

Overview of PM10 SIP Non-road Mobile Source Technical Support Document

The purpose of this document is to explain how the non-road mobile source emission inventories were created for the PM10 SIP for the base year (2011) and projection years 2019, 2024, 2028 and 2030.

The non-road mobile source inventories for this SIP were modeled by Utah Division of Air Quality (UDAQ), Inventory Section (formerly Mobile Sources and Transportation Section).

The baseline inventory covered winter weekdays and winter weekend days in 2011, based on the average of temperatures recorded during the PM_{2.5} episode which took place from Wednesday, December 7, 2009 through Saturday, January 23, 2010 inclusive.

The baseline inventory covers the “core” PM10 SIP domain--the four largest counties along the Wasatch Front in Utah (Davis, Salt Lake, Utah and Weber Counties). In addition, the modeling domain includes an additional thirteen counties that surround the core domain:

FIPs*	County	FIPs	County
49003	Box Elder	49029	Morgan
49005	Cache	49033	Rich
49007	Carbon	49039	Sanpete
49013	Duchesne	49043	Summit
49015	Emery	49045	Tooele
49023	Juab	49051	Wasatch
49027	Millard		

*FIPs denotes “Federal Information Processing Standard code” assigned to each county in the U.S. Utah’s two digit code is 49.

The thirteen counties that surround the core PM10 non-attainment area were not inventoried for this SIP per se. Instead, the inventories for these counties came from the NEI 2011. Emissions from these thirteen counties were included when air quality was evaluated using the CMAQ model.

Projection-year inventories were created using the same method that was used to create the base-year inventory. Emissions units for the baseline and projection-year inventories were tons per year, obtained by multiplying tons per winter weekday and tons per winter weekend day by 365.25, thus creating a “pseudo-tons-per-year” inventory. The CMAQ model then converts these ton-per-year inventories back to tons per winter weekday and tons per winter weekend day.

Non-road mobile source emissions come from the following:

- 1) Non-road motorized equipment found in the EPA NONROAD Model, (version 2008.1.0);
- 2) Aircraft emissions from large and small airports, modeled by the Federal Aviation Administration “Emissions Dispersion Modeling System” 5.1.4.1 model;

3) Diesel locomotive emissions.

EPA guidance requires that states create inventories that use the most recent available data for fleet or equipment characterization, fuel parameters and meteorological data.

Agencies involved in discussions or supplying data include:

EPA Office of Transportation and Air Quality: Mobile Team (OTAQ)—general questions
Railroad companies operating in Utah—reports of locomotive fuel consumption by county
Utah Department of Transportation, Division of Aeronautics—aircraft activity for small airports
Utah Division of Motor Vehicles (UDMV)—snowmobile inventory for Utah

Non-road Motorized Equipment (EPA NONROAD Model)

The EPA NONROAD Model was used to obtain emission inventories for mobile equipment and vehicles that operate on unpaved roads or other areas but not on paved roads.

There are twelve general equipment categories in the NONROAD database, which include source categories such as agricultural, commercial, construction, recreational and others.

Additional inputs include:

Counties to be modeled
Month and Years to be modeled
Fuel Properties
Meteorological Inputs

Emissions from the NONROAD model are created separately for each major county in the modeling domain. The calendar year and month to be modeled are input, and all sources of non-road equipment are selected.

There is an input GUI for diesel, gasoline, CNG and LPG properties (sulfur content, Reid Vapor Pressure, ethanol market shares and ethanol volume percent, etc.). The input screen also requires the user to key in the minimum, maximum and average daily temperatures for the period being modeled.

Pollutants modeled include CO, NO_x, PM₁₀ and PM_{2.5} exhaust, SO₂ and VOC. Ammonia (NH₃) is not modeled by the NONROAD Model. It is virtually impossible to estimate ammonia emissions from such a large variety of non-road motorized sources.

Aircraft Emissions

The aircraft portion of the inventory includes aircraft and helicopter emissions from all the major and minor airports operating in Utah.

Only two airports are considered major point sources: Salt Lake City International and the military installation Hill Air Force Base in Davis County. The vast majority of aircraft emissions come from Salt Lake City International.

Aircraft produce significant amounts of CO and SO_x. In fact, the majority of SO_x in the non-road inventory comes from aircraft.

Airport Ground Support Equipment

In general, Airport Ground Support Equipment (GSE) emissions are included in the EPA NONROAD Model. See the main non-road document for details.

Locomotive Emissions

There are six railroad companies operating in Utah. The vast majority of emissions come from Union Pacific Railroad, which operates in seventeen of the 29 counties in Utah.

Locomotives produce significant amounts of NO_x and SO_x, and minor amounts of CO, PM and VOC.

Final Comments

PM₁₀ shown above does not include fugitive dust from unpaved roads, which is an Area Source category.