to Santa Fe Drive	Residential & Retail
10	Santa Fe Drive to Encinitas Boulevard	Residential & Retail
11	Encinitas Boulevard to Leucadia Boulevard	Residential & Retail
12	Leucadia Boulevard to La Costa Avenue	Residential & Retail
13	La Costa Avenue to Poinsettia Lane	Residential & Retail
14	Poinsettia Lane to Palomar Airport Road	Residential & Commercial
15	Palomar Airport Road to Cannon Road	Residential & Commercial
16	Cannon Road to Tamarack Avenue	Residential & Commercial
17	Tamarack Avenue to Carlsbad Village Road	Residential & Commercial
18	Carlsbad Village Road to Vista Way	Residential & Commercial
19	Vista Way to Oceanside Boulevard	Residential & Commercial
20	Oceanside Boulevard to Mission Avenue	Residential & Commercial
21	Mission Avenue to SR 76	Residential & Commercial
22	SR 76 to Wire Mountain Road	Residential &Commercial

Figure 1: I-5 North Coast Corridor Widening Project

The changes in the MSAT emissions projected among the proposed alternatives over the years are illustrated in Figures 2 through 7. These plots show emission rates for the combined northbound and southbound traffic for each MSAT along the I-5 from north to south, by segment.

Figure 2: Changes in Diesel PM Emissions

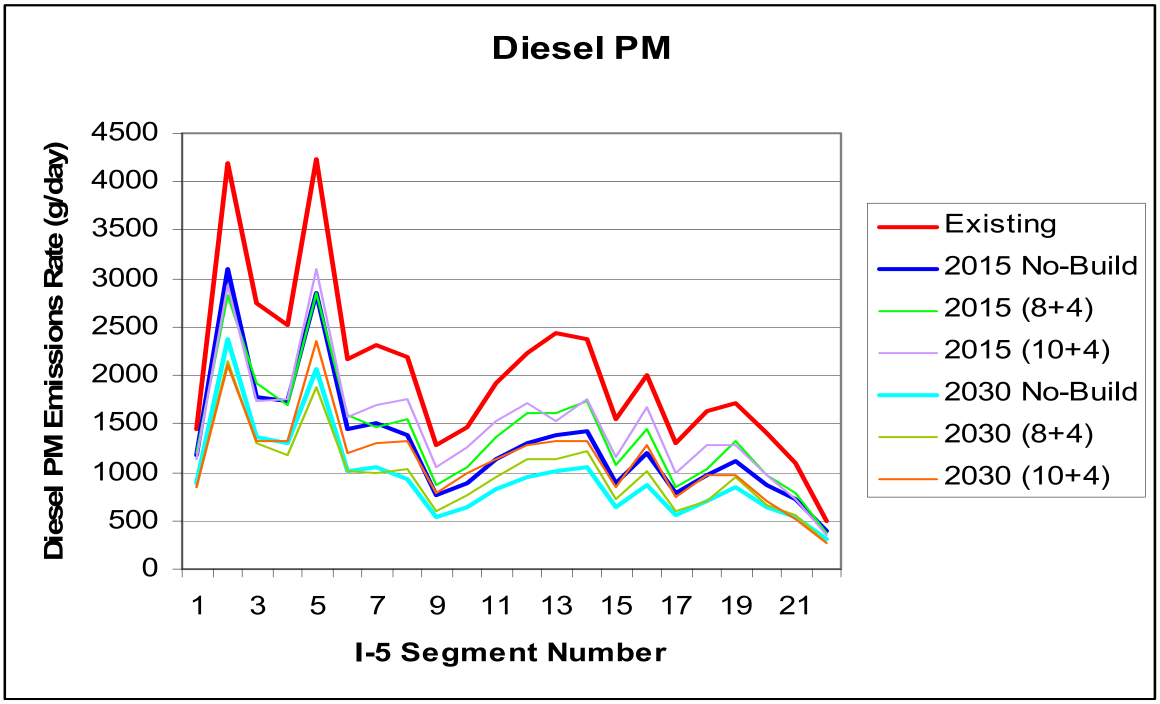


Figure 3: Changes in Benzene Emission

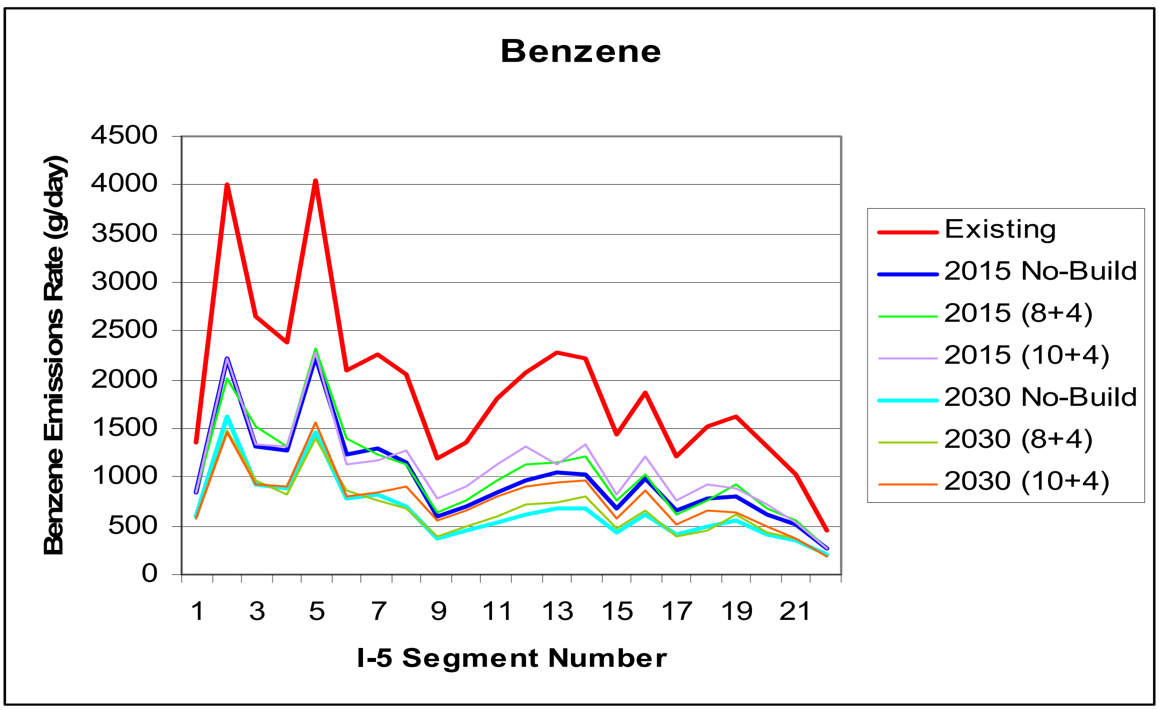


Figure 4: Changes in Butadiene Emissions

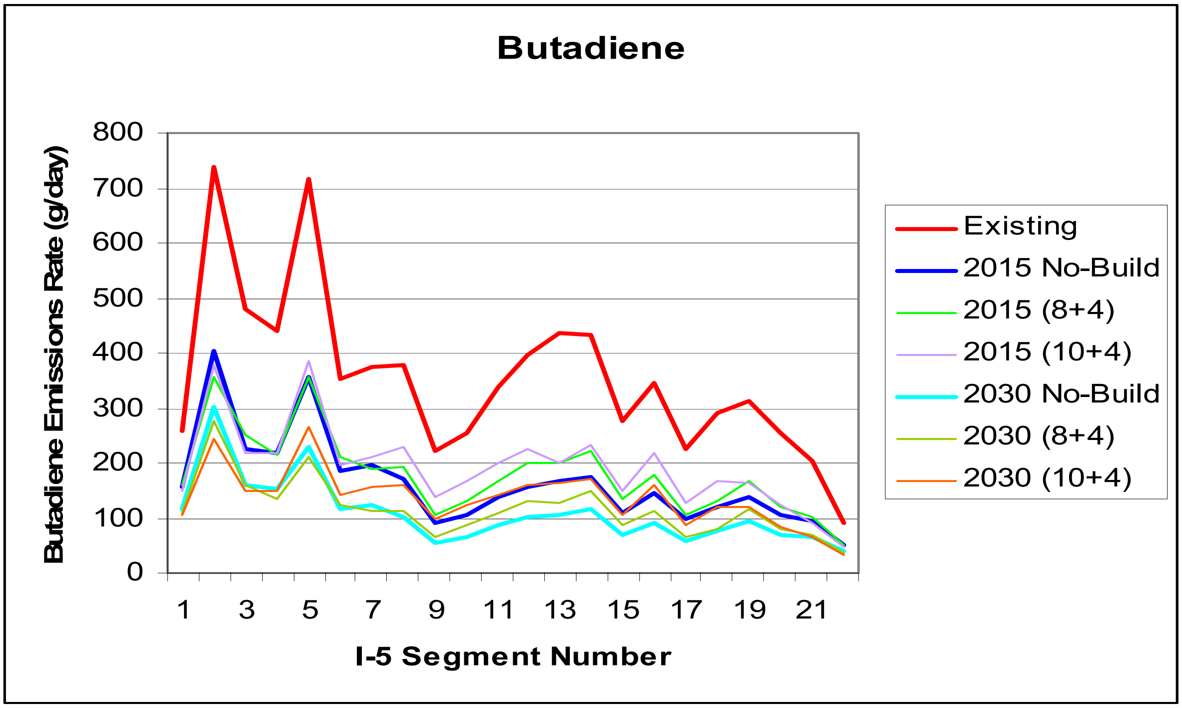


Figure 5: Changes in Acetaldehyde Emissions

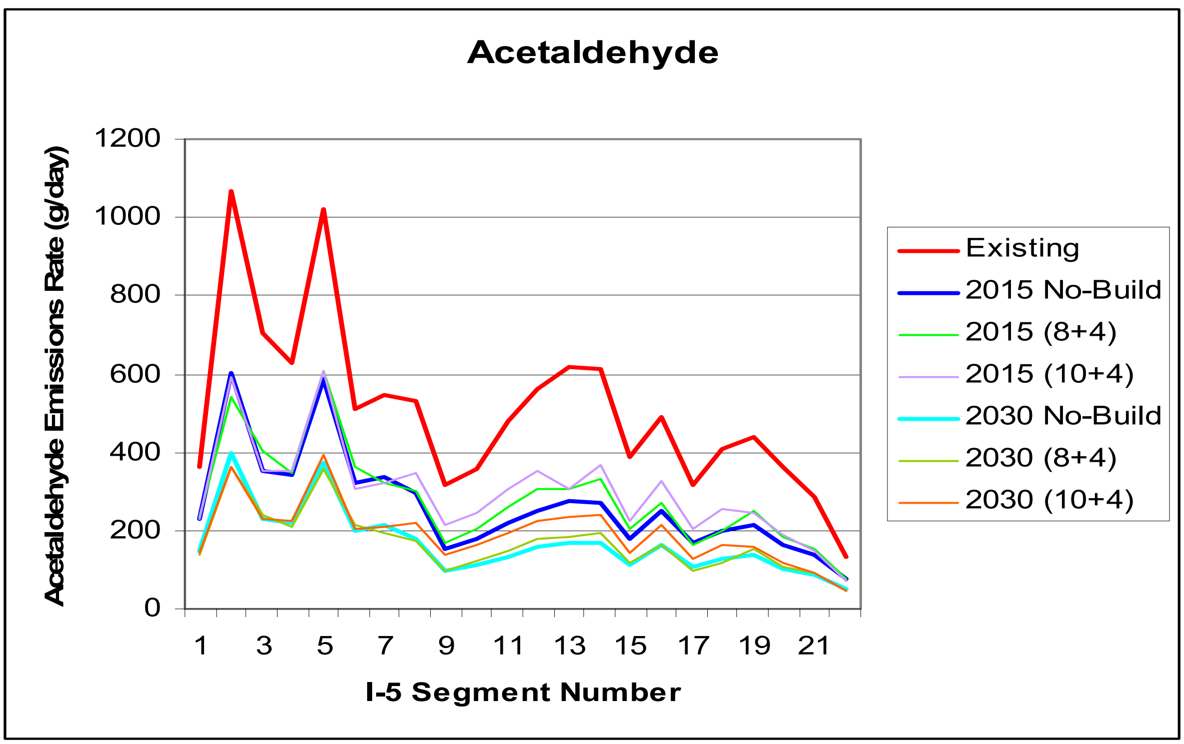


Figure 6: Changes in Acrolein Emissions

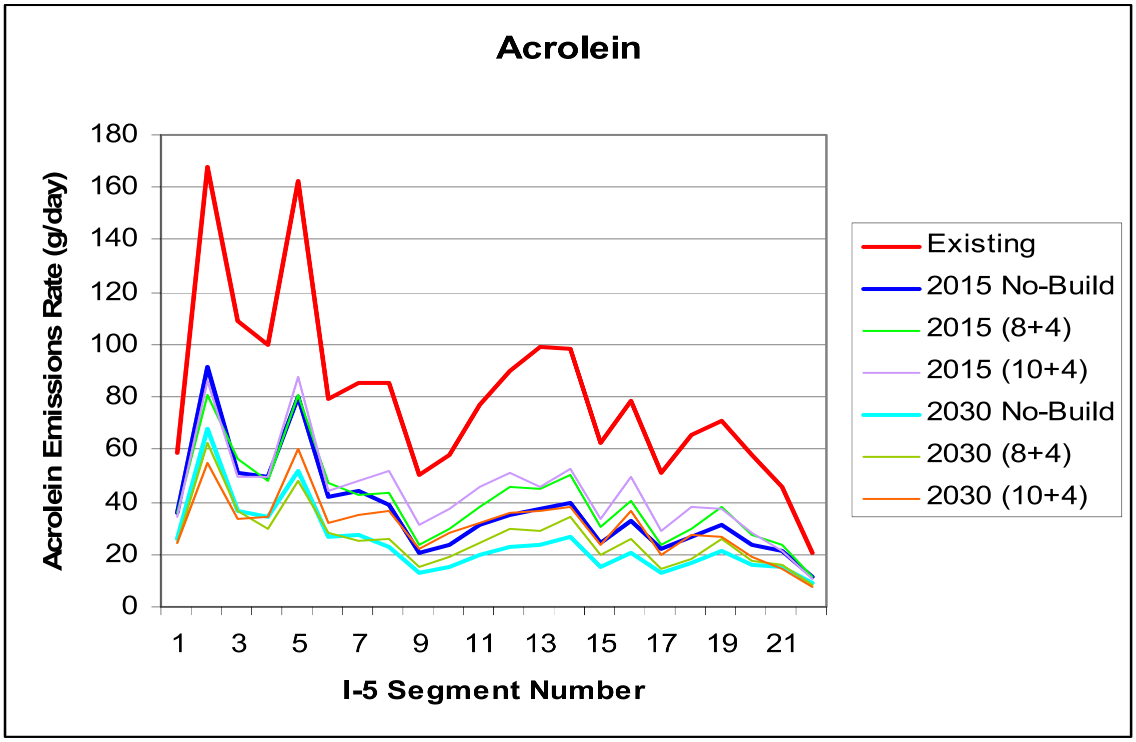
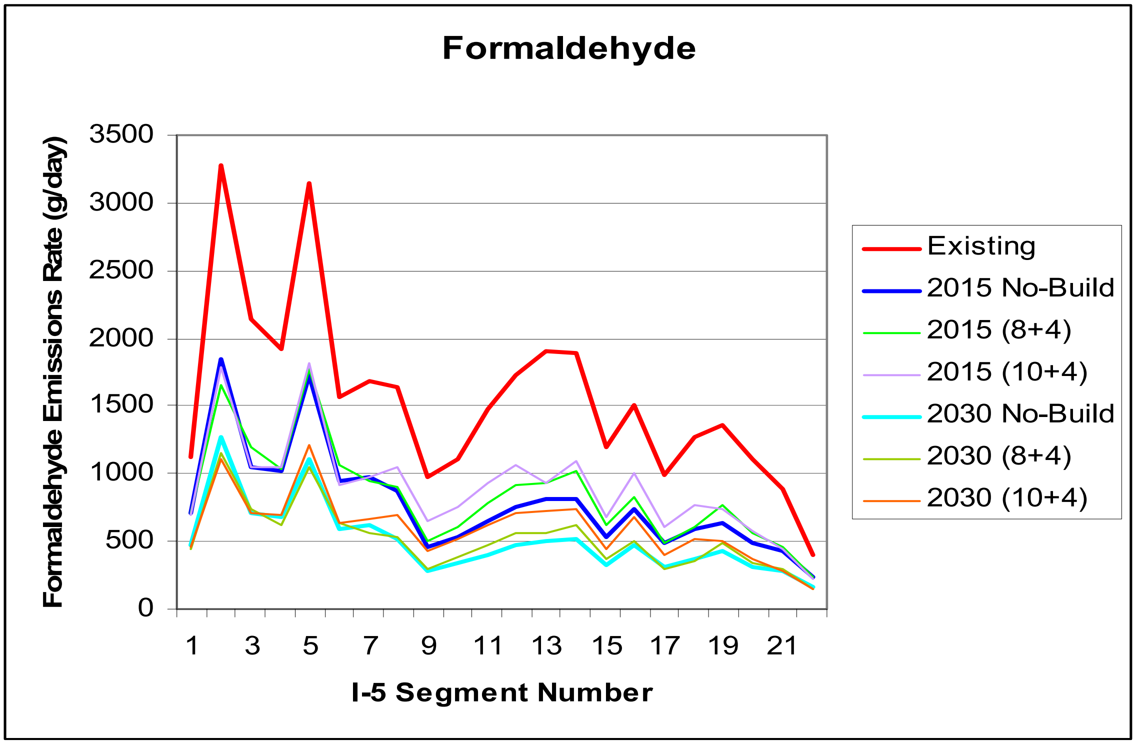


Figure 7: Changes in Formaldehyde Emissions



DISCUSSION OF RESULTS

The analysis indicates that a significant decrease in MSAT emissions can be expected for the proposed alternatives from the base year (2006) levels through future year levels. This decrease is prevalent throughout the highest-priority MSATs and the analyzed alternatives, regardless of the difference in mainline configurations as depicted in the figures. This decrease is also consistent with the aforementioned EPA's study that projects a significant reduction in on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde between 2000 and 2020. Based on the analysis for this project as shown in Table C, reductions in existing MSAT levels expected by 2030 are: between 44 and 52 percent of DPM, 59 and 65 percent of benzene, 62 and 67percent of 1,3-butadiene, 62 and 67 percent of acetaldehyde, 62 and 67 percent of acrolein, and 61 and 67 percent of formaldehyde, depending on the alternative. These projected reductions are achieved while the total VMT for the Alternatives increase by approximately 22 to 37 percent in 2030 depending on the alternative.

Differences of varying degrees are noted in the projected individual MSAT emissions. According to the results, all Build Alternatives are expected to reduce emissions of DPM well below the base year values, ranging from 26 to 30 percent less for the operational year (2015) and 44 to 52 percent less for the horizon year (2030).

Differences in MSAT emissions among the proposed alternatives are noted in Tables B and C. The "Build" Alternatives result in higher VMT and emissions when compared to the No Build Alternatives. However the "Build" Alternatives substantially relieve congestion with average peak period speed increments from the No Build Alternatives ranging from 85 to 103 percent for the operational year and 101 to 180 percent for the horizon year.

UNAVA ILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT IMPACT ANALYSIS

This Addendum includes a basic analysis of the likely MSAT emission impacts of the project alternatives. However, the project-specific health impacts of the emission changes associated with the alternatives presented in the EIS cannot be predicted with available technical tools. Due to these limitations, the following discussion is included in accordance with Council of Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete

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 and California 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 both MOBILE 6.2 and EMFAC (either 2002 or the recently released 2007 version) are used to predict emissions at a regional level, they have limitations when applied at the project level. Both are trip-based models; emission factors are projected based on a

typical trip of approximately 7.5 miles and on average speeds for this typical trip. This means that neither model has the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, both models can only approximate emissions from 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 (PM), the MOBILE 6.2 model results are not sensitive to average trip speed; however, PM emissions from the EMFAC model are sensitive to trip speed, so for California conditions, DPM emissions are treated the same as other emissions. Unlike MOBILE 6.2, the EMFAC model does not provide MSAT emission factors; off-model speciation of EMFAC's total organic compounds output must be used to generate MSAT emissions. The emissions rates used in both MOBILE 6.2 and EMFAC are based on a limited number of vehicle tests.
These deficiencies compromise the capability of both MOBILE 6.2 and EMFAC 2002/2007 to estimate MSAT emissions. Both are adequate tools for projecting emissions trends and performing relative analyses between alternatives for very large projects, but neither is sensitive enough to capture the effects of travel changes caused by smaller projects or to predict emissions near specific roadside locations.

Dispersion: The tools to predict how MSATs disperse are also limited. Quantitative analysis (i.e., dispersion modeling) cannot provide any meaningful comparison of alternatives and, in fact, may provide misleading information as to the current understanding of MSATs and the capabilities of current tools. There are a number of reasons why, at this time, dispersion modeling does not result in meaningful information. First, as part of the development of the FHWA interim MSAT guidance, the FHWA conducted a thorough review of the scientific information related to MSATs from transportation sources. As a result of that review, FHWA concluded that the available technical tools do not enable reliable estimates of pollutant exposure concentrations or predictions of the project-specific health impacts of the emissions changes associated with transportation project alternatives. EPA's Guidance on Air Quality Models includes the following conclusions on the accuracy and precision of air quality models:

"(1) models are more reliable for estimating longer, time-averaged concentrations than for estimating short-term concentrations at specific locations, and
(2) the models are reasonably reliable in estimating the magnitude of the highest concentrations occurring sometime, somewhere within an area" – errors of 10-40 are typical
(3) Estimates of concentrations that occur at a specific time and site are poorly correlated with actually observed concentrations and are much less reliable."

Exposure Levels and Health Effects: EPA and California Office of Environmental Health Hazard Assessment (OEHHA)1 have developed guidance for health risk assessments, but they do not eliminate uncertainties inherent in health risk assessments. The uncertainties associated with performing risk assessments are acknowledged in the introduction of the OEHHA guidelines. The concern with performing these kinds of assessments for highway projects is that the calculated difference in health impacts due to implementation of the project is likely to be much smaller than the uncertainties associated with calculating them. Therefore, these assessments would not result in any meaningful project conclusions.

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 that show that some 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 (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA 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) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. 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 and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

Benzene - acute (short-term) exposure by inhalation can lead to drowsiness, dizziness, headaches, and unconsciousness. Chronic (long-term) inhalation of benzene causes disorders in the blood, specifically affecting bone marrow. EPA has classified benzene as a Group A, known human carcinogen.
Acrolein - considered having high acute toxicity, and chronic exposure results in general respiratory congestion and eye, nose, and throat irritation. It is also a strong dermal irritant, causing skin burns.

OEHHA, *Toxics Hot Spots Program Risk Assessment Guidelines*, August 2003.

Formaldehyde - acute inhalation exposure can result in eye, nose, and throat irritation and effects on the nasal cavity. Chronic inhalation exposure has been associated with respiratory symptoms and eye, nose, and throat irritation. EPA considers formaldehyde to be a probable human carcinogen (cancer-causing agent) and has ranked it in EPA's Group B1.
1,3-butadiene - acute inhalation exposure results in irritation of the eyes, nasal passages, throat, and lungs. EPA has classified 1,3-butadiene as a Group B2, probable human carcinogen.

Acetaldehyde - acute inhalation exposure results in irritation of the eyes, skin, and respiratory tract. EPA has classified acetaldehyde as a Group B2, probable human carcinogen.

Diesel exhaust (DE) - likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of DPM 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.

There have been other studies that address 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. 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 us to perform 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 on 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 us to reasonably predict 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 above, the current 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.”

In this document, Caltrans has provided a quantitative analysis of MSAT emissions relative to the various alternatives and has acknowledged that some alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain; because of this uncertainty, the health effects from these emissions cannot be estimated.

REFERENCES

1. California Department of Transportation, Interstate 5 Traffic Volumes, 2007.

2. California Office of Environmental Health Hazard Assessment, *Toxics Hot Spots Program Risk Assessment Guidelines*, August 2003.

3. Caltrans District 7, Air Quality Study, I-5 Corridor Improvement Project, Technical Addendum 0.2, Mobile Source Air Toxic (MSAT) Analysis.

4. Federal Highway Administration, *Interim Guidance on Air Toxic Analysis for National Environmental Policy Act (NEPA) Documents*, February 3, 2006.

5. South Coast Air Quality Management District, Air Quality Management Plan 2003.

6. United States Environmental Protection Agency, Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, March 29, 2001