

To: Interested Parties

From: James G. Wilkinson, PhD
Senior Engineer
Alpine Geophysics, LLC

Date: 10-January-2005

Subject: Identification and correction of errors in the July 1999, 2005, and 2010 on-road mobile source emissions estimates for the counties of San Francisco, San Mateo, and Santa Clara

Introduction

In early November 2004, staff at the Bay Area Air Quality Management District (BAAQMD) discovered an error in the on-road mobile source emissions estimates for the 04-14 July 1999 episode. The spatial extent and magnitude of this error is shown in Figure 1. As can be observed in Figure 1, the on-road mobile source NO emissions estimates are noticeably higher on 31 July 2000 in the counties of San Francisco, San Mateo, and Santa Clara and somewhat lower in the Sacramento area over those same emissions on 05 July 1999. BAAQMD asked Alpine Geophysics (AG) to determine the cause of the error, and further, to correct the error.

Source of the Error

The methods to estimate on-road mobile source emissions for this episode, which are beyond the scope of this memorandum, are documented in Wilkinson (2004). One step involved in estimating the on-road mobile source emissions requires running a Windows PC-based computer program that develops inputs to the EMFAC2002 (v.2.2 April 23, 2003) on-road mobile source emissions factors and estimates model. This program is a perl script called *mkinp.pl* that was supplied for use in the BAAQMD study by staff at the California Air Resources Board (ARB). Of note, perl is a general purpose programming language used extensively for automating tedious computer programming functions (www.tpj.com/whatisperl.html).

An error was discovered in the perl script which prevented the script from properly reading an Excel spreadsheet. The Excel spreadsheet contained alternative speed fractions for the nine counties in the BAAQMD. The error occurred when the perl script attempted to read the modified speed fractions for hours 0700 through 1800 for the counties of San Francisco, San Mateo, and Santa Clara. Appendix A contains the original perl script, and Appendix B contains the corrected perl script with the modified code highlighted in yellow.

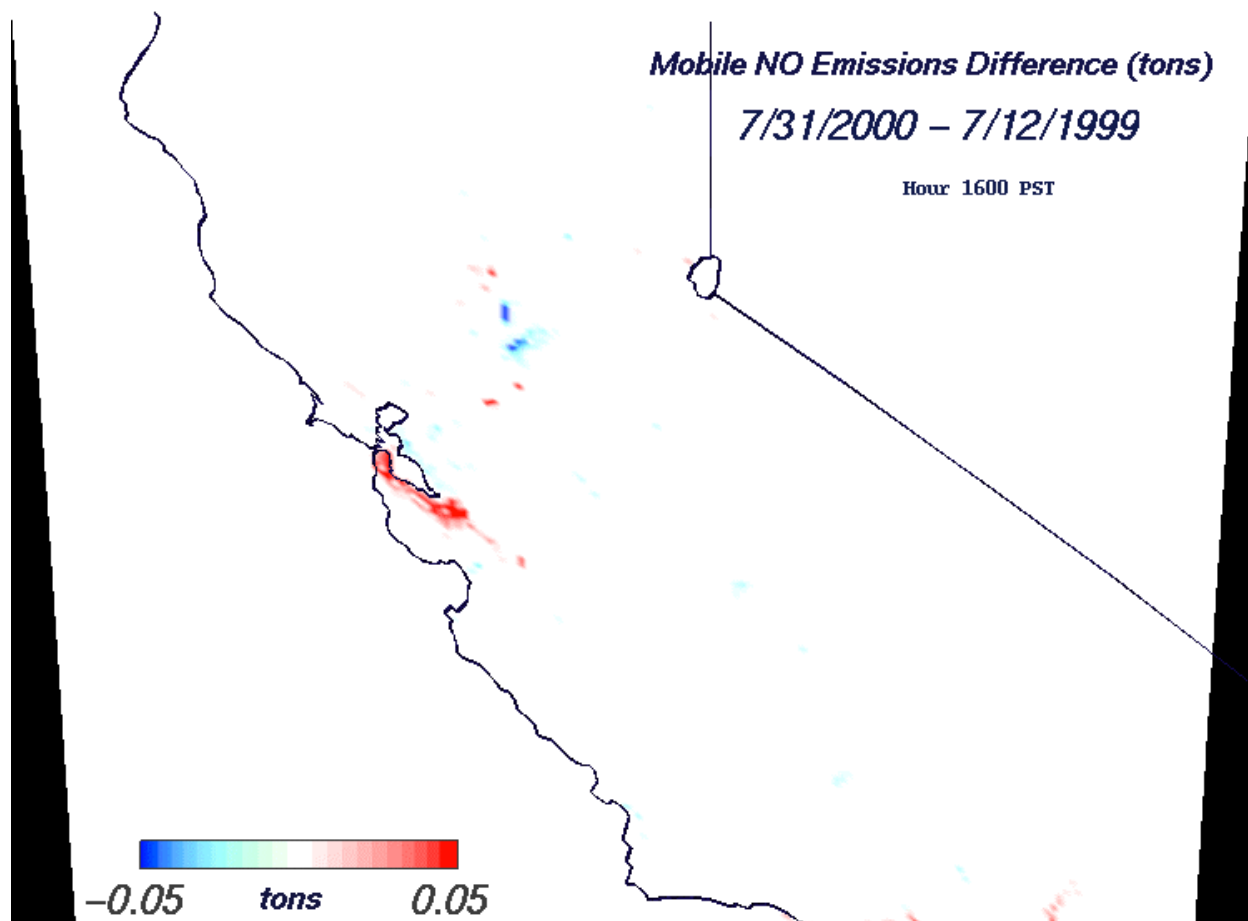


Figure 1. Spatial extent and relative magnitude of the error in on-road mobile source NO emissions estimates. The deficit-enhancement plot results from subtracting the 05 July 1999 on-road mobile source NO emissions estimates at 1600 hours from those of 31 July 2000. (graphic courtesy of BAAQMD).

In a series of emails between ARB and AG staff in early December 2004, it was confirmed that this was indeed an error in the perl script. However, it was also discovered that ARB had alerted AG to this error in July 2003 (the original emissions estimates for the July 1999, 2005, and 2010 episodes were delivered to the BAAQMD in August 2003). Review of AG processing procedures indicates that for the July 1999, 2005, and 2010 episodes, AG (i.e., the author of this memorandum) inadvertently reused the errant perl script to process these three episodes (no other CCOS episode was affected by this oversight).

Impact of the Error

The result of this coding error was that the perl script set the speed fractions to zero for light-duty automobiles, light-duty trucks (T1), light-duty trucks (T2), medium-duty trucks (T3), and motorcycles in the period 0700 through 1800 for the affected counties in the EMFAC2002 input file (Appendix C contains the San Francisco county EMFAC2002 input file for 05-July-1999 with the erroneous speed fractions highlighted in yellow. Appendix D contains the corrected San

Francisco county EMFAC2002 input file for 05-July-1999 showing the correct speed fractions highlighted in green). Hence, running exhaust emissions estimates for all pollutants for the period 0700 through 1800 for the affected counties and vehicle classes were zero.

At this time, it is unclear why NO emissions in the Sacramento area are less in the July 2000 episode than they are in the July 1999 episode.

Corrected Emissions Estimates

After correcting the error in the perl script, new on-road mobile source emissions estimates were prepared for the counties of San Francisco, San Mateo, and Santa Clara for the July 1999, 2005, and 2010 episodes. Further, to ensure that the coding changes affected only the aforementioned counties, EMFAC2002 was run for the counties of Alameda and Sacramento, and it was confirmed that there were no changes to the emissions estimates for the counties of Alameda and Sacramento after the modifications to the perl script were affected.

The new on-road mobile source CAMx-ready emissions estimates files were delivered to the BAAQMD in early November 2003. Table 1 compares the emissions estimates before and after the modification to the *mkimps.pl* perl script for Monday, 05 July 1999. Table 1 also shows the Monday, 31 July 2000 on-road mobile source emissions estimates for comparison purposes.

Table 1. Comparison of on-road mobile source emissions estimates for 05 July 1999 before and after correcting the perl script.

County	TOG (tons/day)			NOX (tons/day)			CO (tons/day)		
	05 Jul 99 (error)	05 Jul 99 (correct)	31 Jul 00	05 Jul 99 (error)	05 Jul 99 (correct)	31 Jul 00	05 Jul 99 (error)	05 Jul 99 (correct)	31 Jul 00
Alameda	49	49	51	84	84	76	435	435	443
Contra Costa	35	35	36	48	48	44	315	315	321
Marin	10	10	10	14	14	12	92	92	87
Napa	6	6	6	8	8	7	51	51	52
San Francisco	16	21	20	30	40	36	96	183	173
San Mateo	20	28	27	26	43	39	127	267	256
Santa Clara	42	61	61	56	91	86	249	571	564
Solano	10	10	10	14	14	13	88	88	89
Sonoma	17	17	16	24	24	22	151	151	145
Total	205	237	237	304	366	335	1,604	2,153	2,130

Unusual NOX Reduction from July 1999 to July 2000?

Meteorology. For purposes of the ensuing discussion, it is necessary to understand the meteorology that has been used in EMFAC2002. Figure 2 shows the hourly temperatures and relative humidities by county that were used in the EMFAC2002 runs.

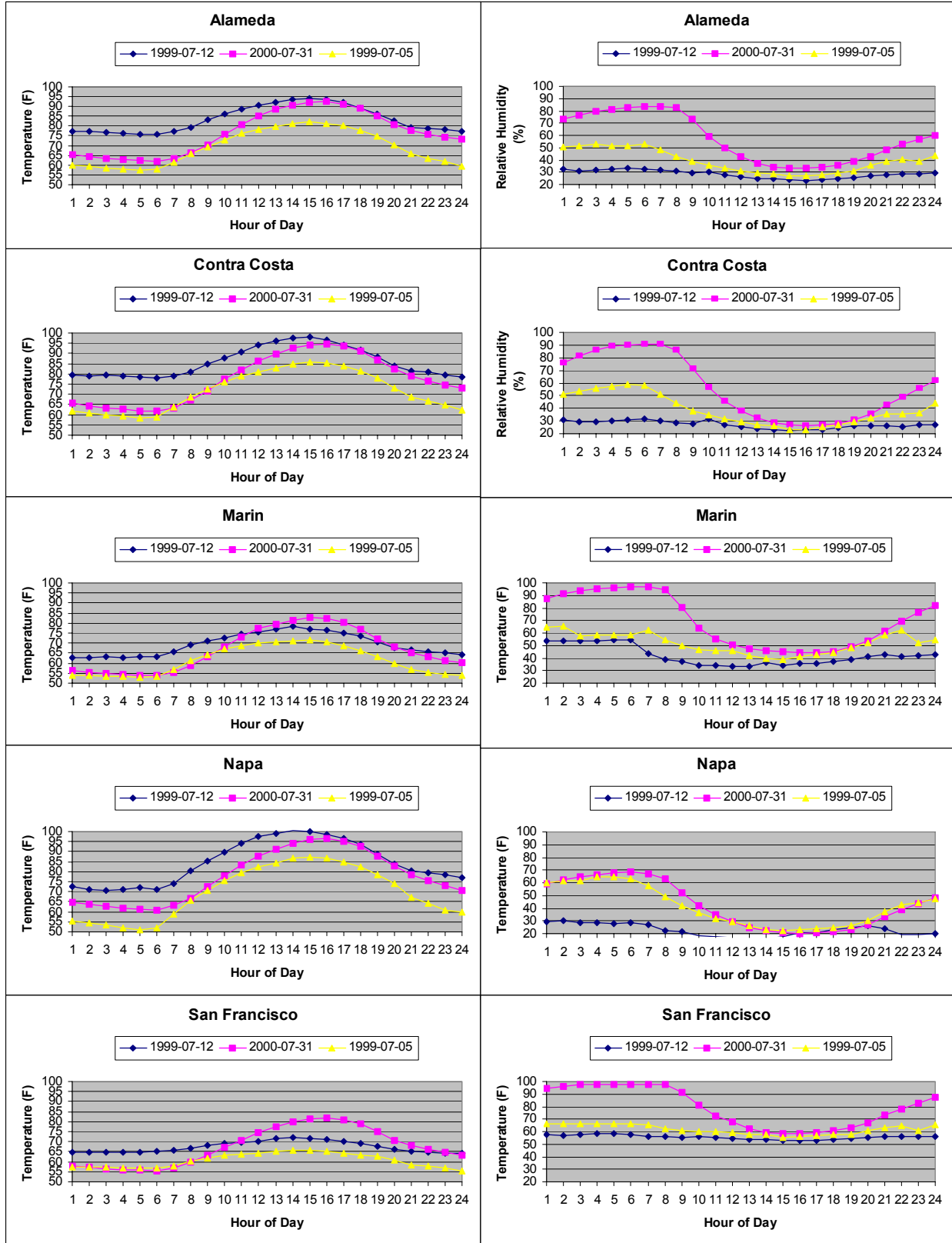


Figure 2. Hourly temperatures and relative humidities by Bay Area county used in EMFAC2002 for 05 and 12 July 1999 and 31 July 2000.

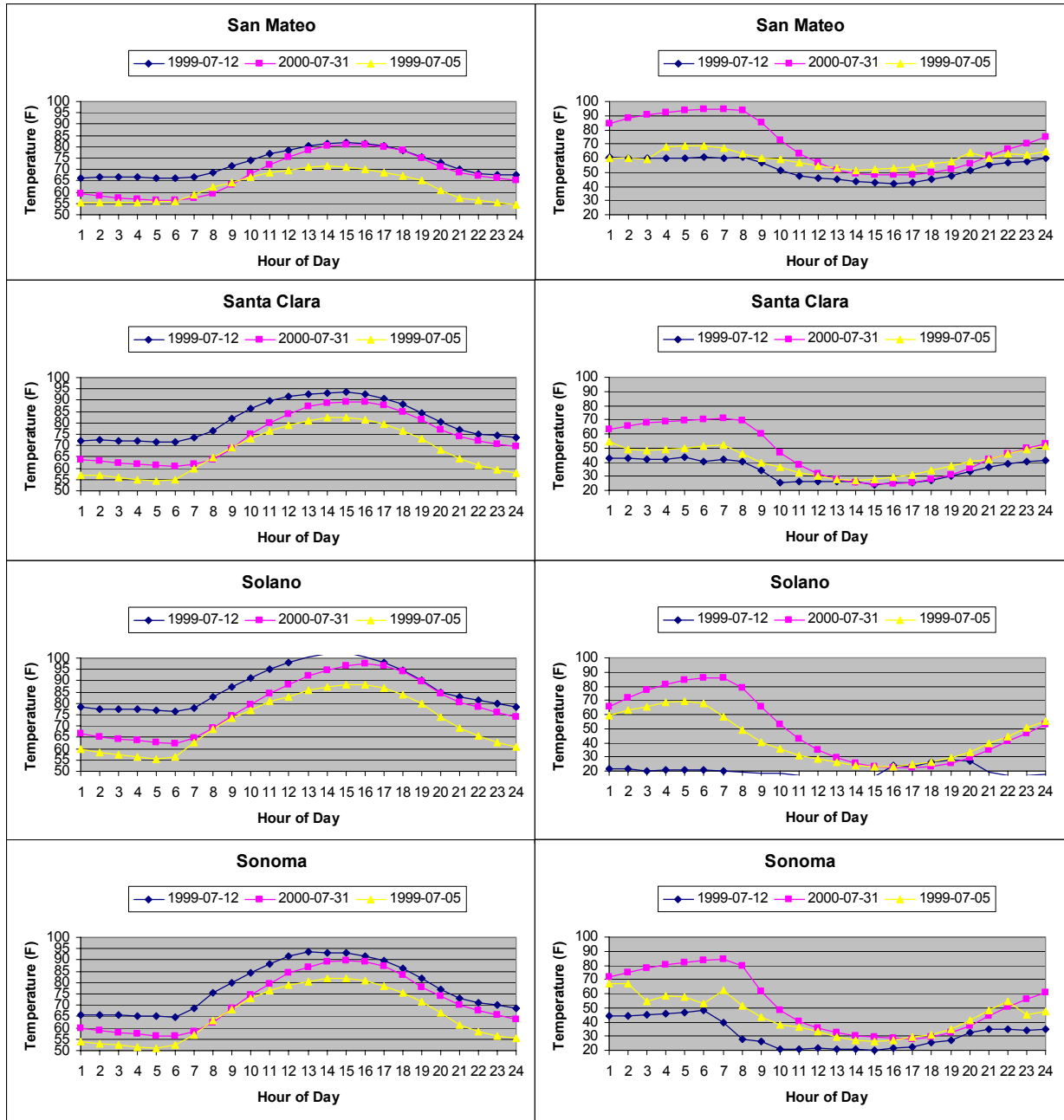


Figure 2. (concluded).

12-July-1999 was typically the hottest day throughout the Bay Area though the afternoon temperatures of 31-July-2000 are roughly equivalent. 05-July-1999 was typically the coolest day. The highest relative humidities were on 31-July-2000 though afternoon to early evening values on all three days are lower (than morning and late evening values) and roughly equal.

Intra-episode and Inter-episode Emissions Comparison. After correcting the emissions estimates, there still existed what on the surface appears to be a greater overall Bay Area NOX reduction (approximately nine percent [i.e., 366 tons/day to 335 tons/day]) from 05-July-1999 to 31-July-2000 than what would otherwise be considered normal, which in this case is assumed to

be approximately three percent. Because there is a second Monday in the July 1999 episode (i.e., 12-July-1999), it is appropriate to present its emissions estimates as well (Table 2).

Table 2. Comparison of on-road mobile source emissions estimates for 05 July 1999, 12 July 1999, 31 July 2000, and 31 July 2000 using 12 July 1999 meteorology.

County	TOG (tons/day)				NOX (tons/day)				CO (tons/day)			
	05 Jul 99 (correct)	12 Jul 99 (correct)	31 Jul 00	31 Jul 00 w/12 Jul 99 met	05 Jul 99 (correct)	12 Jul 99 (correct)	31 Jul 00	31 Jul 00 w/12 Jul 99 met	05 Jul 99 (correct)	12 Jul 99 (correct)	31 Jul 00	31 Jul 00 w/12 Jul 99 met
Alameda	49	56	51	54	84	83	76	82	435	479	443	456
Contra Costa	35	40	36	38	48	48	44	47	315	356	321	338
Marin	10	10	10	10	14	14	12	13	92	89	87	84
Napa	6	7	6	7	8	8	7	8	51	58	52	55
San Francisco	21	21	20	20	40	39	36	38	183	176	173	167
San Mateo	28	29	27	27	43	40	39	39	267	269	256	254
Santa Clara	61	69	61	65	91	88	86	86	571	623	564	593
Solano	10	12	10	11	14	15	13	14	88	99	89	91
Sonoma	17	18	16	17	24	24	22	23	151	161	145	149
Total	237	262	237	249	366	359	335	350	2,153	2,310	2,130	2,187

Table 2 shows that the overall Bay Area TOG emissions increases by about ten percent from 05-July-1999 to 12-July-1999. During that same period, overall Bay Area CO emissions increase about seven percent, and overall Bay Area NOX emissions decrease about two percent. Because the only change in the EMFAC2002 input data sets between 05-July-1999 (Appendix D) and 12-July-1999 (Appendix E) was in regards to the meteorology (meteorology sections are highlighted in red in Appendix D and E), this simple analysis indicates that their appears to exist a greater dependence on meteorology than had been anticipated. Indeed, as shown in Figure 2, the greatest temperature differences occur between 05 and 12 July 1999.

Further, Table 2 shows that the inter-episode differences (i.e., 31-July-2000 versus 05-July-1999 and 31-July-2000 versus 12-July-1999) appear to be somewhat greater than what was expected. As can be observed in Table 2, overall Bay Area TOG emissions estimates do not change, overall Bay Area CO emissions estimates change very little, but, as noted earlier, overall Bay Area NOX emissions decrease about nine percent from 05-July-1999 to 31-July-2000. From 12-July-1999 to 31-July-2000, the changes are a bit more dramatic for TOG, about an eleven percent decrease, and CO, about an eight percent decrease, while NOX decreases about seven percent.

Beyond the meteorological change, the one additional changes that occurs from 1999 to 2000 in the EMFAC2002 input file is that the model year range changes. The calendar year and model year differences between 12-July-1999 (Appendix E) to and 31-July-2000 (Appendix F) are highlighted in cyan, and the meteorological differences are highlighted in red. Of course there are changes in other variables internal to EMFAC2002 which are indirectly controlled by parameters in the EMFAC2002 input file – for example, VMT, which also impacts the emissions estimates calculation presented in Table 2.

However, given that VMT generally increases from 1999 to 2000, it seems unusual to estimate such large decreases in the emissions such as those that are observed from 12-July-1999 to 31-July-2000 without a greater impact coming from meteorology. Or is there something else that can explain these larger than expected changes?

In order to explore this, the meteorology from 12 July 1999 was substituted into the EMFAC run for 31 July 2000. The emissions estimates for this run are also included in Table 2. As can be seen in Table 2, the TOG and CO emissions drop by about five percent, and the NOX emissions drop by about three percent when the 12 July 1999 meteorology is used in the 31 July 2000 EMFAC run. These differences are more in-line with expectations in terms of year-to-year emissions reductions.

Conclusion

Alpine Geophysics has investigated the cause of missing on-road mobile emissions for certain Bay Area counties in the July 1999 episode and has determined that EMFAC2002 inputs were generated incorrectly by using an old perl script that contained a known bug. Processing for all other episodes was determined to be correct. Upon running with the corrected script from CARB, the problem with “lost” emissions in San Mateo, San Francisco, and Santa Clara counties has been resolved. The future years of 2005 and 2010 were also rerun for this episode.

Inspection of daily TOG, CO, and NOx emissions from the Bay Area counties indicated a stronger than expected reduction in NOx between 1999 and 2000 when comparing three Monday scenarios (July 5, 1999, July 12, 1999, and July 31, 2000). Comparing the two Mondays in 1999 reveal a slight (2%) reduction in NOx due purely from meteorological differences; the meteorological influence appears to have a stronger association with lower relative humidity than higher temperature. Comparing July 5, 1999 to July 31, 2000 reveals a rather strong (9%) reduction in NOx. It has been determined that the non-meteorological change from the 1-year difference yields about the expected result, namely a ~3% reduction in NOx. The remaining 6% is apparently related to meteorological factors – it was both slightly warmer and drier on July 31, 2000 than on July 5, 1999 (Figure 2). Review of the air conditioning adjustment factor suggests that the humidity effect plays a stronger role in reducing NOx than the temperature effect has in increasing NOx (ARB, 2000; 2001). At this time, we feel that the EMFAC2002 model has been run correctly, and that these results are explainable in the context of the known adjustments used inside EMFAC2002. It is left for debate as to whether the forms of these equations are appropriate.

References

Wilkinson, J. G. (2004). “Development Of The California Integrated Transportation Network (ITN).” Prepared for Mr. Vernon Hughes, Manager, Control Strategy Modeling Section, CalEPA- Air Resources Board, Planning and Technical Support Division, 1001 I Street, Sacramento, CA. Prepared by Alpine Geophysics, LLC, 7691 Alpine Road, La Honda, CA 94020. AG-TS-90/155. June 07.

ARB (2000). EMFAC2000 Technical Support Documentation. Temperature Correction Factors. 20 April.

www.arb.ca.gov/msei/on-road/downloads/tsd/Temperature_Correction_Final.pdf

ARB (2001). EMFAC2000 Technical Support Documentation. Air Conditioning Correction Factors. 30 March.

www.arb.ca.gov/msei/on-road/downloads/tsd/Air_Condition_Corrections.pdf

Appendix A. Original *mkpins.pl* perl script.

```
use Win32::OLE;
use POSIX;

open(CD, "echo %CD%|");
my $hdir = (<CD>);
close(CD);
chomp($hdir);
my $hdir = "/Documents and Settings/James G. Wilkinson/My Documents/EMFAC/perl
scripts/jul 1999/templates_CCOS_July_1999";

my %Seamon;
my %Mon;
my %BayArea;
my %SJV;
&setup;

my %Pop;
&get_pops;
my %SpFr;
&get_spfr;
my %Temp;
my %Rh;
&get_temp_rh;
my %Counties;
&get_cnums;

for my $file (glob "*.inp") {
    my $cnty;
    my $yr;
    my $seamon;
    if ($file =~ /^([^_]+)_(\d+)_(.*)\.inp/) {
        $cnty = $1;
        $yr = $2;
        $seamon = $3;
    } else {
        print STDERR "Bad template file: $file\n";
        next;
    }
    my $spfryr;
    if ($yr < 2001) {
        $spfryr = 2000;
    } elsif ($yr < 2007) {
        $spfryr = 2006;
    } else {
        $spfryr = 2010;
    }
    my $cnum = $Counties{$cnty};
    open(IN, "$file");
    my @Lines = <IN>;
    close(IN);
    my $mpl = $Seamon{$seamon} + 1;
    for my $mday (sort {$a <=> $b} keys %{$Temp{$cnum}{$mpl}}) {
        if ($mday < 10) {
            $ofile = sprintf "../runs/%s_%s_%s_0%s.inp", $cnty, $yr, $seamon, $mday;
```

```

} else {
    $ofile = sprintf "../runs/%s_%s_%s_%s.inp", $cnty, $yr, $seamon, $mday;
}
if (defined($BayArea{$cnty})) {
    $cnty = $BayArea{$cnty};
}
print STDERR "Creating inp file $ofile\n";
open(OUT, ">$ofile");
select(OUT);
my $lnum = 0;
print $Lines[$lnum++];
if (defined($Pop{$cnty}{$yr})) {
    # Bay Area has pop and 120 speed frac. as well as temp/rh
    print "123                ! Number of WIS data items to follow\n";
    $lnum++;
    print $Lines[$lnum++];
    $pop = $Lines[$lnum++]; chomp($pop);
    for (1 .. 8) {
        $pop .= $Lines[$lnum++]; chomp($pop);
    }
    @pop = split(" ", $pop);
    # $sum = 0;
    #for (0 .. $#pop) {
    #    $sum += $pop[$_];
    #}
    #print "sum = $sum\n";
    for (0 .. $#pop) {
        $pop[$_] *= $Pop{$cnty}{$yr}/100000;
        $pop[$_] = &emformat($pop[$_]);
    }
    &emprint(@pop[0 .. 12]);
    &emprint(@pop[13 .. 25]);
    &emprint(@pop[26 .. 38]);
} elsif (defined($SJV{$cnty}{$yr})) {
    # SJV has pop as well as temp/rh
    print "3                ! Number of WIS data items to follow\n";
    $lnum++;
    print $Lines[$lnum++];
    $pop = $Lines[$lnum++]; chomp($pop);
    for (1 .. 8) {
        $pop .= $Lines[$lnum++]; chomp($pop);
    }
    @pop = split(" ", $pop);
    for (0 .. $#pop) {
        $pop[$_] *= $SJV{$cnty}{$yr}/100000;
        $pop[$_] = &emformat($pop[$_]);
    }
    &emprint(@pop[0 .. 12]);
    &emprint(@pop[13 .. 25]);
    &emprint(@pop[26 .. 38]);
} else {
    # For non-Bay Area and non-SJV
    print "2                ! Number of WIS data items to follow\n";
    $lnum += 11;
}
# Temp
print $Lines[$lnum++];

```

```

&sfprint(1,@{$Temp{$Scnum}{$Smp1}{$Mday}});
$lnum += 5;
# Rh
print $Lines[$lnum++];
&sfprint(1,@{$Rh{$Scnum}{$Smp1}{$Mday}});
$lnum += 5;
# dump the Spd Fr and use our own.
$lnum += 5;
if (defined($SpFr{peak}{$spfryr}{$cnty})) {
  for my $veh (qw(1 2 3 4 11)) {
    for my $period (1 .. 24) {
      printf "      8 %2d %2d 0 0" .
        "          ! Spd Fr AREAfrac(veh=%2d,.,period=%2d)\n",
          $period, $veh, $veh, $period;
      if ($period > 6 && $period < 19) {
        # peak
        &sfprint(100,@{$SpFr{peak}{$spfryr}{$cnty}});
      } else {
        # off-peak
        &sfprint(100,@{$SpFr{offpeak}{$spfryr}{$cnty}});
      }
    }
  }
}
if (defined($BayArea{$cnty})) {
  for ($lnum .. ($#Lines - 1)) {
    if ($Lines[$_] =~ /num_prog/) {
      print " 5          ! Number of I/M programs (num_prog) in scenario 1\n";
    } elsif ($Lines[$_] =~ /BURDEN/) {
      print "TFTTF          ! BURDEN Output Options\n";
    } else {
      print $Lines[$_];
    }
  }
}
print <<EOF;
1 1 2004          ! Subprograms, start month, and start year for I/M
program 5
2          ! Inspection frequency (1=Annual, 2=Biennial)
4          ! Test method
3          ! Visual/Functional checks
1          ! Exhaust Cutpoint Stringency
3          ! Repair Cost
2          ! Mechanic Inspection Effectiveness
0          ! Minimum vehicle age
30         ! Maximum vehicle age
1974       ! Minimum model year
2040       ! Maximum model year
4          ! Free years
0          ! Years to skip
2          ! Mechanic Repair Effectiveness
2          ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17      ! Change of ownership percentage
0.00      ! Annual % vehs captured by random roadside program
0.00      ! Annual % vehs captured by remote sensing program
0.00      ! Annual % vehs captured by tamper detection program
0          ! Years of annual inspections for a gross polluter
0          ! Zero if high-emitter profile is not used

```

```

F          ! True if bad exhaust text algorithm is used
T          ! True if ARB's OBD II assumptions are used for OBD II
vehicles
T          ! All PCs  included in program [Yes(T) or No(F)]
T          ! All LDT  included in program [Yes(T) or No(F)]
T          ! All MDV  included in program [Yes(T) or No(F)]
T          ! All HDGV  included in program [Yes(T) or No(F)]
F          ! All HDDV  included in program [Yes(T) or No(F)]
F          ! All MCs  included in program [Yes(T) or No(F)]
          ! Tech groups (if any) in subprogram.
#
EOF
} else {
  for ($lnum .. $#Lines) {
    if ($Lines[$_] =~ /BURDEN/) {
      print "TFTTF"          ! BURDEN Output Options\n";
    } else {
      print $Lines[$_];
    }
  }
}
}
#exit;
}

sub get_pops
{
  my $chart1 = Win32::OLE->GetObject($hdir . '\..\SFAB_NewPop.xls');
  my $sheet = $chart1->Worksheets(1);
  my $v = $sheet->Range("A6:AC15")->{Value};
  undef($chart1);
  my @Years = @{$v}[0];
  for my $i (1 .. $#{$v}) {
    my $county = ${$v}[$i][0];
    for my $j (1 .. $#{{$v}[0]}) {
      $yr = $Years[$j];
      #if (defined($DoYears{$yr})) {
      #  $Pop{$county}{$yr} = ${$v}[$i][$j];
      #}
      $Pop{$county}{$yr} = ${$v}[$i][$j];
    }
  }
  $Pop{Solano}{2005} = 318629;
  $Pop{Solano}{2006} = 328518;
  $Pop{Sonoma}{2005} = 394786;
  $Pop{Sonoma}{2006} = 402029;
}

sub emprint
{
  my(@nums) = @_;
  while ($#nums > 3) {
    printf "%15s" x 5 . "\n", splice(@nums, 0, 5);
  }
  printf "%15s" x ($#nums + 1) . "\n", @nums;
}
sub emformat

```

```

{
my($num) = @_;
if ($num < .1) {
    $num = sprintf "%14.7E", $num;
    $num =~ s/(E[+-])0/$1/;
} else {
    my $chk = 6 - POSIX::floor(log($num)/log(10));
    if ($chk < 0) { $chk = 0 }
    $fmt = sprintf "%10.7df", $chk;
    $num = sprintf $fmt, $num;
}
return($num);
}

sub get_spfr
{
    my $chart1 = Win32::OLE->GetObject($hdir .
'\..\SFAB_SpeedDistrib_June2003_pb.xls');
    my @Years = qw(2000 2006 2010);
    for my $sn (0 .. $#Years) {
        my $sheet = $chart1->Worksheets(($sn + 1));
        my $v = $sheet->Range("A4:O13")->{Value};
        #my @Bins = @{$v}[0];
        for my $i (1 .. @{$v}) {
            my $county = ${v}[$i][0];
            if (defined($BayArea{$county})) {
                $county = $BayArea{$county};
            }
            for my $j (0 .. 18) {
                $SpFr{offpeak}{$Years[$sn]}{$county}[$j] = 0;
                $SpFr{peak}{$Years[$sn]}{$county}[$j] = 0;
            }
            for my $j (2 .. @{$v}[0]) {
                $SpFr{offpeak}{$Years[$sn]}{$county}[$j-1] =
                    ${v}[$i][$j];
            }
        }
        $v = $sheet->Range("A16:O25")->{Value};
        #@Bins = @{$v}[0];
        for my $i (1 .. @{$v}) {
            my $county = ${v}[$i][0];
            for my $j (2 .. @{$v}[0]) {
                $SpFr{peak}{$Years[$sn]}{$county}[$j-1] =
                    ${v}[$i][$j];
            }
        }
    }
    undef($chart1);
}

sub get_temp_rh
{
    my $misn = -9999;
    my @Missing = (
        $misn, $misn, $misn, $misn, $misn, $misn, $misn, $misn,
        $misn, $misn, $misn, $misn, $misn, $misn, $misn, $misn,
        $misn, $misn, $misn, $misn, $misn, $misn, $misn, $misn,
    )
}

```

```

);

for my $file (glob "../*.avgtrh") {
    my $mon = substr($file,3,3);
    my $m = $Mon{$mon};
    my $day = substr($file,6,2) + 0;
    open(IN, $file);
    while (<IN>) {
        chomp;
        my($cnum,$hr,$temp,$rh) = split(' ', $_);
        if (! defined($Temp{$cnum}{$m}{$day})) {
            @{$Temp{$cnum}{$m}{$day}} = @Missing;
        }
        if (! defined($Rh{$cnum}{$m}{$day})) {
            @{$Rh{$cnum}{$m}{$day}} = @Missing;
        }
        $Temp{$cnum}{$m}{$day}[$hr-1] = $temp;
        $Rh{$cnum}{$m}{$day}[$hr-1] = $rh;
    }
}
# Fix missing temperatures.
for my $cnum (keys %Temp) {
    for my $m (keys %{$Temp{$cnum}}) {
        for my $mday (keys %{$Temp{$cnum}{$m}}) {
            for my $hr (0 .. 23) {
                if ($Temp{$cnum}{$m}{$mday}[$hr] == $misn) {
                    $Temp{$cnum}{$m}{$mday}[$hr] = $Temp{$cnum}{$m}{$mday+1}[$hr];
                }
                if ($Rh{$cnum}{$m}{$mday}[$hr] == $misn) {
                    $Rh{$cnum}{$m}{$mday}[$hr] = $Rh{$cnum}{$m}{$mday+1}[$hr];
                }
            }
        }
    }
}

sub get_cnums
{
    open(IN, "../counties") || die "Can't open file counties";
    while (<IN>) {
        chomp;
        my $num = substr($_,0,3) + 0;
        my $name = substr($_,8);
        $Counties{$name} = $num;
    }
}

sub setup
{
    my @Seamon = qw(
        January February March April May June
        July August September October November December
        Summer Winter Annual
    );
    for my $i (0 .. $#Seamon) {
        $Seamon{$Seamon[$i]} = $i;
    }
}

```

```

}
my @Mon = qw(
    jan feb mar apr may jun
    jul aug sep oct nov dec
);
for my $i (0 .. $#Mon) {
    $Mon{$Mon[$i]} = $i + 1;
}
%BayArea = (
    Alameda => "Alameda",
    "Contra Costa" => "Contra Costa",
    Marin => "Marin",
    Napa => "Napa",
    SF => "San Francisco",
    "San Francisco" => "San Francisco",
    SM => "San Mateo",
    "San Mateo" => "San Mateo",
    SC => "Santa Clara",
    "Santa Clara" => "Santa Clara",
    Solano => "Solano",
    Sonoma => "Sonoma",
);
$SJV{Fresno}{2005} = 556375;
$SJV{Kern}{2005} = 488508;
$SJV{Kings}{2005} = 77138;
$SJV{Madera}{2005} = 107129;
$SJV{Merced}{2005} = 153836;
$SJV{"San Joaquin"}{2005} = 415772;
$SJV{Stanislaus}{2005} = 343288;
$SJV{Tulare}{2005} = 270547;
$SJV{Fresno}{2006} = 571221;
$SJV{Kern}{2006} = 508100;
$SJV{Kings}{2006} = 78887;
$SJV{Madera}{2006} = 111287;
$SJV{Merced}{2006} = 159316;
$SJV{"San Joaquin"}{2006} = 429608;
$SJV{Stanislaus}{2006} = 350629;
$SJV{Tulare}{2006} = 277300;
}

sub sfprint
{
    my($div,@nums) = @_;
    for (@nums) {
        $_ /= $div;
        if ($_ < .1) {
            $_ = sprintf "%14.7E", $_;
            $_ =~ s/(E[+-])0/$1/;
        } else {
            my $chk = 6 - POSIX::floor(log($_)/log(10));
            if ($chk < 0) { $chk = 0 }
            my $fmt = sprintf "%10.5df", $_;
            $_ = sprintf $fmt, $_;
        }
    }
}

while ($#nums > 3) {
    printf "%15s" x 5 . "\n", splice(@nums, 0, 5);
}

```

```
}  
printf "%15s" x ($#nums + 1) . "\n", @nums;  
}
```

Appendix B. Modified mkinps.pl perl script with corrected code highlighted.

```
use Win32::OLE;
use POSIX;

open(CD, "echo %CD%|");
my $hdir = (<CD>);
close(CD);
chomp($hdir);
my $hdir = "/Documents and Settings/James G. Wilkinson/My Documents/EMFAC/perl
scripts/jul 1999/templates_CCOS_July_1999";

my %Seamon;
my %Mon;
my %BayArea;
my %SJV;
&setup;

my %Pop;
&get_pops;
my %SpFr;
&get_spfr;
my %Temp;
my %Rh;
&get_temp_rh;
my %Counties;
&get_cnums;

for my $file (glob "*.inp") {
    my $cnty;
    my $yr;
    my $seamon;
    if ($file =~ /^([_]+)_([\d+)]_(.*)\.inp/) {
        $cnty = $1;
        $yr = $2;
        $seamon = $3;
    } else {
        print STDERR "Bad template file: $file\n";
        next;
    }
    my $spfryr;
    if ($yr < 2001) {
        $spfryr = 2000;
    } elsif ($yr < 2007) {
        $spfryr = 2006;
    } else {
        $spfryr = 2010;
    }
    my $cnum = $Counties{$cnty};
    open(IN, "$file");
    my @Lines = <IN>;
    close(IN);
    my $mpl = $Seamon{$seamon} + 1;
    for my $mday (sort {$a <=> $b} keys %{$Temp{$cnum}{$mpl}}) {
        if ($mday < 10) {
```

```

    $ofile = sprintf "../runs/%s_%s_%s_0%s.inp", $cnty, $yr, $seamon, $mday;
} else {
    $ofile = sprintf "../runs/%s_%s_%s_%s.inp", $cnty, $yr, $seamon, $mday;
}
}
if (defined($BayArea{$cnty})) {
    $cnty = $BayArea{$cnty};
}
print STDERR "Creating inp file $ofile\n";
open(OUT, ">$ofile");
select(OUT);
my $lnum = 0;
print $Lines[$lnum++];
if (defined($Pop{$cnty}{$yr})) {
    # Bay Area has pop and 120 speed frac. as well as temp/rh
    print "123                ! Number of WIS data items to follow\n";
    $lnum++;
    print $Lines[$lnum++];
    $pop = $Lines[$lnum++]; chomp($pop);
    for (1 .. 8) {
        $pop .= $Lines[$lnum++]; chomp($pop);
    }
    @pop = split(" ", $pop);
    # $sum = 0;
    #for (0 .. $#pop) {
    #    $sum += $pop[$_];
    #}
    #print "sum = $sum\n";
    for (0 .. $#pop) {
        $pop[$_] *= $Pop{$cnty}{$yr}/100000;
        $pop[$_] = &emformat($pop[$_]);
    }
    &emprint(@pop[0 .. 12]);
    &emprint(@pop[13 .. 25]);
    &emprint(@pop[26 .. 38]);
} elsif (defined($SJV{$cnty}{$yr})) {
    # SJV has pop as well as temp/rh
    print "3                ! Number of WIS data items to follow\n";
    $lnum++;
    print $Lines[$lnum++];
    $pop = $Lines[$lnum++]; chomp($pop);
    for (1 .. 8) {
        $pop .= $Lines[$lnum++]; chomp($pop);
    }
    @pop = split(" ", $pop);
    for (0 .. $#pop) {
        $pop[$_] *= $SJV{$cnty}{$yr}/100000;
        $pop[$_] = &emformat($pop[$_]);
    }
    &emprint(@pop[0 .. 12]);
    &emprint(@pop[13 .. 25]);
    &emprint(@pop[26 .. 38]);
} else {
    # For non-Bay Area and non-SJV
    print "2                ! Number of WIS data items to follow\n";
    $lnum += 11;
}
}
# Temp

```

```

print $Lines[$lnum++];
&sfprint(1,@{$Temp{$cnum}{$smp1}{$mday}});
$lnum += 5;
# Rh
print $Lines[$lnum++];
&sfprint(1,@{$Rh{$cnum}{$smp1}{$mday}});
$lnum += 5;
# dump the Spd Fr and use our own.
$lnum += 5;
if (defined($SpFr{peak}{$spfryr}{$cnty})) {
  for my $veh (qw(1 2 3 4 11)) {
    for my $period (1 .. 24) {
      printf "      8 %2d %2d 0 0" .
        "          ! Spd Fr AREAFRAC(veh=%2d, :,period=%2d)\n",
          $period, $veh, $veh, $period;
      if ($period > 6 && $period < 19) {
        # peak
        &sfprint(100,@{$SpFr{peak}{$spfryr}{$cnty}});
      } else {
        # off-peak
        &sfprint(100,@{$SpFr{offpeak}{$spfryr}{$cnty}});
      }
    }
  }
}
if (defined($BayArea{$cnty})) {
  for ($lnum .. ($#Lines - 1)) {
    if ($Lines[$_] =~ /num_prog/) {
      print " 5          ! Number of I/M programs (num_prog) in scenario 1\n";
    } elsif ($Lines[$_] =~ /BURDEN/) {
      print "TFTTF          ! BURDEN Output Options\n";
    } else {
      print $Lines[$_];
    }
  }
}
print <<EOF;
1 1 2004          ! Subprograms, start month, and start year for I/M
program 5
2          ! Inspection frequency (1=Annual, 2=Biennial)
4          ! Test method
3          ! Visual/Functional checks
1          ! Exhaust Cutpoint Stringency
3          ! Repair Cost
2          ! Mechanic Inspection Effectiveness
0          ! Minimum vehicle age
30         ! Maximum vehicle age
1974       ! Minimum model year
2040      ! Maximum model year
4          ! Free years
0          ! Years to skip
2          ! Mechanic Repair Effectiveness
2          ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17      ! Change of ownership percentage
0.00      ! Annual % vehs captured by random roadside program
0.00      ! Annual % vehs captured by remote sensing program
0.00      ! Annual % vehs captured by tamper detection program
0          ! Years of annual inspections for a gross polluter

```

```

0          ! Zero if high-emitter profile is not used
F          ! True if bad exhaust text algorithm is used
T          ! True if ARB's OBD II assumptions are used for OBD II
vehicles
T          ! All PCs included in program [Yes(T) or No(F)]
T          ! All LDT included in program [Yes(T) or No(F)]
T          ! All MDV included in program [Yes(T) or No(F)]
T          ! All HDGV included in program [Yes(T) or No(F)]
F          ! All HDDV included in program [Yes(T) or No(F)]
F          ! All MCs included in program [Yes(T) or No(F)]
          ! Tech groups (if any) in subprogram.
#
EOF
} else {
  for ($lnum .. $#Lines) {
    if ($Lines[$_] =~ /BURDEN/) {
      print "TFTTF"          ! BURDEN Output Options\n";
    } else {
      print $Lines[$_];
    }
  }
}
}
#exit;
}

sub get_pops
{
  #use strict;
  #use Win32::OLE qw(in with);
  #use Win32::OLE::Const 'Microsoft Excel';
  #Win32::OLE::Warn = 3;          # die on
errors...
  #my $Excel = Win32::OLE->GetActiveObject('Excel.Application'); # already
active Excel workbook
  #my $Book = $Excel->Workbooks->Open($hdir . "\..\SFAB_NewPop.xls"); #
open Excel file
  #my $sheet = $Book->Worksheets(1); # select
worksheet number 1

my $chart1 = Win32::OLE->GetObject($hdir . '\..\SFAB_NewPop.xls');
my $sheet = $chart1->Worksheets(1);
my $v = $sheet->Range("A6:AC15")->{'Value'};
#$Book->Close;

undef($chart1);
my @Years = @{$v}[0];
for my $i (1 .. @{$v}) {
  my $county = ${v}[$i][0];
  for my $j (1 .. @{$v}[0]) {
    my $yr = $Years[$j];
    #if (defined($DoYears{$yr})) {
    # $Pop{$county}{$yr} = ${v}[$i][$j];
    #}
}
}
}

```

```

        $Pop{$county}{$yr} = ${$v}[$i][$j];
    }
}
$Pop{Solano}{2005} = 318629;
$Pop{Solano}{2006} = 328518;
$Pop{Sonoma}{2005} = 394786;
$Pop{Sonoma}{2006} = 402029;
}

sub emprint
{
    my(@nums) = @_ ;
    while ($#nums > 3) {
        printf "%15s" x 5 . "\n", splice(@nums, 0, 5);
    }
    printf "%15s" x ($#nums + 1) . "\n", @nums;
}

sub emformat
{
    my($num) = @_ ;
    if ($num < .1) {
        $num = sprintf "%14.7E", $num;
        $num =~ s/(E[+-])0/$1/;
    } else {
        my $chk = 6 - POSIX::floor(log($num)/log(10));
        if ($chk < 0) { $chk = 0 }
        $fmt = sprintf "%10.0df", $chk;
        $num = sprintf $fmt, $num;
    }
    return($num);
}

sub get_spfr
{
    my $chart1 = Win32::OLE->GetObject($hdir .
'\..\SFAB_SpeedDistrib_June2003_pb.xls');
    my @Years = qw(2000 2006 2010);
    for my $sn (0 .. $#Years) {
        my $sheet = $chart1->Worksheets(($sn + 1));
        my $v = $sheet->Range("A4:O13")->{Value};
        #my @Bins = @{${$v}[0]};
        for my $i (1 .. @{${$v}}) {
            my $county = ${$v}[$i][0];
            if (defined($BayArea{$county})) {
                $county = $BayArea{$county};
            }
            for my $j (0 .. 18) {
                $SpFr{offpeak}{$Years[$sn]}{$county}[$j] = 0;
                $SpFr{peak}{$Years[$sn]}{$county}[$j] = 0;
            }
            for my $j (2 .. @{${$v}[0]}) {
                $SpFr{offpeak}{$Years[$sn]}{$county}[$j-1] =
                ${$v}[$i][$j];
            }
        }
        my $v = $sheet->Range("A16:O25")->{Value};
        #@Bins = @{${$v}[0]};
    }
}

```

```

    for my $i (1 .. $#{$v}) {
        my $county = ${v}[$i][0];
        if (defined($BayArea{$county})) {
            $county = $BayArea{$county};
        }
        for my $j (2 .. #{{v}[0]}) {
            $SpFr{peak}{{Years[$sn]}{$county}[$j-1]} =
                ${v}[$i][$j];
        }
    }
}
undef($chart1);
}

sub get_temp_rh
{
    my $misn = -9999;
    my @Missing = (
        $misn, $misn, $misn, $misn, $misn, $misn, $misn, $misn,
        $misn, $misn, $misn, $misn, $misn, $misn, $misn, $misn,
        $misn, $misn, $misn, $misn, $misn, $misn, $misn, $misn,
    );

    for my $file (glob "../*.avgtrh") {
        my $mon = substr($file, 3, 3);
        my $m = $Mon{$mon};
        my $day = substr($file, 6, 2) + 0;
        open(IN, $file);
        while (<IN>) {
            chomp;
            my($cnum, $hr, $temp, $rh) = split(' ', $_);
            if (! defined($Temp{$cnum}{$m}{$day})) {
                @{$Temp{$cnum}{$m}{$day}} = @Missing;
            }
            if (! defined($Rh{$cnum}{$m}{$day})) {
                @{$Rh{$cnum}{$m}{$day}} = @Missing;
            }
            $Temp{$cnum}{$m}{$day}[$hr-1] = $temp;
            $Rh{$cnum}{$m}{$day}[$hr-1] = $rh;
        }
    }
    # Fix missing temperatures.
    for my $cnum (keys %Temp) {
        for my $m (keys %{$Temp{$cnum}}) {
            for my $mday (keys %{$Temp{$cnum}{$m}}) {
                for my $hr (0 .. 23) {
                    if ($Temp{$cnum}{$m}{$mday}[$hr] == $misn) {
                        $Temp{$cnum}{$m}{$mday}[$hr] = $Temp{$cnum}{$m}{$mday+1}[$hr];
                    }
                    if ($Rh{$cnum}{$m}{$mday}[$hr] == $misn) {
                        $Rh{$cnum}{$m}{$mday}[$hr] = $Rh{$cnum}{$m}{$mday+1}[$hr];
                    }
                }
            }
        }
    }
}
}

```

```

sub get_cnums
{
  open(IN, "../counties") || die "Can't open file counties";
  while (<IN>) {
    chomp;
    my $num = substr($_,0,3) + 0;
    my $name = substr($_,8);
    $Counties{$name} = $num;
  }
}

sub setup
{
  my @Seamon = qw(
    January February March April May June
    July August September October November December
    Summer Winter Annual
  );
  for my $i (0 .. $#Seamon) {
    $Seamon{$Seamon[$i]} = $i;
  }
  my @Mon = qw(
    jan feb mar apr may jun
    jul aug sep oct nov dec
  );
  for my $i (0 .. $#Mon) {
    $Mon{$Mon[$i]} = $i + 1;
  }
  %BayArea = (
    Alameda => "Alameda",
    "Contra Costa" => "Contra Costa",
    Marin => "Marin",
    Napa => "Napa",
    SF => "San Francisco",
    "San Francisco" => "San Francisco",
    SM => "San Mateo",
    "San Mateo" => "San Mateo",
    SC => "Santa Clara",
    "Santa Clara" => "Santa Clara",
    Solano => "Solano",
    Sonoma => "Sonoma",
  );
  $SJV{Fresno}{2005} = 556375;
  $SJV{Kern}{2005} = 488508;
  $SJV{Kings}{2005} = 77138;
  $SJV{Madera}{2005} = 107129;
  $SJV{Merced}{2005} = 153836;
  $SJV{"San Joaquin"}{2005} = 415772;
  $SJV{Stanislaus}{2005} = 343288;
  $SJV{Tulare}{2005} = 270547;
  $SJV{Fresno}{2006} = 571221;
  $SJV{Kern}{2006} = 508100;
  $SJV{Kings}{2006} = 78887;
  $SJV{Madera}{2006} = 111287;
  $SJV{Merced}{2006} = 159316;
  $SJV{"San Joaquin"}{2006} = 429608;
}

```

```

$SJV{Stanislaus}{2006} = 350629;
$SJV{Tulare}{2006} = 277300;
}

sub sfprint
{
  my($div,@nums) = @_ ;
  for (@nums) {
    $_ /= $div;
    if ($_ < .1) {
      $_ = sprintf "%14.7E", $_;
      $_ =~ s/(E[+-])0/$1/;
    } else {
      my $chk = 6 - POSIX::floor(log($_)/log(10));
      if ($chk < 0) { $chk = 0 }
      my $fmt = sprintf "%%10.0df    ", $chk;
      $_ = sprintf $fmt, $_;
    }
  }
  while ($#nums > 3) {
    printf "%15s" x 5 . "\n", splice(@nums, 0, 5);
  }
  printf "%15s" x ($#nums + 1) . "\n", @nums;
}

```

Appendix C. San Francisco County EMFAC2002 input file with incorrect speed distributions for 05 July 1999.

```

-2 2 20 6 30423 1      ! WIS data first, 1 scenarios follow
123                    ! Number of WIS data items to follow
  21  0  0  0  0      ! Pop Tot A_A_A_Pop(age=sum,veh=:,fuel=:,area= 0)
267229.9              30116.43              46779.05              33018.65              2568.873
910.0837              1979.752              380.4320              0.0000000E+00              391.0003
11462.78              44.00692              1043.083
2201.247              620.1681              651.0545              278.1292              480.1193
571.1015              4497.605              3186.459              0.0000000E+00              1221.001
0.0000000E+00        225.0334              27.00315
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00
  2  7  0  0  0      ! AreaAvg T AREATEMP(:,month= 7)
57.43000              57.38000              57.29000              56.92000              56.97000
56.98000              57.88000              60.40000              61.92000              63.19000
63.56000              64.27000              65.23000              65.65000              65.80000
65.20000              64.24000              63.40000              62.61000              60.56000
58.54000              57.76000              56.65000              55.33000
  4  7  0  0  0      ! AreaAvg RH AREA_RH(:,month= 7)
65.95000              66.26000              66.19000              66.58000              66.49000
66.35000              65.87000              62.64000              60.83000              60.18000
59.64000              59.58000              58.01000              57.49000              55.54000
56.03000              56.64000              57.47000              57.39000              60.90000
62.94000              64.35000              60.44000              65.49000
  8  1  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 1)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  2  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 2)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  3  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 3)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  4  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 4)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  5  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 5)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  6  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 6)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  7  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 7)
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00

```



```

San Francisco County Avg 1999 July Default Title ! Scenario Title
Burden      8 1      ! Program mode TOG PM30
1999        ! Calendar Year
7           ! Month/Season
4           ! Geographic area selection: San Francisco County
38          ! County Number
FFFFF      ! WEIGHT Output Options
FFFTF      ! EMFAC Output Options
TFTTF      ! BURDEN Output Options
FTFFF      ! CALIMFAC Output Options
FFFFF      ! EMFACnn Output Options
25          ! First hour printed for detailed Burden output
6 1        ! Bag and correction for Calimfac output
1965       ! First model year considered in calculations
1999       ! Last model year considered in calculations

! Data on I/M Programs
! -----
5           ! Number of I/M programs (num_prog) in scenario 1
43          ! Area used for I/M basis: San Francisco (SF)
2 3 1984   ! Subprograms, start month, and start year for I/M program 1
2 2        ! Inspection frequency (1=Annual, 2=Biennial)
1 2        ! Test method
2 2        ! Visual/Functional checks
1 1        ! Exhaust Cutpoint Stringency
1 1        ! Repair Cost
1 1        ! Mechanic Inspection Effectiveness
0 0        ! Minimum vehicle age
45 45     ! Maximum vehicle age
1966 1980  ! Minimum model year
1979 2040  ! Maximum model year
1 1        ! Free years
0 0        ! Years to skip
1 1        ! Mechanic Repair Effectiveness
1 1        ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 ! Change of ownership percentage
0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 ! Annual % vehs captured by tamper detection program
0 0        ! Years of annual inspections for a gross polluter
0 0        ! Zero if high-emitter profile is not used
F F        ! True if bad exhaust text algorithm is used
T T        ! True if ARB's OBD II assumptions are used for OBD II vehicles
T T        ! All PCs included in program [Yes(T) or No(F)]
T T        ! All LDT included in program [Yes(T) or No(F)]
T T        ! All MDV included in program [Yes(T) or No(F)]
F F        ! All HDGV included in program [Yes(T) or No(F)]
F F        ! All HDDV included in program [Yes(T) or No(F)]
F F        ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
3 7 1990   ! Subprograms, start month, and start year for I/M program 2
2 2 2      ! Inspection frequency (1=Annual, 2=Biennial)
1 1 2      ! Test method
3 3 3      ! Visual/Functional checks
2 2 2      ! Exhaust Cutpoint Stringency
2 2 2      ! Repair Cost
2 2 2      ! Mechanic Inspection Effectiveness
0 0 0      ! Minimum vehicle age
45 45 45   ! Maximum vehicle age
1966 1966 1980 ! Minimum model year
2040 1979 2040 ! Maximum model year
1 1 1      ! Free years
0 0 0      ! Years to skip

```

```

2 2 2      ! Mechanic Repair Effectiveness
1 1 1      ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 0.17 ! Change of ownership percentage
0.00 0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 0.00 ! Annual % vehs captured by tamper detection program
  0  0  0      ! Years of annual inspections for a gross polluter
  0  0  0      ! Zero if high-emitter profile is not used
  F  F  F      ! True if bad exhaust text algorithm is used
  T  T  T      ! True if ARB's OBD II assumptions are used for OBD II vehicles
  F  T  T      ! All PCs  included in program [Yes(T) or No(F)]
  F  T  T      ! All LDT  included in program [Yes(T) or No(F)]
  F  T  T      ! All MDV  included in program [Yes(T) or No(F)]
  T  F  F      ! All HDGV included in program [Yes(T) or No(F)]
  F  F  F      ! All HDDV included in program [Yes(T) or No(F)]
  F  F  F      ! All MCs  included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
1  7 1996    ! Subprograms, start month, and start year for I/M program  3
2              ! Inspection frequency (1=Annual, 2=Biennial)
2              ! Test method
3              ! Visual/Functional checks
3              ! Exhaust Cutpoint Stringency
2              ! Repair Cost
2              ! Mechanic Inspection Effectiveness
  0              ! Minimum vehicle age
45             ! Maximum vehicle age
1966           ! Minimum model year
2040           ! Maximum model year
1              ! Free years
0              ! Years to skip
2              ! Mechanic Repair Effectiveness
1              ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17           ! Change of ownership percentage
0.00           ! Annual % vehs captured by random roadside program
0.00           ! Annual % vehs captured by remote sensing program
0.00           ! Annual % vehs captured by tamper detection program
  0              ! Years of annual inspections for a gross polluter
  0              ! Zero if high-emitter profile is not used
  F              ! True if bad exhaust text algorithm is used
  T              ! True if ARB's OBD II assumptions are used for OBD II vehicles
  T              ! All PCs  included in program [Yes(T) or No(F)]
  T              ! All LDT  included in program [Yes(T) or No(F)]
  T              ! All MDV  included in program [Yes(T) or No(F)]
  T              ! All HDGV included in program [Yes(T) or No(F)]
  F              ! All HDDV included in program [Yes(T) or No(F)]
  F              ! All MCs  included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
2  6 1998    ! Subprograms, start month, and start year for I/M program  4
2  2              ! Inspection frequency (1=Annual, 2=Biennial)
2  2              ! Test method
3  3              ! Visual/Functional checks
3  3              ! Exhaust Cutpoint Stringency
3  3              ! Repair Cost
2  2              ! Mechanic Inspection Effectiveness
  0  0              ! Minimum vehicle age
30 30            ! Maximum vehicle age
1974 1974        ! Minimum model year
2040 2040        ! Maximum model year
4  4              ! Free years
0  0              ! Years to skip
2  2              ! Mechanic Repair Effectiveness
2  2              ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17       ! Change of ownership percentage

```

```

0.00 0.00      ! Annual % vehs captured by random roadside program
0.00 0.00      ! Annual % vehs captured by remote sensing program
0.00 0.00      ! Annual % vehs captured by tamper detection program
0 0            ! Years of annual inspections for a gross polluter
0 0            ! Zero if high-emitter profile is not used
F F            ! True if bad exhaust text algorithm is used
T T            ! True if ARB's OBD II assumptions are used for OBD II vehicles
F T            ! All PCs included in program [Yes(T) or No(F)]
F T            ! All LDT included in program [Yes(T) or No(F)]
F T            ! All MDV included in program [Yes(T) or No(F)]
T F            ! All HDGV included in program [Yes(T) or No(F)]
F F            ! All HDDV included in program [Yes(T) or No(F)]
F F            ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
1 1 2004       ! Subprograms, start month, and start year for I/M program 5
2              ! Inspection frequency (1=Annual, 2=Biennial)
4              ! Test method
3              ! Visual/Functional checks
1              ! Exhaust Cutpoint Stringency
3              ! Repair Cost
2              ! Mechanic Inspection Effectiveness
0              ! Minimum vehicle age
30             ! Maximum vehicle age
1974           ! Minimum model year
2040           ! Maximum model year
4              ! Free years
0              ! Years to skip
2              ! Mechanic Repair Effectiveness
2              ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17          ! Change of ownership percentage
0.00          ! Annual % vehs captured by random roadside program
0.00          ! Annual % vehs captured by remote sensing program
0.00          ! Annual % vehs captured by tamper detection program
0             ! Years of annual inspections for a gross polluter
0             ! Zero if high-emitter profile is not used
F             ! True if bad exhaust text algorithm is used
T             ! True if ARB's OBD II assumptions are used for OBD II vehicles
T             ! All PCs included in program [Yes(T) or No(F)]
T             ! All LDT included in program [Yes(T) or No(F)]
T             ! All MDV included in program [Yes(T) or No(F)]
T             ! All HDGV included in program [Yes(T) or No(F)]
F             ! All HDDV included in program [Yes(T) or No(F)]
F             ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.

```

#

Appendix D. San Francisco County EMFAC2002 input file with correct speed distributions for 09 July 1999.

```

-2 2 20 6 30423 1      ! WIS data first, 1 scenarios follow
123                    ! Number of WIS data items to follow
  21  0  0  0  0      ! Pop Tot A_A_A_Pop(age=sum,veh=:,fuel=:,area= 0)
267229.9              30116.43              46779.05              33018.65              2568.873
910.0837              1979.752              380.4320              0.0000000E+00              391.0003
11462.78              44.00692              1043.083
2201.247              620.1681              651.0545              278.1292              480.1193
571.1015              4497.605              3186.459              0.0000000E+00              1221.001
0.0000000E+00        225.0334              27.00315
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00
  2  7  0  0  0      ! AreaAvg T AREATEMP(:,month= 7)
57.43000              57.38000              57.29000              56.92000              56.97000
56.98000              57.88000              60.40000              61.92000              63.19000
63.56000              64.27000              65.23000              65.65000              65.80000
65.20000              64.24000              63.40000              62.61000              60.56000
58.54000              57.76000              56.65000              55.33000
  4  7  0  0  0      ! AreaAvg RH AREA RH(:,month= 7)
65.95000              66.26000              66.19000              66.58000              66.49000
66.35000              65.87000              62.64000              60.83000              60.18000
59.64000              59.58000              58.01000              57.49000              55.54000
56.03000              56.64000              57.47000              57.39000              60.90000
62.94000              64.35000              60.44000              65.49000
  8  1  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 1)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866            1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  2  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 2)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866            1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  3  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 3)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866            1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  4  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 4)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866            1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  5  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 5)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866            1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  6  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 6)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866            1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8  7  1  0  0      ! Spd Fr AREAFRAC(veh= 1,,:,period= 7)
0.0000000E+00        3.6410000E-03        3.1603400E-02        0.1194938            0.1712609
0.2682291            6.2379300E-02        6.9655600E-02        8.2834300E-02        5.2257800E-02
4.1615200E-02        5.4699400E-02        4.2330100E-02        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00

```



```

0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 13 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=13)
0.000000E+00 3.641000E-03 3.160340E-02 0.1194938 0.1712609
0.2682291 6.237930E-02 6.965560E-02 8.283430E-02 5.225780E-02
4.161520E-02 5.469940E-02 4.233010E-02 0.000000E+00 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 14 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=14)
0.000000E+00 3.641000E-03 3.160340E-02 0.1194938 0.1712609
0.2682291 6.237930E-02 6.965560E-02 8.283430E-02 5.225780E-02
4.161520E-02 5.469940E-02 4.233010E-02 0.000000E+00 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 15 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=15)
0.000000E+00 3.641000E-03 3.160340E-02 0.1194938 0.1712609
0.2682291 6.237930E-02 6.965560E-02 8.283430E-02 5.225780E-02
4.161520E-02 5.469940E-02 4.233010E-02 0.000000E+00 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 16 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=16)
0.000000E+00 3.641000E-03 3.160340E-02 0.1194938 0.1712609
0.2682291 6.237930E-02 6.965560E-02 8.283430E-02 5.225780E-02
4.161520E-02 5.469940E-02 4.233010E-02 0.000000E+00 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 17 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=17)
0.000000E+00 3.641000E-03 3.160340E-02 0.1194938 0.1712609
0.2682291 6.237930E-02 6.965560E-02 8.283430E-02 5.225780E-02
4.161520E-02 5.469940E-02 4.233010E-02 0.000000E+00 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 18 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=18)
0.000000E+00 3.641000E-03 3.160340E-02 0.1194938 0.1712609
0.2682291 6.237930E-02 6.965560E-02 8.283430E-02 5.225780E-02
4.161520E-02 5.469940E-02 4.233010E-02 0.000000E+00 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 19 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=19)
0.000000E+00 0.000000E+00 1.167620E-02 6.487550E-02 0.1387506
0.2196982 1.988430E-02 2.656000E-04 5.469800E-03 5.688780E-02
1.950600E-02 5.107390E-02 0.4108866 1.025500E-03 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 20 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=20)
0.000000E+00 0.000000E+00 1.167620E-02 6.487550E-02 0.1387506
0.2196982 1.988430E-02 2.656000E-04 5.469800E-03 5.688780E-02
1.950600E-02 5.107390E-02 0.4108866 1.025500E-03 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 21 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=21)
0.000000E+00 0.000000E+00 1.167620E-02 6.487550E-02 0.1387506
0.2196982 1.988430E-02 2.656000E-04 5.469800E-03 5.688780E-02
1.950600E-02 5.107390E-02 0.4108866 1.025500E-03 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 22 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=22)
0.000000E+00 0.000000E+00 1.167620E-02 6.487550E-02 0.1387506
0.2196982 1.988430E-02 2.656000E-04 5.469800E-03 5.688780E-02
1.950600E-02 5.107390E-02 0.4108866 1.025500E-03 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 23 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=23)
0.000000E+00 0.000000E+00 1.167620E-02 6.487550E-02 0.1387506
0.2196982 1.988430E-02 2.656000E-04 5.469800E-03 5.688780E-02
1.950600E-02 5.107390E-02 0.4108866 1.025500E-03 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
 8 24 11 0 0 ! Spd Fr AREAFRAC(veh=11,:,period=24)
0.000000E+00 0.000000E+00 1.167620E-02 6.487550E-02 0.1387506
0.2196982 1.988430E-02 2.656000E-04 5.469800E-03 5.688780E-02
1.950600E-02 5.107390E-02 0.4108866 1.025500E-03 0.000000E+00
0.000000E+00 0.000000E+00 0.000000E+00 0.000000E+00
@ ! End of WIS data
1 2 20 6 30423 ! Number of scenarios in file, version info

```

```

San Francisco County Avg 1999 July Default Title ! Scenario Title
Burden      8 1      ! Program mode TOG PM30
1999        ! Calendar Year
7           ! Month/Season
4           ! Geographic area selection: San Francisco County
38          ! County Number
FFFFF      ! WEIGHT Output Options
FFFTF      ! EMFAC Output Options
TFTTF      ! BURDEN Output Options
FTFFF      ! CALIMFAC Output Options
FFFFF      ! EMFACnn Output Options
25          ! First hour printed for detailed Burden output
6 1        ! Bag and correction for Calimfac output
1965       ! First model year considered in calculations
1999       ! Last model year considered in calculations

! Data on I/M Programs
! -----
5           ! Number of I/M programs (num_prog) in scenario 1
43          ! Area used for I/M basis: San Francisco (SF)
2 3 1984   ! Subprograms, start month, and start year for I/M program 1
2 2        ! Inspection frequency (1=Annual, 2=Biennial)
1 2        ! Test method
2 2        ! Visual/Functional checks
1 1        ! Exhaust Cutpoint Stringency
1 1        ! Repair Cost
1 1        ! Mechanic Inspection Effectiveness
0 0        ! Minimum vehicle age
45 45     ! Maximum vehicle age
1966 1980  ! Minimum model year
1979 2040  ! Maximum model year
1 1        ! Free years
0 0        ! Years to skip
1 1        ! Mechanic Repair Effectiveness
1 1        ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 ! Change of ownership percentage
0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 ! Annual % vehs captured by tamper detection program
0 0        ! Years of annual inspections for a gross polluter
0 0        ! Zero if high-emitter profile is not used
F F        ! True if bad exhaust text algorithm is used
T T        ! True if ARB's OBD II assumptions are used for OBD II vehicles
T T        ! All PCs included in program [Yes(T) or No(F)]
T T        ! All LDT included in program [Yes(T) or No(F)]
T T        ! All MDV included in program [Yes(T) or No(F)]
F F        ! All HDGV included in program [Yes(T) or No(F)]
F F        ! All HDDV included in program [Yes(T) or No(F)]
F F        ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
3 7 1990   ! Subprograms, start month, and start year for I/M program 2
2 2 2      ! Inspection frequency (1=Annual, 2=Biennial)
1 1 2      ! Test method
3 3 3      ! Visual/Functional checks
2 2 2      ! Exhaust Cutpoint Stringency
2 2 2      ! Repair Cost
2 2 2      ! Mechanic Inspection Effectiveness
0 0 0      ! Minimum vehicle age
45 45 45   ! Maximum vehicle age
1966 1966 1980 ! Minimum model year
2040 1979 2040 ! Maximum model year
1 1 1      ! Free years
0 0 0      ! Years to skip

```

```

2 2 2      ! Mechanic Repair Effectiveness
1 1 1      ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 0.17 ! Change of ownership percentage
0.00 0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 0.00 ! Annual % vehs captured by tamper detection program
0 0 0      ! Years of annual inspections for a gross polluter
0 0 0      ! Zero if high-emitter profile is not used
F F F      ! True if bad exhaust text algorithm is used
T T T      ! True if ARB's OBD II assumptions are used for OBD II vehicles
F T T      ! All PCs included in program [Yes(T) or No(F)]
F T T      ! All LDT included in program [Yes(T) or No(F)]
F T T      ! All MDV included in program [Yes(T) or No(F)]
T F F      ! All HDGV included in program [Yes(T) or No(F)]
F F F      ! All HDDV included in program [Yes(T) or No(F)]
F F F      ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
1 7 1996   ! Subprograms, start month, and start year for I/M program 3
2          ! Inspection frequency (1=Annual, 2=Biennial)
2          ! Test method
3          ! Visual/Functional checks
3          ! Exhaust Cutpoint Stringency
2          ! Repair Cost
2          ! Mechanic Inspection Effectiveness
0          ! Minimum vehicle age
45         ! Maximum vehicle age
1966       ! Minimum model year
2040       ! Maximum model year
1          ! Free years
0          ! Years to skip
2          ! Mechanic Repair Effectiveness
1          ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17       ! Change of ownership percentage
0.00       ! Annual % vehs captured by random roadside program
0.00       ! Annual % vehs captured by remote sensing program
0.00       ! Annual % vehs captured by tamper detection program
0          ! Years of annual inspections for a gross polluter
0          ! Zero if high-emitter profile is not used
F          ! True if bad exhaust text algorithm is used
T          ! True if ARB's OBD II assumptions are used for OBD II vehicles
T          ! All PCs included in program [Yes(T) or No(F)]
T          ! All LDT included in program [Yes(T) or No(F)]
T          ! All MDV included in program [Yes(T) or No(F)]
T          ! All HDGV included in program [Yes(T) or No(F)]
F          ! All HDDV included in program [Yes(T) or No(F)]
F          ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
2 6 1998   ! Subprograms, start month, and start year for I/M program 4
2 2        ! Inspection frequency (1=Annual, 2=Biennial)
2 2        ! Test method
3 3        ! Visual/Functional checks
3 3        ! Exhaust Cutpoint Stringency
3 3        ! Repair Cost
2 2        ! Mechanic Inspection Effectiveness
0 0        ! Minimum vehicle age
30 30     ! Maximum vehicle age
1974 1974 ! Minimum model year
2040 2040 ! Maximum model year
4 4        ! Free years
0 0        ! Years to skip
2 2        ! Mechanic Repair Effectiveness
2 2        ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 ! Change of ownership percentage

```

```

0.00 0.00      ! Annual % vehs captured by random roadside program
0.00 0.00      ! Annual % vehs captured by remote sensing program
0.00 0.00      ! Annual % vehs captured by tamper detection program
0 0            ! Years of annual inspections for a gross polluter
0 0            ! Zero if high-emitter profile is not used
F F            ! True if bad exhaust text algorithm is used
T T            ! True if ARB's OBD II assumptions are used for OBD II vehicles
F T            ! All PCs included in program [Yes(T) or No(F)]
F T            ! All LDT included in program [Yes(T) or No(F)]
F T            ! All MDV included in program [Yes(T) or No(F)]
T F            ! All HDGV included in program [Yes(T) or No(F)]
F F            ! All HDDV included in program [Yes(T) or No(F)]
F F            ! All MCs included in program [Yes(T) or No(F)]
               ! Tech groups (if any) in subprogram.
1 1 2004       ! Subprograms, start month, and start year for I/M program 5
2              ! Inspection frequency (1=Annual, 2=Biennial)
4              ! Test method
3              ! Visual/Functional checks
1              ! Exhaust Cutpoint Stringency
3              ! Repair Cost
2              ! Mechanic Inspection Effectiveness
0              ! Minimum vehicle age
30             ! Maximum vehicle age
1974           ! Minimum model year
2040           ! Maximum model year
4              ! Free years
0              ! Years to skip
2              ! Mechanic Repair Effectiveness
2              ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17           ! Change of ownership percentage
0.00           ! Annual % vehs captured by random roadside program
0.00           ! Annual % vehs captured by remote sensing program
0.00           ! Annual % vehs captured by tamper detection program
0              ! Years of annual inspections for a gross polluter
0              ! Zero if high-emitter profile is not used
F              ! True if bad exhaust text algorithm is used
T              ! True if ARB's OBD II assumptions are used for OBD II vehicles
T              ! All PCs included in program [Yes(T) or No(F)]
T              ! All LDT included in program [Yes(T) or No(F)]
T              ! All MDV included in program [Yes(T) or No(F)]
T              ! All HDGV included in program [Yes(T) or No(F)]
F              ! All HDDV included in program [Yes(T) or No(F)]
F              ! All MCs included in program [Yes(T) or No(F)]
               ! Tech groups (if any) in subprogram.

```

#

Appendix E. San Francisco County EMFAC2002 input file for 12 July 1999.

```

-2 2 20 6 30423 1      ! WIS data first, 1 scenarios follow
123                    ! Number of WIS data items to follow
  21 0 0 0 0          ! Pop Tot A A A Pop(age=sum,veh=:,fuel=:,area= 0)
267229.9              30116.43          46779.05          33018.65          2568.873
910.0837              1979.752           380.4320           0.0000000E+00     391.0003
11462.78              44.00692            1043.083
2201.247              620.1681            651.0545           278.1292           480.1193
571.1015              4497.605            3186.459           0.0000000E+00     1221.001
0.0000000E+00         225.0334            27.00315
0.0000000E+00         0.0000000E+00       0.0000000E+00     0.0000000E+00     0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00     0.0000000E+00     0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00
  2 7 0 0 0          ! AreaAvg T AREATEMP(:,month= 7)
64.88000              64.75000             64.72000             64.54000             64.64000
65.05000              65.71000             66.49000             68.20000             69.28000
69.79000              70.20000             71.58000             72.02000             71.55000
70.94000              70.27000             68.94000             67.56000             66.15000
65.08000              64.87000             64.34000             64.05000
  4 7 0 0 0          ! AreaAvg RH AREA RH(:,month= 7)
57.74000              57.20000             58.02000             58.24000             58.49000
57.97000              56.18000             56.41000             55.52000             56.33000
55.47000              54.84000             53.82000             53.46000             53.28000
52.81000              52.97000             53.65000             54.64000             55.28000
55.86000              55.82000             55.93000             55.70000
  8 1 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 1)
0.0000000E+00         0.0000000E+00       1.1676200E-02       6.4875500E-02       0.1387506
0.2196982             1.9884300E-02       2.6560000E-04       5.4698000E-03       5.6887800E-02
1.9506000E-02        5.1073900E-02       0.4108866           1.0255000E-03       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 2 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 2)
0.0000000E+00         0.0000000E+00       1.1676200E-02       6.4875500E-02       0.1387506
0.2196982             1.9884300E-02       2.6560000E-04       5.4698000E-03       5.6887800E-02
1.9506000E-02        5.1073900E-02       0.4108866           1.0255000E-03       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 3 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 3)
0.0000000E+00         0.0000000E+00       1.1676200E-02       6.4875500E-02       0.1387506
0.2196982             1.9884300E-02       2.6560000E-04       5.4698000E-03       5.6887800E-02
1.9506000E-02        5.1073900E-02       0.4108866           1.0255000E-03       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 4 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 4)
0.0000000E+00         0.0000000E+00       1.1676200E-02       6.4875500E-02       0.1387506
0.2196982             1.9884300E-02       2.6560000E-04       5.4698000E-03       5.6887800E-02
1.9506000E-02        5.1073900E-02       0.4108866           1.0255000E-03       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 5 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 5)
0.0000000E+00         0.0000000E+00       1.1676200E-02       6.4875500E-02       0.1387506
0.2196982             1.9884300E-02       2.6560000E-04       5.4698000E-03       5.6887800E-02
1.9506000E-02        5.1073900E-02       0.4108866           1.0255000E-03       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 6 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 6)
0.0000000E+00         0.0000000E+00       1.1676200E-02       6.4875500E-02       0.1387506
0.2196982             1.9884300E-02       2.6560000E-04       5.4698000E-03       5.6887800E-02
1.9506000E-02        5.1073900E-02       0.4108866           1.0255000E-03       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 7 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 7)
0.0000000E+00         3.6410000E-03        3.1603400E-02       0.1194938           0.1712609
0.2682291             6.2379300E-02       6.9655600E-02       8.2834300E-02       5.2257800E-02
4.1615200E-02        5.4699400E-02       4.2330100E-02       0.0000000E+00       0.0000000E+00
0.0000000E+00         0.0000000E+00       0.0000000E+00       0.0000000E+00
  8 8 1 0 0          ! Spd Fr AREAFRAC(veh= 1,,:,period= 8)

```



```

      8 13 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=13)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 14 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=14)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 15 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=15)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 16 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=16)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 17 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=17)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 18 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=18)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 19 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=19)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 20 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=20)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 21 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=21)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 22 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=22)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 23 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=23)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 24 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=24)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
@      ! End of WIS data
1 2 20 6 30423      ! Number of scenarios in file, version info
San Francisco County Avg 1999 July Default Title ! Scenario Title

```

```

Burden      8  1      ! Program mode TOG  PM30
1999        ! Calendar Year
7           ! Month/Season
4           ! Geographic area selection: San Francisco County
38          ! County Number
FFFFF      ! WEIGHT Output Options
FFFTF      ! EMFAC Output Options
TFTTF      ! BURDEN Output Options
FTFFF      ! CALIMFAC Output Options
FFFFF      ! EMFACnn Output Options
25          ! First hour printed for detailed Burden output
6 1        ! Bag and correction for Calimfac output
1965       ! First model year considered in calculations
1999       ! Last model year considered in calculations

! Data on I/M Programs
! -----
5           ! Number of I/M programs (num_prog) in scenario 1
43          ! Area used for I/M basis: San Francisco (SF)
2 3 1984   ! Subprograms, start month, and start year for I/M program 1
2 2        ! Inspection frequency (1=Annual, 2=Biennial)
1 2        ! Test method
2 2        ! Visual/Functional checks
1 1        ! Exhaust Cutpoint Stringency
1 1        ! Repair Cost
1 1        ! Mechanic Inspection Effectiveness
0 0        ! Minimum vehicle age
45 45      ! Maximum vehicle age
1966 1980  ! Minimum model year
1979 2040  ! Maximum model year
1 1        ! Free years
0 0        ! Years to skip
1 1        ! Mechanic Repair Effectiveness
1 1        ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 ! Change of ownership percentage
0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 ! Annual % vehs captured by tamper detection program
0 0        ! Years of annual inspections for a gross polluter
0 0        ! Zero if high-emitter profile is not used
F F        ! True if bad exhaust text algorithm is used
T T        ! True if ARB's OBD II assumptions are used for OBD II vehicles
T T        ! All PCs included in program [Yes(T) or No(F)]
T T        ! All LDT included in program [Yes(T) or No(F)]
T T        ! All MDV included in program [Yes(T) or No(F)]
F F        ! All HDGV included in program [Yes(T) or No(F)]
F F        ! All HDDV included in program [Yes(T) or No(F)]
F F        ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
3 7 1990   ! Subprograms, start month, and start year for I/M program 2
2 2 2      ! Inspection frequency (1=Annual, 2=Biennial)
1 1 2      ! Test method
3 3 3      ! Visual/Functional checks
2 2 2      ! Exhaust Cutpoint Stringency
2 2 2      ! Repair Cost
2 2 2      ! Mechanic Inspection Effectiveness
0 0 0      ! Minimum vehicle age
45 45 45   ! Maximum vehicle age
1966 1966 1980 ! Minimum model year
2040 1979 2040 ! Maximum model year
1 1 1      ! Free years
0 0 0      ! Years to skip
2 2 2      ! Mechanic Repair Effectiveness

```

```

1 1 1          ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 0.17 ! Change of ownership percentage
0.00 0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 0.00 ! Annual % vehs captured by tamper detection program
  0  0  0      ! Years of annual inspections for a gross polluter
  0  0  0      ! Zero if high-emitter profile is not used
F  F  F        ! True if bad exhaust text algorithm is used
T  T  T        ! True if ARB's OBD II assumptions are used for OBD II vehicles
F  T  T        ! All PCs  included in program [Yes(T) or No(F)]
F  T  T        ! All LDT  included in program [Yes(T) or No(F)]
F  T  T        ! All MDV  included in program [Yes(T) or No(F)]
T  F  F        ! All HDGV included in program [Yes(T) or No(F)]
F  F  F        ! All HDDV included in program [Yes(T) or No(F)]
F  F  F        ! All MCs  included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
1  7 1996     ! Subprograms, start month, and start year for I/M program  3
2             ! Inspection frequency (1=Annual, 2=Biennial)
2             ! Test method
3             ! Visual/Functional checks
3             ! Exhaust Cutpoint Stringency
2             ! Repair Cost
2             ! Mechanic Inspection Effectiveness
  0           ! Minimum vehicle age
45           ! Maximum vehicle age
1966        ! Minimum model year
2040        ! Maximum model year
1           ! Free years
0           ! Years to skip
2           ! Mechanic Repair Effectiveness
1           ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17        ! Change of ownership percentage
0.00        ! Annual % vehs captured by random roadside program
0.00        ! Annual % vehs captured by remote sensing program
0.00        ! Annual % vehs captured by tamper detection program
  0         ! Years of annual inspections for a gross polluter
  0         ! Zero if high-emitter profile is not used
F          ! True if bad exhaust text algorithm is used
T          ! True if ARB's OBD II assumptions are used for OBD II vehicles
T          ! All PCs  included in program [Yes(T) or No(F)]
T          ! All LDT  included in program [Yes(T) or No(F)]
T          ! All MDV  included in program [Yes(T) or No(F)]
T          ! All HDGV included in program [Yes(T) or No(F)]
F          ! All HDDV included in program [Yes(T) or No(F)]
F          ! All MCs  included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
2  6 1998     ! Subprograms, start month, and start year for I/M program  4
2  2         ! Inspection frequency (1=Annual, 2=Biennial)
2  2         ! Test method
3  3         ! Visual/Functional checks
3  3         ! Exhaust Cutpoint Stringency
3  3         ! Repair Cost
2  2         ! Mechanic Inspection Effectiveness
  0  0       ! Minimum vehicle age
30 30       ! Maximum vehicle age
1974 1974   ! Minimum model year
2040 2040   ! Maximum model year
  4  4       ! Free years
  0  0       ! Years to skip
  2  2       ! Mechanic Repair Effectiveness
  2  2       ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17   ! Change of ownership percentage
0.00 0.00   ! Annual % vehs captured by random roadside program

```

```

0.00 0.00      ! Annual % vehs captured by remote sensing program
0.00 0.00      ! Annual % vehs captured by tamper detection program
0 0            ! Years of annual inspections for a gross polluter
0 0            ! Zero if high-emitter profile is not used
F F           ! True if bad exhaust text algorithm is used
T T           ! True if ARB's OBD II assumptions are used for OBD II vehicles
F T           ! All PCs included in program [Yes(T) or No(F)]
F T           ! All LDT included in program [Yes(T) or No(F)]
F T           ! All MDV included in program [Yes(T) or No(F)]
T F           ! All HDGV included in program [Yes(T) or No(F)]
F F           ! All HDDV included in program [Yes(T) or No(F)]
F F           ! All MCs included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
1 1 2004      ! Subprograms, start month, and start year for I/M program 5
2            ! Inspection frequency (1=Annual, 2=Biennial)
4            ! Test method
3            ! Visual/Functional checks
1            ! Exhaust Cutpoint Stringency
3            ! Repair Cost
2            ! Mechanic Inspection Effectiveness
0            ! Minimum vehicle age
30           ! Maximum vehicle age
1974         ! Minimum model year
2040         ! Maximum model year
4            ! Free years
0            ! Years to skip
2            ! Mechanic Repair Effectiveness
2            ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17        ! Change of ownership percentage
0.00        ! Annual % vehs captured by random roadside program
0.00        ! Annual % vehs captured by remote sensing program
0.00        ! Annual % vehs captured by tamper detection program
0            ! Years of annual inspections for a gross polluter
0            ! Zero if high-emitter profile is not used
F           ! True if bad exhaust text algorithm is used
T           ! True if ARB's OBD II assumptions are used for OBD II vehicles
T           ! All PCs included in program [Yes(T) or No(F)]
T           ! All LDT included in program [Yes(T) or No(F)]
T           ! All MDV included in program [Yes(T) or No(F)]
T           ! All HDGV included in program [Yes(T) or No(F)]
F           ! All HDDV included in program [Yes(T) or No(F)]
F           ! All MCs included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.

```

#

Appendix F. San Francisco County EMFAC2002 input file for 31 July 2000.

```

-2 2 20 6 30423 1      ! WIS data first, 1 scenarios follow
123                    ! Number of WIS data items to follow
  21 0 0 0 0          ! Pop Tot A A A Pop(age=sum,veh=,fuel=,area= 0)
272310.8              30814.57              47640.43              33296.90              2693.159
922.4784              1938.361              372.7910              0.0000000E+00        457.9604
11694.68              44.52164              1058.779
2060.431              606.9538              605.9673              593.0256              523.4359
583.7920              4699.788              3297.805              0.0000000E+00        1334.623
0.0000000E+00        230.0420              29.29516
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00
  2 7 0 0 0          ! AreaAvg T AREATEMP(:,month= 7)
57.91000              57.17000              56.57000              56.11000              55.66000
55.62000              56.98000              59.86000              63.30000              66.94000
70.71000              74.64000              77.23000              79.75000              81.55000
82.00000              80.85000              78.77000              74.86000              70.83000
68.09000              66.12000              64.58000              63.44000
  4 7 0 0 0          ! AreaAvg RH AREA RH(:,month= 7)
94.28000              96.08000              97.42000              97.91000              98.00000
97.98000              97.92000              97.48000              91.02000              80.80000
72.88000              67.62000              62.11000              59.46000              58.61000
58.53000              59.15000              60.40000              62.99000              67.42000
73.40000              78.24000              82.93000              87.47000
  8 1 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 1)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 2 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 2)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 3 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 3)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 4 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 4)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 5 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 5)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 6 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 6)
0.0000000E+00        0.0000000E+00        1.1676200E-02        6.4875500E-02        0.1387506
0.2196982            1.9884300E-02        2.6560000E-04        5.4698000E-03        5.6887800E-02
1.9506000E-02        5.1073900E-02        0.4108866           1.0255000E-03        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 7 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 7)
0.0000000E+00        3.6410000E-03        3.1603400E-02        0.1194938           0.1712609
0.2682291            6.2379300E-02        6.9655600E-02        8.2834300E-02        5.2257800E-02
4.1615200E-02        5.4699400E-02        4.2330100E-02        0.0000000E+00        0.0000000E+00
0.0000000E+00        0.0000000E+00        0.0000000E+00        0.0000000E+00
  8 8 1 0 0          ! Spd Fr AREAFRAC(veh= 1,.,period= 8)

```



```

      8 13 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=13)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 14 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=14)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 15 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=15)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 16 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=16)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 17 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=17)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 18 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=18)
0.0000000E+00 3.6410000E-03 3.1603400E-02 0.1194938 0.1712609
0.2682291 6.2379300E-02 6.9655600E-02 8.2834300E-02 5.2257800E-02
4.1615200E-02 5.4699400E-02 4.2330100E-02 0.0000000E+00 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 19 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=19)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 20 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=20)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 21 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=21)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 22 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=22)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 23 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=23)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
      8 24 11 0 0      ! Spd Fr AREAFRAC(veh=11,.,period=24)
0.0000000E+00 0.0000000E+00 1.1676200E-02 6.4875500E-02 0.1387506
0.2196982 1.9884300E-02 2.6560000E-04 5.4698000E-03 5.6887800E-02
1.9506000E-02 5.1073900E-02 0.4108866 1.0255000E-03 0.0000000E+00
0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00 0.0000000E+00
@      ! End of WIS data
1 2 20 6 30423      ! Number of scenarios in file, version info
San Francisco County Avg 2000 July Default Title ! Scenario Title

```

```

Burden      8 1      ! Program mode TOG PM30
2000        ! Calendar Year
7           ! Month/Season
4           ! Geographic area selection: San Francisco County
38          ! County Number
FFFFFF     ! WEIGHT Output Options
FFFTF     ! EMFAC Output Options
TFTTF     ! BURDEN Output Options
FTFFF     ! CALIMFAC Output Options
FFFFFF     ! EMFACnn Output Options
25         ! First hour printed for detailed Burden output
6 1        ! Bag and correction for Calimfac output
1965       ! First model year considered in calculations
2000       ! Last model year considered in calculations

! Data on I/M Programs
! -----
5          ! Number of I/M programs (num_prog) in scenario 1
43         ! Area used for I/M basis: San Francisco (SF)
2 3 1984   ! Subprograms, start month, and start year for I/M program 1
2 2        ! Inspection frequency (1=Annual, 2=Biennial)
1 2        ! Test method
2 2        ! Visual/Functional checks
1 1        ! Exhaust Cutpoint Stringency
1 1        ! Repair Cost
1 1        ! Mechanic Inspection Effectiveness
0 0        ! Minimum vehicle age
45 45     ! Maximum vehicle age
1966 1980  ! Minimum model year
1979 2040  ! Maximum model year
1 1        ! Free years
0 0        ! Years to skip
1 1        ! Mechanic Repair Effectiveness
1 1        ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 ! Change of ownership percentage
0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 ! Annual % vehs captured by tamper detection program
0 0        ! Years of annual inspections for a gross polluter
0 0        ! Zero if high-emitter profile is not used
F F        ! True if bad exhaust text algorithm is used
T T        ! True if ARB's OBD II assumptions are used for OBD II vehicles
T T        ! All PCs included in program [Yes(T) or No(F)]
T T        ! All LDT included in program [Yes(T) or No(F)]
T T        ! All MDV included in program [Yes(T) or No(F)]
F F        ! All HDGV included in program [Yes(T) or No(F)]
F F        ! All HDDV included in program [Yes(T) or No(F)]
F F        ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
3 7 1990   ! Subprograms, start month, and start year for I/M program 2
2 2 2      ! Inspection frequency (1=Annual, 2=Biennial)
1 1 2      ! Test method
3 3 3      ! Visual/Functional checks
2 2 2      ! Exhaust Cutpoint Stringency
2 2 2      ! Repair Cost
2 2 2      ! Mechanic Inspection Effectiveness
0 0 0      ! Minimum vehicle age
45 45 45   ! Maximum vehicle age
1966 1966 1980 ! Minimum model year
2040 1979 2040 ! Maximum model year
1 1 1      ! Free years
0 0 0      ! Years to skip
2 2 2      ! Mechanic Repair Effectiveness

```

```

1 1 1          ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17 0.17 ! Change of ownership percentage
0.00 0.00 0.00 ! Annual % vehs captured by random roadside program
0.00 0.00 0.00 ! Annual % vehs captured by remote sensing program
0.00 0.00 0.00 ! Annual % vehs captured by tamper detection program
0 0 0         ! Years of annual inspections for a gross polluter
0 0 0         ! Zero if high-emitter profile is not used
F F F        ! True if bad exhaust text algorithm is used
T T T        ! True if ARB's OBD II assumptions are used for OBD II vehicles
F T T        ! All PCs included in program [Yes(T) or No(F)]
F T T        ! All LDT included in program [Yes(T) or No(F)]
F T T        ! All MDV included in program [Yes(T) or No(F)]
T F F        ! All HDGV included in program [Yes(T) or No(F)]
F F F        ! All HDDV included in program [Yes(T) or No(F)]
F F F        ! All MCs included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
1 7 1996     ! Subprograms, start month, and start year for I/M program 3
2           ! Inspection frequency (1=Annual, 2=Biennial)
2           ! Test method
3           ! Visual/Functional checks
3           ! Exhaust Cutpoint Stringency
2           ! Repair Cost
2           ! Mechanic Inspection Effectiveness
0           ! Minimum vehicle age
45          ! Maximum vehicle age
1966        ! Minimum model year
2040        ! Maximum model year
1           ! Free years
0           ! Years to skip
2           ! Mechanic Repair Effectiveness
1           ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17        ! Change of ownership percentage
0.00        ! Annual % vehs captured by random roadside program
0.00        ! Annual % vehs captured by remote sensing program
0.00        ! Annual % vehs captured by tamper detection program
0           ! Years of annual inspections for a gross polluter
0           ! Zero if high-emitter profile is not used
F           ! True if bad exhaust text algorithm is used
T           ! True if ARB's OBD II assumptions are used for OBD II vehicles
T           ! All PCs included in program [Yes(T) or No(F)]
T           ! All LDT included in program [Yes(T) or No(F)]
T           ! All MDV included in program [Yes(T) or No(F)]
T           ! All HDGV included in program [Yes(T) or No(F)]
F           ! All HDDV included in program [Yes(T) or No(F)]
F           ! All MCs included in program [Yes(T) or No(F)]
              ! Tech groups (if any) in subprogram.
2 6 1998     ! Subprograms, start month, and start year for I/M program 4
2 2         ! Inspection frequency (1=Annual, 2=Biennial)
2 2         ! Test method
3 3         ! Visual/Functional checks
3 3         ! Exhaust Cutpoint Stringency
3 3         ! Repair Cost
2 2         ! Mechanic Inspection Effectiveness
0 0         ! Minimum vehicle age
30 30       ! Maximum vehicle age
1974 1974   ! Minimum model year
2040 2040   ! Maximum model year
4 4         ! Free years
0 0         ! Years to skip
2 2         ! Mechanic Repair Effectiveness
2 2         ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17 0.17   ! Change of ownership percentage
0.00 0.00   ! Annual % vehs captured by random roadside program

```

```

0.00 0.00      ! Annual % vehs captured by remote sensing program
0.00 0.00      ! Annual % vehs captured by tamper detection program
0 0            ! Years of annual inspections for a gross polluter
0 0            ! Zero if high-emitter profile is not used
F F            ! True if bad exhaust text algorithm is used
T T            ! True if ARB's OBD II assumptions are used for OBD II vehicles
F T            ! All PCs included in program [Yes(T) or No(F)]
F T            ! All LDT included in program [Yes(T) or No(F)]
F T            ! All MDV included in program [Yes(T) or No(F)]
T F            ! All HDGV included in program [Yes(T) or No(F)]
F F            ! All HDDV included in program [Yes(T) or No(F)]
F F            ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.
1 1 2004      ! Subprograms, start month, and start year for I/M program 5
2            ! Inspection frequency (1=Annual, 2=Biennial)
4            ! Test method
3            ! Visual/Functional checks
1            ! Exhaust Cutpoint Stringency
3            ! Repair Cost
2            ! Mechanic Inspection Effectiveness
0            ! Minimum vehicle age
30           ! Maximum vehicle age
1974         ! Minimum model year
2040         ! Maximum model year
4            ! Free years
0            ! Years to skip
2            ! Mechanic Repair Effectiveness
2            ! Evap test: 1 => None, 2 => Gas Cap, 3 => Pressure-purge
0.17        ! Change of ownership percentage
0.00        ! Annual % vehs captured by random roadside program
0.00        ! Annual % vehs captured by remote sensing program
0.00        ! Annual % vehs captured by tamper detection program
0            ! Years of annual inspections for a gross polluter
0            ! Zero if high-emitter profile is not used
F            ! True if bad exhaust text algorithm is used
T            ! True if ARB's OBD II assumptions are used for OBD II vehicles
T            ! All PCs included in program [Yes(T) or No(F)]
T            ! All LDT included in program [Yes(T) or No(F)]
T            ! All MDV included in program [Yes(T) or No(F)]
T            ! All HDGV included in program [Yes(T) or No(F)]
F            ! All HDDV included in program [Yes(T) or No(F)]
F            ! All MCs included in program [Yes(T) or No(F)]
! Tech groups (if any) in subprogram.

```

#