

Appendix 2

Applicable SIP Excerpts

The SIP excerpts contained within this appendix are from the RFP SIP. This SIP can be found on the TCEQ Web site:

<http://www.tceq.state.tx.us/implementation/air/sip/may2007hgb.html>

RFP Excerpts:

Chapter 5: 5-1 to 5-2

5.3 MOTOR VEHICLE EMISSION BUDGETS FOR RFP MILESTONE YEAR 2008

Based on comments received by the EPA, this MVEB remains consistent with the 2007 NO_x MVEB budget from the HGB Mid-Course Review SIP as adopted on December 1, 2004, by the Commission. The HGB Mid-Course Review SIP NO_x MVEB was deemed adequate by the EPA on March 23, 2005, and approved by the EPA in August 2006. The RFP VOC MVEB reflects the 2008 on-road mobile EIs, the on-road mobile reduction strategies used to demonstrate RFP, and a ten percent transportation conformity safety margin. The NO_x safety margin is the difference between the 2008 on-road emissions projection with post-1990 FCAA controls and the 2007 NO_x MVEB budget from the HGB Mid-Course Review SIP. A transportation conformity safety margin is allowed when there is an excess in emission reductions required to demonstrate RFP for the milestone year. The amount of the safety margin is less than the total in excess emission reductions and, therefore, even if the safety margin is used for a transportation conformity determination, the HGB area will still meet the eight-hour ozone RFP requirements for 2008. See Table 5-1: 2008 Eight-Hour Ozone RFP Motor Vehicle Emission Budgets for the HGB Area and Appendix 1, Sheet 15.

Table 5-1: 2008 Eight-Hour Ozone RFP Motor Vehicle Emission Budgets for the HGB Eight-County Ozone Nonattainment Area

Description	NO _x tons per day	VOC tons per day
2008 On-road Emissions Projection Without Post-1990 FCAA Controls	346.83	180.99
2008 On-Road Mobile Reasonable Further Progress Controls		
Tier 1 Federal Motor Vehicle Program (Tier 1 FMVCP)	63.30	41.77
I/M in Harris County	12.08	10.15
Federal Reformulated gasoline (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery and Waller)	44.40	31.64
National Low Emission Vehicle Program (NLEV)	9.65	5.25
Tier 2 Federal Motor Vehicle Control Program (Tier2 FMVCP)	28.67	10.33
2007 Heavy Duty Diesel FMVCP	8.24	0.13
Expanded I/M- Inspection/Maintenance (I/M) (Brazoria, fort Bend, Galveston and Montgomery)	3.58	2.80
TxLED	5.26	0.04
2008 On-Road Emissions Projection with Post-1990 FCAA Controls (Uncontrolled inventory minus control reductions)	171.65	78.88
Add Transportation Conformity Safety Margin	14.48	7.89
2008 Eight-Hour Ozone RFP VOC Motor Vehicle Emission Budgets	NA	86.77
2008 Eight-Hour Ozone RFP NO_x Motor Vehicle Emission Budget as Contained in the December 1, 2004, HGB Mid-Course Review SIP	186.13	NA

The 2008 RFP control strategy produces more than the required emission reductions. Some of the excess in emission reductions is used to provide a safety margin for 2008. This safety margin is less than the total

emission reductions needed for the RFP demonstration. Therefore, even if this safety margin is used, the area will still demonstrate RFP 2008.

Chapter 2: 2-6-2-11

2.5 ON-ROAD MOBILE SOURCES

2.5.1 Emissions Inventory Development On-road mobile emissions sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways. On-road mobile source emissions are usually categorized as either combustion-related emissions or evaporative hydrocarbon emissions. Combustion-related emissions are estimated for vehicle engine exhaust. Evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative leak sources on the vehicle. To calculate emissions, both the rate of emissions per unit of activity (emission factors) and the number of units of activity must be determined. The EPA provides guidance on the development of emission factors and activity levels.

Emission factors are developed using EPA's mobile emission factor model MOBILE. The model may be run using national default information or input may be provided to modify the model calculations to simulate the driving behavior, meteorological conditions, and vehicle characteristics specific to the HGB area. Because inputs influence the emission factors calculated by the MOBILE model, every effort is made to input parameters reflecting local conditions, rather than national default values. The localized inputs used for the HGB RFP on-road mobile EI development include vehicle speeds for each roadway link, temperature, humidity, vehicle age distributions for each vehicle type, percentage of miles traveled for each vehicle type, type of inspection-maintenance program, fuel control programs, and gasoline vapor pressure.

To estimate on-road mobile emissions, emission factors calculated by the MOBILE model described above must be multiplied by the level of vehicle activity. On-road mobile source emission factors are expressed in units of grams per mile. Therefore, the activity information that is required to complete the inventory calculation is vehicle miles traveled (VMT) in units of miles per day. The level of vehicle travel activity is developed using travel demand models (TDMs) run by the Texas Department of Transportation or the local metropolitan planning organizations. TDMs are validated against a large number of ground counts, i.e., traffic passing over counters placed in various locations throughout a county or area. VMT estimates are often calibrated against outputs from the federal Highway Performance Monitoring System, a federal model built from a different set of traffic counters.

In addition to the number of miles traveled on each roadway link, the speed on each roadway type or segment is also needed to complete on-road inventory development. Roadway speeds, required inputs for the MOBILE model, are calculated by using the activity volumes from the TDM and a post-processor speed model.

In order to perform the RFP calculations, a state must determine the base inventory from which the calculations begin, the amount of control achieved from controls that were implemented prior to the 1990 FCAAA and therefore not creditable toward FCAAA RFP requirements, the uncontrolled milestone year inventory, and the emission reduction controls to demonstrate that RFP is met for the milestone year. To determine all the information required for RFP calculations, a set of on-road mobile source inventories and control reduction estimates are required to complete the RFP calculations.

- The 2002 base year is the starting point for the eight-hour ozone RFP demonstration. This starting point establishes the inventory as it existed in 2002, the RFP base year established by EPA for areas designated as nonattainment for the eight-hour ozone standard.
- The adjusted base year (ABY) inventories are the basis for calculating the percent reductions, as required in the RFP guidance document in 40 CFR Parts 51, 52, and 80, Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard; Final Rule, November 29, 2005, and as a basis for determining the non-creditable reductions due to control programs implemented prior to the FCAAA. Because the ABY inventory adjusts the 2002 base year inventory for the fleet turnover effects of the pre-1990 Federal Motor Vehicle Control Program (FMVCP) and the 1992 Reid Vapor Pressure (RVP) control, only the emission rates are different than the 2002 base year. Speed and VMT activity levels for both the 2002 base year and ABY inventories are consistent with both the TDM output for the 2002 roadway network and demographic demands
- An on-road mobile ABY inventory is required for each milestone year and for any year for which a percent reduction requirement calculation must be completed. The ABY inventory is used to determine the level of non-creditable reductions for each RFP milestone year.
- The RFP analysis also requires an uncontrolled inventory with growth between the base year and the milestone year. These uncontrolled inventories serve as the basis for determining how much emissions reduction is required to meet the RFP target.
- The RFP analysis requires the calculation of a controlled inventory to subtract from the uncontrolled inventory to determine the effectiveness of control strategies. RFP requires direct calculation of the emission reductions from control strategies that are then subtracted from the uncontrolled emission reduction, to determine the controlled inventory value. Both the total from on-road mobile control strategies and the emission reductions from each individual control strategy are calculated.

A summary of the on-road mobile source vehicle miles traveled used to develop the various NO_x and VOC emissions levels in subsequent tables is presented in Table 2-7: *HGB Eight-County RFP Ozone RFP Ozone Season Weekday On-Road Mobile Source VMT*, Table 2-8: *HGB Eight-County RFP Ozone Season Weekday On-Road Mobile Source NO_x Emissions*, and Table 2-9: *HGB Eight County RFP Ozone Season Weekday On-Road Mobile Source VOC Emissions*. For complete documentation of the development of the on-road mobile source inventories for the HGB RFP demonstration, refer to Appendix 3: *Development of HGB RFP On-Road Mobile Source Emissions Inventories*. The complete set of input and output files are available upon request from the TCEQ's Air Quality Division.

Table 2-7: HGB Eight-County RFP Ozone Season Weekday On-Road Mobile Source VMT

Emissions Inventory	VMT (miles per day)
2002 Base Year	118,741,309
2002 Adjusted Base Year (ABY)	118,741,309
2008 ABY	118,741,309
2008 Uncontrolled	140,957,487
2008 Controlled	140,957,487

Table 2-8: HGB Eight-County RFP Ozone Season Weekday On-Road Mobile Source NO_x Emissions

Emissions Inventory	VMT (miles per day)
2002 Base Year	283.20
2002 Adjusted Base Year (ABY)	335.20
2008 ABY	293.00
2008 Uncontrolled	346.83
2008 Controlled	171.65

Table 2-9: HGB Eight-County RFP Ozone Season Weekday On-Road Mobile Source VOC Emissions

Emissions Inventory	VMT (miles per day)
2002 Base Year	114.30
2002 Adjusted Base Year (ABY)	162.20
2008 ABY	152.20
2008 Uncontrolled	180.99
2008 Controlled	78.88

2.5.2 Updated 2002 Base Year Inventory

The 2002 base year EI for on-road mobile sources was updated using emission factors calculated using the latest version of the MOBILE model, MOBILE6.2.03. Additional updates were made in order to incorporate the latest activity estimates from the HGB travel demand model 2002 network. Only control strategies implemented prior to 2002 were included in the input to the inventory development for the 2002 on-road mobile source base year inventory. These controls include: Pre-1990 FMVCP, fleet turnover to Tier 1 FMVCP, reformulated gasoline, and the HGB vehicle inspection and maintenance (I/M) program. The activity levels used to calculate the inventory reflect the 2002 roadway network with 2002 VMT and speeds. A summary of the inventory is presented in Table 2-10. For complete documentation of the development of the inventory and details on MOBILE model inputs, refer to Appendix 3: *Development of HGB RFP On-Road Mobile Source Emissions Inventories*.

2.5.3 Updated 2002 Adjusted Base Year Inventories for Base and Milestone Years 2002 and 2008

The RFP planning process includes calculating the adjusted base year EI, from which required percent emission reductions are calculated. As specified by the FCAAA, certain on-road mobile source emissions reductions are not creditable toward these required percentage reductions. The non-creditable reductions include reductions that would occur by the target years due to the pre-1990 FCAAA state controls, pre-1990 FMVCP, and pre-1990 promulgated federal fuel volatility regulations (summertime gasoline RVP limits beginning in 1992). Because the defeat device for heavy-duty diesel vehicles (HDDVs) was affecting a FMVCP that was implemented prior to the 1990 FCAAA, the HDDV NO_x off-cycle emissions effects and associated mitigation program effects are also considered non-creditable. For this HGB RFP demonstration, pre-1990 non-creditable emission factor reductions include pre-1990 non-creditable

emission factor reductions include pre-1990 FCAAA FMVCP, 1992 summertime RVP limits, and HDDV NO_x off-cycle emissions and mitigation programs.

An adjusted base year EI for non-road mobile sources is developed for each milestone year using emission factors from the Mobile model that reflect only control strategies implemented prior to 1990. By projecting the pre-1990 FMVCP into future years, the effects of additional fleet turn over benefit because of the new standards is reflected in the emission factors. The controls included in the ABY inventory development include Pre-1990 FMVCP and the 1992 low-RVP control. The activity levels used to calculate the ABY inventories reflect the 2002 roadway network with 2002 VMT and speeds. The estimated non-creditable emissions reductions due to pre-1990 controls are calculated by subtracting the 2002 ABY inventory, relative to the target year, from the actual 2002 base year inventory. A summary of the inventories and associated non-creditable emissions reductions is presented in Table 2-10: *Summary of HGB Non-Creditable Reductions, Ozone Season Weekday On-Road Mobile Source VMT and Emissions*. For complete documentation of the development of the inventory and details on MOBILE model inputs, refer to Appendix 3: *Development of HGB RFP On-Road Mobile Source Emissions Inventories*.

Table 2-10: Summary of HGB Non Credible Reductions, Ozone Season Weekday On-Road Mobile Source VMT and Emissions (tons per day)

Calendar Year	VMT	2002 Base/Adjusted Base Year Inventory		Non-Creditable Emissions Reductions	
		NO _x	VOC	NO _x	VOC
2002 Base Year	118,741,309	283.20	114.30	N/A	N/A
2002 Adjusted Base Year (ABY)	118,741,309	335.20	162.20	N/A	N/A
2008 ABY	118,741,309	293.00	152.20	42.20	10.00

2.5.4 Updated Uncontrolled 2008 Milestone Year Emission Inventory

The milestone year uncontrolled EI for on-road mobile sources was developed using emission factors from the MOBILE model that reflect only control strategies implemented prior to 2002. The latest version of MOBILE, MOBILE6.2.03 was used to develop the inventories for this SIP revision. The activity levels were updated to include the latest output from the HGB transportation demand model. These controls include Pre-1990 FMVCP, the 1992 RVP control, fleet turnover to Tier 1 FMVCP, reformulated gasoline, and the HGB vehicle I/M program. The activity levels used to calculate the inventory reflect the milestone roadway network, with milestone year VMT and speeds. A summary of the inventories is presented in Tables 2-8 and 2-9. For complete documentation of the development of the inventory and details on MOBILE model inputs, refer to Appendix 3: *Development of HGB RFP On-Road Mobile Source Emissions Inventories*.

2.2.5 Updated Controlled 2008 Milestone Year Emission Inventory

The milestone year controlled EI for on-road mobile sources was developed using emission factors from the Mobile model that reflect both control strategies implemented prior to 2002 and the control strategies used to demonstrate compliance with RFP requirements. These controls include Pre-1990 FMVCP, fleet turnover to Teir 1 of the FMVCP, fleet turnover to Tier 2 of the MVCP, the 2007 heavy duty diesel FMVCP standards, summer reformulated gasoline, the HGB vehicle I/M program, anti-tampering program, and Texas Low Emission Diesel (TxLED). Control scenario inventory values include both the controlled inventory value and the quantification of reductions for each control strategy. A summary of the uncontrolled on-road mobile inventory, the individual on-road mobile control reductions, and the resulting controlled on-road mobile inventory for 2008 are summarized in Table 2-11: *HGB RFP Ozone Season Weekday On-Road Mobile Source NO_x Emissions and Control Strategy Reductions* and Table 2-

12: HGB RFP Ozone Season Weekday On-Road Mobile Source VOC Emissions and Control Strategy Reductions.

Table 2-11: HGB RFP Ozone Season Weekday On-Road Mobile Source NOx Emissions and Control Strategy Reductions

Emissions Inventory	NOx (tons per day)
2008 Uncontrolled	346.83
Tier 1 Federal Motor Vehicle Control Program (FMVCP)	63.30
I/M in Harris County	12.08
Federal Reformulated Gasoline (RFG)	44.40
National Low Emission Vehicle Program (NLEV)	9.65
Tier 2 FMVCP	28.67
2007 Heavy Duty Diesel FMVCP	8.24
Expanded I/M	3.58
TxLED	5.26
2008 Control Strategy	171.65*

*Calculations have been rounded to the hundredth's place to maintain consistency between all values.

Table 2-12: HGB RFP Ozone Season Weekday On-Road Mobile Source VOC Emissions and Control Strategy Reductions

Emissions Inventory	VOC (tons per day)
2008 Uncontrolled	180.99
Tier 1 Federal Motor Vehicle Control Program (FMVCP)	41.77
I/M in Harris County	10.15
Federal Reformulated Gasoline (RFG)	31.64
National Low Emission Vehicle Program (NLEV)	5.25
Tier 2 FMVCP	10.33
2007 Heavy Duty Diesel FMVCP	0.13
Expanded I/M	2.80
TxLED	0.04
2008 Control Strategy	78.88*

*Calculations have been rounded to the hundredth's place to maintain consistency between all values.

The MVEBs for each milestone year is derived from the on-road mobile source uncontrolled inventory and the amount of emissions reduction for each mobile source control used in the demonstration of the RFP requirements. MVEB calculations are documented in Chapter 5.

The activity levels used to calculate the inventory reflect the milestone roadway network, with milestone year VMT and speeds. A summary of the inventories is presented in Table 2-8: *HGB Eight-County RFP Ozone Season, Weekday On-Road Mobile Source NO_x Emissions*, and Table 2-9: *HGB Eight-County RFP Ozone Season Weekday On-Road Mobile Source VOC Emissions*. For complete documentation of the development of the inventory and details on MOBILE model inputs, refer to Appendix 3: *Development of HGB RFP On-Road Mobile Source Emissions Inventories*.

