EMFAC Modeling Change Technical Memo

**SUBJECT:** SCAG Activity Change (April 2003)

**LEAD:** AGNES DUGYON

# SUMMARY

# In June of 2002, staff received forecasts of vehicle miles traveled (VMT) by speeds from the Southern California Association of Governments (SCAG). SCAG is responsible for the travel demand modeling of the greater Los Angeles metropolitan area, including Ventura County and much of the Mojave Desert and Salton Sea Air Basins (SSAB). These data were incorporated in the latest official version of EMFAC 2002 ([http://www.arb.ca.gov/msei/on-road/latest\_revisions.htm)](http://www.arb.ca.gov/msei/on-road/latest_revisions.htm%29). In that update, the VMT data for Coachella and Banning were added to make up the Riverside County portion of the SSAB. The SCAG file labeled Banning as part of SSAB. The South Coast Air Quality Management District (SCAQMD) pointed out that this was incorrect, designating Banning as part of the Riverside portion of South Coast Air Basin (SCAB). Staff confirmed that SCAQMD was correct according to ARB Resolution 96-20. In April 2003, using these same data, staff were requested by SCAG to make the following changes:

1. Remove Banning from the Riverside portion of SSAB, and add it to the Riverside portion of SCAB.

# This means that the VMT by speed for Banning, previously added to Coachella to comprise the Riverside portion of SSAB, was added instead to the Riverside portion of SCAB. As indicated in Tables 1-3, the changes in emissions are roughly proportional to the changes in VMT.

1. Redefine PM Peak to be from 3 p.m. to 7 p.m.

This period has always been defined in past models to be from 3 p.m. to 6 p.m. In this revision, SCAG has requested that the PM peak be extended from 3 p.m. to 7 p.m. for all areas of SCAG responsibility. This change was done simultaneously with the Banning change, so the incremental effect cannot be definitively determined.

Tables 1, 2, and 3 show the differences in annual inventories (ver. 2.206 – ver. 2.205) for areas of the SCAG’s responsibility. The tables show that removing the VMT of Banning from the Riverside portion of SSAB and then adding it to the Riverside portion of SCAB resulted in a corresponding decrease/increase in emissions for the three calendar years (CY) shown (2000, 2010, and 2020). Note that other, presumably unaffected areas also change. These are minor, and arise because of the p.m. peak redefinition and rematching of the VMT (see Methodology).

##### Table 1: Area Specific VMT Changes and Emissions in 2000

(Annual Average Emissions in tons per day)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Area** | **County** | **Air Basin** | **VMT\*1000** | **ROG** | **CO** | **NOx** | **PM** |
| 58 | Ventura  | SCC | 0 | 0 | 0 | 0 | 0 |
| 59 | Los Angeles | SC | 6 | 1 | 4 | -2 | 0 |
| 60 | Orange | SC | 0 | 0 | 1 | -1 | 0 |
| 61 | Riverside | SC | 3265 | 4 | 38 | 8 | 0 |
| 62 | San Bernardino | SC | -3 | 0 | 0 | 0 | 0 |
| 64 | Riverside | SS | -3266 | -4 | -43 | -7 | 0 |
| 68 | Los Angeles | MD | 0 | 0 | 0 | 0 | 0 |
| 69 | San Bernardino | MD | 0 | 0 | 0 | 0 | 0 |

##### Table 2: Area Specific VMT Changes and Emissions in 2010

(Annual Average Emissions in tons per day)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Area** | **County** | **Air Basin** | **VMT\*1000** | **ROG** | **CO** | **NOx** | **PM** |
| 58 | Ventura  | SCC | -4 | 0 | 0 | 0 | 0 |
| 59 | Los Angeles | SC | 50 | 0 | 4 | -1 | 0 |
| 60 | Orange | SC | -1 | 0 | 1 | 0 | 0 |
| 61 | Riverside | SC | 3927 | 2 | 19 | 4 | 0 |
| 62 | San Bernardino | SC | -14 | 0 | 0 | 0 | 0 |
| 64 | Riverside | SS | -3927 | -2 | -21 | -4 | 0 |
| 68 | Los Angeles | MD | 3 | 0 | 0 | 0 | 0 |
| 69 | San Bernardino | MD | 4 | 0 | 0 | 0 | 0 |

##### Table 3: Area Specific VMT Changes and Emissions in 2020

(Annual Average Emissions in tons per day)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Area** | **County** | **Air Basin** | **VMT\*1000** | **ROG** | **CO** | **NOx** | **PM** |
| 58 | Ventura  | SCC | -16 | 0 | 0 | 0 | 0 |
| 59 | Los Angeles | SC | 69 | 0 | 4 | 0 | 0 |
| 60 | Orange | SC | -7 | 0 | 1 | 0 | 0 |
| 61 | Riverside | SC | 4470 | 1 | 10 | 2 | 0 |
| 62 | San Bernardino | SC | -27 | 0 | 0 | 0 | 1 |
| 64 | Riverside | SS | -4485 | -1 | -10 | -2 | 0 |
| 68 | Los Angeles | MD | -3 | 0 | 0 | 0 | 0 |
| 69 | San Bernardino | MD | 8 | 0 | 0 | 0 | 0 |

# Definitions:

AREA -Geographic Area Index used by EMFAC

SCC – South Central Coast

SC – South Coast

SS – Salton Sea

MD – Mojave Desert

# NEED FOR REVISION

The current motor vehicle emissions inventory model (EMFAC 2002) needs to be revised to reflect SCAG’s latest activity updates.

**AFFECTED SOURCE CODE/VERSION**

SPD1ASSIGN.FOR Version 2.206

SPD2ASSIGN.FOR Version 2.206

POPG\_SC.F90

## METHODOLOGY FOR REVISION

There were no new data submitted for this revision. The SCAG data that were submitted to ARB dated June 2002 were used. These data are for calendar years 2000, 2006, 2010, 2020, 2025, and 2030. The VMT by speed for Banning was added to the Riverside portion of the SCAB, and removed from the Riverside portion of the SSAB. This resulted in a different VMT and speed distribution for these two areas. The new speed distribution is put into the SPD2ASSIGN.FOR source code for each of the areas, according to the calendar years and periods affected.

The change in Banning called for rematching the VMT using the VMT matching algorithm, which is discussed in an EMFAC Modeling Change Technical Memo titled: “UPDATING ESTIMATES OF VEHICLE MILES TRAVELED” (<http://www.arb.ca.gov/msei/on-road/latest_revisions.htm>). This rematching resulted in a slight change in VMT for areas other than Riverside County as shown in Tables 1, 2, and 3 above (Summary). The rematching of VMT affected the source code POPG\_SC.F90.

For the redefinition of the PM peak, the hours for PM peak were extended from 6 p.m. to 7 p.m. for all SCAG areas. This change affected the source codes SPD1ASSIGN.FOR and SPD2ASSIGN.FOR.

**INVENTORY EFFECTS**

Figures1 and 2 of Attachment A show samples of graphical representations of the change in speed distribution for CY 2000 and 2010, for light-duty and heavy-duty vehicles. The graphs show comparison between the old and the new speed distribution of Riverside County for each air basin with and without Banning. As expected, Riverside-SSAB (Coachella) shows a more significant change than Riverside-SCAB.

The following tables show the VMT and annual average emissions in tons per day before and after the changes in SCAG (ver. 2.205 and ver. 2.206, respectively). Tables 1C, 2C, and 3C show the change in VMT and emissions in tons per day. The tables show that removing the VMT of Banning from the Riverside portion of SSAB and then adding it to Riverside portion of SCAB resulted in a corresponding decrease/increase in emissions for the three calendar years shown (2000, 2010, and 2020). Note that the VMTs and emissions for some areas other than Riverside change. This is a consequence of the aforementioned VMT rematching.

##### Table 1A: Area Specific VMT and Emissions before the Changes (v2.205) in CY 2000

(Annual Average Emissions in tons per day)



##### Table 1B: Area Specific VMT and Emissions after the Changes (v2.206) in CY 2000

(Annual Average Emissions in tons per day)



##### Table 1C: Area Specific VMT Changes and Emissions Differences in CY 2000[[1]](#footnote-1)\*

(Annual Average Emissions in tons per day)



##### Table 2A: Area Specific VMT and Emissions before the Changes (v2.205) in CY 2010

(Annual Average Emissions in tons per day)



##### Table 2B: Area Specific VMT and Emissions after the Changes (v2.206) in CY 2010

(Annual Average Emissions in tons per day)



##### Table 2C: Area Specific VMT Changes and Emissions Differences in CY 2010[[2]](#footnote-2)\*

(Annual Average Emissions in tons per day)



##### Table 3A: Area Specific VMT and Emissions before the Changes (v2.205) in CY 2020

(Annual Average Emissions in tons per day)

##### Table 3A: Area Specific VMT and Emissions before the Changes (v2.205) in    CY 2020

##### Table 3B: Area Specific VMT and Emissions after the Changes (v2.206) in CY 2020

(Annual Average Emissions in tons per day)



##### Table 2C: Area Specific VMT Changes and Emissions Differences in CY 2010[[3]](#footnote-3)\*

(Annual Average Emissions in tons per day)



##### Attachment A

## Definition of Terms for the Speed Distribution Graphs:

1. p1p6old - old SCAG data for period 1 (midnight to 6 am) and period 6 (7 pm

 to midnight)

1. p1p6new - new SCAG data for period 1 (midnight to 6 am) and period 6 (7 pm

 to midnight)

3. ampkold - old SCAG data for morning peak period, which covers the hours between 6 am to 9 am.

4. ampknew - new SCAG data for morning peak period, which covers the hours between 6 am to 9 am.

5. pmpkold - old SCAG data for afternoon peak period, which covers the hours between 3 pm to 7 pm.

1. pmpknew - new SCAG data for afternoon peak period, which covers the hours between 3 pm to 7 pm.

 Figure 1 - Riverside (SCAB)



 Figure 2 - Coachella Valley

1. \* Differences may not be exact due to rounding [↑](#footnote-ref-1)
2. \* Differences may not be exact due to rounding [↑](#footnote-ref-2)
3. \* Differences may not be exact due to rounding [↑](#footnote-ref-3)