Appendix C-2
Road Construction Emission Model
User Instructions

The Roadway Construction Emissions Model, Version 2.1 is a Microsoft Excel$^{©}$spreadsheet model that contains seven individual worksheets:

1. User Instructions
2. Emission estimates (results)
3. Data Entry
4. Appendix D worksheet
5. Appendix B worksheet
6. Emfac7f worksheet
7. Emfac7g worksheet

Each of the seven individual worksheets is explained briefly below. Of these seven worksheets, the user can only make changes to specific areas of the third worksheet: Data Entry. The following discussion describes each of the worksheets in the order listed above, except for the Data Entry worksheet, which is described last.

User Instruction Worksheet

The first worksheet contains user instructions that identify how to use the road construction emissions model. Those instructions are self-explanatory and are covered in more detail here.

Emission Estimates Worksheet

The emission estimates worksheet summarizes the results of the project being evaluated. The emission estimates worksheet cannot be edited directly. It can only be modified by entering or editing values on the data entry worksheet. Daily and total project emissions of ROG, CO, NOx, and PM_{10} are shown for each project phase. Both PM_{10} exhaust and fugitive dust emissions are also shown. Emissions in English and metric units are shown in separate tables. The primary assumptions used to estimate emissions are shown in the footnotes of each table.

Appendix D Worksheet

The Appendix D Worksheet is based on the California Air Resources Board's Off Road Model Appendix D report. Appendix D contains information on emission rates (grams per hp-hr) for various off-road engine sizes. Appendix D also contains information on engine emission deterioration rates, which are not included in the road construction emission estimates. Appendix D is linked to the Appendix B Worksheet (described below), which contains information of vehicle replacement rates. Those rates are used in Appendix D to estimate average vehicle emissions by vehicle year class.

Appendix B Worksheet

The Appendix B Worksheet is also based on the California Air Resources Board's Off Road Model report. Appendix B contains information on the average horsepower and useful life of a wide range of construction equipment. That information is linked to Appendix D, described above.

EMFAC7G Worksheet

The EMFAC7G worksheet contains emissions for two types of vehicles: light duty trucks and heavy-heavy duty diesel trucks. They are based on two separate runs of the California Air Resources Board's EMFAC7G emissions model. Each run is based on an average vehicle speed of 30 mph. Light duty truck emissions include running exhaust, tire and brake wear, start emissions, and evaporative emissions. Heavy-heavy duty truck emissions include running exhaust and tire and brake wear emissions.

EMFAC7F Worksheet

The EMFAC7F worksheet contains emissions for two types of vehicles: light duty trucks and heavy-heavy duty diesel trucks. They are based on two separate runs of the California Air Resources Board's EMFAC7F emissions model, version 1.1. Each run is based on an average vehicle speed of 30 mph. Light duty truck emissions include running exhaust, including running evaporative emissions. Diurnal and multi-day evaporative emissions are not included in the EMFAC7G emission rates. Heavy-heavy duty truck emissions include running exhaust.

Data Entry Worksheet

The data entry worksheet represents the only one of the seven worksheets that can be directly modified by the user. To enter or modify project-specific data, the user must go to the data entry worksheet. Prior to beginning a new project, the user is encouraged to hit the button (found at column h, row 9) that clears all previously entered data input and user overrides. The first user inputs are shaded in Figure C-2.1. These represent the required data fields that must be modified by the user for the model to generate default values for the project.

The required fields are:

Project Name - User identifies a name for the project.

Construction Start Year - The construction start year must be between year 2000 and 2010.

Project Type - The model has three different default parameters for three different project types: new road construction, road widening, and bridge or overpass construction.

Project length - The number of months required for the project to be completed. For projects with construction scheduled to last more than 12 months, the model adjusts vehicle emissions based on the years in which construction would occur.

Predominate Soil/Site Type - The model allows the user to select one of three soil/site types. By selecting one of these soil types, the model allocates differing percentages of time to construction phases.

On-Road Emission Factors - The emission factors needed to calculate worker commute emissions. EMFAC7F is a vehicle emissions model that was in use in California during the mid 1990's. Many of the existing state implementation plans are based on EMFAC7F. EMFAC7F was superseded by EMFAC7G in the late 1990's. Most recently, EMFAC2000 has been released by the California Air Resources Board. This vehicle emissions model, along with the MOBILE model, will be incorporated into the road construction model in future updates.

Project length/Total project area - Project length identifies the linear distance of the project, while project area represents the project square footage or acreage.

Maximum area disturbed per day - The maximum area disturbed per day is used by the model to estimate the total fugitive PM_{10} emissions that will be generated by the project.

Soil Imported/Soil Exported/Average Truck Capacity - If soil must be imported or exported from the project site, the user must enter the project-specific information here. Average truck capacity is used by the model to calculate the daily number of truck trips required for soil transport.

When all the required data are entered, the model automatically calculates the optional fields, which include, but are not limited to, the length of each construction phase, the area disturbed by construction, and the types of construction equipment that will be used.

Figure C-2.1. Data Input