

5.13 Air Quality Conformity and Motor Vehicle Emission Budget

5.13.1 Regulatory Overview

Transportation conformity is required under Clean Air Act section 176(c) (42 U.S.C. 7506(c)) to ensure that federally supported highway and transit project activities are consistent with the purpose of the state air quality implementation plan (SIP). The requirements for transportation conformity are found in State regulation at 18 AAC 50 Article 7, Conformity, and in Volume II Section III.I in the State Air Quality Control Plan.

Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant national ambient air quality standards (NAAQS or “standards”) or any required interim emissions reductions or other milestones. The U.S. Environmental Protection Agency’s (EPA) transportation conformity rule (40 CFR 51.390 and Part 93) establishes the criteria and procedures for determining whether transportation activities conform to the SIP. Conformity helps protect public health through early consideration of the air quality impacts of transportation decisions in places where air quality does not currently meet federal standards.

In March, 2010, the EPA finalized changes to the transportation conformity rule that primarily affected PM_{2.5} and PM₁₀ non-attainment and maintenance areas. The final rule provides clear guidance on how to implement transportation conformity under the 2006 PM_{2.5} National Ambient Air Quality Standards (NAAQS) to ensure transportation planning and air quality planning are coordinated and air quality is protected.

On October 7, 2014 EPA approved the release of the MOVES2014¹ emissions model for SIPs and transportation conformity analyses in states other than California.² This approval also started a two-year transportation conformity grace period that ends on October 7, 2016, after which MOVES2014 is required to be used for new transportation conformity analyses outside of California.

Specific guidance on PM_{2.5} conformity requirements is also contained in the Final Fine Particulate Implementation Rule for the 2006 PM_{2.5} NAAQS.³ A court decision⁴ in January 2013 remanded the 2006 PM_{2.5} Implementation Rule back to EPA to be re-promulgated to be consistent with Subpart 4. EPA withdrew the Subpart 1- based guidance document and new Subpart 4 based guidance has not been issued.

¹ Vehicle emissions in the SIP were developed based on MOVES2010a, which was released in August 2010 and was the latest version of MOVES at the time SIP inventory development work began. In April 2012, EPA released an updated version, MOVES2010b. For criteria pollutants addressed under this SIP both versions of MOVES produce essentially identical results.

² Federal Register, Vol. 79, No. 194, Tuesday, October 7, 2014.

³ Federal Register, Vol. 72, No. 79, Wednesday, April 25, 2007.

⁴ Natural Resources Defense Council (NRDC) v. EPA, No. 08-1250 (D.C. Cir., Jan. 4, 2013).

Until EPA re-promulgates the implementation rule to meet Subpart 4 requirements, the 1992 general preamble⁵ to the Clean Air Act and its addendum are the only available guidance documents.

5.13.2 Regional Conformity and Motor Vehicle Emission Budget

EPA requires that all non-attainment areas develop a motor vehicle emissions budget for use in determining regional transportation conformity. The process used to calculate the motor vehicle emission budget is described in Chapter 5.6.5. Relevant portions of that description are presented below to ensure consistency in the information presented and to avoid the need for readers to shift between sections of this document.

Need for MVEBs – Generally, motor vehicle emission budgets (MVEBs) must be established within a SIP for use in subsequent regional transportation conformity analysis that is tied to the SIP's attainment demonstration and the on-road vehicle emissions share of the overall attainment inventory. However as discussed in Chapter 5.9, the central finding of this Moderate Area SIP is that attainment of the PM_{2.5} NAAQS by the required 2015 deadline will be impracticable in Fairbanks due to the magnitude of required reductions and the difficulty and the cost of implementing measures that achieve these reductions in the near term (i.e., by 2015).

A control strategy implementation plan revision and MVEB is defined under 40 CFR §93.101 as follows:

Control strategy implementation revision is the implementation plan which contains specific strategies for controlling the emissions of and reducing ambient levels of pollutants in order to satisfy CAA requirements for demonstrations of reasonable further progress and attainment (including implementation plan revisions submitted to satisfy CAA sections 172(c), 182(b)(1), 182(c)(2)(A), 182(c)(2)(B), 187(a)(7), 187(g), 189(a)(1)(B), 189(b)(1)(A), and 189(d); sections 192(a) and 192(b), for nitrogen dioxide; and any other applicable CAA provision requiring a demonstration of reasonable further progress or attainment).

Motor vehicle emissions budget is that portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions.

EPA's Office of Transportation and Air Quality (OTAQ) and Office of Air Quality Planning and Standards (OAQPS) through EPA Region 10 were consulted to assess the need for MVEBs within this SIP. EPA confirmed the need for MVEBs within this "impracticability" SIP, citing language in the 1992 General Preamble⁵ for Title I implementation of the CAA. Under the Reasonable Further Progress (RFP)/Quantitative Milestone (QM) Requirements portion of the Particulate Matter, Statutory Background section [III.C(1)(f)], the Preamble contains the following language:

⁵ Federal Register, Vol. 57, No. 74, April 16, 1992.

The PM-10 non-attainment area SIP's must include quantitative emissions reductions milestones which are to be achieved every 3 years and which demonstrate RFP, as defined in section 171(1) until the area is redesignated attainment [section 189(c)].

and

There is a gap in the law that the text of section 189(c) does not articulate the starting point for counting the 3-year period. The EPA believes it is reasonable to begin counting the 3-year milestone deadline from the due date for applicable implementation plan revisions containing the control measures for the area. The EPA believes it is reasonable to key the milestone clock to the SIP revision containing control measures which will give rise to emission reductions.

Although this Preamble was written prior to development and implementation of separate ambient standards for PM_{2.5}, EPA has confirmed that the language above for PM₁₀ also applies to PM_{2.5} SIPs. Thus, EPA guidance was that MVEBs must be developed under this SIP pursuant to the RFP/QM requirements of Section III.C(1)(f) of the Preamble.

MVEB Calendar Year and Pollutants – As discussed in earlier in Section 5.6.5, the milestone year for RFP is 2017. Thus, RFP inventories and MVEBs were established for calendar year 2017. Separate budgets of on-road motor vehicle emissions occurring within the non-attainment area were set for both directly-emitted PM_{2.5} and NO_x, the latter based on EPA's interpretation of applicable precursor requirements under 40 CFR §93.102(b)(1) and §93.102(b)(2)(iv), which applies to precursors of PM_{2.5}.

Summary of MVEB Methodology – The MVEBs were calculated using the same approach applied in modeling motor vehicle emissions within the SIP emission inventories. The MVEB modeling is summarized below.

Emissions Model – Emissions were calculated using the MOVES2010a vehicle emissions model, executed in county-wide “Inventory” mode. The model was run to generate emissions over the six-month non-attainment season (October through March). The Time Aggregation Level option was set to “Hour” as required for SIPs and regional emissions analysis⁶.

- *Activity Inputs* – Vehicle activity inputs (VMT by vehicle type, speed distributions, road type VMT distributions) for calendar year 2017 were developed by interpolating activity between the 2010 and 2035 calendar years for which regional travel demand model outputs were available from FMATS.

⁶ “Using MOVES to Prepare Emissions Inventories in State Implementation Plans and Transportation Conformity: Technical Guidance for MOVES2010, 2010a and 2010b,” U.S. Environmental Protection Agency, EPA-420-B-12-028, April 2012, <http://www.epa.gov/otaq/models/moves/documents/420b12028.pdf>.

- 2012-2015 TIP modeling were available. The same locally developed seasonal, weekly, and diurnal travel activity profiles used in the SIP inventories were also used to generate the MVEBs. Default MOVES activity was assumed for heavy-duty trucks (with no explicitly input extended idling).
- *Fleet Characteristics Inputs* – 2017 vehicle populations were extrapolated from actual 2010 registrations using the same growth rate assumptions used to generate the 2015 and 2019 Projected Baseline inventories. Vehicle age distribution and Alternative Vehicle and Fuel Technology (AVFT) inputs were based on the calendar year 2010 registration data, with an exception for light-duty vehicle age distributions explained as follows. Age distribution inputs for light-duty vehicles were based on wintertime parking lot survey data collected by ADEC, rather than registration data. Multiple parking lot surveys have consistently found that older vehicles are operated less during winter due to drivability concerns. In developing winter non-attainment season inputs, motorcycles were assumed to not operate during harsh winter conditions. Thus their populations were zeroed out. . The source population, age distribution and AVFT inputs were supplied to MOVES using the County Data Manager importers in accordance with the modeling guidance⁶.
- *Meteorology Inputs* – Based on interagency consultation guidance from EPA and FHWA, single hourly ambient temperature and relative humidity profiles were developed from hourly temperatures (and humidity data) averaged across the 35 modeling episode days and used as the meteorology inputs to the MVEB modeling. The resulting hourly temperature profile exhibited a diurnal range from -14.1°F (Hour 8) to -6.4°F (Hour 15), with an average daily temperature of -11.8°F. This was consistent with episodic modeling inventory development in the SIP although the average meteorology profile across the 35 episode days was used for the MVEB while individual day meteorology (for each of the 35 days) was used to establish the MVEB and was agreed upon in consultation with EPA and FHWA.
- *Plug-In Adjustments to PM_{2.5} Emissions* – Finally, starting exhaust PM_{2.5} emissions for light-duty gasoline vehicles were adjusted to account for the effects of wintertime vehicle plug-in block heater use in Fairbanks. These adjustments were applied using an EPA-accepted approach that consisted of modifying the MOVES soak time distribution inputs for light-duty vehicles contained in *OpModeDistribution* table in the model's default database. Appendix III.D.5.6 provides further details on these plug-in adjustments. Note that EPA's approval of the methodology for modeling the adjustments only extends to analyses conducted using MOVES2010.

Motor Vehicle Emission Budgets – Using the modeling methodology outlined above, MOVES2010a was executed with locally developed inputs representative of wintertime calendar year 2017 conditions. Table 5.13-1 summarizes the resulting regional average winter day on-road vehicle PM_{2.5} and NO_x emissions, which represent the applicable MVEBs under the SIP.

**Table 5.13-1
Fairbanks Non-Attainment Area Motor Vehicle Emission Budgets**

Calendar Year	Motor Vehicle Emission Budgets (tons/day)	
	PM _{2.5}	NO _x
2017 and later	0.33	2.13

The PM_{2.5} MVEB shown in Table 5.13-1 includes the plug-in adjustment effects. (As noted earlier, the plug-in adjustments are applied only to starting exhaust emissions for light-duty gasoline vehicles. Plug-ins reduced vehicle fleet-wide PM_{2.5} emissions by 5.4%.) The PM_{2.5} MVEB assumed zero contribution from fugitive road dust. This is consistent with the SIP inventory assumption that road dust emissions do not occur during winter in Fairbanks when road surfaces are snow- and ice-covered. The emissions budget also does not include construction dust for the same reason.

MVEB Context within 2017 Inventory – To provide a clear understanding for the contribution of emissions from on-road motor vehicles (i.e., the MVEBs) relative to all other emission sources within the non-attainment area, Table 5.13-2 presents a summary of 2017 PM_{2.5} and NO_x emissions by major source sector. Emissions are shown on both an absolute (tons/day) and relative (% of total emissions) basis for both pollutants. On-road vehicle emissions (based on the MVEBs) are highlighted.

**Table 5.13-2
2017 PM_{2.5} and NO_x Emissions (tons/day) by Source Sector
Showing Motor Vehicle Emissions Contribution**

Source Sector	<i>NA Area Emissions (tons/day)</i>		<i>Relative Emissions Contribution (%)</i>	
	PM _{2.5}	NO _x	PM _{2.5}	NO _x
Point Sources (Actual)	1.41	8.17	37.1%	63.9%
Area Sources	2.04	2.40	53.6%	18.8%
On-Road Sources (MVEBs)	0.33	2.13	8.7%	16.7%
Non-Road Sources	0.02	0.09	0.6%	0.7%
TOTALS	3.81	12.78	100.0%	100.0%

As highlighted in Table 5.13-2, the contribution of on-road vehicles to total emissions from all sources for both pollutants are relatively small, comprising under 9% and 17% of total PM_{2.5} and NO_x emissions respectively. Although on-road vehicles are by no means the predominant source of these pollutants, the vehicle emission budgets established under the federal conformity regulations require that emissions associated with future federally-funded regional transportation plans do not exceed budgeted limits, thereby ensuring these plans conform to the overall attainment progress reflected in the SIP.

Budget Adequacy Requirements - For an emissions budget to be found adequate by EPA, the revisions to the air quality control plan that establishes the budget must fulfill a series of requirements per 40 CFR 93.118(e)(4). Each of these requirements are listed in *italics* below, along with specific actions that satisfy each requirement.

- *Be endorsed by the Governor (or a designee)* - Prior to final submittal to EPA, this plan will be filed by the Lieutenant Governor as per state regulation.
- *Be subject to a public hearing* - Prior to submittal to EPA, these plan revisions were the subject of public hearings held in Fairbanks, Anchorage, and Juneau on December 3rd and December 17th, 201. The affidavits of oral hearing are included in Appendix III.D.5.13.
- *Be developed through consultation among federal, State and local agencies* - Federal, state, and local agencies were consulted on the motor vehicle emissions budget. Specifically, the state has held monthly status calls related to the regulatory requirements and the appropriate technical methodologies for development of the motor vehicle emissions budget. These calls have involved appropriate DEC, FMATS, Borough, EPA, FHWA and FTA personnel. The most recent call was held on October 3, 2014 and focused on ensuring consistency between budgets established in the SIP and estimation of vehicle emissions under subsequent conformity determinations. The motor vehicle emissions budget was also presented and discussed at the interagency FMATS Technical Committee meeting on December 3, 2014 and the FMATS Policy Committee meeting on December 17, 2014. The FMATS Policy Committee voted on December 17th to approve the motor vehicle emissions budget as presented in this plan.
- *Be supported by documentation that has been provided to EPA* - This plan contains documentation supporting the motor vehicle emission budget. See Section 5.6. The PM_{2.5} and NO_x vehicle emission inventories are described in further detail in Appendix III.D.5.6.
- *Address any EPA concerns received during the comment period* - Comments received from EPA both before and during the public comment period were addressed through revisions contained in this final SIP.
- *Clearly identify and precisely quantify the revised budgets* - This section clearly identifies the motor vehicle emissions budgets for the Fairbanks North Star Borough PM_{2.5} non-attainment area.
- *Demonstrate that the budgets, when considered together with all other emissions sources in the inventory and control measures in the plan revision, are consistent with applicable requirements for reasonable further progress, attainment or maintenance (depending on which is relevant to the specific plan submission)* - The motor vehicle emissions budget was established based on the Fairbanks PM_{2.5} emission inventory and control measures

included in the plan and satisfies reasonable further progress requirements. In particular, see Sections 5.6, 5.7, 5.8, and 5.9.

- *Explain and document revisions to the previous budget and control measures, and include any impacts on point or area sources* - The budget presented in this plan is the initial emission budget for the PM_{2.5} non-attainment area.
- *Address all public comment on the plan's revisions and include a compilation of these comments* - The response to comments received is included in Appendix III.D.5.13.

Once a motor vehicle emissions budget is found to be adequate by EPA, the Fairbanks non-attainment area Transportation Plans and Transportation Improvement Programs (TIP) must be less than or equal to the motor vehicle emissions budget. For projects not from a conforming plan and TIP, the additional emissions from the project together with the transportation plan emissions must be less than or equal to the budget.

Interagency Consultation - Under 40 CFR 93.105, the Fairbanks Metropolitan Area Transportation System (FMATS), the MPO in the Fairbanks North Star Borough PM_{2.5} non-attainment area, must coordinate interagency consultation procedures for regional transportation conformity determinations to ensure transportation plan emissions are properly calculated in a manner consistent with the applicable SIP.

5.13.3 Project-Level Conformity

Interagency Consultation - Under 40 CFR 93.105, FMATS must similarly coordinate interagency consultation procedures for project-level conformity determinations (as is the case for regional conformity). Because the boundary of the non-attainment area is larger than the MPO boundary, in 2010, the transportation and environmental agencies within the area (Alaska DOT&PF, ADEC, FMATS, and FNSB) established a *Memorandum of Agreement for the Development of Transportation Conformity Determinations within the Fairbanks PM_{2.5} Non-attainment Area*.⁷ The agreement was established for the purpose of conducting cooperative planning and analysis of, and determining transportation conformity, for all transportation projects within the Fairbanks PM_{2.5} non-attainment area and outlines the roles and responsibilities for the agencies. It includes discussion of the extent of FMATS's involvement in any specific project-level determination. Interagency consultation is used in all project-level conformity determinations and FMATS data may be valuable in hot-spot analyses, especially regarding regional transportation and traffic conditions and emissions.

The interagency consultation process will be the key means of ensuring emissions are properly calculated. The interagency consultation process will also be important in ensuring that appropriate analyses of project emission impacts are conducted. As always, conformity determinations will be subject to the applicable public review requirements required under

⁷ <http://fmats.us/wp-content/uploads/2012/08/MOU-for-FBX-Transportation-Conformity-PM-2-5-Final.pdf>

regulation. This provides the public an opportunity to comment on the approach that is taken for the conformity determination for each plan, program and project.

The project sponsor is the agency responsible for implementing the project. Typically, the project sponsor is a local government, transit operator, or state department of transportation. The project sponsor is responsible for providing the PM_{2.5} and/or PM₁₀ hot-spot analysis described in 40 CFR 93.123 or the approved conformity SIP. The interagency consultation process is critical to completing project-level conformity determinations and PM_{2.5} and PM₁₀ hot-spot analyses. The project sponsor, in cooperation with federal agencies, is also responsible for conducting the environmental analysis and review to comply with NEPA as required by the Council on Environmental Quality regulations (40 CFR 1500-1508) and the FHWA/FTA Environmental Impact and Related Procedures (23 CFR Part 771).

Analysis Guidance - EPA released guidance for the preparation of Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Non-attainment and Maintenance Areas in November 2013.⁸ It provides guidance on estimating project level PM emissions using MOVES. It also provides guidance in selecting appropriate air quality models, determining background concentrations from nearby and other emission sources, calculating PM design values and preparing conformity determinations. These requirements should be addressed in the interagency consultation process, so that FMATS and the State can determine the support needed to:

- prepare MOVES-based emission estimates which reflect appropriate fleet characterization, activity and meteorological inputs and plug-in adjustments;
- access monitoring data available to characterize background concentrations; and
- specify meteorological conditions used in air quality modeling to assess conformity.

5.13.4 General Conformity

For projects requiring general conformity determinations, it is also important to consider the impacts of off-road motor vehicle emissions (e.g., idle emissions) in developing conformity determinations. Interagency consultation shall be used to determine whether off-network mobile source emissions are significant and what analysis of these emissions is appropriate for determining general conformity. An example of this type of project is an airport expansion. Federal actions not funded or approved under Title 23 or the Federal Transit Act should assess project emissions relative to de minimus thresholds established for PM_{2.5} and precursor emissions¹⁰ and applicability requirements established in § 93.153 to determine whether general conformity requirements apply.

⁸ <http://www.epa.gov/otaq/stateresources/transconf/policy/420b13053-sec.pdf>