

CHAPTER 4: CONTROL MEASURES TO ACHIEVE TARGET EMISSION LEVELS

4.1 OVERVIEW OF CONTROL MEASURES

This section briefly describes the control measures used to achieve the necessary emission reductions to meet the RFP requirements. The methodologies used to estimate reduced emission levels are described in Sections 4.2 through 4.6. The projected emission reductions reflect the identified federal and state emission controls. All state control measures are codified in Texas state regulations. The list of controls does not include all emission reduction programs for the HGB area. The summary of emission reductions from the control measures used to meet the 2008 RFP target is presented in Table 4-1: *Summary of HGB RFP Emission Reductions for 2008*. The 15 percent reduction requirement is satisfied using reductions in NO_x emissions. VOC emission reductions were not used for RFP demonstration purposes, but are needed to establish the MVEB.

Table 4-1: Summary of HGB RFP Emission Reductions for 2008

Control Strategy Description	NO _x tpd	VOC tpd
Mass Emissions Cap and Trade Program (MECT)	206.70	0.00
HRVOC Cap	0.00	135.79
Portable Fuel Containers	0.00	3.89
Tier 1 Federal Motor Vehicle Control Program (FMVCP)	63.30	41.77
I/M in Harris County	12.08	10.15
Federal Reformulated Gasoline (RFG)	44.40	31.64
National Low Emission Vehicle Program (NLEV)	9.65	5.25
Tier 2 Federal Motor Vehicle Control Program (FMVCP)	28.67	10.33
2007 Heavy Duty Diesel FMVCP	8.24	0.13
Expanded I/M	3.58	2.80
TxLED	5.26	0.04
Tier I and II Locomotive NOX Standards	4.02	0.00
New Non-road Spark-Ignition (SI) Engines*	-7.21	46.61
Heavy Duty Non-Road Engines	43.92	10.61
Tier 1, 2, and 3 Non-Road Diesel Engines	24.62	1.95
Small Non-Road SI Engines (Phase II)	4.63	37.45
Large Non-Road SI and Recreational Marine	20.81	2.98
Sum of Control Reductions	472.67	341.40

* Projections from the EPA NONROAD 2005 model suggest that net NO_x emissions will exceed control strategy reductions for new non-road spark-ignition engines. This emission increase results from a projected increase in total number of non-road engines that outpaces the emissions reduction per individual unit expected.

4.2 POINT SOURCE CONTROLS

The point source controls are calculated using several sources of data, including but not limited to emissions inventory data, mass emissions cap and trade (MECT) data, acid rain data, and banked emissions credit data. All emission reductions required by state, federal, and local rules are incorporated into the future projections for controlled inventories. The summary of uncontrolled and controlled emissions for the HGB area for point sources may be found below in Table 4-2:

Summary of Point Source Emissions. Point source controls are detailed in Appendix 1 - Sheet 13. The most significant of these strategies is the 30 TAC Chapter 117 emission specifications for attainment demonstration (ESADs) and the MECT Program for NO_x. Some of the source categories and associated reductions from these strategies are utility boilers, turbines and duct burners, heaters and furnaces, IC engines and industrial boilers with an overall point source NO_x reduction of approximately 80 percent. The estimated reduction in point source VOC emissions comes from the HRVOC rules in Chapter 115, Subchapter H.

Table 4-2: Summary of Point Source Emissions

Houston-Galveston-Brazoria (tpd)	2008	
	NO_x	VOC
Uncontrolled Emissions Estimates	381.59	322.04
Controlled Emissions Estimates	174.89	186.25
Total Reductions	206.70	135.79

4.3 AREA SOURCE CONTROLS

The only area source control in the HGB area used in this RFP demonstration is the portable fuel container rule. The EI forecast used EPA-approved EGAS growth factors to develop the corresponding controlled EIs for milestone and attainment years. To develop the controlled emissions, rule effectiveness factors were applied for source categories with applicable TCEQ rules. The summary of uncontrolled and controlled emissions for area sources in the HGB area may be found below in Table 4-3: *Summary of Area Source Emissions.*

Table 4-3: Summary of Area Source Emissions

Houston/Galveston/Brazoria (tpd)	2008	
	NO_x	VOC
Uncontrolled Emissions Estimates	55.18	262.08
Controlled Emissions Estimates	55.18	258.19
Total Reductions	0.00	3.89

4.4 NON-ROAD MOBILE SOURCE CONTROLS

Most non-road mobile source emissions were calculated using the EPA NONROAD 2005 model. The NONROAD 2005 model comes with a set of default files that are required for calculating non-road mobile emissions. The TCEQ customized several data files used by the NONROAD model to more accurately reflect the emissions generated by non-road mobile equipment in Texas. Emissions from the remaining non-road mobile sources not included in the NONROAD model, comprised of locomotives, aircraft and support equipment, and commercial marine vessels, were calculated outside of the NONROAD 2005 model using EPA-approved methodologies.

For the RFP plan, the model was executed using custom population and activity files. In some cases, custom allocation and technology type data files were also used. The technology type file identifies what percent of an equipment population is expected to use federal non-road equipment controls for the year of interest. Emissions for 2008 were developed with and without controls using the updated version of the model. These emissions were provided by a contractor and the documentation for this procedure is in Appendix 4: *Reasonable Further Progress Analysis for Non-Road Sources.*

Once the uncontrolled and controlled emissions estimates were generated by the NONROAD 2005 model, the effectiveness of control strategies for each year of interest was evaluated.

Emissions reductions from federal controls on non-road equipment was calculated by subtracting the controlled emissions estimates from the uncontrolled emissions estimates.

Locomotive emissions were calculated on spreadsheets using track mileage and engine fuel data provided by individual railroad lines. Aircraft emissions estimates were calculated using the EPA approved Emissions and Dispersion Model System (EDMS) model. Commercial marine vessel emissions were developed in 1999 by contractor. Emissions were developed from surveys to determine vessel types and shipping activities within the Houston ship channel. The inventory was then updated for 2002.

The summary of uncontrolled and controlled emissions for the HGB area for all non-road mobile sources may be found below in Table 4-4: *Summary of Non-Road Mobile Emissions*. Details of the non-road control strategy emission reductions are documented in Appendix 4: *Reasonable Further Progress Analysis for Non-Road Sources*.

Table 4-4: Summary of Non-Road Mobile Emissions

Houston-Galveston-Brazoria (tpd)	2008	
	NO _x	VOC
Uncontrolled Emissions Estimates	243.03	182.92
Controlled Emissions Estimates	146.66	81.82
Total Reductions*	90.79	99.60

* Not all possible control measures were necessary to demonstrate RFP requirements. Thus, the controlled emissions estimates are less than the difference between the uncontrolled emissions estimate and the total reductions

4.5 ON-ROAD MOBILE SOURCE CONTROLS

The projected mobile source emissions inventories documented in Appendix 3: *Development of HGB RFP On-Road Mobile Source Emissions Inventories* includes quantification of emission reductions for all federal and state on-road mobile source control rules for each RFP milestone year for the eight-county HGB area. Not all available mobile source controls are needed to demonstrate RFP for the HGB area. A summary of the on-road mobile controls included in the 2002 and 2008 RFP inventories is presented in Table 4-5: *Control Programs Modeled in MOBILE6 Emissions Factors for 2002 and 2008 RFP Controlled Emissions Inventories*.

Table 4-5: Control Programs Modeled in MOBILE6 Emissions Factors for 2002 and 2008 RFP Controlled Emissions Inventories

Milestone Year	Controls Modeled
2002 Base Year	Pre-90 FMVCP, Post-1990 FMVCP, Summer Reformulated Gasoline, 2002 State Programs: I/M in Harris County ATP in Harris County
2008 Control Strategy	Pre-90 FMVCP, Post-1990 FMVCP, Summer Reformulated Gasoline, 2007 State Programs: I/M in Brazoria, Fort Bend, Galveston, Harris and Montgomery Counties ATP in Brazoria, Fort Bend, Galveston, Harris and Montgomery Counties

Table 4-6: *On-Road Mobile Control Reduction Summary 2008, HGB, Ozone Season Weekday* summarizes the amount of control reduction for on-road mobile sources for the milestone year.

**Table 4-6: On-Road Mobile Control Reduction Summary
2008, HGB, Ozone Season Weekday**

Houston/Galveston/Brazoria (Tons/Day)	2008	
	NO _x	VOC
Uncontrolled Emissions Estimates	346.83	180.99
Controlled Emissions Estimates	171.65	78.88
Total Reductions*	175.18	102.11

4.6 CONTINGENCY MEASURES

In case of a milestone failure, the state is required to have contingency control measures that reduce emissions by an additional three percent between the milestone year and the next calendar year. Controlled emission reductions not previously used in the 2008 milestone demonstration may be used to satisfy contingency requirements. Because the excess emission reductions from the 2008 RFP demonstration are greater than the reductions required for 2009 contingency, the 2009 contingency plan for the HGB area does not include any additional controls. A summary of the estimated control reductions and the required contingency level of reductions is presented in Table 4-7: *RFP Contingency Demonstration for HGB Area*. This contingency plan meets the reduction requirements for all years.

Table 4-7: RFP Contingency Demonstration for HGB Area

Description	2009	
	NO _x	VOC
Adjusted 2008 Base Year EI	788.37	733.30
	x 3.0%	N/A
Required Contingency Reductions in 2009	23.65	N/A
Excess From 2008 RFP Demonstration (see Appendix 1 Sheet 12)	47.25	86.41
Total Contingency Reductions	47.25	86.41
Contingency Excess (+) or Shortfall (-)	+23.60	+86.41
Are contingency reductions greater than required contingency reduction?	Yes	Yes