

## **CHAPTER 3: TARGET EMISSION LEVELS AND RFP DEMONSTRATION**

### **3.1 INTRODUCTION**

This chapter details the process and results to show the state meets the 15 percent emission reduction requirements for the period between the 2002 base year through the first RFP milestone year 2008.

Compliance with the 2008 milestone emission reduction requirements are demonstrated by using EPA methodologies, first to calculate the elements of the RFP demonstration and then to use these elements in conjunction with EPA RFP methodology to demonstrate compliance with RFP reduction requirements.

The required RFP elements are:

- 2002 base year emissions,
- 2002 to 2008 non-creditable reductions,
- 2008 target levels of emissions,
- 2008 projected emissions with growth,
- 2008 required emission reductions for VOC and NO<sub>x</sub>, and,
- control strategy emissions reduction for 2008.

This chapter describes how the elements of the HGB 2008 RFP demonstration are calculated, describes how the elements are integrated to demonstrate compliance with 2008 RFP requirements, and provides a summary of the 2008 HGB RFP demonstration. First, the target level of emissions for 2008 is calculated. Second, the 2008 RFP control reductions are subtracted from the 2008 emission inventory that includes growth between 2002 and 2008. When the 2008 projected inventory, minus the RFP controls is less than the target level of emissions for VOC and/or NO<sub>x</sub>, the RFP requirement has been met.

### **3.2 TARGET LEVEL METHODOLOGY**

EPA guidance specifies the method states use to calculate the maximum amount of emissions a nonattainment area can emit for each RFP milestone year. These RFP target levels of emissions are calculated with a six step process.

1. Develop the 2002 base year inventory,
2. Develop the 2002 RFP base year inventory,
3. Develop the adjusted base year inventories for 2002 and 2008,
4. Calculate the non-creditable fleet turnover correction,
5. Calculate the 2008 necessary 15 percent emission reduction, and
6. Calculate the 2008 target levels of emissions for VOC and NO<sub>x</sub>.

### **3.3 CALCULATION OF TARGET EMISSION LEVELS**

Step one of the RFP target calculation is development of the 2002 base year emission inventory. EPA guidance specifies the method states must use to develop the base year and all other SIP emission inventories. Details of the development of the 2002 HGB base year inventory are discussed in Chapter Two.

The second step of the RFP target calculation methodology subtracts biogenic emissions from the 2002 base year inventory because the RFP calculations do not include biogenic emissions. The resulting inventory is called the 2002 RFP base year inventory and represents the total anthropogenic emissions for the area. Details of the development of the 2002 HGB RFP base year inventory are discussed in Chapter Two.

Step three of the target calculation methodology is development of the adjusted base year inventories for 2002 and 2008. These inventories are an algebraic representation of the effects of the pre-1990 FCAA controls projected to the RFP base and milestone years. As such these inventories can be used to estimate the effects of the pre-1990 FCAA controls between milestone years. This allows for the calculation of the non-creditable control reduction that is done as step four. The emission rates for an adjusted base year inventory are developed using the latest version of EPA's emission factor model, MOBILE6.2.03. The model input file is set up to turn off all 1990 FCAA effects, set the model evaluation year to the RFP base or milestone year, and then the model is run to get emission factors for each base/milestone year with only pre-1990 FCAA controls. The emission factors for all years are then multiplied by the 2002 base year VMT. Since all the inventories use the base year VMT, these inventories are referred to as RFP adjusted base year inventories. Details of the development of the 2002 and 2008 HGB RFP adjusted base year inventories is documented in Chapter Two.

Step four, calculating the non-creditable fleet turnover correction, is accomplished by subtracting the the 2008 adjusted base year inventory from the 2002 adjusted base inventory. Since the adjusted base year inventories estimate the effects of the non-creditable pre-1990 FCAA controls, the difference between adjusted base year inventories represent an estimate of the non-creditable RFP emission reductions, also referred to as the fleet turnover correction. The equation for calculating the fleet turn over correction for 2008 is:

$$\text{Fleet Turnover Correction for 2008} = [ \text{EF}_{2002\text{ABY}} * \text{VMT}_{2002} ] - [ \text{EF}_{2008\text{ABY}} * \text{VMT}_{2002} ]$$

Where:

- $\text{EF}_{2002\text{ABY}}$  = MOBILE6.2.03 emission rate with pre-1990 CAA controls and 2002 evaluation year
- $\text{EF}_{2008\text{ABY}}$  = MOBILE6.2.03 emission rate with pre-1990 CAA controls and 2008 evaluation year
- $\text{VMT}_{2002}$  = 2002 vehicle miles traveled

Step five, calculating required 2008 reductions, is accomplished by multiplying the 2002 adjusted base year inventory values by the percent reduction needed to meet RFP requirements. EPA's Phase II eight-hour ozone implementation rule requires all ozone nonattainment areas classified as moderate and above to reduce  $\text{NO}_x$  and/or VOC emissions by 15 percent for the period 2002 through 2008, but use of  $\text{NO}_x$  emissions reductions must meet the criteria in Section 182(c)(2)(C) in the FCAA. For the eight HGB counties, an equivalent percentage of  $\text{NO}_x$  reduction may be substituted for VOC reduction requirements. The total percent  $\text{NO}_x$  and VOC reductions must equal the 15 percent. The companion HGB eight-hour ozone SIP revision to this RFP SIP identifies reductions in  $\text{NO}_x$  emissions as more effective than reductions in VOC emissions for reducing ozone levels in the HGB area. Accordingly, the RFP reduction requirement for this SIP is satisfied with 15 percent reduction in  $\text{NO}_x$  emissions. Table 3-1 *Summary of VOC and  $\text{NO}_x$  Percent Reduction for 2008 Milestone Year* summarizes the  $\text{NO}_x$  and VOC reductions being used in the HGB counties to satisfy the RFP requirements. The following equation generally describes the method to calculate the percentage of  $\text{NO}_x$  emissions substituted for VOC emissions:

$$N_{2008} = 15 - V_{2008}$$

where:

$V_{2008}$  = percentage VOC reductions for 2008  
 $N_{2008}$  = percentage  $NO_x$  reductions for 2008

**Table 3-1: Summary of VOC and  $NO_x$  Percent Reduction for 2008 Milestone Year**

County Description	Percent VOC Reduction	Percent $NO_x$ Reduction	Tons per Day $NO_x$ Reduction
Eight HGB Counties	0	15	118.26 tpd

The VOC and  $NO_x$  percentages are multiplied by the 2002 adjusted base year inventories for VOC and  $NO_x$  respectively to calculate the required VOC and  $NO_x$  emission reductions for 2002. The adjustment to 2008 is calculated by subtracting the non-creditable reductions between 2002 and 2008 from the 2002 base year inventory. The equations for calculating the required percent reductions for VOC and  $NO_x$  are described below:

$$RQ_{VOC} = [ BY_{2002VOC} - ( ABY_{2002VOC} - ABY_{2008VOC} ) ] * PV_{2008}$$

and

$$RQ_{NO_x} = [ BY_{2002NO_x} - ( ABY_{2002NO_x} - ABY_{2008NO_x} ) ] * PN_{2008}$$

where:

$RQ_{VOC}$  = required percent VOC emission reductions by 2008  
 $RQ_{NO_x}$  = required percent  $NO_x$  emission reductions by 2008  
 $BY_{2002VOC}$  = 2002 base year inventory for VOC  
 $BY_{2002NO_x}$  = 2002 base year inventory for  $NO_x$   
 $ABY_{2002VOC}$  = 2002 adjusted base year inventory for VOC  
 $ABY_{2002NO_x}$  = 2002 adjusted base year inventory for  $NO_x$   
 $ABY_{2008VOC}$  = 2008 adjusted base year inventory for VOC  
 $ABY_{2008NO_x}$  = 2008 adjusted base year inventory for  $NO_x$   
 $PV_{2008}$  = percentage VOC reductions by 2008  
 $PN_{2008}$  = percentage  $NO_x$  reductions by 2008

Step six, calculating 2008 target levels of emissions, is accomplished by subtracting the required emission reductions calculated in step five, and the fleet turnover correction factor calculated in step four, from the 2002 base year inventory. This target level represents the level of emissions that must be achieved in 2008 in order for the HGB area to meet its eight-hour ozone RFP requirements for the 2008 RFP milestone year. Because the fleet turnover correction affects both  $NO_x$  and VOC, target levels will be calculated for both pollutants even when the entire reduction requirement is taken from one pollutant or the other. The calculation of the target levels of emissions for the milestone year can be generalized into the following equation:

$$TL_{2008X} = RFPBY_{2002X} - RQ_x - FTC_{2008X}$$

where:

$TL_{2008X}$  = Target level of emissions for 2008 milestone  
 $RFPBY_{2002X}$  = 2002 RFP Base Year Emissions  
 $RQ_x$  = Emission reduction requirement for 2008 for pollutant X  
 $FTC_{2008X}$  = Fleet turnover correction term for 2008 for pollutant X  
X = Either VOC or  $NO_x$

The RFP plan must demonstrate that the projected emissions for 2008, reflecting the RFP control strategy, will be less than or equal to the calculated target values. Appendix 1, Sheet 14 documents the calculation of the 2008 target values. Table 3-2: *Summary of RFP Demonstration for HGB Counties*, summarizes the target levels for the 2008 for HGB. The following sections describe how the target levels are integrated into the RFP demonstration.

### 3.4 GROWTH

This 2008 RFP SIP demonstration must also describe how any growth in emissions between 2002 and 2008 will be offset. If the target levels are subtracted from projected inventories that include growth and exclude all controls between 2002 and 2008, the result will be the required RFP control reductions that account for noncreditable reductions, the percent reduction requirement and emissions growth. The following two equations represent the general calculation methodology for determining the total amount of control reduction for VOC and NO<sub>x</sub> that is required for the 2008 HGB milestone year.

$$\begin{aligned} ER_{NO_x2008} &= UPE_{2008NO_x} - TL_{2008NO_x} \\ ER_{VOC2008} &= UPE_{2008VOC} - TL_{2008VOC} \end{aligned}$$

Where:

$ER_{NO_x2008}$	= RFP NO <sub>x</sub> emission reductions for 2008
$UPE_{2008NO_x}$	= uncontrolled projected NO <sub>x</sub> emission for 2008
$TL_{2008NO_x}$	= Target level of NO <sub>x</sub> emissions for 2008 milestone
$ER_{VOC2008}$	= RFP VOC emission reductions for 2008
$UPE_{2008VOC}$	= uncontrolled projected VOC emission for 2008
$TL_{2008VOC}$	= Target level of VOC emissions for 2008 milestone

The projection or forecast year emission inventories is the state's estimation of the level of VOC and NO<sub>x</sub> emissions if no further action is taken to control VOC or NO<sub>x</sub> emissions. The VOC and NO<sub>x</sub> projected year emission inventories are derived by applying the appropriate projection methodologies to the 2002 base year emission inventories, to emission factor development, and/or to activity level estimates. The resulting inventories include any growth that occurs between 2002 and 2008. The projection methodology for the uncontrolled 2008 RFP emission inventories excludes changes in the emission factors due to control strategies so that the projections represent the total growth in emissions. The development of the uncontrolled projected emission inventories is documented in Chapter Two.

### 3.5 RFP DEMONSTRATION

The EPA's Phase II Eight-hour Ozone Implementation Rule requires all ozone nonattainment areas classified as moderate and above to reduce NO<sub>x</sub> and/or VOC emissions by 15 percent for the period 2002 through 2008. The target levels are subtracted from the emissions forecast to calculate the required emission reductions necessary for the 2008 milestone year. The actual reductions achieved are then subtracted from the required reductions. The control strategy plan must show emission reductions that will reduce the future emissions inventories to a value less than the emissions target value. For the eight HGB counties, this requirement is met by achieving reductions of 15 percent NO<sub>x</sub> for RFP and three percent NO<sub>x</sub> for contingency purposes. Since all reductions in the HGB counties are achieved with NO<sub>x</sub> reductions there is no VOC reduction requirement for these counties. Table 3-2: *Summary of RFP Demonstration for Eight HGB Counties* summarizes the demonstration of the RFP plan for HGB for the 2008 milestone year. All RFP calculations, including the required 2008 reductions, the fleet turnover correction factor, and the 2008 target emission levels are calculated and shown in Appendix 1.

**Table 3-2: Summary of RFP Demonstration for Eight HGB Counties**

Description	2008	
	tpd NO <sub>x</sub>	tpd VOC*
2008 Uncontrolled Emissions Forecast	1026.60	948.04
Target level of 2008 emissions	670.11	733.30
Required Reductions from 2008 uncontrolled emissions forecast	356.49	214.74
Sum of RFP Control Reductions	622.86	646.89
Are control reductions greater than required reductions?	Yes	Yes

\* VOC reductions were not used for RFP demonstration purposes, but are needed to establish the MVEB as detailed in Chapter Five.