Vehicle Miles of Travel (VMT)

VMT is calculated by multiplying the amount of daily traffic on a roadway segment by the length of the segment, then summing all the segments’ VMT to give you a total for the geographical area of concern. The vehicular traffic amounts are either estimates (current or past data) or they are projections (future data). VMT for this plan is expressed in miles per day.

The Protocol calls for an evaluation of the current long-range transportation plan. By definition the long-range plan covers the geographical area of the MPO, which for the Austin Metropolitan area includes only Hays, Travis and Williamson Counties. The MSA and the region covered by this clean air plan also include Bastrop and Caldwell Counties. Therefore, the analysis of the region’s on-road emissions will be of VMT from 3 different sources. Because VMT is an estimate of the amount of vehicular travel in a given geographical area, these estimates and projections are comparable, but not identical.

1. VMT estimates for past years are readily available by county from TxDOT. The VMT from TxDOT is a “typical” daily VMT that can be expected on any given “normal” day, that is, a non-holiday/weekend, no special events occurring, and seasonality removed. VMT projections (future years) must be obtained from another source.

Emission factors for each year were calculated by CAMPO staff using MOBILE6. Emissions factors are typically expressed in grams/mile. Multiplying the emissions factor times the VMT results in the grams of emissions, either NOx or VOC. Because the emissions inventory is expressed in tons per day, the resultant grams of on-road emissions were converted to tons by dividing the number of grams by 454 grams/lb and then by 2000 lbs/ton.

After much discussion and testing of various ways to express the reduction of emissions attributable to VMT, staff decided to use EPA’s VMT screen as presented in EPA’s proposed guidance for transitional areas. EPA’s VMT screen uses the following formulas.

2007 VMT Screen (Attainment Year)
\[
VMT_{2007} \times \frac{\text{EF}_{2007}}{\text{EF}_{1999}} \leq VMT_{\text{baseline (1999)}}
\]

\[
VMT_{2015} \times \frac{\text{EF}_{2015}}{\text{EF}_{1999}} \leq VMT_{\text{baseline (1999)}}
\]

Where,

\[
VMT = \text{Vehicle Miles of Travel}
\]

\[
VMT_{\text{baseline (1999)}} = \text{VMT estimated for base year (1999)}
\]

\[
VMT_{2007} = \text{VMT projected for 2007}
\]

\[
VMT_{2015} = \text{VMT projected for 2015}
\]

\[
\text{EF}_{\text{baseline (1999)}} = \text{Emission Factor estimated for base year (1999)}
\]

\[
\text{EF}_{2007} = \text{Emission Factor projected for 2007}
\]

\[
\text{EF}_{2015} = \text{Emission Factor projected for 2015}
\]

As long as the product of the future year’s VMT and future year’s emission factor quotient does not exceed the VMT for the base year, 1999 for this clean air plan, the transportation plan does not intensify the formation of ozone.

The “VMT Screen” for years 2007 and 2015 of the current Capital Area Metropolitan Planning Organization’s (CAMPO) long-range transportation plan, *Mobility 2025* gave the following results.

<table>
<thead>
<tr>
<th>Year</th>
<th>NOx 3-County</th>
<th>NOx CAMPO LRP</th>
<th>VOC 3-County</th>
<th>VOC CAMPO LRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>29,002,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>25,581,815</td>
<td>24,272,679</td>
<td>20,341,594</td>
<td>17,806,098</td>
</tr>
<tr>
<td>2015</td>
<td>11,829,175</td>
<td>9,445,901</td>
<td>14,983,609</td>
<td>11,901,044</td>
</tr>
</tbody>
</table>

VMT in the 3-county region is expected to increase 40% from 1999 to 2007 and another 35% from 2007 to 2015. The associated NOx will decrease in the same time so much that it will be as if there will be a 59% decrease in VMT from 1999 to 2007 and a 366% decrease from 1999 to 2015. Slightly more decreases will be realized from the region implementing an inspection and maintenance program in Travis, Williamson and Hays Counties in 2005 (67% and 483%). The expected increases in population and the
planned roadway system that will contribute to an increase in VMT will not contribute to emissions exceeding the amount of emissions that were seen in 1999.

It is not necessary to perform this test for the Transportation Improvement Program (TIP) and TIP amendments, as these, by definition, are incorporated in the long-range transportation plan.

Bastrop and Caldwell Counties are outside the CAMPO boundaries, so their VMT must be obtained from a different source. Also, they will not participate in the I&M program. Therefore, a separate VMT screen, using the same formulas, was conducted for the aggregate 5-county region. Similar results were obtained as realized for the CAMPO area.

<table>
<thead>
<tr>
<th>Year</th>
<th>No Control Measures</th>
<th>TTI VMT</th>
<th>No Control Measures</th>
<th>TTI VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>32,506,000</td>
<td>32,506,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>27,876,311</td>
<td>22,222,919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>12,597,286</td>
<td>15,830,018</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VMT is expected to increase in the 5-county region by 36% from 1999 to 2007 and 79.3% from 1999 to 2015. Without I&M in the 5-county region, NOX from VMT is expected to decline by 59% from 1999 to 2007 and 362% from 1999 to 2015. Again, the expected increases in population and the planned roadway system which will contribute to an increase in VMT will not contribute to emissions exceeding the amount of on-road emissions that were seen in 1999.

All calculations are shown in Appendix ??.

Another way to evaluate VMT and associated emissions is to directly compare the estimated emissions for future years to the base year emissions. Multiplying the emission factor by the VMT results in an estimate of the daily emissions associated with on-road travel. This evaluation shows a decrease in both NOx and VOC emissions, despite an increase in VMT.

Both evaluation techniques, the VMT screen and comparison of emissions, show large enough decreases in on-road emissions to more than offset the anticipated growth in
VMT through 2015. These decreases in emissions will be even greater with the I&M program.

**VMT SCREEN FOR THE CONTINUING PLANNING PROCESS**

CAPCO and CAMPO staff will analyze air quality and related data and perform necessary modeling updates on an annual basis using the same or similar techniques as used in developing this plan. As new or improved techniques become available, they will be incorporated into the process. The results of these analyses will be reported in the June semi-annual reports beginning in June 2005.

The analyses will evaluate:
1. future transportation patterns;
2. all relevant actual new point sources; and
3. impacts from potential new source growth.

**Future Transportation Patterns:** As part of the *Mobility 2030* plan development process CAMPO staff will perform the VMT screen for years 2007 and 2017. The screen will test to be sure that any expected increase in VMT over the planning horizons will be offset by technology and control measures, that is, that the expected associated emissions will not exceed the associated emissions of the base year (1999).

As part of this analysis, the emission factors will be reviewed and updated as necessary. Review of the emission factors includes checking and updating the fleet mix.

Future VMT screens will use these or comparable updated formulas.

**2007 VMT Screen (Attainment Year)**

\[
\frac{VMT_{2007}}{EF_{2007}} \leq \frac{VMT_{baseline (1999)}}{EF_{1999}}
\]

**2017 VMT Screen (Horizon Year)**

\[
\frac{VMT_{2017}}{EF_{2017}} \leq \frac{VMT_{baseline (1999)}}{EF_{1999}}
\]

Where,
- \( VMT = \) Vehicle Miles of Travel
- \( VMT_{baseline (1999)} = \) VMT estimated for base year (1999)
VMT_{2007} = VMT estimated for 2007  
VMT_{2017} = VMT estimated for 2017  
EF_{baseline\,1999} = Emission Factor estimated for base year (1999)  
EF_{2007} = Emission Factor estimated for 2007  
EF_{2017} = Emission Factor estimated for 2017  

This test will be performed prior to adoption of any CAMPO long-range transportation plan update or amendment that significantly increases VMT.
Appendix for Chapter 6
Statistical Backup

The following tables are copies of the spreadsheets used to make the calculations in Chapter 6, Maintenance for Growth. CAMPO and TxDOT staff developed the spreadsheets in an Excel workbook.

Also included in this appendix are the MOBILE6 output files.
Summary of the VMT Screen

These charts summarize the results of the VMT screen. The VMT screen can be seen as showing emission reductions in terms of VMT (vehicle miles of travel).

Actual VMT is expected to increase through 2017.

These calculations assume that the I&M (inspection and maintenance) program starts in 2005/2006.

### NOx

<table>
<thead>
<tr>
<th></th>
<th>3-County</th>
<th>CAMPO LRP</th>
<th>TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Controls</td>
<td>29,938,000</td>
<td>29,002,000</td>
<td>32,506,000</td>
</tr>
<tr>
<td>2007</td>
<td>20,187,584</td>
<td>19,154,494</td>
<td>18,801,663</td>
</tr>
<tr>
<td>2015</td>
<td>8,365,520</td>
<td>6,680,084</td>
<td>9,162,901</td>
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</tbody>
</table>

### VOC

<table>
<thead>
<tr>
<th></th>
<th>3-County</th>
<th>CAMPO LRP</th>
<th>TTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Controls</td>
<td>29,938,000</td>
<td>29,002,000</td>
<td>32,506,000</td>
</tr>
<tr>
<td>2007</td>
<td>20,796,915</td>
<td>18,204,665</td>
<td>17,869,330</td>
</tr>
<tr>
<td>2015</td>
<td>13,728,273</td>
<td>10,903,967</td>
<td>15,036,818</td>
</tr>
</tbody>
</table>

### Actual VMT

<table>
<thead>
<tr>
<th></th>
<th>CAMPO 3-County</th>
<th>TTI 3-County</th>
<th>TTI 5-County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>29,938,000</td>
<td>32,506,000</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
<td>41,476,000</td>
<td>44,508,000</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
<td>50,337,000</td>
<td>58,274,000</td>
</tr>
</tbody>
</table>

The emissions from VMT will decline over the years, but could decline a little more and a little sooner if we do I&M (or equivalent measure). Actual VMT will INCREASE while the consequent emissions will decrease.
Percent Reductions

Because VMT actually increases over the years and the results of the VMT screen show emissions reductions in terms of VMT, staff decided that another way to express the reductions may be more appropriate. The first alternate approach is to express the emission reductions in percent change.

The following formula was used to calculate percent change.

\[
\text{Percent change in Emissions} = 100 \times \frac{\text{EM}_{2007} - \text{EM}_{1999}}{\text{EM}_{1999}}
\]

These charts summarize the results of the VMT screen in percent change from 1999 to the future years. The VMT screen can be seen as showing emission reductions in terms of VMT (vehicle miles of travel).

Actual VMT is expected to increase through 2017.

These calculations assume that the I&M (inspection and maintenance) program starts in 2005/2006.

<table>
<thead>
<tr>
<th>NOx</th>
<th>3-County</th>
<th>5-County</th>
<th>% reduction in emission factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Controls</td>
<td>I&amp;M</td>
<td>No Controls</td>
</tr>
<tr>
<td>1999</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2007</td>
<td>-31.7%</td>
<td>-35.2%</td>
<td>-33.3%</td>
</tr>
<tr>
<td>2015</td>
<td>-68.4%</td>
<td>-74.8%</td>
<td>-69.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOC</th>
<th>3-County</th>
<th>5-County</th>
<th>% reduction in emission factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Controls</td>
<td>I&amp;M</td>
<td>No Controls</td>
</tr>
<tr>
<td>1999</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2007</td>
<td>-29.6%</td>
<td>-38.4%</td>
<td>-31.3%</td>
</tr>
<tr>
<td>2015</td>
<td>-48.2%</td>
<td>-58.8%</td>
<td>-51.1%</td>
</tr>
<tr>
<td></td>
<td>CAMPO 3-County</td>
<td>TTI 5-County</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VMT % Change</td>
<td>VMT % Change</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>29,002,000 40.4%</td>
<td>32,506,000 36.9%</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000 90.0%</td>
<td>44,508,000 79.3%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000 90.0%</td>
<td>58,274,000 79.3%</td>
<td></td>
</tr>
</tbody>
</table>

The emissions from VMT will decline over the years, but could decline a little more and a little sooner if we do I&M (or equivalent measure). Actual VMT will INCREASE while the consequent emissions will decrease.
Summary VMT X EF (tons)

In order to review the reduction of emissions in a way other than expressed in VMT, staff performed the following calculations:

Emissions = VMT X EF

Where,

VMT = vehicle miles of travel (daily)
EF = the emission factor for either NOx or VOC (grams)

The resultant grams of emissions were converted to tons by dividing by 454 X 2000.

**Units = tons**

### CAMPO, 3-County, No Controls

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>2.4490</td>
<td>78</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
<td>1.1920</td>
<td>53</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
<td>0.4070</td>
<td>25</td>
</tr>
</tbody>
</table>

*tons per day

### CAMPO, 3-County, I & M

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>2.4490</td>
<td>78</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
<td>1.1310</td>
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</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
<td>0.3250</td>
<td>20</td>
</tr>
</tbody>
</table>

*tons per day

### TTI, 3-County, No Controls

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,938,000</td>
<td>2.4490</td>
<td>81</td>
</tr>
<tr>
<td>2007</td>
<td>41,476,000</td>
<td>1.1920</td>
<td>54</td>
</tr>
<tr>
<td>2015</td>
<td>50,337,000</td>
<td>0.4070</td>
<td>23</td>
</tr>
</tbody>
</table>

*tons per day
### TTI, 3-County, I & M

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,938,000</td>
<td>1.8970</td>
<td>63</td>
</tr>
<tr>
<td>2007</td>
<td>41,476,000</td>
<td>1.1310</td>
<td>52</td>
</tr>
<tr>
<td>2015</td>
<td>50,337,000</td>
<td>0.3250</td>
<td>18</td>
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</tbody>
</table>

*tons per day

### TTI, 5-County, No Controls

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>32,506,000</td>
<td>2.4330</td>
<td>87</td>
</tr>
<tr>
<td>2007</td>
<td>44,508,000</td>
<td>1.1850</td>
<td>58</td>
</tr>
<tr>
<td>2015</td>
<td>58,274,000</td>
<td>0.4090</td>
<td>26</td>
</tr>
</tbody>
</table>

*tons per day

### VOC

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,938,000</td>
<td>1.4130</td>
<td>47</td>
</tr>
<tr>
<td>2007</td>
<td>41,476,000</td>
<td>0.6180</td>
<td>28</td>
</tr>
<tr>
<td>2015</td>
<td>50,337,000</td>
<td>0.3050</td>
<td>17</td>
</tr>
</tbody>
</table>

*tons per day

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily VMT</th>
<th>EF</th>
<th>VMT X EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>32,506,000</td>
<td>1.4250</td>
<td>51</td>
</tr>
<tr>
<td>2007</td>
<td>44,508,000</td>
<td>0.7150</td>
<td>35</td>
</tr>
<tr>
<td>2015</td>
<td>58,274,000</td>
<td>0.3890</td>
<td>25</td>
</tr>
</tbody>
</table>

*tons per day
Increase in VMT per year to equal 1999 emissions

Staff calculated the amount of VMT that theoretically could be added in future years and still not exceed the amount of emissions in the base year (1999). Discussion of this test was not included in the plan because the amounts are so large that they seemed illogical and these increments of increases could not reasonably be expected to be implemented within the region, especially within the time covered by the review (1999 – 2015).

The formula used was to subtract the future year emissions (tons) from the base year emissions and then multiply that times the VMT per ton of emissions.

\[
\text{VMT}_{\text{additional}2007} = (\text{EM}_{1999} - \text{EM}_{2007}) \times \frac{\text{VMT}_{2007}}{\text{EM}_{2007}}
\]

Where,

- \( \text{VMT}_{\text{additional}2007} \) = the additional VMT that could be added and not exceed emissions from the base year
- \( \text{EM}_{1999} \) = base year emissions
- \( \text{EM}_{2007} \) = future year emissions
- \( \text{VMT}_{2007} \) = future year VMT

### CAMPO, 3-County, No Controls

<table>
<thead>
<tr>
<th></th>
<th>NOx Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
<th>VOC Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>18,873,485</td>
<td>14.3</td>
<td>2007</td>
<td>17,127,683</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>119,375,806</td>
<td>71.0</td>
<td>2015</td>
<td>51,205,667</td>
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</table>

### CAMPO, 3-County, I&M

<table>
<thead>
<tr>
<th></th>
<th>NOx Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
<th>VOC Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>22,087,202</td>
<td>16.7</td>
<td>2007</td>
<td>25,363,754</td>
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<td></td>
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<tr>
<td>2015</td>
<td>163,406,225</td>
<td>97.2</td>
<td>2015</td>
<td>78,749,643</td>
</tr>
</tbody>
</table>

### TTI, 3-County, No Controls

<table>
<thead>
<tr>
<th></th>
<th>NOx Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
<th>VOC Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>20,032,525</td>
<td>15.2</td>
<td>2007</td>
<td>18,442,405</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>129,805,904</td>
<td>77.2</td>
<td>2015</td>
<td>59,825,484</td>
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</tbody>
</table>

7
<table>
<thead>
<tr>
<th>Year</th>
<th>NOx Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
<th>VOC Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>8,738,311</td>
<td>6.6</td>
<td>2007</td>
<td>26,974,476</td>
</tr>
<tr>
<td>2015</td>
<td>124,408,803</td>
<td>74.0</td>
<td>2015</td>
<td>88,359,374</td>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>NOx Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
<th>VOC Additional Daily VMT to Equal 1999 Emissions</th>
<th>Increase in VMT per Capita</th>
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<td>2007</td>
<td>22,232,167</td>
<td>16.8</td>
<td>2007</td>
<td>20,276,685</td>
</tr>
<tr>
<td>2015</td>
<td>135,092,988</td>
<td>80.4</td>
<td>2015</td>
<td>60,803,249</td>
</tr>
</tbody>
</table>
Data Input Sheet

To facilitate updates and/or corrections in data and to help manage the Excel workbook, a data input sheet was developed. A change of data on this one spreadsheet is reflected in every appropriate spreadsheet.

### 3-County, CAMPO, No Controls

<table>
<thead>
<tr>
<th>Year</th>
<th>VMT</th>
<th>NOx EF</th>
<th>VOC EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>2.4490</td>
<td>1.4080</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
<td>1.1920</td>
<td>0.7060</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
<td>0.4070</td>
<td>0.3840</td>
</tr>
</tbody>
</table>

### 3-County, CAMPO, I & M

<table>
<thead>
<tr>
<th>Year</th>
<th>VMT</th>
<th>NOx EF</th>
<th>VOC EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>2.4490</td>
<td>1.4080</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
<td>1.1310</td>
<td>0.6180</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
<td>0.3250</td>
<td>0.3050</td>
</tr>
</tbody>
</table>

### 3-County, TTI, No Controls

<table>
<thead>
<tr>
<th>Year</th>
<th>VMT</th>
<th>NOx EF</th>
<th>VOC EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,938,000</td>
<td>1.8970</td>
<td>1.4130</td>
</tr>
<tr>
<td>2007</td>
<td>41,476,000</td>
<td>1.1920</td>
<td>0.7060</td>
</tr>
<tr>
<td>2015</td>
<td>50,337,000</td>
<td>0.4070</td>
<td>0.3840</td>
</tr>
</tbody>
</table>

### 3-County, TTI, I & M

<table>
<thead>
<tr>
<th>Year</th>
<th>VMT</th>
<th>NOx EF</th>
<th>VOC EF</th>
</tr>
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<tbody>
<tr>
<td>1999</td>
<td>29,938,000</td>
<td>1.8970</td>
<td>1.4130</td>
</tr>
<tr>
<td>2007</td>
<td>41,476,000</td>
<td>1.1310</td>
<td>0.6180</td>
</tr>
<tr>
<td>2015</td>
<td>50,337,000</td>
<td>0.3250</td>
<td>0.3050</td>
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### 5-County, TTI, No Controls

<table>
<thead>
<tr>
<th>Year</th>
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<th>NOx EF</th>
<th>VOC EF</th>
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</thead>
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<tr>
<td>1999</td>
<td>32,506,000</td>
<td>2.4330</td>
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<td>44,508,000</td>
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<td>Source</td>
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<td></td>
</tr>
<tr>
<td>------------</td>
<td>----------------------</td>
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</tr>
<tr>
<td>1,118,730</td>
<td>*REMI pop. Estimate</td>
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<tr>
<td>1,322,000</td>
<td>CAMPO pop. Estimate</td>
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<td>1,681,000</td>
<td>CAMPO pop. Estimate</td>
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<tr>
<td>2,026,000</td>
<td>CAMPO pop. Estimate</td>
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</tbody>
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MOBILE6 Output Files

CAMPO staff calculated the following MOBILE6 emission factors for use in the VMT screen. The VMT screen uses the composite NOx and VOC rates for “All Vehicles,” but not the CO. The writers have highlighted the emissions factors that were used in the VMT screen.

3-County, 1999, No Controls

************************************************************************
*** 
* MOBILE6.2 (31-Oct-2002) *
* Input file: C:\M6RUNS\3COEF99.IN (file 2, run 1). *
************************************************************************
***

M603 Comment: 
User has disabled the calculation of REFUELING emissions.

M618 Comment: 
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 8 PM.

* Reading Registration Distributions from the following external 
* data file: C:\M6RUNS\3COREG.RGD
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)

*Diesel Fractions - 2007 (TTI)
M614 Comment:
User supplied diesel sale fractions.

*1999 3-County VMT Mix, weighted by the %VMT by facility for all 3 Counties
*For info, see this spreadsheet: 1999 VMT Data.xls

M615 Comment:
User supplied VMT mix.

M616 Comment:
User has supplied post-1999 sulfur levels.
Calendar Year: 1999
Month: July
Altitude: Low
Minimum Temperature: 73.6 (F)
Maximum Temperature: 85.5 (F)
Absolute Humidity: 100. grains/lb
Nominal Fuel RVP: 7.6 psi
Weathered RVP: 7.4 psi
Fuel Sulfur Content: 300. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type: LDGV LDGT12 LDGT34 LDGT HDGV LDDV LDDT HDDV MC All Veh
GVWR: <6000 >6000 (All)

VMT Distribution: 0.6413 0.2190 0.0463 0.0200 0.0007 0.0007 0.0710 0.0010 1.0000

<table>
<thead>
<tr>
<th>Composite Emission Factors (g/mi):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite VOC: 1.40 1.73 1.22 1.64 1.65 0.74 0.75 0.55</td>
</tr>
<tr>
<td>3.79 1.408</td>
</tr>
<tr>
<td>Composite CO: 15.71 21.55 17.10 20.77 25.87 1.63 1.36 2.87</td>
</tr>
<tr>
<td>17.06 16.329</td>
</tr>
<tr>
<td>Composite NOX: 1.07 1.23 1.14 1.21 5.29 1.45 1.47 18.80</td>
</tr>
<tr>
<td>1.13 2.449</td>
</tr>
</tbody>
</table>
3-County, 2007, No Controls

************************************************************************
***
* MOBILE6.2 (31-Oct-2002) *
* Input file: C:\M6RUNS\3COEF07.IN (file 2, run 1). *
************************************************************************
***

M603 Comment:
User has disabled the calculation of REFUELING emissions.

M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 8 PM.

* Reading Registration Distributions from the following external
* data file: C:\M6RUNS\3COREG.RGD
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00  MYR sum not = 1. (will normalize)

* Reading Hourly VMT distribution from the following external
* data file: C:\M6RUNS\TR07WKD.VHR
M614 Comment:
  User supplied diesel sale fractions.
*2007 3-County VMT Mix, weighted by the %VMT by facility for all 3 Counties
*For info, see this spreadsheet: 3-Co VMT Data.xls (Updated)
M615 Comment:
  User supplied VMT mix.
M616 Comment:
  User has supplied post-1999 sulfur levels.

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2007 3-County Regional Run
* File 2, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
Calendar Year: 2007
Month: July
Altitude: Low
Minimum Temperature: 73.6 (F)
Maximum Temperature: 85.5 (F)
Absolute Humidity: 100. grains/lb
Nominal Fuel RVP: 7.6 psi
Weathered RVP: 7.4 psi
Fuel Sulfur Content: 33. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type: LDGV LDGT12 LDGT34 LDGT HDGV LDDV
LDDT HDDV MC All Veh
GVWR: <6000 >6000 (All)

VMT Distribution: 0.6283 0.2250 0.0493 0.0207 0.0007 0.0008
0.0743 0.0010 1.0000

-----------------------------

Composite Emission Factors (g/mi):

<table>
<thead>
<tr>
<th></th>
<th>LDGV</th>
<th>LDGT12</th>
<th>LDGT34</th>
<th>LDGT</th>
<th>HDGV</th>
<th>LDDV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite VOC</td>
<td>0.695</td>
<td>0.840</td>
<td>0.606</td>
<td>0.798</td>
<td>0.858</td>
<td>0.361</td>
</tr>
<tr>
<td></td>
<td>0.385</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite CO</td>
<td>8.92</td>
<td>11.12</td>
<td>8.58</td>
<td>10.67</td>
<td>12.28</td>
<td>1.340</td>
</tr>
<tr>
<td></td>
<td>16.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.949</td>
</tr>
<tr>
<td>Composite NOX</td>
<td>0.538</td>
<td>0.742</td>
<td>0.731</td>
<td>0.740</td>
<td>2.907</td>
<td>0.823</td>
</tr>
<tr>
<td></td>
<td>7.926</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.49</td>
</tr>
</tbody>
</table>

-------------

3-County, 2015, No Controls

************************************************************************
*** MOBILE6.2 (31-Oct-2002) ***
* Input file: C:\M6RUNS\3COEF15.IN (file 3, run 1).
************************************************************************

M603 Comment:
User has disabled the calculation of REFUELING emissions.

M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 8 PM.

* Reading Registration Distributions from the following external
  * data file: C:\M6RUNS\3COREG.RGD
  M 49 Warning:
    1.00  MYR sum not = 1. (will normalize)
  M 49 Warning:
    1.00  MYR sum not = 1. (will normalize)
  M 49 Warning:
    1.00  MYR sum not = 1. (will normalize)
  M 49 Warning:
    1.00  MYR sum not = 1. (will normalize)
  M 49 Warning:
    1.00  MYR sum not = 1. (will normalize)
  M 49 Warning:
    1.00  MYR sum not = 1. (will normalize)

* Reading Hourly VMT distribution from the following external
  * data file: C:\M6RUNS\TR07WKD.VHR
  * Diesel Fractions - 2007 (TTI)
  M614 Comment:
    User supplied diesel sale fractions.
  * 2007 3-County VMT Mix, weighted by the %VMT by facility for all 3 Counties
  * For info, see this spreadsheet: 3-Co VMT Data.xls (Updated)
  M615 Comment:
    User supplied VMT mix.
  M616 Comment:
    User has supplied post-1999 sulfur levels.

* #########################################################################
  * 2015 3-County Regional Run
  * File 3, Run 1, Scenario 1.
  * #########################################################################

    Calendar Year: 2015
    Month: July
    Altitude: Low
    Minimum Temperature: 73.6 (F)
    Maximum Temperature: 85.5 (F)
    Absolute Humidity: 100. grains/lb
    Nominal Fuel RVP: 7.6 psi
    Weathered RVP: 7.4 psi
    Fuel Sulfur Content: 30. ppm

    Exhaust I/M Program: No
    Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type: LDGV  LDGT12  LDGT34  LDGT  HDGV  LDDV
LDDT  HDDV  MC  All Veh
GVWR: <6000  >6000  (All)
       -----  ------  ------  ------  ------  ------
VMT Distribution: 0.6283  0.2250  0.0493  0.0207  0.0007  0.0008
0.0743  0.0010  1.0000

Composite Emission Factors (g/mi):
Composite VOC : 0.363  0.475  0.353  0.453  0.445  0.274  0.241
0.254  3.04  0.384
Composite CO : 6.20  7.92  6.51  7.67  7.64  1.075  0.622  0.360
16.15  6.199
Composite NOX : 0.256  0.383  0.346  0.376  0.973  0.418  0.280
1.627  1.17  0.407

3-County, 2007, I&M

************************************************************************
***
* MOBILE6.2 (31-Oct-2002) *
* Input file: C:\M6RUNS\3COIM07.IN (file 5, run 1). *
************************************************************************
***
M603 Comment:
User has disabled the calculation of REFUELING emissions.

M618 Comment:
User supplied alternate AC input: Sunrise at 7 AM, Sunset at 8 PM.

* Reading Registration Distributions from the following external
* data file: C:\M6RUNS\3COREG.RGD
M 49 Warning:
1.00 MYR sum not = 1. (will normalize)
M 49 Warning:
1.00 MYR sum not = 1. (will normalize)
M 49 Warning:
1.00 MYR sum not = 1. (will normalize)
M 49 Warning:
1.00 MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00 MYR sum not = 1. (will normalize)
M 49 Warning:
  1.00 MYR sum not = 1. (will normalize)

* Reading Hourly VMT distribution from the following external
data file: C:\M6RUNS\TR07WKD.VHR
* Exhaust I/M program #1 2-Speed/IDLE
* Exhaust I/M program #2 OBD
* Evap I/M program #3 Pressure Test program
* Evap I/M program #4 Pressure Test program
* Diesel Fractions - 2007 (TTI)
M614 Comment:
  User supplied diesel sale fractions.
* 2007 3-County VMT Mix, weighted by the %VMT by facility for all 3 Counties
* For info, see this spreadsheet: 3-Co VMT Data.xls (Updated)
M615 Comment:
  User supplied VMT mix.
M616 Comment:
  User has supplied post-1999 sulfur levels.

* # # # # # # # # # # # # # # # # # # # # # # # # #
* 2007 3-County Regional Run
* File 5, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
*** I/M credits for Tech1&2 vehicles were read from the following external
data file: TECH12.D

Calendar Year: 2007
  Month: July
  Altitude: Low
Minimum Temperature: 73.6 (F)
Maximum Temperature: 85.5 (F)
  Absolute Humidity: 100. grains/lb
Nominal Fuel RVP: 7.6 psi
  Weathered RVP: 7.4 psi
Fuel Sulfur Content: 33. ppm

Exhaust I/M Program: Yes
Evap I/M Program: Yes
  ATP Program: No
Reformulated Gas: No

Vehicle Type:  LDGV  LDGT12  LDGT34  LDGT  HDGV  LDDV
             LDDT  HDDV  MC  All Veh
GVWR: | <6000 | >6000 | (All) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT Distribution:</td>
<td>0.6283</td>
<td>0.2250</td>
<td>0.0493</td>
<td>0.0207</td>
<td>0.0007</td>
<td>0.0008</td>
<td>0.0743</td>
<td>0.0010</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

---

Composite Emission Factors (g/mi):

- **Composite VOC**: 0.604 0.724 0.523 0.688 0.849 0.361 0.416 0.385 3.26 0.618
- **Composite CO**: 7.36 9.13 7.15 8.77 12.01 1.340 0.832 1.990 16.15 7.442
- **Composite NOX**: 0.479 0.653 0.658 0.654 2.905 0.823 0.749 7.926 1.17 1.131

---

**3-County, 2015, I&M**

***Mobile6.2 (31-Oct-2002)***

* Input file: C:\M6RUNS\3COIM15.IN (file 6, run 1).

User has disabled the calculation of REFUELING emissions.

User supplied alternate AC input: Sunrise at 7 AM, Sunset at 8 PM.

* Reading Registration Distributions from the following external
  * data file: C:\M6RUNS\3COREG.RGD

M 49 Warning:
- 1.00 MYR sum not = 1. (will normalize)
- 1.00 MYR sum not = 1. (will normalize)
- 1.00 MYR sum not = 1. (will normalize)
- 1.00 MYR sum not = 1. (will normalize)
- 1.00 MYR sum not = 1. (will normalize)
- 1.00 MYR sum not = 1. (will normalize)
* Reading Hourly VMT distribution from the following external data file: C:\M6RUNS\TR07WKD.VHR
* Exhaust I/M program #1 2-Speed/IDLE
* Exhaust I/M program #2 OBD
* Evap I/M program #3 Pressure Test program
* Evap I/M program #4 Pressure Test program
* Diesel Fractions - 2007 (TTI)
  M614 Comment:
    User supplied diesel sale fractions.
* 2007 3-County VMT Mix, weighted by the %VMT by facility for all 3 Counties
* For info, see this spreadsheet: 3-Co VMT Data.xls (Updated)
  M615 Comment:
    User supplied VMT mix.
  M616 Comment:
    User has supplied post-1999 sulfur levels.

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2015 3-County Regional Run
  File 6, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
*** I/M credits for Tech1&2 vehicles were read from the following external data file: TECH12.D

  Calendar Year: 2015
  Month: July
  Altitude: Low
  Minimum Temperature: 73.6 (F)
  Maximum Temperature: 85.5 (F)
  Absolute Humidity: 100. grains/lb
  Nominal Fuel RVP: 7.6 psi
  Weathered RVP: 7.4 psi
  Fuel Sulfur Content: 30. ppm

  Exhaust I/M Program: Yes
  Evap I/M Program: Yes
  ATP Program: No
  Reformulated Gas: No

  Vehicle Type: LDGV  LDGT12  LDGT34  LDGT  HDGV  LDDV
  LDDT  HDDV  MC  All Veh  <6000  >6000  (All)
  ------  -----  -----  ------  ------  ------  ------  ------  ------  ------
  VMT Distribution: 0.6283  0.2250  0.0493  0.0207  0.0007  0.0008
  0.0743  0.0010  1.0000

--------------------------------------------
Composite Emission Factors (g/mi):

<table>
<thead>
<tr>
<th></th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite VOC</td>
<td>0.283</td>
<td>0.364</td>
<td>0.274</td>
<td>0.348</td>
<td>0.442</td>
<td>0.274</td>
<td>0.241</td>
</tr>
<tr>
<td></td>
<td>0.254</td>
<td>3.04</td>
<td>0.305</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite CO</td>
<td>4.64</td>
<td>5.87</td>
<td>5.04</td>
<td>5.72</td>
<td>7.60</td>
<td>1.075</td>
<td>0.622</td>
</tr>
<tr>
<td></td>
<td>16.15</td>
<td>4.684</td>
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<tr>
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<td>0.266</td>
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<td>1.627</td>
<td>1.17</td>
<td>0.325</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**5-County, 1999, No Controls**

************************************************************************
***
* MOBILE6.2 (31-Oct-2002)                                               *
* Input file: C:\M6RUNS\5COEF99.IN (file 1, run 1).                     *
************************************************************************
***
M603 Comment:
  User has disabled the calculation of REFUELING emissions.

M618 Comment:
  User supplied alternate AC input: Sunrise at  7 AM, Sunset at  8 PM.

* Reading Registration Distributions from the following external
  data file: C:\M6RUNS\5COREG.RGD

* Diesel Fractions - 2007 (TTI)
  M614 Comment:
    User supplied diesel sale fractions.

* 1999 5-County VMT Mix, weighted by the %VMT by facility for all 5 Counties
  *For info, see this spreadsheet: 1999 VMT Data.xls
  M615 Comment:
    User supplied VMT mix.

M616 Comment:
  User has supplied post-1999 sulfur levels.

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* 1999 5-County Regional Run
  * File 1, Run 1, Scenario 1.
  * # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #

  Calendar Year: 1999
    Month: July
    Altitude: Low
  Minimum Temperature: 73.6 (F)
  Maximum Temperature: 85.5 (F)
Absolute Humidity:  100. grains/lb
Nominal Fuel RVP:    7.6 psi
Weathered RVP:     7.4 psi
Fuel Sulfur Content:  300. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type:  LDGV  LDGT12  LDGT34  LDGT  HDGV  LDDV
LDDT  HDDV  MC  All Veh
GVWR:  <6000  >6000  (All)

VMT Distribution:  0.6413  0.2190  0.0463  0.0195  0.0007  0.0007  0.0715  0.0010  1.0000

---------------
Composite Emission Factors (g/mi):

Composite VOC :  1.42  1.74  1.23  1.65  1.77  0.75  0.76  0.54
3.83  1.425

Composite CO  :  15.87  21.70  17.22  20.92  27.94  1.64  1.38  2.83
17.13  16.496

Composite NOX :  1.07  1.23  1.14  1.22  5.62  1.46  1.48  18.29
1.13  2.433

---------------

5-County, 2007, No Controls

***************************************************************************
*** MOBILE6.2 (31-Oct-2002)                                                 *
*** Input file: C:\M6RUNS\5COEF07.IN (file 9, run 1).                       *
***************************************************************************

M603 Comment:
User has disabled the calculation of REFUELING emissions.

M618 Comment:
User supplied alternate AC input: Sunrise at  7 AM, Sunset at  8 PM.

* Reading Registration Distributions from the following external
* data file: C:\M6RUNS\5COREG.RGD
*Diesel Fractions - 2007 (TTI)
M614 Comment:
User supplied diesel sale fractions.

*2007 5-County VMT Mix, weighted by the % Total VMT for all 5 Counties
*For info, see this spreadsheet: 2007 5-Co VMT Data.xls (Updated)

M615 Comment:
User supplied VMT mix.

M616 Comment:
User has supplied post-1999 sulfur levels.

* # # # # # # # # # # # # # # # # # # # # # # # # #

* 2007 5-County Regional Run
* File 9, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #

Calendar Year: 2007
Month: July
Altitude: Low
Minimum Temperature: 73.6 (F)
Maximum Temperature: 85.5 (F)
Absolute Humidity: 100. grains/lb
Nominal Fuel RVP: 7.6 psi
Weathered RVP: 7.4 psi
Fuel Sulfur Content: 33. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type: LDGV LDGT12 LDGT34 LDGT HDGV LDDV
LDDT HDDV MC All Veh
GVWR: <6000 >6000 (All)

VMT Distribution: 0.6283 0.2260 0.0493 0.0201 0.0007 0.0008
0.0739 0.0010 1.0000

---------------------------------------------------------------------------------

Composite Emission Factors (g/mi):

Composite VOC : 0.705 0.848 0.612 0.806 0.922 0.367 0.422
0.377 3.28 0.715

Composite CO : 8.98 11.18 8.66 10.73 13.27 1.349 0.841 1.957
16.15 9.022

Composite NOX : 0.543 0.745 0.740 0.744 3.125 0.836 0.759
7.767 1.17 1.185

---------------------------------------------------------------------------------

-------------------
5-County, 2015, No Controls

***************************************************************************
*** MOBILE6.2 (31-Oct-2002)                                           ***
*** Input file: C:\M6RUNS\5COEF15.IN (file 10, run 1).                ***
***************************************************************************

M603 Comment:
   User has disabled the calculation of REFUELING emissions.

M618 Comment:
   User supplied alternate AC input: Sunrise at 7 AM, Sunset at 8 PM.

* Reading Registration Distributions from the following external
* data file: C:\M6RUNS\5COREG.RGD
*Diesel Fractions - 2007 (TTI)
M614 Comment:
   User supplied diesel sale fractions.
*2007 5-County VMT Mix, weighted by the % Total VMT for all 5 Counties
*For info, see this spreadsheet: 2007 5-Co VMT Data.xls (Updated)
M615 Comment:
   User supplied VMT mix.
M616 Comment:
   User has supplied post-1999 sulfur levels.

* # # # # # # # # # # # # # # # # # # # # # # # # #
* 2015 5-County Regional Run
* File 10, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # #

   Calendar Year: 2015
   Month: July
   Altitude: Low
   Minimum Temperature: 73.6 (F)
   Maximum Temperature: 85.5 (F)
   Absolute Humidity: 100. grains/lb
   Nominal Fuel RVP: 7.6 psi
   Weathered RVP: 7.4 psi
   Fuel Sulfur Content: 30. ppm

   Exhaust I/M Program: No
   Evap I/M Program: No
   ATP Program: No
   Reformulated Gas: No
<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>LDGV</th>
<th>LDGT12</th>
<th>LDGT34</th>
<th>LDGT</th>
<th>HDGV</th>
<th>LDDV</th>
<th>LDDT</th>
<th>HDDV</th>
<th>MC</th>
<th>All Veh</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVWR</td>
<td>&lt;6000</td>
<td>&gt;6000</td>
<td>(All)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VMT Distribution</td>
<td>0.6283</td>
<td>0.2260</td>
<td>0.0493</td>
<td>0.0201</td>
<td>0.0007</td>
<td>0.0008</td>
<td>0.0739</td>
<td>0.0010</td>
<td>1.0000</td>
<td></td>
</tr>
</tbody>
</table>

Composite Emission Factors (g/mi):

- Composite VOC: 0.369  0.480  0.357  0.458  0.475  0.281  0.245
- Composite CO: 6.25  7.96  6.56  7.71  8.34  1.086  0.629  0.357
- Composite NOX: 0.260  0.386  0.349  0.379  1.039  0.429  0.285

--------------------------
The following tables are the VMT screens. Each title includes the targeted precursor, the area covered, source of VMT, and any additional local control measures included in the emissions factor. For example, “NOx, 5-county, TTI VMT, No controls” means that the emission factors are for NOx, the entire 5-county MSA is covered, the VMT is from the TTI report on the September episode, and there were no additional local control measures included in the MOBILE6 input files.
### NOx, 3-County, TxDOT & CAMPO VMT, No Controls

#### NOx

<table>
<thead>
<tr>
<th>Emission Factors</th>
<th>1999 VMT =</th>
<th>29,002,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>2.4490</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>1.1920</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>0.4070</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2025 Plan VMT</th>
<th>* HPMS 1999 VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
</tr>
</tbody>
</table>

Is the 1999 VMT greater than or equal to the VMT for the future year? Yes/No

- 2007: \( \text{VMT}_{1999} \geq \frac{\text{EF}_{2007}}{\text{EF}_{1999}} \times \text{VMT}_{2007} \) YES 19,815,722.34
- 2015: \( \text{VMT}_{1999} \geq \frac{\text{EF}_{2015}}{\text{EF}_{1999}} \times \text{VMT}_{2015} \) YES 9,162,901.18
### VOC, 3-County, TxDOT & CAMPO VMT, No Controls

#### VOC

<table>
<thead>
<tr>
<th>Emission Factors</th>
<th>1999 VMT</th>
<th>1999 VMT =</th>
<th>1999 VMT =</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>1.4080</td>
<td>29,002,000</td>
<td>20,413,829.55</td>
</tr>
<tr>
<td>2007</td>
<td>0.7060</td>
<td>40,712,000</td>
<td>YES</td>
</tr>
<tr>
<td>2015</td>
<td>0.3840</td>
<td>55,135,000</td>
<td>YES</td>
</tr>
</tbody>
</table>

- **Is the 1999 VMT greater than or equal to the VMT for the future year?**
- **Yes/No**
- **2007**
  - VMT\(_{1999}\) \(\geq\) EF\(_{2007}/EF_{1999}\) \(\times\) VMT \(_{2007}\)
- **YES**
- **2015**
  - VMT\(_{1999}\) \(\geq\) EF\(_{2015}/EF_{1999}\) \(\times\) VMT \(_{2015}\)
- **YES**

**2025 Plan VMT**

<table>
<thead>
<tr>
<th>1999</th>
<th>29,002,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>40,712,000</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
</tr>
</tbody>
</table>

* HPMS 1999 VMT
<table>
<thead>
<tr>
<th>Emission Factors</th>
<th>1999 VMT = 29,002,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is the 1999 VMT greater than or equal to the VMT for the future year?</td>
</tr>
<tr>
<td>1999</td>
<td>2.4490</td>
</tr>
<tr>
<td>2007</td>
<td>1.1310</td>
</tr>
<tr>
<td>2015</td>
<td>0.3250</td>
</tr>
</tbody>
</table>

**2025 Plan VMT**

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2007</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
<td>40,712,000</td>
<td>55,135,000</td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* HPMS 1999 VMT
### VOC, 3-County, TxDOT & CAMPO VMT, I&M

**VOC**

<table>
<thead>
<tr>
<th>Emission Factors</th>
<th>1999 VMT = 29,002,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>1.4080</td>
</tr>
<tr>
<td>2007</td>
<td>0.6180</td>
</tr>
<tr>
<td>2015</td>
<td>0.3050</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.6180</td>
<td>YES</td>
<td>29,002,000</td>
<td>17,869,329.55</td>
<td>YES</td>
<td>17,869,329.55</td>
</tr>
<tr>
<td>2015</td>
<td>0.3050</td>
<td>YES</td>
<td>29,002,000</td>
<td>11,943,306.11</td>
<td>YES</td>
<td>11,943,306.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2025 Plan VMT</th>
<th>1999 VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>29,002,000</td>
</tr>
<tr>
<td>2007</td>
<td>40,712,000</td>
</tr>
<tr>
<td>2015</td>
<td>55,135,000</td>
</tr>
</tbody>
</table>

* HPMS 1999 VMT
NOx, 5-county, TTI VMT, No controls

**NOx**

<table>
<thead>
<tr>
<th>Emission Factors</th>
<th>1999 VMT =</th>
<th>1999 VMT</th>
<th>2007</th>
<th>1.1850</th>
<th>2007</th>
<th>YES</th>
<th>21,677,755.86</th>
<th>2015</th>
<th>0.4090</th>
<th>YES</th>
<th>9,796,163.58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the 1999 VMT greater than or equal to the VMT for the future year?</td>
<td>Yes/No</td>
<td>1999 VMT</td>
<td>32,506,000</td>
<td>2007</td>
<td>VMT_{1999} ≥ EF_{2007}/EF_{1999} × VMT_{2007}</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>VMT_{1999} ≥ EF_{2015}/EF_{1999} × VMT_{2015}</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TTI VMT**

| 1999 | 32,506,000 |
| 2007 | 44,508,000 |
| 2015 | 58,274,000 |

* TTI VMT Sept. 20, 1999 episode
### VOC, 5-County, TTI VMT, No Controls

#### VOC

<table>
<thead>
<tr>
<th>Emission Factors</th>
<th>1999 VMT = 32,506,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>1.4250</td>
</tr>
<tr>
<td>2007</td>
<td>0.7150</td>
</tr>
<tr>
<td>2015</td>
<td>0.3890</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Emission Factor</th>
<th>Is the 1999 VMT greater than or equal to the VMT for the future year?</th>
<th>Yes/No</th>
<th>VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.7150</td>
<td>VMT_{1999} ≥ EF_{2007}/EF_{1999} × VMT_{2007}</td>
<td>YES</td>
<td>22,332,084.21</td>
</tr>
<tr>
<td>2015</td>
<td>0.3890</td>
<td>VMT_{1999} ≥ EF_{2015}/EF_{1999} × VMT_{2015}</td>
<td>YES</td>
<td>15,907,779.65</td>
</tr>
</tbody>
</table>

#### TTI VMT

<table>
<thead>
<tr>
<th>Year</th>
<th>TTI VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>32,506,000</td>
</tr>
<tr>
<td>2007</td>
<td>44,508,000</td>
</tr>
<tr>
<td>2015</td>
<td>58,274,000</td>
</tr>
</tbody>
</table>

* TTI VMT Sept. 20, 1999 episode