United States Environmental Protection Agency
Air and Radiation
EPA420-R-99-005
March 1999

Development of Light-Duty Emission Inventory Estimates in the Notice of Proposed Rulemaking for Tier 2 and Sulfur Standards

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1 Introduction

EPA is proposing the adoption of Tier 2 emission and fuel sulfur standards which would result in substantial reductions in emissions from light-duty vehicles (LDVs) and trucks (LDTs). Pollutants primarily affected by the proposed vehicle and fuel standards are oxides of nitrogen (NOx) and volatile organic compounds (VOC), precursors of tropospheric ozone; particulate matter ($PM_{2.5}$ and PM_{10}), and sulfur dioxide (SOx), an important agent in the formation of ambient PM and acid rain. In support of the proposed emission and fuel standards, a comprehensive analysis of emissions generated from light-duty vehicles and trucks was necessary, both to understand the future trend of these emissions without further control, and to assess the affect the proposed controls will have on these emissions. The purpose of this report is to provide in detail the methodology used to generate the emission inventories for light-duty vehicles and trucks as presented in both the Preamble and Regulatory Impact Analysis (RIA) of the proposed Tier 2 and sulfur standards.[a] The light-duty emission inventories themselves are also presented in full.

The computer models MOBILE (for VOC and NOx) and PART (for PM and SOx) are used by EPA to estimate emission levels from on-highway mobile sources, including light-duty vehicles and trucks, heavy-duty trucks, and motorcycles. MOBILE5, the current version of MOBILE, was released in 1992 with subsequent minor revisions made in 1993 (MOBILE5a) and 1996 (MOBILE5b). EPA is in the process, however, of substantially revising the MOBILE model. MOBILE6, scheduled for release in late 1999, will include revisions to many key areas impacting estimates of light-duty car and truck emissions. In particular, MOBILE6 will be updated to reflect a) major revisions to basic emission rates, b) the impacts of aggressive driving and air conditioning emissions, c) revised fuel sulfur impacts on newer technology vehicles, and d) recent trends in LDT sales and usage patterns. Because of these changes, MOBILE6 emission estimates are expected to vary considerably from those in MOBILE5.

The PART5 model will be updated to PART6 following completion of MOBILE6. Although the changes to be made to this model have not been fully developed, two updates that are known are the incorporation of MOBILE6 inputs related mostly to fleet characteristics (such as the relative proportion of miles traveled by cars and trucks, annual miles accumulated, and the distribution of vehicle ages within the fleet), and updated fuel sulfur effects on gasoline PM and SOx emissions rates.

Because the differences between MOBILE5/PART5 and MOBILE6/PART6 will affect estimates of current and future emissions from light-duty cars and trucks, it is important to account for these changes in the development of light-duty emission inventories. Unfortunately neither MOBILE6 nor PART6 were available for use in this analysis. However, many of the

[a] Although the proposed vehicle and fuel standards will reduce carbon monoxide (CO) emissions as well, CO is not considered a focus of the proposed standards. Hence, updated light-duty CO inventories were not developed in support of the proposed standards, and are not discussed in this report.

inputs proposed for use in these models have been developed in draft form. An updated assessment of light-duty vehicle and truck emissions was therefore developed using a model which incorporated these draft inputs, known as the Tier 2 Model. The Tier 2 Model represents the next generation of the Modified MOBILE5b model, or T2AT, which was developed in support of the Tier 2 Study.[1] Updated inputs included in the Tier 2 Model include 1981 and later basic emission rates, fuel sulfur effects, mileage accumulation rates, and fleet age distributions. For other elements such as off-cycle emissions (including emission effects due to aggressive driving and air conditioning) and VMT mix between vehicle classes, the exact methodology proposed for MOBILE6 were not replicated in the Tier 2 Model; however, these inputs have been updated since the Tier 2 Study to allow an approach as consistent as possible with MOBILE6. The model also reflects existing national and local motor vehicle control programs including National LEV (NLEV), Supplemental Federal Test Procedure (SFTP), On-Board Diagnostics (OBD), reformulated gasoline (RFG) and Inspection/Maintenance (I/M) programs.

The Tier 2 Model was used to calculate emission inventory estimates in selected areas for NOx, exhaust VOC, PM and SOx. These inventories were generated for a baseline case (i.e. without Tier 2 and Sulfur standards), the proposed Tier 2/Sulfur program, and alternative control scenarios. The effect of increased diesel truck sales growth on PM emission was also evaluated, with and without the proposed Tier2/Sulfur controls.[b]

The baseline nonexhaust (i.e. evaporative and refueling) VOC emission inventory was developed using MOBILE5b, since draft MOBILE6 estimates of evaporative emissions were not available at the time of this analysis. A modified version of MOBILE5b was also developed to estimate the benefits of evaporative VOC standards proposed under Tier 2.

In addition to presenting inventory results and the methodology used in derive them, this report also presents a comparison of light-duty VOC and NOx emissions between the Tier 2 Model and MOBILE5b. In addition, the methodology used for generating estimates of per-vehicle lifetime emissions used in the Tier 2 cost effectiveness analysis is outlined.

2 Overview

Emission inventories were generated separately for light-duty vehicles, light-duty trucks below 6,000 pounds gross vehicle weight (LDT1s and 2s), and light-duty trucks above 6,000 pounds (LDT3s and 4s). The structure of this report details three basic stages in the generation of emissions inventories for these classes. The first stage was the development of NOx and HC final emission rates used by the Tier 2 Model, covered in Section 3. Final emission rates (FERs) are defined as in-use emission levels expressed in terms of grams per mile, which include the effects of all applicable standards, off-cycle driving, fuel effects, I/M, and OBD. Final emission rates were developed starting with basic emission rates proposed for MOBILE6 for the baseline case; for the

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[b]The Tier 2 Model and related documentation are being made publicly available in conjunction with the Tier 2 NPRM. The model has been shifted to a Microsoft Excel platform for added flexibility.

control cases, new basic emission rates were developed as detailed in Section 3. Aggressive driving and air conditioning effects were then added accordingly (including the effects of the SFTP requirement), followed by fuel effects (both sulfur and non-sulfur) and the effects of I/M and OBD. In addition to forming the basis of the Tier 2 Model, the NOx and HC final emission rates were used to generate per-vehicle emission reductions for the Tier 2 cost effectiveness analysis.[c]

The second stage in inventory development (discussed in Section 4 for NOx and HC and Section 5 for PM and SOx) was to generate inputs for the Tier 2 Model which allowed the modeling of the baseline scenario and control scenarios of interest across specific geographic areas. This required generating by-model year final emissions rates which accounted for the phase-in of relevant control programs such as Tier 1, NLEV and SFTP, as well as the evaluated control scenarios. These by-model year emission rates also needed to reflect the desired geographic region, taking into account the mix of I/M, fuel (RFG versus conventional gasoline), and NLEV (Ozone Transport Region, or OTR, versus non-OTR) programs.

The final stage of inventory development (Section 6) was the generation of tonnage estimates by calendar year using the by-model year final emission rates discussed above, in conjunction with fleet characteristics (e.g., age distribution and mileage accumulation rates) and estimates of vehicle miles traveled (VMT). The result of this process was emission inventories for NOx, VOC, PM and SOx for LDVs, LDT1s and 2s, and LDT3s and 4s for selected calendar years from 1990 through 2030. These results were generated for the 47-state region (comprising the U.S. minus California, Alaska and Hawaii), and four urban areas: New York, Chicago, Atlanta and Charlotte. The generation of the evaporative VOC inventories for these areas is discussed in Section 7. Section 8 presents final inventory results, Section 9 provides a comparison between the Tier 2 Model and MOBILE5b, and Section 10 discusses the development of per-vehicle emission estimates used in the Tier 2 cost effectiveness analysis.

3 Generation of NOx and HC Final Emission Rates for Gasoline LDVs and LDTs

Final emission rates are intended to provide a realistic assessment of in-use emissions, accounting for all existing vehicle and fuel control programs. NOx and exhaust HC[d] final emission rates were developed by first starting with basic emission rates, which represent in-use emissions levels which would occur over EPA's standard certification cycle known as the Federal Test Procedure (FTP). The BER reflects the effects of age and vehicle mileage on the deterioration of a vehicle's emission control system; hence, the BER increases with vehicle age.

[c] The Tier 2 cost effectiveness analysis is contained in the Tier 2 Regulatory Impact Analysis, Section VI.

[d] "HC" in the context of final emission rates refers to NMHC for Tier 1 and earlier vehicles, and NMOG for LEV and Tier 2 vehicles. Exhaust VOC emission inventories were developed using NMHC/NMOG FERs without further adjustment.

Estimates of the emission impact due to off-cycle driving (i.e. driving behavior more aggressive than found on the FTP, as well as air-conditioning usage), fuel sulfur and other fuel effects are then added to the BER, and the effects of I/M and OBD accounted for. The methodologies used in the development of each component are discussed in the following sections.

3.1 Basic Emission Rates

3.1.1 Tier 1 and Later LDVs and LDTs

Basic emission rates (BERs) are emission levels expressed in grams per mile which represent FTP emissions, and increase as a function of vehicle mileage. The Tier 2 Model expressed BERs as a linear function of mileage, according to Equation (1):

$$(1)\ FTP\ Emissions\ (g / mi) = ZML + DR1 * MILE, if\ MILE \leq FLEX$$
$$= ZML + (DR1 * FLEX) + (DR2 * (MILE - FLEX)), if\ MILE > FLEX$$

Where:

ZML = The intercept, or "zero-mile level" of the equation
DR1 = Deterioration rate prior to Flex, in grams/mile per 10,000 miles
DR2 = Deterioration rate after Flex, in grams/mile per 10,000 miles
MILE = Vehicle Mileage / 10,000 miles
FLEX = Inflection point of a two-piece linear regression, in Mileage / 10,000

BERs proposed for use in MOBILE6 were used for Tier 1 and LEV LDVs and LDTs.[2] These BERs are disaggregated into running emissions (base emissions that result when the engine and catalyst are fully warmed up) and start emissions (excess emissions resulting following engine start-up, in which the engine and catalyst are not fully warmed up). These BERs were generated for "normal" emitters (vehicles with FTP emissions less than two times the applicable 50,000 mile FTP standard), "high" emitters (FTP emissions greater than two times the applicable 50,000 mile FTP standard), or "repaired" emitters (high emitters which have undergone repair due to OBD MIL illumination, and emit at a constant level of 1.5 times the 50,000 mile FTP standard). Thus, there were six BERs for a given vehicle class and emission standard level, covering normal, high, and repaired emitters for both running and start emissions. These BERs are shown in Tables 1 and 2 for Tier 1 and LEV LDVs and LDTs, along with the FTP-based BERs from which the running and start BERs were derived.

BERs were developed for a subset of the proposed Tier 2 emission standards[e] by extending the methodology proposed for deriving MOBILE6 Tier 1 and later BERs. For NOx,

[e] A full description of the proposed Tier 2 vehicle program is contained in Section 4.3.2

BERs were generated for the 0.07 g/mi standard[f] applicable to all LDVs and LDTs, the 0.3 g/mi interim standard applicable to LDT2s, and the 0.6 g/mi interim standard applicable to LDT3s. For HC, BERs were generated for the 0.09 g/mi standard applicable to all LDVs and LDTs, and the 0.23 g/mi interim standard applicable to LDT3s.[g] Tier 2 BERs were developed using as a base BERs proposed for MOBILE6: For NOx, LDV Tier 1 BERs; for HC, 1988-1993 Ported Fuel Injection (PFI) LDV BERs. These standard levels are referred to as the "base standard levels". FTP-based BERs were first generated, and split into running and start BERs using the methodology described for Tier 1 and later vehicles in the report under reference 2 above (Koupal and Glover, March 1999). For both NOx and HC, the following steps were involved in calculating FTP-based BERs for the Tier 2 standard levels listed above:

1) **Normal Emitter** BERs were developed by applying the ratio of the Tier 2 standard level to the base standard level *at 50,000 miles* (intermediate useful life) to the base BER (ZML and DR).[h] For example, normal-emitting LDV Tier 2 BERs were generated by multiplying the normal-emitting Tier 1 intercept (ZML) and slope (DR) by 0.05/0.4 g/mi = 0.125. Thus, basic emission rates for properly operating vehicles reflect the full benefit of the proposed Tier 2 standards through reduced initial emissions and reduced deterioration. This approach presumes that properly operating Tier 2 vehicles will on average achieve the same compliance margin ("headroom") with the 50,000 mile certification standard observed in the data used to generate the base standard level BERs proposed for MOBILE6.

2) **High Emitter** BERs estimate emissions from vehicles that significantly exceed their certification standards due to malfunctioning emission control systems. As emission standards are lowered, emission levels for high emitters are not assumed to be reduced in proportion to the standard change. The theory behind this approach is that a malfunctioning vehicle will behave more (but not completely) independent of certification standard level. BERs for high emitters (assumed to remain constant over the life of the vehicle) were developed by taking the average of the high emitter BER at the base standard level and the BER that would result if the ratio of 50,000 mile standards were applied to the base BER (the approach also proposed for Tier 1 and later BERs in MOBILE6). This resulted in a high emitter BER which is 50 percent proportional to the change in standard; this allows malfunctioning vehicles some benefit due to lower emission standards, but not the full benefit afforded to normal emitters. The end result of this

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[f]Unless otherwise noted, all emission standards referenced in this report are applicable to 120,000 miles (full useful life).

[g]The BERs applying to the 0.6/0.23 g/mi NOx/NMOG "Interim A" standards applicable to LDT4s in 2004 and the 0.2/0.156 g/mi "Interim B"standards applicable to LDT3s and LDT4s were derived as described in Section 4.3.2.

[h]The 50,000 mile standards were used as the basis for developing BERs across vehicle class and standard level because of differences in the full useful life mileage between the base standard level and Tier 2 standards.

approach is that in-use emissions for the average Tier 2 vehicle are not reduced in full proportional to the change in certification standard level.

3) **Repaired Emitter** BERs are simply assumed constant at 1.5 times the 50,000 mile certification standard, consistent with the draft MOBILE6 methodology for Tier 1 vehicles and LEVs. For current vehicles, this level is at or below the threshold for OBD system failure detection, depending on vehicle mileage and standard class. Vehicles repaired to this level are assumed not to deteriorate for the remainder of their life, unless they migrate into the high emitter category. Thus, over the life of the vehicle this repair level methodology results in significant benefit for OBD-induced repairs.

The BERs developed for Tier 1, LEV, Interim Tier 2 and Final Tier 2 standards for LDVs and LDTs are shown in Tables 1 and 2.

Table 1 - Tier 1, LEV and Tier 2 NOx Basic Emission Rates

Vehicle Class	Standard Class	50/120K* Standard (g/mi)	Mode	"Normal" BER (g/mi)		"High" BER (g/mi)	"Repaired" BER (g/mi)
				ZML	DR		
LDV/T1	Tier 1	0.4/0.6	FTP	0.265	0.015	1.28	0.600
			Running	0.159	0.009	0.77	0.360
			Start (grams)	1.524	0.085	7.35	3.450
	LEV	0.2/0.3	FTP	0.133	0.007	0.96	0.300
			Running	0.080	0.004	0.58	0.180
			Start (grams)	0.765	0.043	5.51	1.725
	Tier 2	0.05/0.07	FTP	0.033	0.002	0.72	0.075
			Running	0.020	0.001	0.43	0.045
			Start (grams)	0.190	0.010	4.13	0.431
LDT2	Tier 1	0.7/0.97	FTP	0.464	0.026	1.76	1.050
			Running	0.278	0.015	1.05	0.630
			Start (grams)	2.668	0.148	10.10	6.038
	LEV	0.4/0.5	SAME AS LDV/T1 TIER 1				
	Interim Tier 2	0.2/0.3	SAME AS LDV/T1 LEV				
	Tier 2	0.05/0.07	SAME AS LDV/T1 TIER 2				
LDT3	Tier 1	0.7/0.98	SAME AS LDT2 TIER 1				
	Interim Tier 2	0.4/0.6	SAME AS LDV/T1 TIER 1				
	Tier 2	0.05/0.07	SAME AS LDV/T1 TIER 2				
LDT4	Tier 1	1.1/1.53	FTP	0.730	0.040	2.40	1.650
			Running	0.438	0.024	1.44	0.990
			Start (grams)	4.198	0.232	13.78	9.488
	Tier 2	0.05/0.07	SAME AS LDV/T1 TIER 2				

* 100K for Tier 1 and LEV LDVs

Table 2 - Tier 1, LEV and Tier 2 HC* Basic Emission Rates							
Vehicle Class	**Standard Class**	**50K Standard (g/mi)**	**Mode**	**"Normal" BER (g/mi)**		**"High" BER (g/mi)**	**"Repaired" BER (g/mi)**
				ZML	**DR**		
LDV/ LDT1	**Tier 1**	0.25/0.31	FTP	0.098	0.0113	1.67	0.375
			Running	0.016	0.0018	0.27	0.060
			Start (grams)	1.183	0.1364	20.17	4.526
	LEV/Tier 2	0.075/0.09	FTP	0.029	0.0034	1.23	0.113
			Running	0.009	0.0010	0.37	0.034
			Start (grams)	0.293	0.0343	12.40	1.141
LDT2	**Tier 1**	0.32/0.4	FTP	0.125	0.0145	1.85	0.480
			Running	0.020	0.0023	0.30	0.077
			Start (grams)	1.509	0.1750	22.31	5.794
	LEV	0.1/0.13	FTP	0.039	0.0045	1.29	0.150
			Running	0.012	0.0013	0.38	0.045
			Start (grams)	0.394	0.0455	13.04	1.515
	Tier 2	0.075/0.09	SAME AS LDV/T1 LEV/TIER2				
LDT3	**Tier 1**	0.32/0.46	FTP	0.125	0.0145	1.85	0.480
			Running	0.020	0.0023	0.30	0.077
			Start (grams)	1.509	0.1750	22.31	5.794
	Interim Tier 2	0.16/0.23	FTP	0.063	0.0073	1.44	0.240
			Running	0.019	0.0022	0.43	0.072
			Start (grams)	0.636	0.0737	14.54	2.424
	Tier 2	0.075/0.09	SAME AS LDV/T1 LEV/TIER 2				
LDT4	**Tier 1**	0.39/0.56	FTP	0.152	0.0177	2.03	0.585
			Running	0.024	0.0029	0.33	0.094
			Start (grams)	1.835	0.2136	24.44	7.061
	Tier 2	0.075/0.09	SAME AS LDV/T1 LEV/TIER 2				

* NMHC for Tier 1, NMOG for LEV and later

3.1.2 Pre-Tier 1 Basic Emission Rates

Draft MOBILE6 BERs for LDVs and LDTs were used directly in the Tier 2 Model for model year 1981 through 1993 (i.e., Tier 0) vehicles and trucks.[3,4] These BERs are disaggregated by start and running emissions, for normal and high emitters,[i] and across fuel delivery technology type. The equations for these BERs are presented in Appendix A. The hydrocarbon BERs proposed for MOBILE6 and shown in Appendix A are expressed in Total HC (THC); they were adjusted to NMHC using a conversion factor of 0.867.

[i]Repaired emitters are not modeled for Tier 0 vehicles due to treatment for I/M that differs from Tier 1 and later vehicles, as discussed in Section 3.6.

In MOBILE6, 1980 and earlier BERs will remain unchanged from MOBILE5b. Thus, 1980 and earlier BERs from MOBILE5b were used for the Tier 2 model;[5] for these vehicles, THC was not converted to NMHC.

3.2 Cumulative Mileage

The effects of off-cycle, fuel properties and OBD/IM benefits were applied to the BER throughout the course of a vehicle's life, to account for the deterioration of emissions with age. This was done by applying adjustments to the basic emission levels computed at the end of each year in a vehicle's life, up through age 25. These yearly basic emissions levels were calculated by applying cumulative mileages levels to the mileage-based BER equations presented in Tables 1 and 2, and Appendix A, according to Equation (1) above. For Tier 1 and later vehicles, the cumulative mileages used for calculating yearly emission rates are those proposed for MOBILE6, shown in Table 3 by vehicle class.[6]

Table 3 - Draft MOBILE6 Cumulative Mileages (10,000 miles)

Year	LDV	LDT1/2	LDT3/4	Year	LDV	LDT1/2	LDT3/4
1	1.491	1.950	2.133	14	15.338	18.453	19.583
2	2.908	3.788	4.120	15	16.072	19.165	20.371
3	4.256	5.519	5.970	16	16.770	19.815	21.104
4	5.537	7.146	7.692	17	17.434	20.406	21.786
5	6.755	8.672	9.297	18	18.064	20.941	22.422
6	7.912	10.100	10.791	19	18.664	21.425	23.014
7	9.013	11.436	12.183	20	19.234	21.861	23.566
8	10.059	12.681	13.478	21	19.776	22.252	24.079
9	11.054	13.839	14.685	22	20.291	22.602	24.557
10	12.000	14.914	15.809	23	20.781	22.914	25.003
11	12.899	15.910	16.856	24	21.247	23.191	25.418
12	13.753	16.829	17.830	25	21.690	23.438	25.804
13	14.566	17.676	18.738				

3.3 Off-Cycle Effects

Off-cycle effects encompass emissions in excess of those generated over the FTP due to aggressive driving (i.e., driving in excess of speed and acceleration rates found on the conventional FTP), and air conditioner operation. These effects were added to the basic emission rates developed in Section 3.1 in a manner consistent with the approach proposed for MOBILE6, which includes accounting for the impact of the Supplemental Federal Test Procedure (SFTP) requirement on these emissions. The treatment of aggressive driving and air conditioning are discussed separately in the following sections.

3.3.1 Aggressive Driving Effects for 1981 and Later Cars and Trucks

The complexity of the MOBILE6 proposal for handling speed and aggressive driving effects was beyond the scope of this analysis, and required a simplified approach for the Tier 2 Model. In short, speed and aggressive driving effects as proposed for MOBILE6 will represent the difference between emissions over representative in-use driving, and base running emissions as defined by the running LA4. This approach was approximated in the Tier 2 Model using data collected over ARB's LA92 cycle on the vehicle sample used for developing the proposed MOBILE6 aggressive driving adjustments. The LA92 cycle is meant to represent in-use driving in Los Angeles by capturing the proportion of vehicle speed and acceleration found from in-use driving surveys. Since the running BERs in MOBILE6 (and hence the Tier 2 Model) are based on the running LA4 cycle, direct comparison of emissions over the LA92 with those over the running LA4 allows determination of excess emission which occur as a result of driving not found on the FTP (aggressive driving).

Aggressive driving emissions as proposed for MOBILE6 will be modeled by adding an emission increment to the base running emission factor. A similar approach was used for the Tier 2 Model. Using the LA92 data, a quadratic regression equation was fit between the "aggressive driving emission adjustment" (defined as the difference in emissions between the running LA92 and the running LA4, in grams per mile) and the running LA4, as shown in Appendix B. The resulting equation provides a relationship between base emission level and the aggressive driving emission adjustment which was applied across all standard levels, vehicle classes and emitter classes. The effect of this adjustment is to correct running LA4 emissions to running LA92 emissions, which are used as basis for the remaining adjustments of air conditioning, fuel effects, and OBD/IM. Hence, emission levels estimated by the Tier 2 Model are generated at the average speed of the LA92, 24.6 miles per hour.

The equations used for generating pre-SFTP controlled aggressive driving offsets for NOx and HC are as follows:

$$(2)\ \text{NOx Aggressive Driving Adjustment (g/mi)} = 0.135 + (0.332 * LA4_{NOx}) - (0.045 * LA4_{NOx}^{2})$$
$$(3)\ \text{HC Aggressive Driving Adjustment (g/mi)} = 0.043 + (0.284 * LA4_{HC}) - (0.171 * LA4_{HC}^{2})$$

Where:

LA4 = running LA4 emissions, as calculated by the applicable running BER
Maximum NOx Adjustment = 0.74 g/mi @ $LA4_{NOx} \geq 3.66$ *g/mi*
Minimum HC Adjustment = -0.5 g/mi @ $LA4_{HC} \geq 2.80$ *g/mi*

At higher base emission levels, the HC aggressive driving adjustment becomes negative. This is attributed to the response of hydrocarbon emissions to average vehicle speed when considered separately from aggressive driving. Because the average speed of the LA92 is 24.6 miles per hour, the adjustments generated by the equations above account for speed differences as well as “off-cycle” acceleration and/or power. When considered independent of off-cycle driving, HC emissions are reduced at average speeds above 19.6 miles per hour, the speed of the LA4. This speed effect appears to overwhelm the aggressive driving effect at high base emission levels, resulting in a negative adjustment. The vehicles emitting in this range are equipped with older fuel delivery and emission control technology which are likely malfunctioning to some degree; it is likely that maximum hydrocarbon emissions are already achieved on-cycle, and hence do not see significant increases off-cycle.

The effects of the Supplemental Federal Test Procedure (SFTP) rulemaking were accounted for by reducing the aggressive driving adjustment generated in the above equations by the percentages shown in Table 4. As detailed in Appendix C, these percentages were derived based on benefits estimated in EPA’s Tier 1 SFTP rule, adjusted to account for the relative stringency of the California Air Resources Board (ARB) LEV SFTP rule (which applies to LDVs, LDT1s and LDT2s under NLEV). Because the SFTP standards being proposed for Tier 2 are functionally equivalent to ARB’s current LEV standards, aggressive driving emissions are assumed to remain unchanged between SFTP-controlled LEVs and Tier 2 vehicles. Tier 2 LDVs and LDTs are therefore modeled as having the same additive aggressive driving adjustment as SFTP-controlled LEVs, by vehicle class. As shown in Table 4, the percent reductions due to the SFTP requirement for high emitters were reduced to one-half that for normal emitters. Because of overlap in emission control strategies used to comply with the SFTP and FTP (primary catalyst size, precious metal loading, and air-fuel calibration), SFTP-controlled vehicles identified as high emitters over the FTP will likely also be higher emitters over the SFTP. As discussed in Section 3.1.1, high emitters are assumed not to realize the full benefit of reduced FTP standards, and likewise are also assumed not to realize the full benefit of the SFTP standards.

Table 4 - Reductions in Aggressive Driving Adjustment Due to SFTP

Vehicle Class	Standard Class	NOx		HC	
		Normal	High	Normal	High
LDV	LEV	97%	49%	98%	49%
LDT2	LEV	98%	49%	99%	50%
LDT3	Tier 1	78%	39%	88%	44%
	LEV	87%	44%	93%	47%
LDT4	Tier 1	78%	39%	88%	44%
	LEV	84%	42%	91%	46%
All	Tier 2	Tier 2 adjustment = Post-SFTP LEV adjustment			

In developing the Tier 2 Model, aggressive driving adjustments were generated at the end of each year in a vehicle’s life, to account for deterioration in a vehicle’s base emissions over time.

Thus, a comprehensive presentation of aggressive driving adjustments by vehicle class, standard class, emitter class and technology type (for pre-Tier 1 vehicles) on an annual basis is too exhaustive for this document. However, Tables 5 and 6 show example calculations for LDVs at 100,000 miles across selected standard levels (for Tier 1 and later) or model year/technology cases (for pre-Tier 1).

Table 5 - NOx Aggressive Driving Adjustments: Selected LDV Cases at 100,000 Miles*

Case	Normal Emitters			High Emitters		
	Base Running Emissions (g/mi)	Aggressive Driving Adjustment (g/mi)	Percent Increase	Base Running Emissions (g/mi)	Aggressive Driving Adjustment (g/mi)	Percent Increase
1981 Carb	0.818	0.376	46%	2.951	0.720	24%
1985 FI	0.669	0.337	50%	2.951	0.720	24%
1992 PFI	0.579	0.312	54%	2.846	0.712	25%
Tier 1	0.248	0.214	86%	0.767	0.363	47%
LEV	0.124	0.175	141%	0.575	0.311	54%
LEV SFTP	0.124	0.005	4%	0.575	0.160	28%
Tier 2 SFTP	0.031	0.005	16%	0.431	0.160	37%

*Represents Conventional Gasoline with 330 ppm sulfur and no I/M program

Table 6 - HC Aggressive Driving Adjustments: Selected LDV Cases at 100,000 Miles

Group	Normal Emitters			High Emitters		
	Base Running Emissions (g/mi)	Aggressive Driving Adjustment (g/mi)	Percent Increase	Base Running Emissions (g/mi)	Aggressive Driving Adjustment (g/mi)	Percent Increase
1981 Carb	0.244	0.102	42%	2.057	-0.097	-5%
1985 FI	0.206	0.094	46%	2.057	-0.097	-5%
1992 PFI	0.139	0.079	57%	1.509	0.082	5%
Tier 1	0.034	0.052	153%	0.269	0.107	40%
LEV	0.019	0.048	253%	0.366	0.124	34%
LEV SFTP	0.019	0.001	5%	0.366	0.063	17%

These tables highlight an important assumption inherent in the Tier 2 Model's aggressive driving adjustments: without SFTP control, aggressive driving emissions do not decrease in proportion to decreases in base emissions. The logic behind this is that prior to SFTP control, the focus on emission performance has been on the FTP. Although reductions in FTP emissions do carry over to off-cycle emissions to some degree (as shown by the decrease in the gram per mile aggressive driving adjustment in conjunction with decreases in base emissions), they are not assumed to carry over proportionally. Thus, the relative (percent) increase in aggressive driving emissions becomes larger as FTP emission performance is driven lower. Concurrently, the percent increase due to aggressive driving is smaller for high emitters than for normals. This is considered appropriate, since for these vehicles there is likely less of a gap (on a percent basis) between "on-cycle" and "off-cycle" emissions. Although not shown in the tables above, by calculating adjustment factors at several points within a vehicle's life, this effect is also accounted for as a vehicle's base emissions increase with age.

3.3.2 Air Conditioning Effects for 1981 and Later Cars and Trucks

Air conditioning emissions in the Tier 2 Model were developed in a manner similar to aggressive driving, using an approach consistent with but simplified from that planned for MOBILE6. Specifically, additive air conditioning emission adjustments were developed from data generated over the LA92 cycle with and without air conditioning (as with aggressive driving, these data were based on the vehicle sample used to develop MOBILE6 air conditioning inputs). Initial analysis of these data showed no significant effect for HC, so air conditioning adjustment factors were generated only for NOx. Because these data were generated under extreme temperature and humidity levels (using a test procedure which produced air conditioner load similar to that at 95° F and 40 percent relative humidity with full solar loading), the air conditioning adjustment derived from these data represents full air conditioning load, termed "full-usage". A single "full-usage" air conditioning adjustment equation was developed for application across all vehicle classes, standards and emitter levels. This equation is a linear regression of excess emissions due to air conditioning over the LA92 cycle versus LA92 emissions without air conditioning, as follows:

$$(4)\ \textit{NOx "Full Usage" Air Conditioning Adjustment (g/mi)} = 0.125 + 0.157 * LA92_{A/C\ OFF}$$

For development of the Tier 2 Model, this adjustment was calculated using base running emissions plus the additive aggressive driving adjustment to representing the LA92 without air conditioning. This analysis is shown graphically in Appendix B.

In order to reflect air conditioning emissions under more typical summertime conditions, the full-usage air conditioning adjustment from Equation (4) was reduced according to the methodology proposed for MOBILE6.[7] This methodology relates a combined measure of ambient temperature and humidity known as the "heat index" to air conditioning demand; the result is an air conditioning "demand factor" by which full-usage emission levels (which represent a demand factor of 1) can be reduced. The demand factor for the Tier 2 Model was calculated according to Equation (5):

$$(5)\ \textit{Air Conditioning Demand Factor} = -3.63 + (0.0725 * HI) - (0.00028 * HI^2)$$

Where:

HI = Heat Index of the ambient condition being modeled, °F

A typical summer day was modeled as having a diurnal temperature range of 72° to 96° F; MOBILE5b computes an average daily temperature of 91° based on this range, accounting for differences in travel demand during each period of a day. This average temperature was input into Equation (5) as the heat index term, resulting in a demand factor of 0.68. This demand factor was multiplied by the full–usage emission adjustments from Equation (4) to generate air conditioning emission adjustments representative of a typical summer day.

Air conditioning emission reductions resulting from the SFTP requirement were handled in a manner similar to aggressive driving (Appendix C). The percent reductions in the typical summer day air conditioning adjustments attributed to the SFTP rule are shown in Table 7. For SFTP-controlled vehicles, these reductions were applied to the uncontrolled typical summer day air conditioning adjustment .

Table 7 - Reductions in Air Conditioning Adjustment Due to SFTP

Vehicle Class	Standard Class	Normal	High
LDV	**LEV**	79%	40%
LDT2	**LEV**	93%	47%
LDT3	**Tier 1**	50%	25%
	LEV	90%	45%
LDT4	**Tier 1**	50%	25%
	LEV	90%	45%
All	**Tier 2**	Tier 2 adjustment = Post-SFTP LEV adjustment	

Table 8 shows the typical summer day air conditioning emission adjustment for LDVs at 100,000 miles, across selected cases.

Table 8 - NOx Air Conditioning Adjustments: Selected LDV Cases at 100,000 Miles*						
Group	Normal Emitters			High Emitters		
	A/C Off LA92 (g/mi)	Adjustment (g/mi)	% Increase	A/C Off LA92 (g/mi)	Adjustment (g/mi)	% Increase
1981 Carb	1.194	0.312	26.1%	3.671	0.702	19.1%
1985 FI	1.006	0.283	28.1%	3.671	0.702	19.1%
1992 PFI	0.891	0.265	29.7%	3.558	0.684	19.2%
Tier 1	0.462	0.128	27.7%	1.130	0.195	17.3%
LEV	0.299	0.111	37.1%	0.886	0.171	19.3%
LEV SFTP	0.129	0.020	15.5%	0.735	0.094	12.8%
Tier 2 SFTP	0.036	0.020	55.6%	0.591	0.094	15.9%

*Represents Conventional Gasoline with 330 ppm sulfur and no I/M program

3.3.3 Pre-1981 Off-Cycle Effects

For 1980 and earlier LDVs and LDTs, off-cycle emissions were estimated by adding a constant adjustment (which accounted for both aggressive driving and air conditioning) to the zero-mile levels of these vehicles. Separate adjustments were applied to LDV and LDTs based on adjustments calculated for 1981 carbureted LDVs and LDTs using the methodologies outlined in Sections 3.3.1 and 3.3.2. The NOx adjustments were 0.61 g/mi and 1.03 g/mi for LDVs and LDTs, respectively; for HC, comparable adjustments were 0.045 g/mi and 0.146 g/mi. The intent behind this approach was to assign some off-cycle emissions to older technology vehicles, while recognizing that for these vehicles the difference between off-cycle emission and on-cycle emissions is likely relatively small. For NOx, this is presumed to be the case because oxidation-only catalysts (in place to oxidize HC and CO) were prevalent in the late 1970's and early 1980's. On newer vehicles, a good portion of off-cycle NOx emissions result from the catalyst being “overwhelmed”; this effect does not occur on vehicles equipped with oxidation-only catalysts. For HC, the lack of tight fuel control on carburetors and early fuel injection systems are presumed to result in less of a dichotomy between “on-cycle” and “off-cycle” emissions. Overall, emissions over all driving are presumed to be more appropriately accounted for with the FTP-based BER for earlier technology vehicles. The application of a constant additive off-cycle adjustment for all pre-1981 vehicles reflects this assumption by reducing the percent increase due to off-cycle emissions for progressively earlier model years.

3.4 Sulfur Effects

The BERs developed under Section 3.1 were implicitly based on the certification fuel of the vehicle and standard being modeled: indolene for Federal vehicles, or California Phase II RFG for California vehicles and NLEVs. For this analysis, the average sulfur level for these fuels was assumed to be 30 parts per million (ppm). The effects of increased sulfur levels were accounted for on all 1981 and later vehicles using the adjustment factors proposed for MOBILE6.[8] The adjustments for Tier 0 and Tier 1 cars and trucks have been updated from those contained within the MOBILE5b fuel adjustment, but are not substantially different in magnitude. Adjustments for LEV cars and trucks, however, are based primarily on data from recent CRC and AAMA/AIAM LEV test programs and are significantly higher than those assumed by MOBILE5b. The proposed MOBILE6 adjustment factors for sulfur levels of 150 and 330 ppm, relative to 30 ppm, are shown in Table 9 for Tier 0, Tier 1 and LEV cars and trucks. Because these sulfur increases were developed from FTP data, they were applied both to the disaggregated start BERs, and running BERs after application of the off-cycle adjustments discussed in Section 3.3.[j]

In evaluating sulfur levels higher than 30 ppm under the proposed Tier 2 vehicle program, sulfur adjustments for Tier 2 cars and trucks were assumed to equal the LEV LDV adjustments, as were LDT2s meeting the 2004 interim Tier 2 standards ("Interim A") and LDT3/4s meeting the phase-in interim Tier 2 NOx standard ("Interim B"). Final emission rates for LDT4s meeting the Interim A standards and LDT3/4s meeting the Interim B NMOG standards were developed from interpolation between the LEV and LDV LEV standard levels, as described in Section 4.3.2. The sulfur factors for these cases thus were implicitly based on an interpolation between the LDT2/3/4 LEV and LDV LEV sulfur effects. Sulfur adjustments for 1980 and earlier vehicles were accounted for by applying the percent increases for model year 1981 composite emission rates to off-cycle adjusted 1980 and earlier BERs.

[j]Data for off-cycle sulfur effects on LEVs were not available at the time of this analysis. It was assumed that the sulfur adjustments shown in Table 9 applied to off-cycle operation as well as FTP operation.

Table 9 - FTP Emissions Increase Due To Fuel Sulfur, Relative to 30 ppm									
Std	**Vehicle Class**	**NOx**				**HC***			
		Normal Emitters		**High Emitters**		**Normal Emitters**		**High Emitters**	
		150 ppm	**330 ppm**	**150 ppm**	**330 ppm**	**150 ppm**	**330 ppm**	**150 ppm**	**330 ppm**
Tier 0	**All**	5.1%	7.7%	3.7%	9.6%	9.3%	14.1%	0.4%	1.1%
Tier 1	**All**	3.9%	10.0%	2.3%	6.0%	9.1%	24.2%	0.4%	1.1%
LEV	**LDV**	76.8%	133.7%	46.1%	80.2%	25.3%	39.9%	0.4%	1.1%
	LDT2/3/4	26.5%	42.0%	15.9%	25.2%	15.5%	24.0%	0.4%	1.1%
Tier 2	**LDT2 Interim "A"**	Same as LDV LEV							
	LDT3 Interim "A"	Same as LDT2/3/4 LEV							
	LDT4 Interim "A"	Interpolation between LDT2/3/4 LEV and LDV LEV							
	LDT3/4 Interim "B"	Same as LDV LEV				Interpolation between LDT2/3/4 LEV and LDV LEV			
	All Final	Same as LDV LEV							

* based of NMHC adjustments proposed for MOBILE6

3.5 Non-Sulfur Fuel Effects

In the Tier 2 Model, fuel sulfur effects were isolated to allow the assessment of changes in sulfur level only. The effects of all other fuel characteristics (including RVP, aromatics, olefins, etc.) were accounted for in the Tier 2 Model using multiplicative correction factors developed for conventional (Federal baseline) gasoline and Federal Phase 2 Reformulated gasoline (RFG). For Tier 1 and later vehicles, these factors were generated based on results from EPA's Complex Model for Tier 0 vehicles with PFI and three-way catalyst technology (the most recent available in the Complex Model), for both normal and high emitters (Appendix D). For pre-Tier 1 vehicles, non-sulfur fuel effects were derived from the MOBILE5b fuel corrections, also using Complex Model runs. The resulting adjustment factors, shown in Table 10, are relative to the fuel a particular standard class is certified on; Federal Indolene for pre-Tier 0 and Tier 1 vehicles, and California Phase II RFG for LEVs (for this analysis, the latter was also assumed for Tier 2 vehicles). For all vehicles, these adjustments were applied both to start BERs and running BERs (with off-cycle adjustments) independent of fuel sulfur level. Thus, the non-sulfur properties of conventional gasoline were assumed to remain constant even at low sulfur levels.

Table 10 - Non-Sulfur Fuel Adjustments Relative to Certification Fuel								
Standard	**NOx**				**HC**			
	Normal Emitters		**High Emitters**		**Normal Emitters**		**High Emitters**	
	RFG	**Conv**	**RFG**	**Conv**	**RFG**	**Conv**	**RFG**	**Conv**
Tier 0	3.0%	3.2%	3.0%	3.2%	-5.4%	9.3%	-5.4%	9.3%
Tier 1	1.2%	4.0%	4.1%	6.7%	-14.1%	0.4%	-17.0%	-1.8%
LEV/Tier	1.0%	3.8%	5.2%	7.8%	-1.2%	15.4%	-5.9%	11.4%

3.6 Calculation of Final Emission Rates

For a given vehicle class, standard level (for Tier 1 and later LDVs and LDTs) or model year and technology (for 1981 through 1993 LDVs and LDTs), the methodologies outlined in Sections 3.1 through 3.5 resulted in adjusted running and start emission levels (grams/mile for running, grams for start) for normal emitters, high emitters and repaired emitters at the end of each year in a vehicle's life, according to the following formulas:

$$(6)\ Running\ Emissions_{EM,AGE}\ (g/mi) = (RBASE_{EM,AGE} + AG_{EM} + AC_{EM}) * SULF_{EM} * NONSULF_{EM}$$

$$(7)\ Start\ Emissions_{EM,AGE}\ (grams) = SBASE_{EM,AGE} * SULF_{EM} * NONSULF_{EM}$$

Where:

EM = Emitter Class (Normal, High or Repaired)
AGE = Vehicle age, from one to 25 years
RBASE = Running BER, as a function of the cumulative mileage at the end of year AGE
SBASE = Running BER, as a function of the cumulative mileage at the end of year AGE
AG = aggressive driving adjustment, in g/mi
AC = typical summer day air conditioning adjustment, in g/mi
SULF = fuel sulfur adjustment factor
NONSULF = non-sulfur fuel adjustment factor

Age-based start and running emission levels as calculated in the preceding equations were then combined into age-based composite emission levels based on the mix of running and start operation used in the FTP. An equation used in the development of proposed MOBILE6 BERs[9] was used for this step, as follows:

*(8) Composite Emissions (g/mi) = (RUN * 7.5 + ST * 0.43 + ST * 0.57 * HOT) / 7.5*

Where:

RUN = running emissions from Equation (6), grams/mile
ST = start emissions from Equation (7), grams
HOT = Ratio of hot start emissions (i.e. following 10 minute soak) to cold start emissions; 0.16 was used for both NOx and HC[k]
7.5 = total miles in LA4
0.43/0.57 = relative weightings of cold start (Bag 1) and hot start (Bag 3)

The next step was to combine the age-based composite emission levels across emitter class, resulting in composite emission levels for an average in-use vehicle at each year in a vehicle's life. This step required the application of emitter group weighting fractions (i.e., the probability a vehicle will be a normal, high or repaired vehicle) that vary by vehicle age. For Tier 1 and later vehicles, all of which were assumed to be OBD-equipped, these emitter weightings are used to account for the benefits of OBD-based I/M checks. This was accomplished by reapportioning the fraction of high emitters estimated in the absence of I/M to the fraction to repaired emitters in the presence of I/M.[l] Hence, two sets of emitter group weighting fractions were required, depending on whether an I/M program was present or not (Appendix E).[m,10]

Based on this approach, Equation (9) was used for generating average in-use emission levels by vehicle age for Tier 1 and later vehicles:

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[k]For simplicity the HOT factor was assumed to be a constant in the development of the Tier 2 Model. In general, it varies from 0.16 on the order of approximately 25 percent for both NOx and HC, depending on the relationship between Bag 1 and Bag 3. To correct any error introduced by this approach, the start factors discussed in Section 3.1 were developed to ensure that Equation (8) would result in the correct composite values when HOT was set equal to 0.16.

[l]This methodology was identical to that proposed for MOBILE6; for more detail, see Draft MOBILE6 Report No. M6.EXH.007, "Determination of NOx and HC Basic Emission Rates, OBD and I/M Effects for Tier 1 and Later LDVs and LDTs".

[m]In the Tier 2 Model, two simplifying assumption were made regarding OBD and IM: first, all Tier 1 vehicles were assumed to be equipped with OBD (OBD was not required federally until 1996, while Tier 1 vehicle began phasing in in 1994). Second, although not required until calendar year 2001, IM programs were assumed to be fully OBD-based by 2000.

(9) FER_{AGE} *(g/mi) =* $HCMP_{AGE}$ ** $P(High)_{AGE}$ + $NCMP_{AGE}$** $P(Norm)_{AGE}$ + $RCMP_{AGE}$** $P(Repair)_{AGE}$

$$FER_{AGE}\ (g/mi) = HCMP_{AGE} * P(High)_{AGE} + NCMP_{AGE} * P(Norm)_{AGE} + RCMP_{AGE} * P(Repair)_{AGE}$$

Where:

FER_{AGE} = *Final Emission Rate at the end of year AGE*
$HCMP_{AGE}$ = *Composite high emitter emissions (g/mi)*
$P(High)_{AGE}$ = *Probability that vehicle will be a high emitter in year AGE*
$NCMP_{AGE}$ = *Composite normal emitter emissions in (g/mi)*
$P(Norm)_{AGE}$ = *Probability that vehicle will be a normal emitter in year AGE*
$RCMP_{AGE}$ = *Composite repaired emitter emissions (g/mi)*
$P(Repair)_{AGE}$ = *Probability that vehicle will be a repaired emitter in year AGE*

For 1981 through 1993 vehicles, the approach for calculating final emission rates was similar to Tier 1 and later vehicles, with the exception of I/M benefit methodology. As with Tier 1 and later vehicles, proposed MOBILE6 emitter class weightings[11] were used to combine normal and high emitters; however, these weightings were not used to account for I/M benefits (hence, no "repaired" emitter class). Rather, I/M benefits as a function of vehicle age were applied as percent reductions in emissions after calculation of the final emission rates . These benefits[n] reflect an IM240 program with the following attributes:[o]

a) "Phase-in" cutpoints of 1.2 g/mi HC and 3.0 g/mi NOx
b) Running/Start HC identification rates (IDRs) of 0.76/0.47
c) Running/Start NOx identification rates (IDRs) of 0.59/0.0
d) Waiver rate of 10 percent
e) Non-compliance rate of 15 percent
f) Repaired waiver rate of 80 percent

This I/M program was used to represent the average effects of I/M on all 1981 through 1993 LDVs and LDTs.[p]

Age-based composite emission levels for 1981 through 1993 model year cars and trucks as calculated by Equations (8) were disaggregated by fuel injection technology (PFI, TBI and

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[n]The percent reductions associated with the IM240 program used for 1981 through 1993 LDVs and LDTs can be located in the Microsoft Excel files PRET1VNX, PRET1TNX, PRET1VHC, and PRET1THC used as inputs to the Tier 2 Model; these files are being made available concurrently with this report.

[o]Details on these parameters can be found in the draft MOBILE6 report M6.IM.001 ("MOBILE6 Inspection/Maintenance Benefits Methodology for 1981 through 1993 Model Year Light-Duty Vehicles").

[p] Assuming a uniform IM program is generally appropriate for Tier 1 and later vehicle equipped with OBD systems; for pre-Tier 1 vehicles, however, this represents a simplifying assumption. For non-OBD vehicles, MOBILE6 will continue to model a range of IM programs; however, the complexity of accounting for this in the Tier 2 Model was beyond the scope of this analysis.

Carbureted). Average in-use emission levels were therefore first developed for each technology group, as follows:

$$(10)\ FER_{AGE,TECH}\ (g/mi) = [HCMP_{AGE,TECH} * P(High)_{AGE,TECH} + NCMP_{AGE,TECH} * P(Norm)_{AGE,TECH}] * [1 - IM_{AGE,TECH}]$$

Where:

$FER_{AGE,TECH}$ = *Final Emission Rate for fuel delivery technology TECH (PFI/FI, TBI, Carbureted) after year AGE*
$HCMP_{AGE,TECH}$ = *Composite high emitter emissions for technology TECH after year AGE (g/mi)*
$P(High)_{AGE,TECH}$ = *Probability that vehicle will be a high emitter in year AGE*
$NCMP_{AGE,TECH}$ = *Composite normal emitter emissions for technology TECH after AGE (g/mi)*
$P(Norm)_{AGE,TECH}$ = *Probability that vehicle will be a normal emitter in year AGE*
$IM_{AGE,TECH}$ = *(Percent reduction in emissions due to phase-in IM240 program) / 100, by age and technology group*

The technology-based final emission rates were then combined into average in-use final emission rates using the by-model year technology weighting factors presented in Table 11, according to Equation (11):

$$(11)\ FER_{AGE,MY}\ (g/mi) = (FER_{AGE,PFI/FI} * W_{PFI/FI}) + (FER_{AGE,TBI} * W_{TBI}) + (FER_{AGE,CARB} * W_{CARB})$$

Where:

FER_{AGE} = *Final Emission Rate at the end of year AGE for model year MY*
$FER_{AGE,TECH}$ = *FERs calculated in Equation (10) for technology group TECH*
W_{TECH} = *Weighting factor for technology group TECH, a function of model year MY (Table 11)*

Table 11 - Fuel Technology Weighting Factors For 1981-1993 LDVs and LDTs						
Model Year	**LDVs**			**LDTs**		
	PFI/FI*	**TBI**	**Carbureted**	**PFI/FI**	**TBI**	**Carbureted**
1981	0.090	0.000	0.910	0.000	0.000	1.000
1982	0.168	0.000	0.832	0.000	0.000	1.000
1983	0.271	0.000	0.729	0.002	0.000	0.998
1984	0.392	0.000	0.608	0.022	0.000	0.978
1985	0.515	0.000	0.485	0.113	0.000	0.887
1986	0.657	0.000	0.343	0.374	0.000	0.626
1987	0.735	0.000	0.265	0.607	0.000	0.393
1988	0.492	0.407	0.101	0.416	0.442	0.142
1989	0.597	0.275	0.128	0.540	0.369	0.091
1990	0.793	0.188	0.019	0.552	0.394	0.054
1991	0.790	0.208	0.002	0.484	0.495	0.021
1992	0.901	0.096	0.003	0.660	0.319	0.021
1993	0.891	0.109	0.000	0.688	0.301	0.011

*The PFI/TBI split begins with the 1988 model year; prior to this, only "fuel injection" is designated

The final stage in developing final emission rates for implementation in the Tier 2 Model was to generate a linear regression equation which expressed gram per mile emissions as a function of vehicle mileage (identical to the form expressed in Equation (1)), using the age-based emission rates computed in Equations (9) and (11). The purpose of this was to allow the Tier 2 Model to use final emission rates in a form which could also be input into MOBILE5b as alternate basic emission rates, as done for the Modified MOBILE5b model in the Tier 2 Study. For Tier 1 and later vehicles, a two-piece linear equation was developed by a) manually choosing an initial mileage flex point, b) calculating a best-fit linear regression between zero miles and the flex point (DR1), and between the flex point and highest mileage point (DR2); and c) determining the actual flex point based on the intersection of these best fit regressions. In cases where the two deterioration rates determined from step (b) were very similar, the flex point resulting from step (c) was either very high, or less than zero; in order to avoid computational complications, for all flex points determined from step (c) to be higher than 220,000 miles are less than zero miles, DR2 was set equal to DR1 (because this was only done in cases where DR1 and DR2 were very similar, the error introduced by this approach was negligible). For 1981 through 1993 vehicles, a one-piece best-fit linear regression was developed from the results of Equation (11). For 1980 and earlier vehicles, the one-piece linear regression form from MOBILE5b was kept intact.

For the Tier 2 Model final emission rates as calculated in Equations (9) and (11) were generated across vehicle class, standard level, I/M program and fuel program at several sulfur levels. For 1981 through 1993 LDVs and LDTs, final emission rates were developed with and without I/M, on conventional fuel and RFG, at the following sulfur levels (in ppm): 30,100,150,300, and 330. This resulted in 520 FERs for these model years for both HC and NOx. For Tier 1 and later vehicles, final emission rates were generated for LDV/LDT1s[q], LDT2s, LDT3s and LDT4s, over the Tier 1, LEV, LDV LEV, and Tier 2 emission standards, with and without I/M, on RFG or conventional gasoline, with and without SFTP control, across the sulfur levels listed above. In total, 600 final emissions rates were generated for Tier 1 and later vehicles for both HC and NOx. Final emission rates for 1981 and later vehicles, across all cases mentioned above, are presented in Appendix F for both NOx and HC.

4 Final Emission Rates for HC and NOx by Analysis Region and Control Scenario

The second overall stage in the computation of light-duty NOx and VOC emission inventories was to develop final emission rates on a regional and temporal basis for the baseline and control cases analyzed, using as a basis the "raw" final emission rates developed in Section 3. This involved a) combining the four truck classes (LDT1 through 4) into two classes, to provide consistency with MOBILE5b; b) generating area-specific FERs based on the weighting of IM, fuel and NLEV program for areas for which inventories were desired; and c) developing FERs on a by-model year basis for 1994 and later LDVs and LDTs, for the baseline and control cases analyzed. These steps are outlined in the following sections.

4.1 LDT Aggregation

MOBILE6 will maintain the breakout of certification truck classes used for Tier 1 and later trucks (LDT1 through 4). For the Tier 2 Model, however, the final emission rates for these truck classes were aggregated into the classes used in MOBILE5b, to allow input of the FERs into MOBILE5b as alternate emission rates. These classes are: zero to 6000 pounds gross vehicle weight (GVW) encompassing certification classes LDT1 and LDT2 (referred to for this analysis as LDT1/2), and 6000 to 8500 pounds GVW, encompassing certification classes LDT3 and LDT4 (referred to as LDT3/4). Final emission rates for these groupings were developed by combining the LDT1 through 4 final emission rates according to sales splits derived from 1998 projected sales data submitted by manufacturers to EPA's certification database CFEIS (Table 12). It was assumed for this analysis that these sales splits remain constant over all model years.

[q]In the Tier 2 Model, LDV final emission rates were applied to LDT1s as well, since their emission standards are identical starting with the Tier 1 standards.

Table 12 - Tier 1 and Later Light-Duty Truck Sales Fractions			
Certification Class	**Projected 1998 sales as a fraction of total LDT sales (Absolute weighting)**	**Tier 2 Model Class**	**Projected 1998 sales as a fraction of Tier 2 Model class sales (Relative weighting)**
LDT1	0.18	LDT1/2	0.24
LDT2	0.57		0.76
LDT3	0.17	LDT3/4	0.68
LDT4	0.08		0.32

FERs for LDT1/2s and LDT3/4 were developed according to Equation (12), shown for LDT1/2s:

$$(12)\ FER_{LDT1/2} = (FER_{LDT1} * 0.24) + (FER_{LDT2} * 0.76)$$

Where:

$FER_{LDT1/2}$ = *FER for LDT1/2*
$FER_{LDT1,LDT2}$ = *FER for LDT1s and LDT2s, from Appendix F*
0.24 / 0.76 = Relative sales fraction for LDT1s and LDT2s, from Table 12.

4.2 Regional Weighting

In the Tier 2 NPRM, inventory analyses are presented on the basis of annual tons emitted in the 47-state area defined by the U.S. excluding California, Alaska, and Hawaii, and summertime (May through September) tons emitted in four urban areas: New York, Chicago, Atlanta, and Charlotte. Within each area, composite FERs were developed which accounted for the approximate mix of I/M program, fuel program, and NLEV program (i.e. OTR versus non-OTR). Composite FERs in calendar year 2000 and later[r] were generated across I/M and fuel program by combining the disaggregate FERs from Appendix F according to the population weighting factors presented in Table 13.[s],[12]

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[r]The primary focus of inventories presented in the Tier 2 NPRM are from calendar year 2000 forward. Calendar years 1990 and 1995 are also presented in this report for comparative purposes. In these years, the I/M and fuel weightings were modified from Table 13 to reflect the following assumptions: for 1990, I/M areas would have idle I/M programs for which 50 percent of VOC and zero percent of NOx benefit would be realized relative to enhanced I/M with phase-in cutpoints; RFG areas would have conventional gasoline. In 1995 RFG areas would have Phase 1 RFG, for which VOC would realize 50 percent and NOx zero percent relative to Phase 2 RFG.

[s]It was assumed for this analysis that vehicle miles traveled (VMT) is proportional to population, and hence the fraction of VMT within I/M and/or RFG areas is represented by the fraction of population living within that area.

Table 13 - Fuel/IM Population Weighting Factors (Calendar Year 2000 and Later)						
Area / Period	**Conventional Gasoline**			**RFG**		
	IM	**No IM**	**Total**	**IM**	**No IM**	**Total**
47 State / Annual	0.35	0.51	0.86	0.13	0.01	0.14
47 State / Summer	0.23	0.50	0.73	0.25	0.02	0.27
Urban Areas / Summer						
New York	0.00	0.00	0.00	1.00	0.00	1.00
Chicago	0.00	0.00	0.00	1.00	0.00	1.00
Atlanta	1.00	0.00	1.00	0.00	0.00	0.00
Charlotte	1.00	0.00	1.00	0.00	0.00	0.00

For the fuel weightings contained in Table 13, summer and annual periods were distinguished by the treatment of RFG. For summer-based analysis, the population weightings for RFG areas were not changed from the base population weightings. For the 47-state annual analysis, the RFG population weightings were reduced by 50 percent and the remainder redistributed to the appropriate conventional gasoline weighting, in effect giving credit only to Phase 2 RFG during the summertime months when sulfur levels are reduced.

Using the weightings from Table 13, FERs by analysis region and season (annual/summer) were developed according to Equation (13), shown for the 47-state annual case. This equation was applied across vehicle class, standard level (model year for 1981 through 1993), and sulfur level.

$$(13)\ FER_{REGION} = (FER_{CG/IM} * 0.35)+(FER_{CG/NO\ IM} * 0.51)+(FER_{RFG/IM} * 0.13) + (FER_{RFG/NO\ IM} * 0.01)$$

Where:

$FER_{CG/IM}$ = *Final Emission Rate for Conventional Gasoline / IM area*
$FER_{CG/NO\ IM}$ = *Final Emission Rate for Conventional Gasoline / No IM area*
$FER_{RFG/IM}$ = *Final Emission Rate for RFG / IM area*
$FER_{RFG/NO\ IM}$ = *Final Emission Rate for RFG / No IM area*
0.35 / 0.51 / 0.13 / 0.01 = Population weightings for respective areas in 47-state case, adjusted to annual basis

Regional treatment of the NLEV program (OTR versus non-OTR) was also handled based on population distribution. However, a discussion of the development of by-model year emissions rates is required before presenting the methodology used in accounting for differences in the NLEV program.

4.3 By-Model Year FERs For Baseline and Control Scenarios

4.3.1 Baseline Case

Emission inventory estimation for a specific calendar year required final emission rates to be associated with each model year comprising the light-duty fleet in that year. Because FERs generated for model years 1993 and earlier were already on a by-model year basis, no further computations were required for these years. Because Tier 1 and later FERs were developed based on standard level, however, an additional step was required for conversion to by-model year FERs. Using the FERs weighted across region and analysis period from Equation (12) as a starting point, by-model year FERs were developed which accounted for the phase-in schedules of the Tier 1, NLEV and SFTP requirements. Because these requirements form the basis of vehicle control which would remain in place in the absence of Tier 2 control, they define the baseline case for this analysis from the vehicle program perspective.

Phase-in schedules were handled for the Tier 1, NLEV, and SFTP requirements by weighting pre-control and post-control FERs (e.g., Tier 0 and Tier 1) together according to the applicable phase-in for that year, as follows:

$$(14)\ FER_{MY} = FER_{POST} * PHASE_{MY} + FER_{PRE} * (1 - PHASE_{MY})$$

Where:

FER_{MY} = *Final Emission Rate on regional/seasonal basis for model year MY*
FER_{POST} = *Post-control Final Emission Rate on regional/seasonal basis (e.g., Tier 1)*
FER_{PRE} = *Pre-control Final Emission Rate on regional/seasonal basis (e.g., Tier 0)*
$PHASE_{MY}$ = *(Phase-in percentage of control program in model year MY) / 100*

Equation (14) were applied to each term in the final emission rate equations being combined - zero mile level, deterioration rate(s) and mileage flex point. This approach resulted in a composite FER which upon investigation was found to be a good approximation of a linear regression fit through the result of two age-based FERs (from Equation (11)) combined in each year using Equation (14).

The phase-in schedules for Tier 1, NLEV and SFTP are shown in Table 14, by vehicle class (although the LDT1/2/3/4 classes were aggregated into LDT1/2 and LDT3/4 FERs, individual phase-in schedules in each certification truck class were accounted for). NLEV consists of two phase-in schedules, depending on whether the region being modeled is inside or outside of the Ozone Transport Region (OTR). Phase-in and stringency of the SFTP requirement depends on vehicle class under NLEV: ARB’s LEV requirement applies to LDVs, LDT1s and LDT2s, while EPA’s Tier 1 requirement applies to LDT3s and LDT4s.

Table 14 - Phase-In Schedules for Tier 1, NLEV, SFTP							
Model Year	**Tier 1**		**NLEV (LDV/T1/T2 Only)**		**SFTP**		
	LDV/T1/T2	**LDT3/4**	**TLEV[t]**	**LEV**	**LDV/T1/T2**	**LDT3/4 (Tier 1)**	**LDT3/4 (LEV)**
1994	40%						
1995	80%						
1996	100%	50%					
1997		100%					
1998							
1999			60%[*]	40%[*]			
2000			40%[*]	60%[*]			
2001				100%	25%		
2002					50%	40%	
2003			[*] Ozone Transport Region		85%	60%	25%
2004					100%	100%	50%
2005							100%

The regional weighting aspect of NLEV was accounted for using the OTR population weightings show in Table 15. These weighting factors were only relevant to the FERs generated in model years 1999 and 2000, since these are the only years for which the OTR has a unique NLEV program. Beginning in 2001, NLEV was assumed for this analysis to apply to the 49-state region (U.S. minus California).[u]

[t]TLEV FERs were developed by interpolating between Tier 1 and LEV FERs for a given vehicle class and pollutant, based on the 50,000 mile standard level

[u]Four states (New York, Massachusetts, Maine, and Vermont) have adopted California's vehicle program rather than NLEV. The impact of this was not modeled; rather, NLEV was assumed to apply across the entire 49-state region.

Table 15 - OTR Population Weighting Factors		
Area	**OTR**	**Non-OTR**
47 State	0.29	0.71
Urban Areas		
New York	1.00	0.00
Chicago	0.00	1.00
Atlanta	0.00	1.00
Charlotte	0.00	1.00

Calculation of FERs for model years 1999 and 2000 (for LDVs, LDT1s and LDT2s only) were based on Equation (15), shown for the 47-state case:

$$(15)\ FER_{47STATE} = (FER_{OTR} * 0.29) + (FER_{NONOTR} * 0.71)$$

Where:

FER_{OTR} = $(FER_{TLEV} * 0.6 + FER_{LEV} * 0.4)$ *in 1999*
= $(FER_{TLEV} * 0.4 + FER_{LEV} * 0.6)$ *in 2000*
FER_{NONOTR} = FER_{TIER1} *in 1999 and 2000*
0.29 / 0.71 = OTR/Non-OTR weighting factors across 47-state region

The final step in developing FERs for the baseline case was to account for in-use fuel sulfur levels which are currently in place and are assumed to remain so in the absence of further sulfur controls. By-model year FERs for the baseline vehicle program, weighted on a regional basis, were developed at 30, 100, 150, 300 and 330 ppm. For this analysis, 150 ppm was used to approximate summertime RFG sulfur levels, and 330 ppm was used to approximate average year-round conventional gasoline and wintertime RFG sulfur levels. A single set of by-model year FERs which reflected baseline fuel sulfur levels in each region were generated by combining FERs in each model year according to the population weighting factors for RFG and conventional fuel from Table 13. This step is reflected in equation form as follows, shown for the 47-state case:

$$(16)\ FER_{BASELINE,MY} = (FER_{150,MY} * 0.14) + (FER_{330,MY} * 0.86)$$

Where:

$FER_{150,MY}$ *= 47-state Annual FER at 150 ppm for model year MY, baseline vehicle program*
$FER_{330,MY}$ *= 47-state Annual FER at 330 ppm for model year MY, baseline vehicle program*
0.14 / 0.86 = 47-state annual population weightings of Summertime RFG/Conventional Gas

Final FERs calculated from Equation (16) for the baseline vehicle and fuel case are presented in Appendix G for gasoline LDVs, LDT1/2s and LDT3/4s from 1965 through 2010.

The baseline FERs presented in Appendix G assume an OBD-based enhanced I/M program in I/M areas and Phase 2 RFG in RFG areas. Because Phase 2 RFG begins in calendar year 2000, the FERs presented for the baseline case are only applicable to the analysis of year 2000 and later.[v]

4.3.2 Proposed Tier 2 and Sulfur Standards

The emission standards (for NOx, HC and $PM_{2.5}$) and phase-in schedules proposed for the vehicle component of the Tier 2/Sulfur program are shown in Table 16. In 2004, LDT2s would meet the same emission standards required under NLEV for LDVs and LDT1s (i.e. "LDV LEV" standards). LDVs, LDT1s and LDT2s as a group would then phase in to a 0.07 full useful life (120,000 mile) gram/mile NOx standard from 2004 to 2007. LDT3s and LDT4s are treated as a separate group; in 2004, these vehicles would meet standards for MDV2s under California's LEV I program; as a group, LDT3s and LDT4s would then phase in to a 0.20 gram/mile NOx standard (and 0.156 gram/mile NMOG standard) from 2004 to 2007. Finally, LDT3s and LDT4s would phase in to the 0.07 gram/mile NOx and 0.09 gram/mile NMOG standards over 2008 and 2009.

It was assumed that manufacturers will comply with the required phase-in schedules by phasing in lighter vehicles before heavier vehicles. Thus, in the first phase-in group (below 6000 pounds GVW) , LDVs and LDT1s are assumed to phase-in before LDT2s. In the second group (6000 to 8500 pound GVW) , LDT3s were assumed to phase-in before LDT4s. These "sequential" phase-in percentages (shown in Table 16) were developed based on the estimated relative sales fraction of each class, assuming that 100 percent of a lighter class in a phase-in group (e.g. LDT3s) would comply with the required standard before any of the heavier class (e.g. LDT4s) began to comply. As discussed in Section 6.5.2, trucks were estimated for this analysis to grow from 50 percent to 60 percent of total car and truck sales between 2002 and 2008. Since the phase-in of Tier 2 standards for LDVs, LDT1s and LDT2s falls in the midst of these years, a simplifying assumption was made for this phase-in group that LDVs will comprise 45 percent of sales during all years of the phase-in (this latter assumption was only applied for the calculation of "sequential" phase-in percentages). The truck sales fractions shown in Table 12 were applied to the remaining 55 percent of sales attributed to LDTs to generate absolute sales fractions for each of the truck classes, from which the sequential phase-in percentages were calculated.

As noted in Section 3.4, FERs were generated using the approach outlined in Section 3 for the final Tier 2 standards across each vehicle class, and the interim 2004 standards for LDT2s (LDV LEV) and LDT3s (MDV2 LEV). This was not the case for the 2004 interim LDT4 standards (0.6/0.23 g/mi NOx/NMOG), and the interim phase-in standards for LDT3s and LDT4s (0.20 g/mi NOx and 0.156 g/mi NMOG). FERs were instead developed for these cases using linear interpolation based on full useful life standard. FERs developed at standards levels which

[v]Because of differences in the RFG program between 1990, 1995 and 2000, the emission rates shown for 1965 through 1975 (based on Phase 2 RFG) are similar in magnitude, but not identical, to those used in the development of 1990 and 1995 emission inventories presented in Appendix L.

bracketed the desired standard were used as the endpoints for these interpolations. For the 2004 interim LDT4 standard (Interim A), the interpolation was performed between the FERs for LDT4s at the LDV LEV and MDV3 LEV standard levels (0.3/0.09 and 0.9/0.28 g/mi NOx/NMOG). For the interim phase-in LDT3 and LDT4 NOx standards (Interim B), the interpolation was performed between FERs developed at the Tier 2 and LDV LEV standards levels (0.07 and 0.3 g/mi), and the LDV LEV and MDV2 LEV standards. For NMOG, the Interim B interpolation was performed between FERs developed at the LDV LEV and MDV2 LEV standards for LDT3s (0.09 and 0.23 g/mi), and the LDV LEV and MDV3 LEV standards for LDT4s (0.09 and 0.28 g/mi).

Beginning with model year 2004, “with Tier 2/Sulfur" FERs were developed in each model year by combining the appropriate pre and post-control FERs according to the sequential phase-in percentage in that model year, in the same manner as Tier 1, NLEV and SFTP (Equation (14)). As described in Section 4.1, LDT FERs were developed separately for LDT1 through 4, before being combined into the LDT1/2 and LDT3/4 classes used by the Tier 2 Model. The sulfur control program proposed under Tier 2 was modeled by using the 30 ppm FERs not only for Tier 2 vehicles, but all gasoline vehicles in the fleet. Thus, the “with Tier 2/Sulfur" inventory estimates were based on FERs which reflected 30 ppm for all model years. These FERs are presented in Appendix G for the 47-state region and each of the four urban areas. These FERs are applicable for analysis in calendar years 2004 and later, the first year of sulfur control.

Of particular note is that the FERs for the final Tier 2 standards are not the same between LDVs, LDT1/2s and LDT3/4s, although the Tier 2 standards are exactly the same. This is due to differences in the applicable SFTP standards for these vehicles, which under Tier 2 are based on those adopted by ARB and numerically increase by vehicle class. It was assumed for this analysis that in model years 2002 and 2003, LDT3s and LDT4s would comply with applicable Tier 1 SFTP standards according to the required phase-in schedule of 40 and 80 percent. However, in 2004, it was assumed that 50 percent of LDT3s and LDT4s would comply with ARB’s LEV SFTP standards in 2004, and 100 percent in 2005, following the phase-in schedule adopted by ARB for MDV2s and MDV3s.[w]

[w]This phase-in approach differs from that proposed under Tier 2, which would allow LDT3s and LDT4s to complete the phase-in of EPA’s Tier 1 SFTP standards in 2004, and continue this level of control through 2009. The impact of this inconsistency is small, however, since the reduced level of SFTP compliance assumed in the Tier 2 Model for model year 2004 will be offset by reduced emissions resulting from the more stringent LEV standards through 2009.

Table 16 - Proposed Tier 2 Standards and Phase-In Schedules								
Model Year	**LDV/T1/T2**				**LDT3/4**			
	Full Useful Life $NOx/NMOG/PM_{2.5}$ Fleet Average Standard (g/mi)	Required Phase-In	Modeled Phase-In		Full Useful Life $NOx/NMOG/PM_{2.5}$ Fleet Average Standard (g/mi)	Required Phase-In	Modeled Phase-In	
			LDV/T1	LDT2			LDT3	LDT4
2004 (Interim)	0.30 / 0.09 / 0.06	100%	100%	100%	0.60 / 0.23 / 0.06	100%	100%	100%
2004	0.07 / 0.09 / 0.01	25%	39%	0%	0.20 / 0.156 / 0.02	25%	37%	0%
2005	0.07 / 0.09 / 0.01	50%	79%	0%	0.20 / 0.156 / 0.02	50%	74%	0%
2006	0.07 / 0.09 / 0.01	75%	100%	31%	0.20 / 0.156 / 0.02	75%	100%	22%
2007	0.07 / 0.09 / 0.01	100%	100%	100%	0.20 / 0.156 / 0.02	100%	100%	100%
2008	0.07 / 0.09 / 0.01	100%	100%	100%	0.07 / 0.09 / 0.01	50%	74%	0%
2009	0.07 / 0.09 / 0.01	100%	100%	100%	0.07 / 0.09 / 0.01	100%	100%	100%
2010	0.07 / 0.09 / 0.01	100%	100%	100%	0.07 / 0.09 / 0.01	100%	100%	100%

4.3.3 Alternate Control Options

In addition to the Tier 2 control scenario discussed in Section 4.3.2, 47-state light-duty NOx and VOC inventory projections were developed for three alternative control options, as follows:

1) **"API 1"**: Car and truck emission standards and implementation schedule as proposed for Tier 2 in conjunction with sulfur control proposed to EPA by the American Petroleum Institute (API) and National Petroleum Refiners Association (NPRA). Under this plan, sulfur would be reduced in 2004 to 150 ppm in the eastern half of the U.S., known as the "API NOx Control Region" (API Region), and 300 ppm in the remainder of the 49-state region.[x]

2) **"API 2"**: API 1 with implementation of a "rebuttable" element of API's proposal in which sulfur would be reduced to 30 ppm in 2010 in the API Region, while the remainder of the country remains at 300 ppm.

3) **"Default Standards"**: Sulfur control as proposed for Tier 2 (30 ppm nationwide beginning in 2004) in conjunction with the default Tier 2 car and truck emission standards contained in the Clean Air Act. Under this alternative, LDVs and LDT1s would be required to meet full useful life emission standards of 0.125 g/mi NMHC and 0.20 g/mi NOx, assumed for this analysis to follow the implementation schedule for Tier 2 standards discussed in Section 4.3.2. LDT2s would be subject to California's applicable LEV I standards in 2004, while LDT3s and LDT4s would remain at Tier 1 levels.

The API options were modeled by generating FERs for the Tier 2 vehicle program as described in Section 4.3.2 at the appropriate sulfur levels: 150 ppm and 300 ppm for API 1 (applicable in 2004), and 30 ppm and 300 ppm for API 2 (applicable in 2010). All cars and trucks complying with the SFTP were assigned a "sulfur irreversibility" effect of 50 percent, meaning that vehicles within the API Region exposed to higher sulfur levels outside the region (through travel and/or cross-border refueling) would experience a permanent degradation in emissions performance equivalent to the average of emissions generated on fuel in and outside of the API Region.[y] For these vehicles, "sulfur irreversibility" FERs were developed for the API Region by taking the average of the appropriate FERs at the API Region sulfur level (150 ppm for API 1, 30 ppm for API 2) and the non-API Region sulfur level (300 ppm). It was assumed that at any given time 25 percent of cars and trucks in the API Region fleet would have refueled outside of

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[x]The API/NPRA fuel proposals are discussed in detail in the Tier 2 Preamble, Section IV.C.1

[y]The rationale behind the sulfur irreversibility effect used in this analysis is discussed in Appendix B of the Tier 2 Regulatory Impact Analysis

the region, and hence been exposed to higher sulfur fuel;[z] thus, FERs for SFTP-compliant vehicles in the API Region were calculated as follows (shown for the API 1 case):

$$(17)\ FER_{API\ REGION} = [(FER_{150} * 0.5) + (FER_{300} * 0.5)] * 0.25 + FER_{150} * 0.75$$

47-state FERs for the API options were developed by combining the API Region and non-API Region FERs together using a population weighting in those areas of 80 percent API Region and 20 percent non-API Region,[13] according to Equation (18):

$$(18)\ FER_{47\text{-}STATE} = (FER_{API\ REGION} * 0.8) + (FER_{300} * 0.2)$$

The FERs generated for the API 1 and 2 options are presented in Appendix G. For the API 1 option, FERs are applicable for calendar year 2004 (the first year of sulfur control) and later. For API 2, the FERs are applicable for calendar year 2010 (the first year of 30 ppm in the API Region) and later; between 2004 and 2009, the API 1 FERs are applicable to the API 2 case, as the two options are identical during this timeframe. For the API 2 case, irreversibility effects resulting from exposure to pre-2010 fuel in the API Region (150 ppm) were not accounted for.

The Default Standards option required generation of FERs for the default Tier 2 full useful life standards of 0.2 g/mi NOx and 0.125 g/mi NMHC for LDVs and LDT1s. These FERs were generated by linear interpolation, using the same approach as for LDT interim Tier 2 standards discussed in Section 4.3.2. An interpolation was performed using FERs developed for the LEV and Tier 2 standards for NOx, and the Tier 1 and LEV standards for HC. Although these standards would apply to LDVs and LDT1s only, the sequential phase-ins for these classes used for the Tier 2 case (which also included LDT2s in the phase-in group) were assumed; hence, these classes are phased-in faster than if the phase-in requirement were applied only to LDVs and LDT1s. For LDT2s, full compliance with LDT2 LEV standards was assumed in 2004, hence FERs for SFTP-compliant LEV LDT2s were used beginning in this year. For LDT3s and LDT4s, Tier 1 standards would continue under the default Tier 2 program, hence Tier 1 FERs which assumed compliance with the applicable Tier 1 SFTP standards were used for model years 2004 and later. Because sulfur control under this option was assumed to be the same as proposed for Tier 2, 30 ppm FERs were used for all model years. The resulting Default Standard option FERs are shown in Appendix G, applicable to calendar year 2004 and later.

4.4 Final Emission Rates for Diesel LDVs and LDTs

Under current levels of diesel penetration in the in-use light-duty fleet, the emission

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[z] The baseline emission inventory estimates presented here do not account for sulfur irreversibility effects in RFG areas. Although vehicles in these areas will likely experience irreversibility effects due to exposure to higher sulfur levels during winter months, the overall impact on baseline emissions are expected to be small because a) LDT2/3/4s are less sensitive to sulfur under NLEV than expected under the standards proposed in today's action, and b) vehicles operating on summertime RFG make up a relatively small portion (less than 15%) of annual VMT in the 47-state region.

contribution of diesel LDVs and LDTs to the total light-duty NOx and VOC inventories is very small. Hence, for this analysis a more simplistic approach was used in the treatment of NOx and VOC emissions from diesel vehicles. MOBILE5b basic emission rates for diesel LDVs and LDTs were used directly in the Tier 2 Model for pre-Tier 1 cars and trucks. Tier 1 and later standards were treated as if they were fuel neutral (i.e. applying to diesels as well), and the MOBILE5b emission rates (which remain stable at Tier 0 levels) were adjusted accordingly.[aa] Tier 1 FERs for diesel LDVs were developed by reducing the MOBILE5b Tier 0 BER (ZML and DR) by the ratio of the Tier 0 50,000 mile standard (1.0/0.41 g/mi for NOx/THC) to the Tier 1 50,000 mile standard (0.4/0.25 g/mi NOx/NMHC). The Tier 1 FERs were phased-in from 1994 through 1996 according to the gasoline phase-in schedule (40/80/100 percent). FERs for LEV LDVs were developed in a similar manner, and as a simplified assumption were assumed to be fully in place by model year 2000 for all areas of the country (balancing the OTR and non-OTR NLEV phase-in schedules).

Diesel LDTs are projected by draft MOBILE6 estimates to be comprised entirely of LDT3s and LDT4s after model year 1987,[14] so Tier 1 standards were assumed in the baseline case. Tier 1 diesel LDT FERs were developed in a manner similar to LDVs, except that the ratio approach was based on the 120,000 mile standard. Because LDT standards are separated into multiple classes with the advent of Tier 1, composite Tier 1 LDT3/4 standards were developed (1.15 g/mi for NOx and 0.49 gram/mile HC, based on sales fractions presented in Table 12) to allow computation of the ratio with a single Tier 0 standard. The standard ratio approach method was employed for developing FERs for vehicle standards under the Tier 2 (or alternate) control scenario(s), which were assumed to be fuel neutral. Diesel LDVs were assumed to comply with the Tier 2 standards 100 percent in 2004. For LDTs, the phase-in of Tier 2 standards was identical to the sequential phase-in used for gasoline LDTs, by class. To adjust diesel FERs to 24.6 mph, the default speed of the Tier 2 Model, MOBILE5b speed correction factors for diesel vehicles of 0.94 for NOx and 0.86 for HC were applied to all FERs. The resulting FERs are shown for the baseline and Tier 2 case in Appendix G.

5 Final Emission Rates for PM and SOx

In addition to NOx and VOC, the Tier 2 Model was used to generated light-duty inventory estimates for direct exhaust $PM_{2.5}$ and PM_{10} (i.e. emissions made up of carbonaceous particulate or sulfate emitted directly from the tailpipe), and gaseous SOx. By-model year FERs for $PM_{2.5}$ and SOx from gasoline and diesel LDVs and LDTs were generated by a version of EPA's PART5 model modified to allow adjustments in gasoline fuel sulfur level.[15] The modified PART5 model was run at 24.6 mph for sulfur levels of 30, 150 and 330 ppm in order to generate FERs at the appropriate default speed. The baseline scenario was modeled for each region by

[aa]Treating Tier 1 NOx standards as fuel neutral was an error in this analysis; although LEV NOx standards are fuel nuetral, Tier 1 NOx standards are not; hence, the NOx emission rates for Tier 1 diesel LDVs and LDTs are likely underestimated in the Tier 2 Model.

combining FERs generated at 150 and 330 ppm (for gasoline LDVs and LDTs) according to the fuel program weighting approach outlined in Section 4.3.1 and demonstrated in Equation (16).

The proposed Tier 2/Sulfur program will reduce gasoline PM and SOx emissions due to sulfur control, and diesel PM emissions due to lower tailpipe standards. The effect of sulfur control was modeled by using the gasoline PM and SOx FERs generated at 30 ppm. The proposed tailpipe standards, shown in Section 4.3.2 (Table 16), were modeled for diesel LDVs and LDTs by assuming that the post-control emission rates for all vehicles were equal to the new standard levels (unlike MOBILE5b, PART5 assumes a constant gram/mile emission rate for PM and SOx, with no deterioration with age). These standards were phased-in according to the "sequential" schedules presented in Table 16. Because gasoline $PM_{2.5}$ emissions at 30 ppm were already below the proposed standard levels, they were not modified from the baseline case.

PM_{10} inventories were developed by applying adjustments to the $PM_{2.5}$ inventories; thus, PM_{10} FERs were not developed separately, but can be derived by applying these adjustments to the $PM_{2.5}$ FERs. The adjustments were based on conversion factors for diesel vehicles and catalyst-equipped gasoline vehicles from PART5.[16] $PM_{2.5}$ inventory results were increased by 7.8 percent for gasoline vehicles, and 8.7 percent for diesel vehicles to derive the PM_{10} inventories.

PM and SOx FERs for gasoline and diesel LDVs and LDTs are presented in Appendix G for both the baseline and Tier 2 control cases. Gasoline FERs are shown by sulfur level; the Tier 2 control case is represented by the 30 ppm FERs, applicable to calendar years 2004 and later.

6 Calculation of Exhaust Emission Inventories

Using the final emission rates derived in Sections 4 and 5, the Tier 2 Model was designed to perform a series of calculation resulting in short tons of NOx, exhaust VOC,[bb] $PM_{2.5}$, PM_{10} and SOx emitted from light-duty cars and trucks both a) annually in the U.S. (minus California, Alaska, and Hawaii), and b) during the summer months in the four urban areas of New York, Chicago, Atlanta and Charlotte. These estimates were generated from 1990 through 2030 for the baseline and control cases discussed in Section 4.3,[cc] and reflected summertime ambient conditions and fleet characteristics for July 1st of the modeled year.

A necessary step in producing these inventories was the generation of emission factors (EFs) which reflect the average gram per mile emission rate generated by the light-duty fleet in a given calendar year. EFs were developed separately for LDVs, LDT1/2s and LDT3/4s. Unlike MOBILE5b, separate EFs were not generated for diesel and gasoline LDVs and LDTs; instead,

[bb]VOC emission inventories were generated directly from NMHC (Tier 1 and earlier) and NMOG (LEV and later) FERs without additional correction.

[cc] The alternate control options described in Section 4.3.3 were only evaluated over the 47-state region

the EFs for these classes combined both diesel and gasoline vehicles, weighted by sales.

For a given calendar year, the light-duty car and truck fleet was modeled as consisting of vehicles from within one year old to 25 years old. An EF was calculated for each age level by applying the average miles accumulated for that age level as of July 1st to the FER developed for that model year in Sections 4 and 5, according to the equation form shown in Equation (1) from Section 3.1. A fleet average EF was then calculated by weighting the age-based EFs by the fraction of total vehicle miles traveled by each age level, known as the travel fraction. This computation is shown in Equation (19), reflecting the aggregation of diesel and gasoline FERs within each vehicle class:

$$(19)\ EF_{CLASS} = \left[\sum_{AGE=1}^{25} [(EF_{GAS} * SALES_{GAS}) + (EF_{DIESEL} * SALES_{DIESEL})] * TF \right] + TAMP$$

Where:

EF_{CLASS} = Fleetwide Emission Factor for vehicle class LDV, LDT1/2 or LDT3/4
$EF_{GAS/DIESEL}$= Emission Factor for gasoline/diesel vehicles of year AGE within the class, a function of the gas/diesel FER and July 1st cumulative mileage for the model year of year AGE
$SALES_{GAS/DIESEL}$ = Sales fraction of gasoline/diesel vehicles with the class for the model year of year AGE
TAMP = gram/mile adjustment to account for emission control system tampering, a function of calendar year and vehicle class (NOx and HC only)

Total tons emitted by each vehicle class were generated using the emission factor calculated above, according to Equation (20):

$$(20)\ TONS_{CLASS} = \frac{EF_{CLASS} * VMT_{CLASS}}{902{,}700\ g/ton}$$

Where:

$TONS_{CLASS}$ = tons emitted by vehicle class during the analysis period
VMT_{CLASS} = vehicle miles traveled by vehicle class during the the analysis period
*907,200 g/ton = 453.6 grams per pound * 2000 pounds per short ton*

Total light-duty tons were calculated by summing the results of Equation (20) across LDVs, LDT1/2s, and LDT3/4s. From this total, a composite light-duty EF was derived by converting total light-duty tons to grams and dividing by total light-duty VMT.

The inputs used to generate Equations (19) and (20) are discussed in Sections 6.1 through 6.5, including average cumulative mileage, diesel sales fraction, travel fraction, tampering effects, and VMT by class.

6.1 July 1st Cumulative Mileage

The emission inventories calculated by the Tier 2 Model reflected the car and truck fleet as of July 1st of the modeled calendar year, consistent with the default assumption in MOBILE5b. The cumulative mileage by each vehicle age as of this date were applied to the FERs from Section 4 and 5 to generate July 1st EFs by vehicle age. The average cumulative mileages were derived from MOBILE6 estimates discussed in Section 3.2 (Table 3). The cumulative mileages shown in Table 3 are at the end of each year in a given vehicle's life, not July 1st; thus, the cumulative mileages from Table 3 required further adjustment. MOBILE defines a model year sales period from October of the previous year through September of the current year. In modeling a specific date, MOBILE assumes that for a given model year, the fraction of vehicles sold in the earliest quarter of the model year will accumulate miles at a slower rate than the fraction of vehicles sold in the last three quarters of the model year.[17] In addition, cumulative miles for the newest model year are adjusted downward, since the average vehicle for this model year will be less than one year old. In order to best replicate the MOBILE treatment of annual mileage accumulation MOBILE5b was run using the proposed MOBILE6 unadjusted annual mileage accumulations from Table 3 to derive the adjusted July 1st values,[dd] shown in Table 17.

Table 17 - July 1st Cumulative Mileages (10,000 miles)

Year	LDV	LDT1/2	LDT3/4	Year	LDV	LDT1/2	LDT3/4
1	0.5591	0.7311	0.7999	**14**	14.7483	17.8681	18.9475
2	1.8431	2.4057	2.6251	**15**	15.5112	18.6293	19.7784
3	3.2431	4.2173	4.5778	**16**	16.2364	19.3257	20.5522
4	4.5741	5.9222	6.3963	**17**	16.9258	19.9607	21.2728
5	5.8394	7.5239	8.0898	**18**	17.5813	20.5379	21.9439
6	7.0422	9.0257	9.6669	**19**	18.2044	21.0607	22.5689
7	8.1858	10.4313	11.1357	**20**	18.7967	21.5326	23.1509
8	9.2729	11.7441	12.5035	**21**	19.3598	21.9572	23.6929
9	10.3064	12.9676	13.7773	**22**	19.8952	22.3379	24.1977
10	11.2889	14.1053	14.9636	**23**	20.4041	22.6783	24.6677
11	12.2229	15.1607	16.0683	**24**	20.8878	22.9819	25.1055
12	13.1082	16.1373	17.0971	**25**	21.3478	23.252	25.5133
13	13.9462	17.0386	18.0552				

[dd] Because MOBILE5b only allows the by-model option to be run for January output, the model was run for January 1st in two successive years (X and X+1) with by-model year output; the resulting adjusted by-model year mileage accumulations were then averaged to simulate July 1 mileage accumulations for year X.

6.2 Diesel Sales Fraction

Diesel sales fractions by vehicle class (i.e. the fraction of sales in a vehicle class attributed to diesels in a given model year) proposed for MOBILE6 were used directly for calculating the composite EFs in Equation (19), and are shown in Appendix H.[18] These estimates place diesel sales penetration at less than one percent of light-duty sales in recent model years, and assume no change in these levels through 2030.

In order to assess the potential impact on PM emissions of diesel sales fraction growth in the light-duty truck fleet, an "increased diesel growth" scenario was developed. This scenario assumed that the percent of diesels making up total light-duty truck sales increase to five percent in 2001, adding five percentage points per subsequent year until diesels represent 50 percent of light-duty truck sales in 2010; beyond 2010, the diesel engine share of the light truck market was assumed to stay at 50 percent. Within the period of diesel sales growth, light duty truck classes were "converted" to diesels in a sequential manner starting with the heaviest trucks (i.e., to fulfill the overall LDT sales fraction, 100 percent of LDT4s would become diesels prior to an increase in LDT3 sales fraction, and so on). This methodology resulted in the diesel sales penetrations shown in Table 18. The sales fractions for this scenario aggregated on the basis of LDT1/2 and LDT3/4 are shown in Appendix H.

Table 18 - Diesel Sales Fractions for "Increased Growth" Scenario

Model Year	**Diesel Sales Penetration**			
	All LDT	**LDT2**	**LDT3**	**LDT4**
2001	5%	0%	0%	63%
2002	10%	0%	12%	100%
2003	15%	0%	41%	100%
2004	20%	0%	71%	100%
2005	25%	0%	100%	100%
2006	30%	9%	100%	100%
2007	35%	18%	100%	100%
2008	40%	26%	100%	100%
2009	45%	35%	100%	100%
2010 and later	50%	44%	100%	100%

6.3 Travel Fraction

In a given calendar year and for a given vehicle class, the fraction of total VMT traveled by each vehicle age is known as the travel fraction. Travel fraction is used to weight the EFs calculated for each vehicle age into a single fleet-wide EF, by vehicle class. Travel fraction as a function of age was computed separately for LDVs, LDT1/2s and LDT3/4s, according to

Equation (21):

$$(21)\ TF_{AGE} = \frac{ANNMILE_{AGE}}{\sum_{AGE=1}^{25}(ANNMILE_{AGE} * REGDIST_{AGE})}$$

Where:

TF_{AGE} = Travel Fraction for vehicle of year AGE
$ANNMILE_{AGE}$ = Annual mileage accumulation rate for a vehicle of year AGE
REGDIST = Registration distribution; i.e., fraction of fleet comprised of year AGE

For this calculation, the annual mileage accumulation rates from Table 3 were adjusted to reflect the July 1st analysis date by assuming that 25 percent of the preceding model year (those vehicles sold from July 1st through September 30th of the preceding calendar year) accumulated mileage at the rate for the current year. For example, in calendar year 2000, 25 percent of model year 1999 vehicles accumulated mileage at the year one level and 75 percent accumulated miles at the year two level; this was carried over through all model years. For the newest model year, the incomplete sales year was taken into account through a reduction in the registration fraction for that year (the registration distribution used for calculating the travel fraction in all years were those proposed for use in MOBILE6[19]). The calculation of Equation (20) and resulting travel fractions are presented in Appendix I for each vehicle class.

6.4 Tampering Effects

The final step in calculating fleet-wide emission factors via Equation (19) was to account for exhaust system tampering. MOBILE5b was used directly to generate tampering adjustments in the Tier 2 Model, in the form of an additive gram per mile adjustment (as a function of calendar year) added at the end of the fleet-wide emission factor calculation, as shown above in Equation (19). MOBILE5b accounts for tampering as a function of model year, and allows tampering emission to be reduced through an anti-tampering program (ATP), assumed for this analysis to be linked to an I/M program. MOBILE5 was run for each calendar year from 1990 through 2020 under three scenarios: a) without an anti-tampering program, b) with an anti-tampering program, and c) without tampering effects.[ee] These runs enabled, for each calendar year, the isolation of tampering effects with and without an ATP. This process was repeated for the OTR and non-OTR to account for differences in tampering effects between Tier 1 vehicles and LEVs, resulting in tampering offsets with and without an I/M program in both regions. These offsets were weighted accordingly using the regional weighting factors presented in Section 4.2, resulting in the tampering offsets by analysis region shown in Appendix J. Tampering offsets were assumed

[ee] MOBILE5b can be run so that no tampering effects are included in the results. This option is for analysis purposes only, and is not permitted for official use of the model.

to remain constant between the baseline and control cases.[ff]

6.5 Vehicle Miles Traveled (VMT)

After calculation of the fleet-wide emission factors, the final step in calculating emission inventories was to apply estimates of vehicle miles traveled to the gram per mile EFs, as shown in Equation (20). Estimates of VMT through 2030 were developed for LDVs, LDT1/2 and LDT3/4s for the 47-state and four city areas by first generating estimates of total light-duty VMT, then applying VMT fractions by class as a function of calendar year (Appendix K). These two basic steps are detailed in the following sections.

6.5.1 Total Light-Duty VMT

6.5.1.1 47-State Annual

EPA's Trends Report ("Trends") contains projections of total annual VMT for all on-highway vehicles, by state, for selected years through 2010; national (50-state) estimates of VMT by vehicle class are also provided in these same years.[20] To maintain consistency with Trends, projections of total 47-state light-duty VMT were developed for the Tier 2 Model directly from the Trends Report through 2010. Light-duty VMT for the 47-state area was generated by applying the fraction of total 50-state on-highway VMT accounted for by gasoline and diesel LDVs and LDTs to total 47-state on-highway VMT, in each year for which projections were made. For years prior to 2010 in which projections were not available, estimates of total 47-state on-highway VMT and 50-state light-duty VMT fraction were developed using linear interpolation. Because the earliest year of available data was 1995, estimates for 1990 were developed based on a linear extrapolation from estimates in 1995 through 2000.

Between 2000 and 2010, the average annual rate of light-duty VMT growth generated using the methodology outlined above is 1.8 percent; between 1995 and 1996, total on-highway VMT as reported in Trends grows at the same rate. In contrast, total on-highway VMT as reported by the Federal Highways Administration (FHWA) grows at a rate of 2.0 percent between 1995 and 1996, and averages 2.6 percent between 1988 and 1998.[21] The post-2010 light-duty VMT estimates used in the Tier 2 Model reflect growth rates between those reported in recent years by Trends and FHWA. Although the average annual rate of total VMT growth as reported

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[ff]This approach had a significant effect on post-control emissions for LDT3/4s. MOBILE5b tampering effects for LEVs are reduced considerably from Tier 1 levels, and are nearly negligible. The application of baseline tampering effects to the control case was appropriate for LDVs and LDT1/2s, since this resulted in LEV-like tampering effects being applied to Tier 2 LDVs and LDT1/2s. However, Tier 1 tampering effects were applied to Tier 2 LDT3/4s (because LDT3/4s are Tier 1 under the baseline case), where application of LEV-like tampering effects would have been more consistent; hence emission inventory estimates for LDT3/4s under the control cases are likely overstated. However, implementation of LEV-like tampering benefits for Tier 2 LDT3/4s would have "inflated" the emission reductions attributed to the proposed Tier 2 program. This issue will require reevaluation for the final rule.

by FHWA between 1988 and 1998 was 2.6 percent per year, it was assumed that this rate would slow by 2010 due to several economic and geographic factors, including a) the saturation of suburban growth, b) a slowed rate of growth in two-income families, and c) the shifting of the baby-boom generation into retirement. From 2011 through 2015, the Tier 2 Model assumed a light-duty VMT growth rate of 2.1 percent (compounded) per year; from 2015 through 2030, this rate was reduced further to 2.1 percent simple (i.e., 2.1 percent of 2015 light-duty VMT added to each successive year), resulting in a linear growth function.

6.5.1.2 Four-City Summer

Estimates of total light-duty VMT in New York, Chicago, Atlanta and Charlotte during the summer months (May through September) of 1995 and 2007 were provided to OMS by E.H. Pechan and Associates, based on work for the Ozone Transport Assessment Group (OTAG). Projections for all other years were developed based on linear interpolation or extrapolation of these two years, to take into account expected reductions in VMT growth as discussed in the previous section.

6.5.2 VMT Fraction By Vehicle Class

VMT projections broken down by the LDV, LDT1/2 and LDT3/4 classes were computed by applying VMT fractions (i.e. the fraction of total light-duty VMT traveled by each class) to the total light-duty VMT estimates developed in Section 6.5.1. VMT fractions were first developed for LDVs and LDTs; LDTs were then subdivided into the LDT1/2 and LDT3/4 classes.

Estimates of sales fraction between LDVs and LDTs were the starting point for generating VMT fractions. Starting from an estimate for model year 1996 in which LDTs comprised 40.4 percent of overall sales, previous EPA work estimated that the sales fraction of LDTs would increase at an absolute rate of 1.6 percent per year until 2002, in which LDT sales were assumed to stabilize at 50 percent of the light-duty market.[22] For the Tier 2 Model, the 1.6 percent LDT growth trend was assumed to continue beyond 2002 until 2008, at which point LDT sales were assumed to stabilize at nearly 60 percent of light-duty sales. The primary rationale for the updated estimate is that recent LDT sales are already surpassing EPA's initial estimates of LDT penetration; in recent months trucks have accounted for nearly half of total sales, exceeding 50 percent in November 1998.[23]

From these sales fractions, the relative contribution of VMT by LDVs and LDTs across several calendar years was calculated. The methodology for calculating these VMT fractions is contained in the report under reference 22 (German, 1997), and is not detailed here. In short, this methodology generated the relative VMT fraction based on estimates of sales fraction, mileage accumulation rate and survival rate, assuming that total light-duty sales remain constant. For the generation of VMT fractions for the Tier 2 Model, this approach was updated using the estimates of sales fraction outlined above, survival rates used in the Tier 2 cost/effectiveness analysis (see Section 10), and mileage accumulation rates proposed for MOBILE6.

LDT fraction of light-duty VMT calculated using the above methodology was further subdivided into the LDT1/2 and LDT3/4 classes using the absolute sales fractions presented in Table 12; for each calendar year, 75 percent of LDT VMT was therefore attributed to LDT1/2s, and 25 percent to LDT3/4s. This approach does not account for differences in mileage accumulation rate between the two LDT classes, and assumes that the sales fractions from Table 12 will remain constant across all model years.

The VMT fractions developed for LDVs, LDT1/2s and LDT3/4s were applied to the total light-duty VMT estimates for the 47-state and four urban areas developed in Section 6.5.1. The resulting VMT projections by vehicle class and region are shown in Appendix K.

7 Calculation of Evaporative VOC Emission Inventories

The Tier 2 Model was not used to generate estimates of evaporative VOC emissions (encompassing diurnal, resting loss, running loss and refueling emissions), since the modifications proposed for use in MOBILE6 were not available at the time of this analysis. The evaporative VOC inventories for the baseline case were developed using MOBILE5b directly. Control case inventories were generated using a version of MOBILE5b modified to reflect the proposed evaporative VOC standards.[gg]

The processes were the same for developing baseline inventory estimates using MOBILE5b and control estimates using the modified version of the model. For each model, several runs were made to reflect IM (pressure and purge check) versus No IM, RFG versus No RFG, and North versus South; the latter category was added to account for differences in fuel RVP and ambient temperature between the regions. The models were run in selected years between 1990 and 2030. The specifications for each scenario are shown in Table 19.

Table 19 - Inputs for Evaporative VOC MOBILE5b Runs

Region	Daily Temperature Range	Non-RFG RVP	RFG RVP	I/M (Pressure/Purge Test)
North	72 - 92° F	8.7 psi	6.6 psi	Biennial Test Only Start: 1986 Model Years: 1968-2030 Compliance Rate: 96%
South	69 - 94° F	7.8 psi	6.6 psi	

Total evaporative emission factors by vehicle class were weighted based on fuel and I/M

[gg]Details of the evaporative control component of the proposed Tier 2/Sulfur program and how it was modeled are contained in a memorandum from David Brzezinski to the Tier 2 Docket (A-97-10) entitled "A Modified Version of MOBILE5 for Evaluation of Proposed Tier 2 Evaporative Emission Standards".

program to generate regional EFs by class for the 47-state and four urban areas. The basis of the fuel and I/M weighting factors (shown in Table 19) were the "summer" weighting factors used in developing composite exhaust final emission rates (Section 4.2, Table 13). The split between North and South was assumed to be 50/50 for each fuel and I/M combination.

Table 19 - Fuel/IM Population Weighting Factors

Area / Period	North				South			
	Conventional Gasoline		RFG		Conventional Gasoline		RFG	
	IM	No IM	IM	No IM	IM	No IM	IM	No IM
47 State / Summer	0.115	0.250	0.125	0.010	0.115	0.250	0.125	0.010
New York / Summer	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Chicago / Summer	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Atlanta / Summer	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Charlotte / Summer	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00

For each calendar year, a total light-duty evaporative EF was developed by weighting the regional EFs for each vehicle class (gasoline LDV, LDT1/2 and LDT3/4 only, since diesels produce essentially no evaporative emissions) by the VMT fractions developed in Section 6.5.2. Evaporative VOC inventory estimates were than developed by applying total light-duty VMT from Section 6.5.1 to the composite light-duty EFs for the baseline and control cases for the 47-state and four city scenarios.

8 Inventory Results

The light-duty exhaust inventory estimates generated by the Tier 2 Model for NOx, VOC, $PM_{2.5}$, PM_{10} and SOx are presented in full in Appendix L. Emission factors and tonnage estimates by vehicle class and by total light-duty are presented for Calendar years 1990, 1995 and 2000 through 2030 for the baseline and Tier 2 control cases, in the 47-state and four urban areas. Included in Appendix L are also a) 47-state NOx and exhaust VOC results for the three alternative control options discussed in Section 4.3.3, b) 47-state $PM_{2.5}$ results for the "increased diesel sales growth" baseline and Tier 2 control scenarios discussed in Section 6.2, and c) evaporative VOC inventory estimates for the baseline and control scenarios discussed in the previous section. An overview of these results can be found in Chapter III, Section A of the Tier 2 Regulatory Impact Analysis.

9 Comparison Between Tier 2 Model and MOBILE5b for NOx and Exhaust VOC

In order to assess the magnitude of changes in the Tier 2 Model affecting light-duty NOx and exhaust VOC emissions, an overall comparison was performed between the Tier 2 Model and MOBILE5b for the 47-state and New York areas for the baseline (without Tier 2/Sulfur control) scenario. The basis for this comparison was total light-duty emission factors in selected years from 1990 through 2030. Total light-duty emission factors were calculated for the Tier 2 Model by weighting together the emission factors by LDV, LDT1/2 and LDT3/4 developed in Section 6 (Appendix L) according to the VMT fractions from Section 6.5.2 (Appendix K). For MOBILE5b, total light-duty emission factors were developed by weighting together the EFs for each vehicle class (including diesels) according to VMT fractions computed by the model.

The intent of this analysis was to compare results from the two models using the same assumptions for NLEV phase-in, fuel program, I/M program, average speed, and temperature. In this way, a more direct assessment of the changes made in the Tier 2 Model can be made. For MOBILE5b, the NLEV program was modeled using the phase-in schedule presented in Section 4.3.1, for both an OTR and non-OTR case. RFG areas were modeled using the RFG flag option. The I/M program parameters shown in Table 20 were used for I/M areas, to replicate the I/M programs used by the Tier 2 Model (Section 3.6). For all I/M programs, a biennial test-only anti-tampering (ATP) program was modeled assuming a 96 percent compliance rate based on inspections of the catalyst and fuel inlet restrictor. The default average speed of the Tier 2 Model (24.6 mph) was used; and daily minimum and maximum temperatures were set to 72° and 96° F.

Table 20 - I/M Programs Assumed For MOBILE5b Runs

Calendar Years	Model Years 1968 through 1995	Model Years 1996 and later (non-LEV)	LEVs
1990	Idle Stringency = 20% Waiver Rate = 3%	n/a	n/a
1995	IM240 with Phase-In Cutpoints (2.0 HC / 3.0 NOx) Stringency = 20% Waiver = 10% Compliance = 85%	n/a	n/a
2000 and later	IM240 with Phase-In Cutpoints (2.0 HC / 3.0 NOx) Stringency = 20% Waiver = 10% Compliance = 85%	IM240 with Final Cutpoints (0.8 HC / 2.0 NOx) Stringency = 20% Waiver = 3% Compliance = 96%	"Max" I/M[hh]

[hh]A detailed description of the "Maximum I/M" program for LEVs in contained in the "Memorandum on Emission Reduction Credits for California Low Emission Vehicles (LEVs)", Appendix 2B of the MOBILE5 User's Guide.

Using the inputs described above, MOBILE5b was run over six scenarios covering each combination of OTR/Non-OTR, IM/Non-IM and RFG/Non-RFG, minus the two RFG/Non-IM cases. 47-state emissions were estimated by weighting the results from these runs using the annual weighting factors presented in Table 13. The New York scenario was modeled using the OTR/RFG/IM case.

Results for NOx and exhaust VOC across the 47-state annual and New York summer cases are shown in Figures 1 through 4.

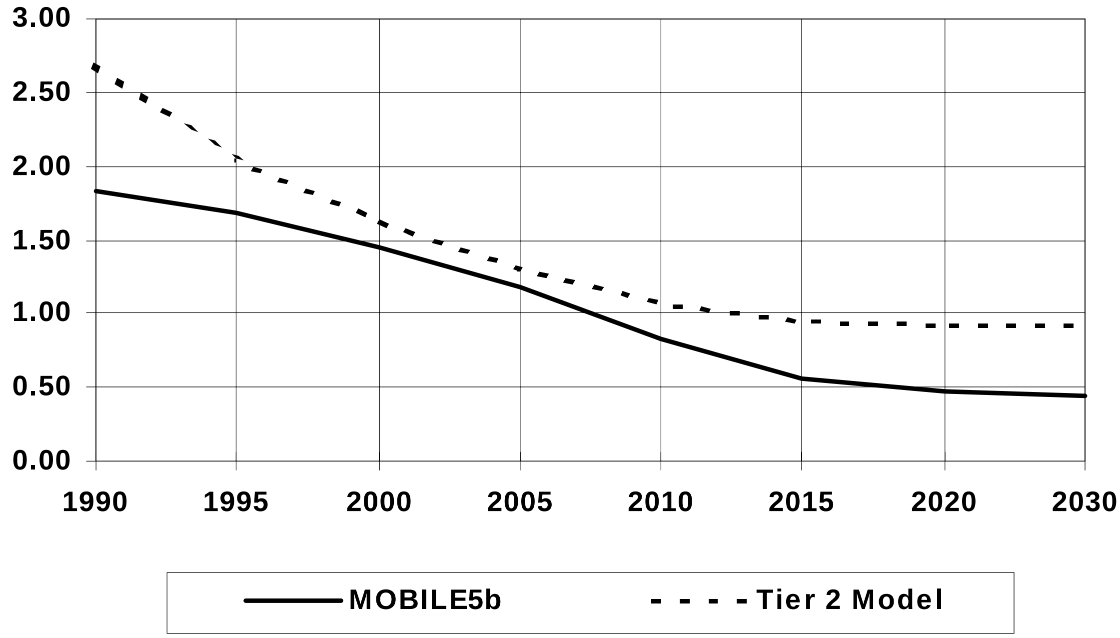

Figure 1 - Total Light-Duty NOx Emission Factor: 47-State (g/mi)

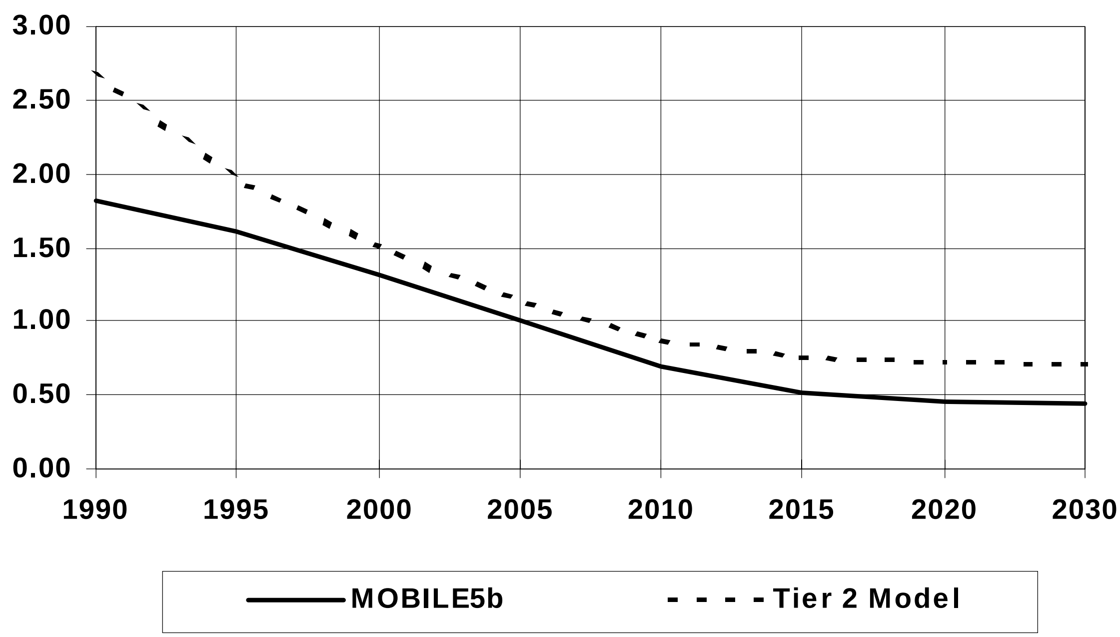

Figure 2 - Total Light-Duty NOx Emission Factor: New York (g/mi)

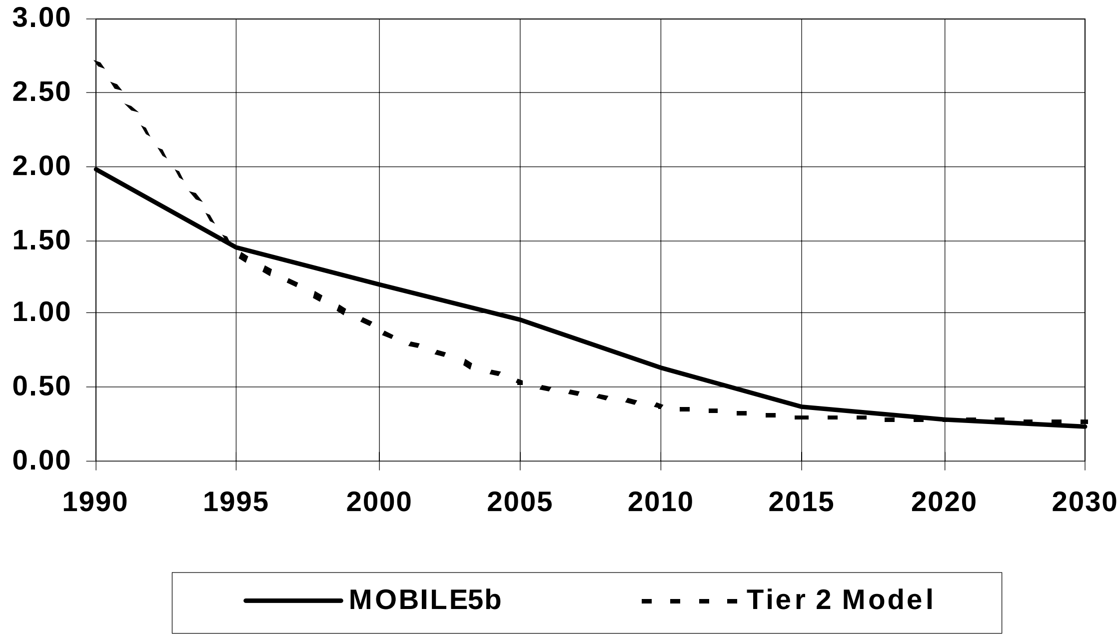

Figure 3 - Total Light-Duty Exhaust VOC Emission Factor: 47-State (g/mi)

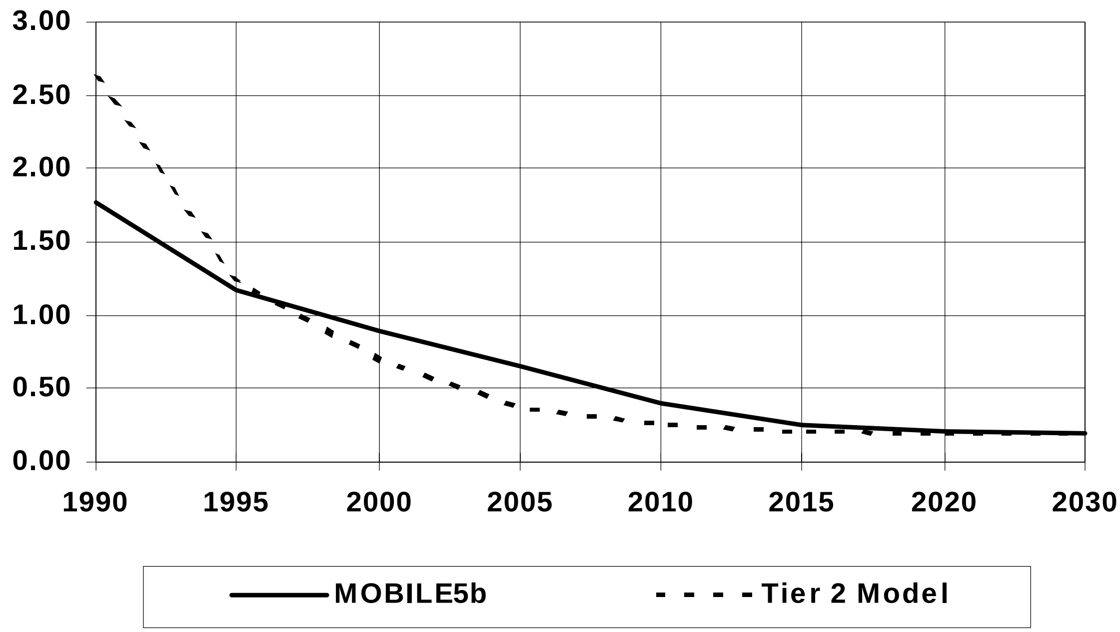

Figure 4 - Total Light-Duty Exhaust VOC Emission Factor: New York (g/mi)

For NOx, the Tier 2 Model is consistently higher than MOBILE5b. Basic emission rates for the Tier 2 Model are lower than for MOBILE5b; however, the effects of off-cycle, increased truck VMT and sulfur appear to overwhelm the difference in basic emission rates. Prior to 2000, higher estimates from the Tier 2 Model are driven mainly by off-cycle effects. Between 2000 and 2010, the implementation of off-cycle control in the Tier 2 Model lessens the gap between the two models. Beyond 2010, increased truck VMT and sulfur effects result in significantly higher emissions as predicted by the Tier 2 Model relative to MOBILE5b.

For exhaust VOC, off-cycle effects also cause higher emissions for the Tier 2 Model relative to MOBILE5b in 1990. The large difference in basic emission rates between the Tier 2 Model and MOBILE5b result in lower emissions for the Tier 2 Model from 1995 through 2015, supplemented by the control of off-cycle emissions. The models converge as increased truck VMT and sulfur effects become more prevalent in the Tier 2 Model.

10 Estimates of Per-Vehicle Emissions Used In Tier 2 Cost Effectiveness Analysis

Chapter VI of the Tier 2 Regulatory Impact Analysis contains the analysis of cost effectiveness for the proposed Tier 2 and Sulfur program. This analysis relied on estimates of emissions reduced over a vehicle's life due to the proposed Tier 2/Sulfur program (i.e., per-vehicle emission reductions), with a discount factor applied to express these reductions in terms of net-present value. For NOx and exhaust HC, the per-vehicle emissions used for this analysis were based on the final emission rates discussed in Section 3. For evaporative HC, per-vehicle emissions were based on the inventory results discussed in Section 7. This section outlines the methodology used for determining these per-vehicle emission estimates.

The "raw" final emission rates developed in Section 3.6 (Equation (9)) were used to generate per-vehicle lifetime emissions for NOx and exhaust HC. The linearized form of these FERs are presented in Appendix F; however, for this calculation, the age-based FERs from Equation (9) were used directly. For both NOx and HC, discounted per-vehicle lifetime tons were calculated according to Equation (22) across each permutation of vehicle class, standard level, I/M program, fuel program, sulfur level, and SFTP compliance:

$$(22)\ TONS = \sum_{AGE=1}^{25} \frac{FER_{AGE} * MILES_{AGE} * SURV_{AGE}}{DISCOUNT_{AGE} * 907{,}200\ g/ton}$$

Where:

TONS = discounted per-vehicle lifetime emissions in tons
FER_{AGE} = Final emission rate as a function of AGE, from Equation (9) (grams per mile)
$MILES_{AGE}$ = Annual miles traveled by vehicle of year AGE, from Table 3
$SURV_{AGE}$ = Survival rate (probability a vehicle of year AGE will be in operation)[24]
$DISCOUNT_{AGE}$ = Discount rate in year AGE, based on 7 percent per year (1.07^{AGE-1})

An example calculation for one case is shown in Appendix M. NOx and exhaust HC results across all cases relative to the Tier 2 cost effectiveness analysis are presented in Appendix IV-A of the Tier 2 Regulatory Impact Analysis.

Evaporative HC lifetime tonnages were also developed using the methodology presented in Equation (22). For the baseline case, the emission rates used for the "FER" term from this equation were 2030 calendar year emission factors from MOBILE5b. For the control case, 2030 calendar year emission factors from the version of MOBILE5b developed for estimating Tier 2 evaporative HC benefits were used. These emission factors before and after control, weighted on a 47-state basis, are contained in Table L-9 of Appendix L. The resulting per-vehicle lifetime emissions are presented in Appendix IV-B of the Tier 2 Regulatory Impact Analysis.

11 Acknowledgments

The author gratefully acknowledges the numerous individuals within OMS who provided input and/or supporting analyses for this report: Phil Lorang, Rick Rykowski, Tesh Rao, Ed Glover, Phil Enns, David Brzezinski, Tracie Jackson, Janet Kremer, David Korotney, Jim McCargar, and Michael Sklar.

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APPENDIX A
Model Years 1981 Through 1993 Basic Emission Rates (NOx and THC)

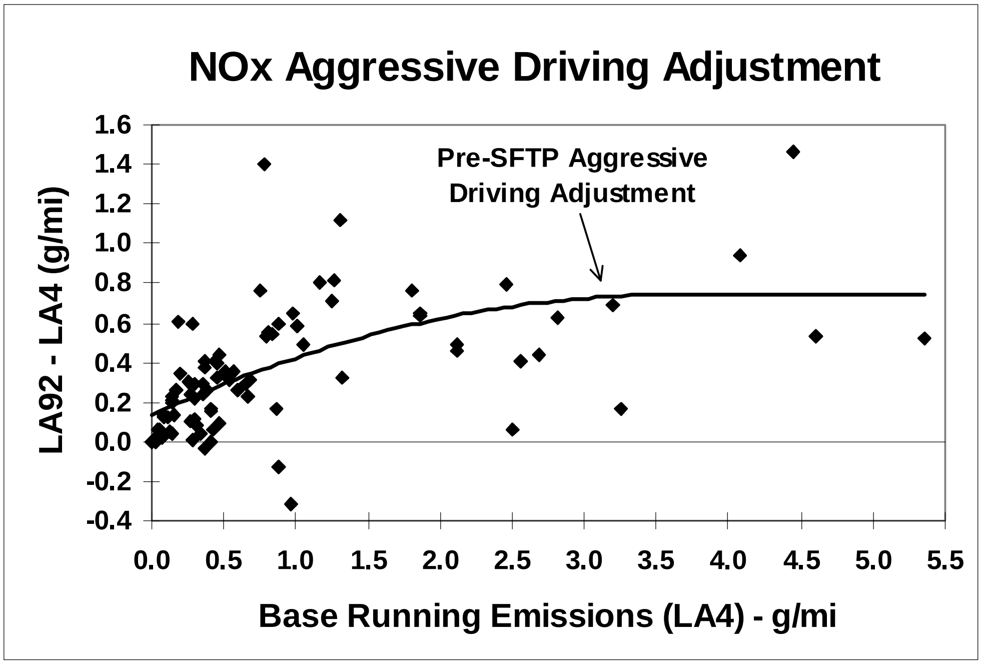
Table A-1
Model Year 1981 through 1993 Basic Emission Rates

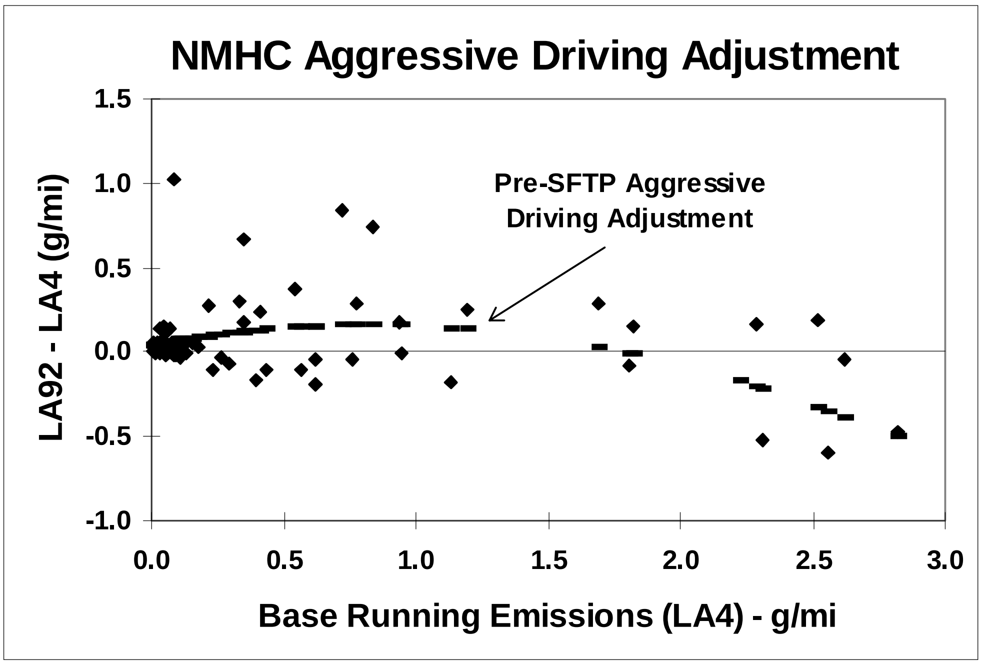
		LDV Basic Emission Rates											
		Running						Start					
		Normal				High		Normal				High	
		THC		NOx		THC	NOx	THC		NOx		THC	NOx
Year	Technology	ZML	DR1	ZML	DR1			ZML	DR1	ZML	DR1		
1988-93	PFI	0.021	0.0014	0.201	0.0038	1.74	2.85	1.999	0.0068	1.444	0.0022	4.829	-
1988-93	TBI	0.004	0.0017	0.225	0.0038	3.39	2.87	1.902	0.0027	2.300	0.0000	3.293	-
1983-87	FI	0.094	0.0014	0.480	0.0019	2.37	2.95	2.359	0.0014	1.461	0.0014	5.313	-
1986-89	Carb	0.077	0.0008	0.496	0.0017	1.85	2.87	1.493	0.0182	1.405	0.0000	10.520	-
1983-85	Carb	0.127	0.0012	0.556	0.0027	1.85	2.87	1.589	0.0094	0.748	0.0052	10.520	-
1981-82	FI	0.097	0.0023	0.460	0.0063	2.37	2.95	2.354	0.0085	1.530	0.0006	5.313	-
1981-82	Carb	0.154	0.0013	0.583	0.0023	2.37	2.95	2.121	0.0136	1.601	0.0000	10.520	-
		LDT Basic Emission Rates											
		Running						Start					
		Normal				High		Normal				High	
		THC		NOx		THC	NOx	THC		NOx		THC	NOx
Year	Technology	ZML	DR1	ZML	DR1			ZML	DR1	ZML	DR1		
1988-93	PFI	0.030	0.0024	0.302	0.0039	2.12	2.85	2.873	0.0000	1.597	0.0000	5.212	-
1988-93	TBI	0.047	0.0030	0.315	0.0032	3.24	2.85	2.599	0.0096	4.294	0.0032	5.212	-
1981-87	FI	0.134	0.0033	0.315	0.0032	2.45	2.85	2.599	0.0096	1.384	0.0000	5.826	-
1984-93	Carb	0.268	0.0027	1.287	0.0001	2.01	4.99	3.916	0.0085	0.143	0.0044	9.406	-
1981-83	Carb	0.492	0.0065	1.616	0.0000	3.71	5.01	6.817	0.0015	1.082	0.0000	17.865	-

APPENDIX B

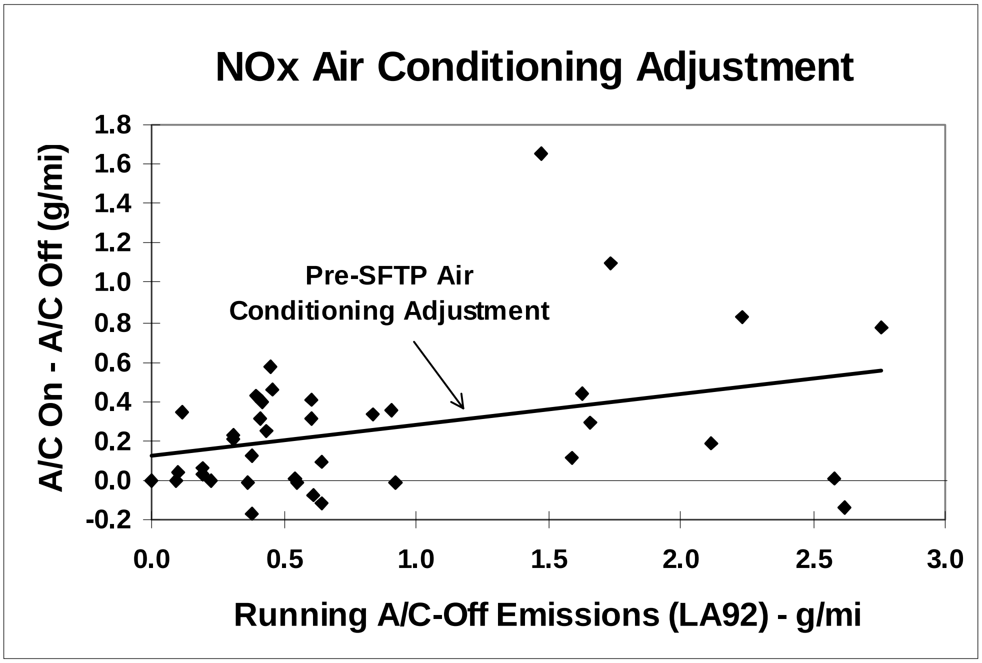
Data Used for Generating Off-cycle Adjustments

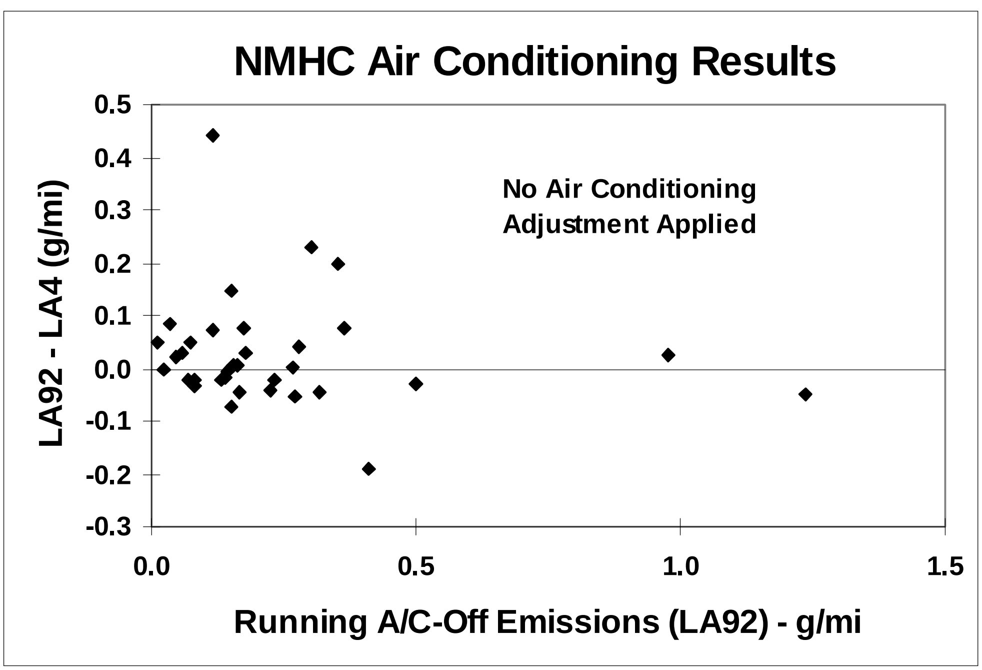
Figures B-1 & B-2:
Pre-SFTP Aggressive Driving Adjustments





Figures B-3 & B-4:
Pre-SFTP Air Conditioning Adjustments





APPENDIX C

Methodology For Developing LEV SFTP Benefits

Methodology for Developing LEV SFTP Benefits

Reductions in off-cycle emissions due to ARB's LEV SFTP standards were estimated through a determination of the relative stringency of the ARB and EPA SFTP requirements, for both aggressive driving (i.e. US06) and air conditioning (SC03). The basis for this determination was a comparison between the US06/SC03 standards and "running FTP standards" for Tier 1 vehicles and LEVs, according to the following steps:

1) Because ARB's SFTP standards are established at 4,000 miles, projection of these standards to 50,000 miles was required. NMHC+NOx SFTP standards were first split into separate NMHC and NOx standards by applying a ratio of 14 percent NMHC/86 percent NOx, used in the development of EPA's Tier 1 SFTP rulemaking. The separate NMHC and NOx standards were then projected to 50,000 miles by applying the deterioration rate from the running BERs for LEVs (presented in Tables 1 and 2 in Section 3.1.1) directly to the 4,000 mile standard levels. The resulting NMHC and NOx standards were recombined into 50,000 mile SFTP NMHC+NOx US06 and SC03 standards.

2) Running FTP "standards" were estimated for Tier 1 and LEV by multiplying the 50,000 mile NMHC and NOx FTP standards by the appropriate Running BER fractions discussed in Section 3.1.1. NMHC and NOx results were combined into a running NMHC+NOx standard.

3) A ratio of the resulting 50,000 mile SFTP NMHC+NOx "standards" from Step 1 and the running FTP NMHC+NOx "standards" from Step 2 were calculated for both the Tier 1 (EPA) and LEV(ARB) requirements for US06 and SC03. The relative stringency of the EPA and ARB standards were compared using these ratios, and the Tier 1 benefits adjusted accordingly to generate controlled correction factors for LEVs.

This process is demonstrated in Table C-1.

Table C-1

Worksheet for Developing LEV NMHC+NOx Benefits

	EPA Tier 1				ARB LEV			
	LDV/ T1	**LDT2**	**LDT3**	**LDT4**	**LDV/ T1**	**LDT2**	**LDT3**	**LDT4**
FTP 50K Standard	0.65	1.02	1.02	1.49	0.275	0.50	0.56	0.795
Estimated "Running" FTP 50K Std	0.28	0.47	0.47	0.72	0.14	0.27	0.29	0.42
Aggressive Driving (US06)								
4K Standard					0.14	0.25	0.40	0.60
Estimated 50K Standard	0.58	0.91	0.91	1.33	0.16	0.30	0.45	0.67
Increase, US06 vs. Run FTP (%)	107	93	93	84	16	10	57	61
Delta Increase (△), ARB vs. EPA (%)					-85	-89	-39	-28
EPA SFTP Benefit (%: NMHC/NOx)	88/78	88/78	88/78	88/78				
EPA "Remainder" (100% - Benefit)	12/22	12/22	12/22	12/22				
ARB "Remainder"(△ applied to EPA Rem)					2/3	1/2	7/13	9/16
ARB Benefit (100% - ARB Remainder)					98/97	99/98	93/87	91/84
Air Conditioning (SC03): NOx Only								
Estimated 4K Standard					0.17	0.23	0.27	0.38
Estimated 50K Standard	0.67	1.05	1.05	1.54	0.22	0.32	0.36	0.51
Increase, US06 vs. Run FTP (%)	139	123	123	113	58	17	25	23
Delta Increase (D), ARB vs. EPA (%)					-58	-86	-79	-80
EPA SFTP Benefit (%: NOx Only)	50	50	50	50				
EPA "Remainder" (100% - Benefit)	50	50	50	50				
ARB "Remainder"(D applied to EPA Rem)					21	7	10	10
ARB Benefit (100% - ARB Remainder)					79	93	90	90

APPENDIX D

Complex Model Output Used to Develop
Tier 1 and Later Non-Sulfur Fuel Effects

Fuel conversions for LEVs

Effect of non-sulfur fuel properties on Tech Groups 1, 2, and 5

	Indolene	Federal CG	Ca Phase 2 RFG	Federal Phase II RFG
MTBE (wt% oxygen)	0	0.2	1.9	2.1
ETBE (wt% oxygen)	0	0.0	0	0
Ethanol (wt% oxygen)	0	0.0	0	0
TAME (wt% oxygen)	0	0.0	0	0
SULFUR (ppm)	fix at 40	fix at 40	fix at 40	fix at 40
RVP (psi)	8.9	8.9	7	6.6
E200 (%)	39	44.8	47	52
E300 (%)	85.1	81.5	89.9	84
AROMATICS (vol%)	26.6	32.3	24	24
OLEFINS (vol%)	4.2	13.3	4.9	11
BENZENE (vol%)	1	1.4	0.81	0.8
<u>Exhaust HC mg/mi</u>				
Normal emitter ave	237.5	238.4	206.6	204.1
High emitter ave	1216.5	1195.0	1072.9	1009.7
<u>NOx mg/mi</u>				
Normal emitter ave	547.9	570.0	549.1	554.6
High emitter ave	590.0	629.4	584.0	614.4
<u>CO mg/mi</u>				
Normal emitter ave	5370.2	5370.0	4989.4	4904.8
High emitter ave	33979.3	34058.0	32276.2	31737.7

Starting point	Indolene	Indolene	Ca Ph 2 RFG	Ca Ph 2 RFG
Ending point	Fed CG	Fed Ph II RFG	Fed CG	*Fed Ph II RFG*
<u>Exhaust HC %change</u>				
Normal emitter ave	0.4	-14.1	15.4	-1.2
High emitter ave	-1.8	-17.0	11.4	-5.9
<u>NOx %change</u>				
Normal emitter ave	4.0	1.2	3.8	1.0
High emitter ave	6.7	4.1	7.8	5.2
<u>CO %change</u>				
Normal emitter ave	-0.0	-8.7	7.6	-1.7
High emitter ave	0.2	-6.6	5.5	-1.7

APPENDIX E

Tier 1 and Later Emitter Class Fractions

Table E-1: NOx Emitter Fractions (Tier 1 and Later)															
Age (Years)	LDV					LDT1/2					LDT3/4				
	All	OBD Only		OBD/IM		All	OBD Only		OBD/IM		All	OBD Only		OBD/IM	
	Normal	High	Repaired	High	Repaired	Normal	High	Repaired	High	Repaired	Normal	High	Repaired	High	Repaired
0	1.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
1	0.946	0.013	0.041	0.013	0.041	0.934	0.015	0.050	0.015	0.050	0.929	0.017	0.054	0.017	0.054
2	0.909	0.022	0.069	0.022	0.069	0.885	0.063	0.052	0.028	0.088	0.876	0.069	0.056	0.030	0.094
3	0.872	0.058	0.070	0.031	0.097	0.837	0.110	0.054	0.040	0.123	0.824	0.119	0.057	0.043	0.133
4	0.836	0.094	0.070	0.041	0.123	0.790	0.156	0.055	0.053	0.158	0.773	0.168	0.058	0.057	0.169
5	0.801	0.128	0.071	0.050	0.149	0.744	0.204	0.052	0.066	0.190	0.725	0.221	0.055	0.071	0.204
6	0.767	0.162	0.071	0.059	0.174	0.700	0.251	0.049	0.079	0.221	0.678	0.271	0.051	0.085	0.237
7	0.734	0.199	0.068	0.069	0.197	0.657	0.297	0.046	0.092	0.251	0.633	0.319	0.048	0.099	0.267
8	0.701	0.234	0.065	0.079	0.220	0.617	0.341	0.043	0.105	0.278	0.590	0.366	0.044	0.114	0.296
9	0.670	0.268	0.062	0.088	0.242	0.577	0.383	0.040	0.118	0.304	0.548	0.411	0.041	0.129	0.323
10	0.639	0.302	0.059	0.098	0.263	0.540	0.423	0.037	0.132	0.328	0.505	0.457	0.038	0.145	0.351
11	0.609	0.334	0.056	0.108	0.283	0.500	0.465	0.035	0.147	0.353	0.461	0.504	0.035	0.162	0.377
12	0.580	0.366	0.054	0.118	0.302	0.462	0.506	0.032	0.162	0.376	0.419	0.549	0.032	0.180	0.401
13	0.552	0.397	0.051	0.128	0.320	0.426	0.545	0.030	0.178	0.397	0.378	0.593	0.028	0.199	0.423
14	0.524	0.428	0.048	0.139	0.338	0.391	0.581	0.027	0.193	0.415	0.339	0.635	0.026	0.218	0.442
15	0.494	0.461	0.046	0.150	0.356	0.359	0.616	0.025	0.209	0.432	0.302	0.676	0.023	0.239	0.460
16	0.465	0.492	0.043	0.162	0.373	0.328	0.649	0.023	0.225	0.447	0.265	0.715	0.020	0.260	0.474
17	0.436	0.523	0.040	0.174	0.390	0.300	0.679	0.021	0.241	0.459	0.231	0.752	0.017	0.283	0.486
18	0.409	0.553	0.038	0.186	0.405	0.273	0.708	0.019	0.256	0.470	0.197	0.788	0.015	0.307	0.495
19	0.382	0.583	0.035	0.199	0.419	0.249	0.734	0.017	0.272	0.479	0.165	0.822	0.012	0.334	0.501
20	0.356	0.611	0.033	0.212	0.433	0.227	0.758	0.016	0.287	0.486	0.135	0.855	0.010	0.362	0.503
21	0.330	0.639	0.031	0.225	0.445	0.206	0.779	0.014	0.302	0.491	0.106	0.886	0.008	0.394	0.499
22	0.305	0.666	0.028	0.239	0.456	0.188	0.799	0.013	0.317	0.495	0.079	0.916	0.006	0.431	0.490
23	0.281	0.693	0.026	0.253	0.466	0.171	0.817	0.012	0.331	0.498	0.052	0.944	0.004	0.476	0.472
24	0.258	0.718	0.024	0.267	0.475	0.156	0.833	0.011	0.345	0.499	0.027	0.971	0.002	0.535	0.438
25	0.236	0.743	0.022	0.282	0.482	0.142	0.848	0.010	0.359	0.499	0.004	0.996	0.000	0.629	0.367

Table E-2: NMHC Emitter Fractions (Tier 1 and Later)

Age (Years)	LDV					LDT1/2					LDT3/4				
	All	OBD Only		OBD/IM		All	OBD Only		OBD/IM		All	OBD Only		OBD/IM	
	Normal	High	Repaired	High	Repaired	Normal	High	Repaired	High	Repaired	Normal	High	Repaired	High	Repaired
0	0.982	0.004	0.014	0.004	0.014	0.982	0.004	0.014	0.004	0.014	0.982	0.004	0.014	0.004	0.014
1	0.975	0.006	0.019	0.006	0.019	0.969	0.007	0.023	0.007	0.023	0.967	0.008	0.025	0.008	0.025
2	0.958	0.010	0.032	0.010	0.032	0.942	0.033	0.025	0.014	0.044	0.936	0.037	0.027	0.015	0.049
3	0.934	0.033	0.033	0.016	0.050	0.910	0.063	0.027	0.022	0.068	0.902	0.069	0.029	0.024	0.074
4	0.910	0.056	0.035	0.022	0.068	0.879	0.092	0.029	0.029	0.091	0.869	0.100	0.031	0.032	0.099
5	0.887	0.077	0.036	0.028	0.086	0.850	0.123	0.028	0.037	0.113	0.837	0.133	0.030	0.040	0.122
6	0.865	0.099	0.037	0.033	0.102	0.821	0.152	0.027	0.045	0.134	0.807	0.165	0.029	0.049	0.145
7	0.843	0.121	0.036	0.039	0.118	0.794	0.180	0.026	0.052	0.154	0.778	0.195	0.028	0.057	0.165
8	0.822	0.143	0.035	0.045	0.133	0.767	0.207	0.025	0.060	0.173	0.750	0.223	0.027	0.064	0.185
9	0.801	0.164	0.034	0.050	0.148	0.743	0.233	0.024	0.067	0.191	0.724	0.250	0.026	0.072	0.204
10	0.782	0.185	0.033	0.056	0.163	0.719	0.257	0.024	0.074	0.207	0.699	0.276	0.025	0.080	0.221
11	0.763	0.205	0.032	0.061	0.176	0.697	0.280	0.023	0.080	0.223	0.675	0.301	0.024	0.087	0.238
12	0.744	0.224	0.032	0.066	0.189	0.676	0.302	0.022	0.087	0.237	0.653	0.324	0.023	0.094	0.253
13	0.727	0.242	0.031	0.072	0.202	0.656	0.322	0.021	0.093	0.251	0.631	0.346	0.022	0.101	0.267
14	0.710	0.260	0.030	0.077	0.214	0.638	0.341	0.021	0.099	0.263	0.611	0.367	0.022	0.108	0.281
15	0.693	0.277	0.029	0.082	0.225	0.621	0.358	0.020	0.105	0.274	0.592	0.387	0.021	0.115	0.294
16	0.677	0.294	0.029	0.087	0.236	0.606	0.375	0.020	0.110	0.284	0.574	0.406	0.020	0.121	0.305
17	0.662	0.310	0.028	0.092	0.246	0.591	0.390	0.019	0.115	0.294	0.557	0.423	0.020	0.127	0.316
18	0.647	0.325	0.028	0.096	0.256	0.578	0.403	0.019	0.120	0.302	0.541	0.440	0.019	0.133	0.326
19	0.633	0.340	0.027	0.101	0.266	0.566	0.416	0.019	0.124	0.310	0.526	0.456	0.019	0.139	0.336
20	0.620	0.354	0.026	0.106	0.275	0.555	0.427	0.018	0.128	0.317	0.511	0.471	0.018	0.144	0.345
21	0.606	0.368	0.026	0.110	0.284	0.545	0.437	0.018	0.132	0.323	0.498	0.485	0.018	0.149	0.353
22	0.594	0.381	0.025	0.114	0.292	0.536	0.446	0.018	0.135	0.329	0.485	0.498	0.017	0.155	0.360
23	0.582	0.393	0.025	0.118	0.300	0.528	0.455	0.017	0.138	0.334	0.473	0.510	0.017	0.159	0.367
24	0.570	0.405	0.024	0.123	0.307	0.521	0.462	0.017	0.141	0.338	0.462	0.522	0.016	0.164	0.374
25	0.559	0.417	0.024	0.127	0.314	0.515	0.469	0.017	0.143	0.342	0.452	0.532	0.016	0.168	0.380

APPENDIX F

NOx and Exhaust HC Final Emission Rates (FERs)

Table F-1
NOx Final Emission Rates: Model Years 1981 through 1993

			330 ppm				300 ppm				150 ppm				100 ppm				30 ppm			
			LDV		LDT		LDV		LDT		LDV		LDT		LDV		LDT		LDV		LDT	
Year	Fuel	IM	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR
1981	Conv	IM	1.384	0.098	3.080	0.014	1.381	0.097	3.070	0.014	1.356	0.092	3.003	0.013	1.340	0.091	2.966	0.013	1.289	0.089	2.859	0.013
		No IM	1.387	0.098	3.080	0.014	1.384	0.097	3.070	0.014	1.358	0.092	3.003	0.013	1.342	0.091	2.966	0.013	1.291	0.089	2.859	0.013
	RFG	IM	1.382	0.097	3.075	0.014	1.379	0.097	3.065	0.014	1.354	0.092	2.998	0.013	1.337	0.091	2.960	0.013	1.286	0.089	2.854	0.013
		No IM	1.385	0.098	3.075	0.014	1.382	0.097	3.065	0.014	1.356	0.092	2.998	0.013	1.340	0.091	2.960	0.013	1.289	0.089	2.854	0.013
1982	Conv	IM	1.372	0.098	3.080	0.014	1.369	0.097	3.070	0.014	1.344	0.093	3.003	0.013	1.327	0.091	2.966	0.013	1.277	0.089	2.859	0.013
		No IM	1.377	0.098	3.080	0.014	1.374	0.097	3.070	0.014	1.348	0.093	3.003	0.013	1.332	0.092	2.966	0.013	1.282	0.090	2.859	0.013
	RFG	IM	1.370	0.098	3.075	0.014	1.367	0.097	3.065	0.014	1.341	0.093	2.998	0.013	1.325	0.091	2.960	0.013	1.275	0.089	2.854	0.013
		No IM	1.375	0.098	3.075	0.014	1.372	0.097	3.065	0.014	1.346	0.093	2.998	0.013	1.330	0.092	2.960	0.013	1.279	0.090	2.854	0.013
1983	Conv	IM	1.246	0.090	3.076	0.014	1.244	0.089	3.067	0.014	1.222	0.085	2.999	0.013	1.207	0.084	2.962	0.013	1.161	0.082	2.856	0.013
		No IM	1.244	0.099	3.076	0.015	1.242	0.098	3.067	0.014	1.221	0.094	2.999	0.014	1.206	0.092	2.962	0.013	1.159	0.091	2.856	0.013
	RFG	IM	1.244	0.090	3.071	0.014	1.242	0.089	3.061	0.014	1.220	0.085	2.994	0.013	1.205	0.083	2.957	0.013	1.159	0.082	2.851	0.013
		No IM	1.242	0.099	3.071	0.015	1.240	0.098	3.061	0.014	1.219	0.094	2.994	0.013	1.204	0.092	2.957	0.013	1.157	0.090	2.851	0.013
1984	Conv	IM	1.251	0.085	2.446	0.006	1.248	0.085	2.439	0.006	1.225	0.081	2.386	0.006	1.211	0.079	2.356	0.006	1.164	0.078	2.271	0.005
		No IM	1.248	0.099	2.446	0.006	1.246	0.098	2.439	0.006	1.224	0.094	2.386	0.006	1.209	0.092	2.356	0.006	1.163	0.090	2.271	0.006
	RFG	IM	1.249	0.085	2.442	0.006	1.246	0.084	2.435	0.006	1.223	0.080	2.382	0.006	1.208	0.079	2.352	0.006	1.162	0.078	2.267	0.005
		No IM	1.246	0.099	2.442	0.006	1.244	0.098	2.435	0.006	1.222	0.093	2.382	0.006	1.207	0.092	2.352	0.006	1.161	0.090	2.267	0.006
1985	Conv	IM	1.256	0.081	2.323	0.010	1.253	0.080	2.316	0.010	1.229	0.076	2.265	0.010	1.214	0.075	2.237	0.010	1.168	0.074	2.156	0.009
		No IM	1.252	0.099	2.322	0.014	1.250	0.098	2.315	0.014	1.227	0.093	2.264	0.013	1.212	0.092	2.236	0.013	1.166	0.090	2.156	0.013
	RFG	IM	1.254	0.081	2.319	0.010	1.251	0.080	2.312	0.010	1.227	0.076	2.261	0.010	1.212	0.075	2.233	0.010	1.166	0.073	2.153	0.009
		No IM	1.250	0.099	2.318	0.014	1.248	0.098	2.311	0.014	1.225	0.093	2.261	0.013	1.210	0.092	2.232	0.013	1.164	0.090	2.152	0.013
1986	Conv	IM	1.275	0.065	1.968	0.023	1.271	0.064	1.962	0.023	1.244	0.061	1.918	0.022	1.229	0.060	1.894	0.022	1.184	0.059	1.827	0.021
		No IM	1.271	0.088	1.966	0.034	1.268	0.087	1.960	0.034	1.242	0.083	1.917	0.033	1.227	0.082	1.893	0.032	1.181	0.080	1.825	0.032
	RFG	IM	1.273	0.065	1.965	0.023	1.269	0.064	1.959	0.023	1.242	0.061	1.915	0.022	1.227	0.060	1.891	0.022	1.182	0.059	1.824	0.021
		No IM	1.269	0.088	1.963	0.034	1.265	0.087	1.957	0.034	1.240	0.083	1.914	0.033	1.225	0.081	1.890	0.032	1.179	0.080	1.822	0.032
1987	Conv	IM	1.275	0.064	1.652	0.035	1.271	0.064	1.646	0.034	1.244	0.060	1.609	0.033	1.229	0.059	1.589	0.032	1.184	0.058	1.533	0.032
		No IM	1.270	0.090	1.648	0.053	1.267	0.089	1.643	0.053	1.242	0.085	1.607	0.051	1.226	0.084	1.586	0.050	1.181	0.082	1.530	0.049
	RFG	IM	1.273	0.064	1.649	0.035	1.269	0.064	1.644	0.034	1.242	0.060	1.606	0.033	1.227	0.059	1.586	0.032	1.182	0.058	1.530	0.032
		No IM	1.268	0.090	1.645	0.053	1.265	0.089	1.640	0.053	1.240	0.085	1.604	0.050	1.224	0.083	1.584	0.050	1.179	0.082	1.527	0.049
1988	Conv	IM	0.859	0.075	1.259	0.045	0.857	0.075	1.255	0.045	0.841	0.072	1.229	0.044	0.831	0.071	1.214	0.043	0.799	0.069	1.169	0.042
		No IM	0.856	0.089	1.273	0.056	0.854	0.088	1.269	0.056	0.839	0.085	1.243	0.055	0.829	0.084	1.228	0.054	0.797	0.082	1.183	0.052
	RFG	IM	0.857	0.075	1.256	0.045	0.855	0.075	1.253	0.045	0.839	0.072	1.227	0.044	0.829	0.071	1.212	0.043	0.798	0.069	1.167	0.042
		No IM	0.855	0.089	1.271	0.056	0.853	0.088	1.267	0.056	0.838	0.085	1.241	0.054	0.828	0.084	1.226	0.054	0.796	0.082	1.181	0.052
1989	Conv	IM	0.858	0.075	1.166	0.049	0.856	0.075	1.163	0.049	0.840	0.072	1.139	0.047	0.830	0.071	1.125	0.047	0.798	0.069	1.084	0.045
		No IM	0.856	0.089	1.181	0.061	0.854	0.088	1.178	0.060	0.838	0.085	1.154	0.059	0.828	0.084	1.139	0.058	0.797	0.082	1.097	0.056
	RFG	IM	0.856	0.075	1.164	0.049	0.854	0.075	1.161	0.049	0.838	0.072	1.137	0.047	0.828	0.071	1.123	0.047	0.797	0.069	1.082	0.045
		No IM	0.854	0.089	1.179	0.061	0.852	0.088	1.176	0.060	0.837	0.085	1.152	0.059	0.827	0.084	1.137	0.058	0.795	0.081	1.096	0.056
1990	Conv	IM	0.792	0.076	1.115	0.051	0.790	0.076	1.112	0.050	0.775	0.073	1.089	0.049	0.766	0.072	1.076	0.048	0.737	0.070	1.036	0.047
		No IM	0.790	0.092	1.130	0.063	0.788	0.091	1.127	0.063	0.774	0.088	1.104	0.061	0.765	0.087	1.091	0.060	0.736	0.084	1.050	0.058
	RFG	IM	0.790	0.076	1.113	0.051	0.788	0.076	1.110	0.050	0.774	0.073	1.087	0.049	0.765	0.072	1.074	0.048	0.736	0.070	1.034	0.047
		No IM	0.788	0.091	1.128	0.063	0.787	0.091	1.125	0.062	0.773	0.088	1.102	0.061	0.764	0.086	1.089	0.060	0.734	0.084	1.049	0.058
1991	Conv	IM	0.785	0.077	1.085	0.051	0.783	0.076	1.082	0.051	0.769	0.073	1.060	0.050	0.760	0.072	1.047	0.049	0.731	0.070	1.008	0.047
		No IM	0.783	0.092	1.101	0.064	0.782	0.091	1.098	0.063	0.768	0.088	1.076	0.062	0.759	0.087	1.063	0.061	0.729	0.085	1.024	0.059
	RFG	IM	0.784	0.076	1.083	0.051	0.782	0.076	1.080	0.051	0.768	0.073	1.058	0.050	0.759	0.072	1.045	0.049	0.730	0.070	1.007	0.047
		No IM	0.782	0.092	1.099	0.064	0.780	0.091	1.096	0.063	0.767	0.088	1.074	0.062	0.758	0.087	1.061	0.061	0.728	0.084	1.022	0.059
1992	Conv	IM	0.773	0.077	1.049	0.053	0.771	0.076	1.047	0.053	0.757	0.073	1.025	0.052	0.748	0.072	1.013	0.051	0.719	0.071	0.975	0.049
		No IM	0.771	0.092	1.065	0.066	0.770	0.092	1.062	0.066	0.757	0.088	1.041	0.064	0.747	0.087	1.028	0.063	0.718	0.085	0.990	0.061
	RFG	IM	0.772	0.077	1.048	0.053	0.770	0.076	1.045	0.053	0.756	0.073	1.024	0.052	0.747	0.072	1.011	0.051	0.718	0.070	0.974	0.049
		No IM	0.770	0.092	1.063	0.066	0.769	0.091	1.060	0.066	0.755	0.088	1.039	0.064	0.746	0.087	1.026	0.063	0.717	0.085	0.988	0.061
1993	Conv	IM	0.773	0.077	1.031	0.054	0.771	0.076	1.028	0.054	0.757	0.073	1.007	0.052	0.748	0.072	0.995	0.052	0.719	0.071	0.958	0.050
		No IM	0.771	0.092	1.046	0.067	0.770	0.092	1.043	0.067	0.756	0.088	1.022	0.065	0.747	0.087	1.010	0.064	0.718	0.085	0.972	0.062
	RFG	IM	0.771	0.077	1.029	0.054	0.770	0.076	1.026	0.054	0.756	0.073	1.005	0.052	0.747	0.072	0.993	0.052	0.718	0.070	0.956	0.050
		No IM	0.770	0.092	1.044	0.067	0.768	0.091	1.042	0.067	0.755	0.088	1.021	0.065	0.746	0.087	1.008	0.064	0.717	0.085	0.971	0.062

Table F-2
NOx Final Emission Rates: Tier 1 and Later
330 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.967	0.041	0.041	10.000	1.055	0.045	0.047	20.950	1.055	0.039	0.070	17.833	1.141	0.042	0.073	17.724
(0.3 g/mi)			**SFTP**	0.379	0.036	0.042	14.130	0.347	0.037	0.052	16.205	0.405	0.037	0.074	17.929	0.430	0.038	0.077	17.894
		RFG	**No SFTP**	0.941	0.040	0.040	10.000	1.026	0.044	0.046	20.568	1.026	0.038	0.068	17.830	1.110	0.041	0.071	17.722
			SFTP	0.369	0.036	0.041	14.115	0.338	0.036	0.051	16.202	0.394	0.036	0.073	17.926	0.418	0.037	0.076	17.891
	No IM	**Conv**	**No SFTP**	0.967	0.047	0.072	4.002	1.055	0.064	0.075	5.543	1.055	0.055	0.078	7.605	1.141	0.058	0.080	7.795
			SFTP	0.379	0.041	0.078	4.361	0.347	0.056	0.083	6.511	0.405	0.055	0.086	7.340	0.430	0.057	0.089	7.379
		RFG	**No SFTP**	0.941	0.046	0.071	4.010	1.026	0.063	0.073	5.570	1.026	0.054	0.077	7.605	1.110	0.056	0.079	7.793
			SFTP	0.369	0.040	0.076	4.363	0.338	0.054	0.081	6.513	0.394	0.054	0.084	7.342	0.418	0.055	0.087	7.381
LEV	**IM**	**Conv**	**No SFTP**	0.967	0.041	0.041	10.000	0.837	0.043	0.040	12.029	0.837	0.043	0.052	20.472	1.085	0.059	0.055	7.518
			SFTP	0.379	0.036	0.042	14.130	0.407	0.038	0.042	17.399	0.441	0.038	0.057	18.627	0.652	0.052	0.062	20.833
		RFG	**No SFTP**	0.941	0.040	0.040	10.000	0.814	0.042	0.039	11.834	0.814	0.042	0.050	20.394	1.055	0.057	0.054	6.733
			SFTP	0.369	0.036	0.041	14.115	0.396	0.037	0.041	17.364	0.430	0.037	0.056	18.615	0.635	0.051	0.060	20.748
	No IM	**Conv**	**No SFTP**	0.967	0.047	0.072	4.002	0.837	0.060	0.064	3.325	0.837	0.060	0.064	3.994	1.085	0.081	0.072	10.455
			SFTP	0.379	0.041	0.078	4.361	0.407	0.054	0.067	6.010	0.441	0.055	0.068	6.695	0.652	0.073	0.077	3.135
		RFG	**No SFTP**	0.941	0.046	0.071	4.010	0.814	0.059	0.063	3.487	0.814	0.058	0.063	4.159	1.055	0.078	0.070	10.540
			SFTP	0.369	0.040	0.076	4.363	0.396	0.053	0.066	6.020	0.430	0.053	0.067	6.707	0.635	0.071	0.075	3.350
TIER1	**IM**	**Conv**	**No SFTP**	0.649	0.036	0.032	11.286	0.938	0.055	0.044	14.551	0.938	0.054	0.054	10.000	1.320	0.079	0.060	14.536
			SFTP	0.408	0.032	0.032	1.821	0.653	0.049	0.045	13.124	0.653	0.048	0.056	21.319	0.978	0.071	0.066	8.345
		RFG	**No SFTP**	0.632	0.035	0.031	11.256	0.913	0.053	0.043	14.536	0.913	0.052	0.052	10.000	1.284	0.077	0.059	14.486
			SFTP	0.397	0.031	0.031	0.428	0.635	0.048	0.044	13.049	0.635	0.047	0.055	21.219	0.952	0.069	0.065	7.818
	No IM	**Conv**	**No SFTP**	0.649	0.042	0.056	3.490	0.938	0.074	0.069	10.222	0.938	0.074	0.068	11.349	1.320	0.106	0.083	9.038
			SFTP	0.408	0.037	0.057	3.984	0.653	0.068	0.071	1.046	0.653	0.068	0.071	1.676	0.978	0.097	0.086	10.416
		RFG	**No SFTP**	0.632	0.041	0.055	3.505	0.913	0.073	0.067	10.343	0.913	0.072	0.067	11.485	1.284	0.104	0.081	9.054
			SFTP	0.397	0.036	0.056	3.991	0.635	0.066	0.069	1.383	0.635	0.066	0.069	2.011	0.952	0.094	0.084	10.482
TIER2	**IM**	**Conv**	**No SFTP**	0.725	0.023	0.033	13.409	0.813	0.029	0.043	16.173	0.813	0.024	0.068	17.436	0.900	0.026	0.072	17.366
(0.07 g/mi)			**SFTP**	0.138	0.019	0.034	13.194	0.106	0.020	0.048	15.853	0.163	0.021	0.073	17.562	0.189	0.022	0.076	17.549
		RFG	**No SFTP**	0.706	0.023	0.032	13.406	0.791	0.028	0.042	16.170	0.791	0.023	0.067	17.436	0.875	0.026	0.070	17.367
			SFTP	0.134	0.019	0.033	13.194	0.103	0.020	0.047	15.853	0.159	0.020	0.072	17.562	0.184	0.021	0.074	17.549
	No IM	**Conv**	**No SFTP**	0.725	0.026	0.064	4.581	0.813	0.044	0.068	6.545	0.813	0.036	0.073	7.836	0.900	0.038	0.075	7.953
			SFTP	0.138	0.020	0.069	4.716	0.106	0.036	0.076	6.779	0.163	0.036	0.081	7.616	0.189	0.037	0.083	7.634
		RFG	**No SFTP**	0.706	0.025	0.062	4.583	0.791	0.043	0.066	6.548	0.791	0.035	0.071	7.835	0.875	0.037	0.073	7.951
			SFTP	0.134	0.020	0.068	4.717	0.103	0.035	0.075	6.779	0.159	0.035	0.079	7.616	0.184	0.036	0.081	7.634

Table F-3
NOx Final Emission Rates: Tier 1 and Later
300 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.935	0.039	0.039	10.000	1.020	0.044	0.046	20.063	1.020	0.038	0.068	17.825	1.103	0.041	0.071	17.718
(0.3 g/mi)			**SFTP**	0.366	0.035	0.041	14.093	0.336	0.036	0.051	16.197	0.391	0.036	0.073	17.922	0.416	0.037	0.076	17.887
		RFG	**No SFTP**	0.909	0.038	0.038	10.000	0.992	0.043	0.045	19.796	0.992	0.037	0.067	17.822	1.073	0.040	0.070	17.716
			SFTP	0.356	0.034	0.040	14.079	0.327	0.035	0.050	16.194	0.381	0.035	0.071	17.919	0.405	0.036	0.074	17.885
	No IM	**Conv**	**No SFTP**	0.935	0.045	0.071	4.023	1.020	0.062	0.073	5.611	1.020	0.054	0.077	7.606	1.103	0.056	0.079	7.791
			SFTP	0.366	0.040	0.076	4.367	0.336	0.054	0.081	6.517	0.391	0.054	0.084	7.345	0.416	0.055	0.087	7.384
		RFG	**No SFTP**	0.909	0.044	0.069	4.031	0.992	0.061	0.071	5.635	0.992	0.053	0.075	7.606	1.073	0.055	0.077	7.789
			SFTP	0.356	0.039	0.074	4.370	0.327	0.053	0.079	6.519	0.381	0.052	0.082	7.347	0.405	0.054	0.085	7.386
LEV	**IM**	**Conv**	**No SFTP**	0.935	0.039	0.039	10.000	0.825	0.043	0.040	11.723	0.825	0.042	0.051	20.355	1.070	0.058	0.055	6.266
			SFTP	0.366	0.035	0.041	14.093	0.401	0.037	0.042	17.346	0.435	0.037	0.056	18.608	0.643	0.051	0.061	20.705
		RFG	**No SFTP**	0.909	0.038	0.038	10.000	0.803	0.041	0.039	11.494	0.803	0.041	0.050	20.283	1.041	0.057	0.054	5.256
			SFTP	0.356	0.034	0.040	14.079	0.390	0.036	0.041	17.312	0.424	0.036	0.055	18.597	0.626	0.050	0.060	20.626
	No IM	**Conv**	**No SFTP**	0.935	0.045	0.071	4.023	0.825	0.060	0.064	3.567	0.825	0.059	0.064	4.241	1.070	0.080	0.072	10.588
			SFTP	0.366	0.040	0.076	4.367	0.401	0.054	0.067	6.025	0.435	0.054	0.068	6.714	0.643	0.072	0.077	3.456
		RFG	**No SFTP**	0.909	0.044	0.069	4.031	0.803	0.058	0.062	3.709	0.803	0.058	0.062	4.385	1.041	0.078	0.070	10.682
			SFTP	0.356	0.039	0.074	4.370	0.390	0.052	0.065	6.035	0.424	0.053	0.066	6.726	0.626	0.070	0.075	3.643
TIER1	**IM**	**Conv**	**No SFTP**	0.643	0.035	0.032	11.244	0.929	0.054	0.043	14.530	0.929	0.053	0.053	10.000	1.307	0.079	0.060	14.467
			SFTP	0.404	0.032	0.032	10.000	0.646	0.048	0.044	13.020	0.646	0.048	0.056	21.183	0.969	0.071	0.066	7.603
		RFG	**No SFTP**	0.626	0.035	0.031	11.212	0.904	0.053	0.042	14.515	0.904	0.052	0.052	10.000	1.272	0.077	0.059	14.415
			SFTP	0.393	0.031	0.031	10.000	0.629	0.047	0.043	12.939	0.629	0.047	0.055	21.090	0.943	0.069	0.064	6.982
	No IM	**Conv**	**No SFTP**	0.643	0.041	0.056	3.511	0.929	0.074	0.069	10.391	0.929	0.073	0.068	11.539	1.307	0.106	0.082	9.060
			SFTP	0.404	0.037	0.057	3.993	0.646	0.068	0.070	1.500	0.646	0.067	0.070	2.128	0.969	0.096	0.086	10.508
		RFG	**No SFTP**	0.626	0.040	0.055	3.526	0.904	0.072	0.067	10.525	0.904	0.071	0.066	11.690	1.272	0.103	0.081	9.077
			SFTP	0.393	0.036	0.055	3.999	0.629	0.066	0.069	1.788	0.629	0.065	0.069	2.417	0.943	0.094	0.084	10.579
TIER2	**IM**	**Conv**	**No SFTP**	0.701	0.023	0.032	13.402	0.786	0.028	0.042	16.164	0.786	0.023	0.067	17.436	0.870	0.026	0.070	17.368
(0.07 g/mi)			**SFTP**	0.133	0.019	0.033	13.193	0.102	0.020	0.047	15.853	0.158	0.020	0.071	17.561	0.183	0.021	0.074	17.549
		RFG	**No SFTP**	0.683	0.022	0.031	13.400	0.765	0.027	0.041	16.161	0.765	0.022	0.065	17.437	0.846	0.025	0.068	17.369
			SFTP	0.129	0.018	0.032	13.193	0.100	0.019	0.046	15.852	0.154	0.020	0.070	17.561	0.178	0.021	0.072	17.548
	No IM	**Conv**	**No SFTP**	0.701	0.025	0.062	4.585	0.786	0.043	0.066	6.551	0.786	0.035	0.071	7.833	0.870	0.037	0.074	7.948
			SFTP	0.133	0.020	0.068	4.717	0.102	0.035	0.075	6.780	0.158	0.035	0.079	7.616	0.183	0.036	0.081	7.634
		RFG	**No SFTP**	0.683	0.024	0.061	4.586	0.765	0.042	0.065	6.554	0.765	0.034	0.070	7.832	0.846	0.036	0.072	7.947
			SFTP	0.129	0.019	0.066	4.717	0.100	0.034	0.073	6.780	0.154	0.034	0.077	7.616	0.178	0.035	0.079	7.634

Table F-4
NOx Final Emission Rates: Tier 1 and Later
150 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.731	0.032	0.033	16.989	0.798	0.035	0.040	17.541	0.798	0.031	0.059	17.770	0.863	0.033	0.062	17.680
(0.3 g/mi)			**SFTP**	0.287	0.029	0.034	13.863	0.263	0.029	0.043	16.138	0.306	0.029	0.062	17.871	0.325	0.030	0.064	17.842
		RFG	**No SFTP**	0.712	0.031	0.032	16.788	0.776	0.034	0.039	17.492	0.776	0.030	0.058	17.768	0.840	0.032	0.061	17.679
			SFTP	0.279	0.028	0.033	13.855	0.256	0.028	0.042	16.135	0.298	0.028	0.060	17.869	0.317	0.029	0.063	17.840
	No IM	**Conv**	**No SFTP**	0.731	0.036	0.061	4.163	0.798	0.051	0.063	5.986	0.798	0.045	0.066	7.614	0.863	0.046	0.068	7.763
			SFTP	0.287	0.032	0.064	4.417	0.263	0.044	0.069	6.556	0.306	0.044	0.071	7.383	0.325	0.045	0.073	7.417
		RFG	**No SFTP**	0.712	0.036	0.059	4.169	0.776	0.050	0.062	5.999	0.776	0.043	0.065	7.614	0.840	0.045	0.067	7.762
			SFTP	0.279	0.031	0.063	4.419	0.256	0.043	0.067	6.558	0.298	0.043	0.069	7.385	0.317	0.044	0.072	7.418
LEV	**IM**	**Conv**	**No SFTP**	0.731	0.032	0.033	16.989	0.745	0.039	0.038	4.919	0.745	0.039	0.050	19.689	0.966	0.053	0.053	10.000
			SFTP	0.287	0.029	0.034	13.863	0.362	0.034	0.040	17.027	0.393	0.034	0.054	18.484	0.581	0.047	0.059	19.972
		RFG	**No SFTP**	0.712	0.031	0.032	16.788	0.725	0.038	0.037	3.037	0.725	0.038	0.048	19.645	0.940	0.052	0.052	10.000
			SFTP	0.279	0.028	0.033	13.855	0.353	0.033	0.039	17.005	0.383	0.033	0.052	18.475	0.566	0.046	0.057	19.923
	No IM	**Conv**	**No SFTP**	0.731	0.036	0.061	4.163	0.745	0.055	0.061	4.701	0.745	0.055	0.061	5.405	0.966	0.073	0.069	12.283
			SFTP	0.287	0.032	0.064	4.417	0.362	0.050	0.063	6.125	0.393	0.050	0.064	6.835	0.581	0.066	0.073	4.940
		RFG	**No SFTP**	0.712	0.036	0.059	4.169	0.725	0.054	0.059	4.764	0.725	0.053	0.060	5.471	0.940	0.072	0.067	12.531
			SFTP	0.279	0.031	0.063	4.419	0.353	0.048	0.062	6.132	0.383	0.049	0.063	6.845	0.566	0.065	0.071	5.022
TIER1	**IM**	**Conv**	**No SFTP**	0.613	0.034	0.031	10.990	0.886	0.052	0.043	14.413	0.886	0.051	0.051	10.000	1.246	0.076	0.060	14.056
			SFTP	0.386	0.031	0.031	10.000	0.616	0.047	0.043	12.326	0.616	0.046	0.055	20.612	0.924	0.068	0.065	0.519
		RFG	**No SFTP**	0.597	0.033	0.030	10.947	0.862	0.051	0.042	14.394	0.862	0.050	0.050	10.000	1.213	0.074	0.059	13.988
			SFTP	0.375	0.030	0.030	10.000	0.600	0.045	0.042	12.197	0.600	0.045	0.054	20.544	0.899	0.066	0.066	10.000
	No IM	**Conv**	**No SFTP**	0.613	0.040	0.055	3.611	0.886	0.071	0.068	11.617	0.886	0.071	0.067	12.934	1.246	0.102	0.081	9.187
			SFTP	0.386	0.035	0.055	4.035	0.616	0.065	0.069	3.033	0.616	0.065	0.069	3.677	0.924	0.093	0.085	11.101
		RFG	**No SFTP**	0.597	0.039	0.054	3.624	0.862	0.069	0.066	11.867	0.862	0.069	0.065	13.223	1.213	0.099	0.080	9.207
			SFTP	0.375	0.034	0.054	4.041	0.600	0.063	0.067	3.184	0.600	0.063	0.067	3.832	0.899	0.090	0.083	11.208
TIER2	**IM**	**Conv**	**No SFTP**	0.549	0.019	0.027	13.357	0.615	0.023	0.036	16.101	0.615	0.019	0.057	17.442	0.681	0.021	0.060	17.382
(0.07 g/mi)			**SFTP**	0.104	0.015	0.028	13.185	0.080	0.016	0.039	15.848	0.124	0.017	0.060	17.557	0.143	0.017	0.062	17.545
		RFG	**No SFTP**	0.534	0.018	0.026	13.355	0.599	0.022	0.035	16.098	0.599	0.019	0.056	17.443	0.662	0.021	0.059	17.382
			SFTP	0.101	0.015	0.027	13.185	0.078	0.016	0.038	15.848	0.120	0.016	0.058	17.556	0.139	0.017	0.061	17.545
	No IM	**Conv**	**No SFTP**	0.549	0.020	0.053	4.609	0.615	0.036	0.057	6.593	0.615	0.029	0.061	7.813	0.681	0.031	0.063	7.915
			SFTP	0.104	0.016	0.057	4.723	0.080	0.029	0.062	6.784	0.124	0.029	0.066	7.619	0.143	0.030	0.068	7.635
		RFG	**No SFTP**	0.534	0.020	0.052	4.610	0.599	0.035	0.056	6.595	0.599	0.029	0.060	7.812	0.662	0.030	0.062	7.913
			SFTP	0.101	0.016	0.055	4.724	0.078	0.028	0.061	6.784	0.120	0.028	0.064	7.619	0.139	0.029	0.067	7.635

Table F-5
NOx Final Emission Rates: Tier 1 and Later
100 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.634	0.028	0.030	15.278	0.691	0.031	0.037	17.025	0.691	0.028	0.055	17.741	0.748	0.030	0.058	17.660
(0.3 g/mi)			**SFTP**	0.248	0.025	0.031	13.755	0.228	0.026	0.039	16.105	0.265	0.026	0.057	17.842	0.282	0.026	0.059	17.815
		RFG	**No SFTP**	0.617	0.028	0.030	15.211	0.673	0.031	0.036	16.999	0.673	0.027	0.054	17.739	0.728	0.029	0.056	17.659
			SFTP	0.242	0.025	0.030	13.749	0.221	0.025	0.038	16.103	0.258	0.025	0.055	17.840	0.274	0.026	0.057	17.813
	No IM	**Conv**	**No SFTP**	0.634	0.032	0.056	4.235	0.691	0.046	0.058	6.138	0.691	0.040	0.061	7.618	0.748	0.042	0.063	7.750
			SFTP	0.248	0.028	0.058	4.446	0.228	0.040	0.062	6.579	0.265	0.039	0.065	7.405	0.282	0.040	0.067	7.436
		RFG	**No SFTP**	0.617	0.031	0.055	4.240	0.673	0.045	0.057	6.147	0.673	0.039	0.060	7.619	0.728	0.041	0.062	7.749
			SFTP	0.242	0.028	0.057	4.448	0.221	0.039	0.061	6.580	0.258	0.038	0.063	7.407	0.274	0.039	0.065	7.437
LEV	**IM**	**Conv**	**No SFTP**	0.634	0.028	0.030	15.278	0.702	0.037	0.037	10.000	0.702	0.037	0.049	19.407	0.911	0.051	0.051	10.000
			SFTP	0.248	0.025	0.031	13.755	0.341	0.032	0.039	16.885	0.371	0.033	0.052	18.419	0.548	0.045	0.057	19.659
		RFG	**No SFTP**	0.617	0.028	0.030	15.211	0.684	0.036	0.036	10.000	0.684	0.036	0.048	19.373	0.886	0.050	0.050	10.000
			SFTP	0.242	0.025	0.030	13.749	0.332	0.032	0.038	16.868	0.361	0.032	0.051	18.410	0.533	0.044	0.056	19.621
	No IM	**Conv**	**No SFTP**	0.634	0.032	0.056	4.235	0.702	0.053	0.059	5.086	0.702	0.052	0.060	5.805	0.911	0.070	0.067	14.953
			SFTP	0.248	0.028	0.058	4.446	0.341	0.047	0.061	6.176	0.371	0.048	0.062	6.897	0.548	0.063	0.071	5.436
		RFG	**No SFTP**	0.617	0.031	0.055	4.240	0.684	0.051	0.058	5.129	0.684	0.051	0.058	5.850	0.886	0.068	0.066	15.605
			SFTP	0.242	0.028	0.057	4.448	0.332	0.046	0.060	6.183	0.361	0.046	0.061	6.905	0.533	0.062	0.069	5.492
TIER1	**IM**	**Conv**	**No SFTP**	0.603	0.034	0.031	10.885	0.872	0.051	0.042	14.367	0.872	0.051	0.051	10.000	1.227	0.075	0.060	13.888
			SFTP	0.379	0.030	0.030	10.000	0.607	0.046	0.043	12.000	0.607	0.046	0.055	20.454	0.909	0.067	0.067	10.000
		RFG	**No SFTP**	0.587	0.033	0.030	10.838	0.848	0.050	0.041	14.347	0.848	0.049	0.049	10.000	1.194	0.073	0.059	13.812
			SFTP	0.369	0.029	0.029	10.000	0.590	0.045	0.042	11.843	0.590	0.044	0.054	20.392	0.885	0.065	0.065	10.000
	No IM	**Conv**	**No SFTP**	0.603	0.039	0.055	3.641	0.872	0.070	0.067	12.261	0.872	0.070	0.067	13.679	1.227	0.101	0.081	9.236
			SFTP	0.379	0.035	0.055	4.049	0.607	0.064	0.068	3.375	0.607	0.064	0.069	4.027	0.909	0.092	0.084	11.367
		RFG	**No SFTP**	0.587	0.038	0.053	3.654	0.848	0.069	0.066	12.587	0.848	0.068	0.065	14.060	1.194	0.098	0.079	9.257
			SFTP	0.369	0.034	0.054	4.055	0.590	0.063	0.067	3.502	0.590	0.062	0.067	4.157	0.885	0.089	0.082	11.491
TIER2	**IM**	**Conv**	**No SFTP**	0.475	0.017	0.025	13.332	0.533	0.021	0.033	16.067	0.533	0.017	0.053	17.446	0.590	0.019	0.055	17.390
(0.07 g/mi)			**SFTP**	0.090	0.014	0.025	13.180	0.069	0.015	0.035	15.845	0.107	0.015	0.054	17.554	0.124	0.016	0.056	17.542
		RFG	**No SFTP**	0.463	0.016	0.024	13.330	0.519	0.020	0.032	16.065	0.519	0.017	0.052	17.446	0.574	0.018	0.054	17.390
			SFTP	0.088	0.013	0.025	13.180	0.068	0.014	0.035	15.845	0.104	0.015	0.053	17.553	0.120	0.015	0.055	17.542
	No IM	**Conv**	**No SFTP**	0.475	0.018	0.049	4.623	0.533	0.032	0.052	6.616	0.533	0.027	0.056	7.802	0.590	0.028	0.058	7.895
			SFTP	0.090	0.014	0.051	4.727	0.069	0.026	0.056	6.786	0.107	0.026	0.060	7.620	0.124	0.027	0.062	7.636
		RFG	**No SFTP**	0.463	0.018	0.048	4.624	0.519	0.032	0.051	6.618	0.519	0.026	0.055	7.801	0.574	0.028	0.057	7.894
			SFTP	0.088	0.014	0.050	4.727	0.068	0.025	0.055	6.787	0.104	0.025	0.058	7.620	0.120	0.026	0.060	7.636

Table F-6
NOx Final Emission Rates: Tier 1 and Later
30 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.414	0.020	0.024	13.891	0.451	0.022	0.030	16.358	0.451	0.020	0.045	17.668	0.488	0.021	0.047	17.611
(0.3 g/mi)			**SFTP**	0.162	0.018	0.023	13.519	0.149	0.018	0.031	16.019	0.173	0.018	0.045	17.761	0.184	0.019	0.047	17.740
		RFG	**No SFTP**	0.403	0.020	0.023	13.880	0.439	0.022	0.029	16.352	0.439	0.020	0.044	17.667	0.475	0.021	0.046	17.610
			SFTP	0.158	0.017	0.023	13.516	0.145	0.018	0.030	16.018	0.168	0.018	0.044	17.759	0.179	0.018	0.045	17.739
	No IM	**Conv**	**No SFTP**	0.414	0.023	0.045	4.411	0.451	0.034	0.048	6.428	0.451	0.030	0.050	7.628	0.488	0.031	0.052	7.718
			SFTP	0.162	0.020	0.045	4.528	0.149	0.029	0.049	6.641	0.173	0.029	0.051	7.465	0.184	0.030	0.053	7.488
		RFG	**No SFTP**	0.403	0.022	0.044	4.414	0.439	0.033	0.047	6.432	0.439	0.029	0.049	7.629	0.475	0.030	0.051	7.717
			SFTP	0.158	0.019	0.044	4.529	0.145	0.028	0.047	6.642	0.168	0.028	0.050	7.466	0.179	0.029	0.051	7.489
LEV	**IM**	**Conv**	**No SFTP**	0.414	0.020	0.024	13.891	0.589	0.032	0.035	18.806	0.589	0.032	0.046	18.832	0.764	0.044	0.051	21.764
			SFTP	0.162	0.018	0.023	13.519	0.286	0.028	0.035	16.582	0.311	0.028	0.048	18.252	0.459	0.039	0.054	19.017
		RFG	**No SFTP**	0.403	0.020	0.023	13.880	0.573	0.031	0.034	18.677	0.573	0.031	0.045	18.814	0.743	0.043	0.049	21.618
			SFTP	0.158	0.017	0.023	13.516	0.279	0.027	0.034	16.572	0.302	0.028	0.047	18.246	0.447	0.038	0.053	18.996
	No IM	**Conv**	**No SFTP**	0.414	0.023	0.045	4.411	0.589	0.046	0.055	5.744	0.589	0.046	0.056	6.493	0.764	0.061	0.061	10.000
			SFTP	0.162	0.020	0.045	4.528	0.286	0.042	0.056	6.304	0.311	0.042	0.057	7.050	0.459	0.055	0.065	6.277
		RFG	**No SFTP**	0.403	0.022	0.044	4.414	0.573	0.045	0.054	5.763	0.573	0.045	0.055	6.513	0.743	0.060	0.062	0.457
			SFTP	0.158	0.019	0.044	4.529	0.279	0.041	0.055	6.309	0.302	0.041	0.056	7.056	0.447	0.054	0.064	6.300
TIER1	**IM**	**Conv**	**No SFTP**	0.590	0.033	0.031	10.717	0.852	0.050	0.042	14.296	0.852	0.050	0.050	10.000	1.200	0.073	0.060	13.617
			SFTP	0.371	0.030	0.030	10.000	0.593	0.045	0.043	11.411	0.593	0.045	0.055	20.255	0.889	0.066	0.066	10.000
		RFG	**No SFTP**	0.574	0.032	0.030	10.661	0.829	0.049	0.041	14.274	0.829	0.048	0.048	10.000	1.167	0.071	0.059	13.528
			SFTP	0.361	0.029	0.029	10.000	0.577	0.044	0.042	11.198	0.577	0.044	0.054	20.200	0.865	0.064	0.064	10.000
	No IM	**Conv**	**No SFTP**	0.590	0.038	0.054	3.683	0.852	0.069	0.067	13.551	0.852	0.069	0.066	15.196	1.200	0.099	0.081	9.311
			SFTP	0.371	0.034	0.054	4.068	0.593	0.063	0.068	3.769	0.593	0.063	0.068	4.431	0.889	0.090	0.084	11.825
		RFG	**No SFTP**	0.574	0.037	0.053	3.694	0.829	0.067	0.065	14.064	0.829	0.067	0.065	15.807	1.167	0.096	0.079	9.335
			SFTP	0.361	0.033	0.053	4.073	0.577	0.062	0.066	3.870	0.577	0.061	0.066	4.535	0.865	0.088	0.082	11.984
TIER2	**IM**	**Conv**	**No SFTP**	0.311	0.012	0.019	13.267	0.348	0.015	0.027	15.984	0.348	0.013	0.042	17.457	0.385	0.014	0.045	17.413
(0.07 g/mi)			**SFTP**	0.059	0.010	0.019	13.166	0.045	0.011	0.027	15.836	0.070	0.011	0.042	17.544	0.081	0.012	0.044	17.534
		RFG	**No SFTP**	0.302	0.012	0.019	13.266	0.339	0.015	0.026	15.983	0.339	0.013	0.041	17.457	0.375	0.014	0.043	17.413
			SFTP	0.057	0.010	0.019	13.165	0.044	0.011	0.026	15.836	0.068	0.011	0.041	17.544	0.079	0.011	0.042	17.534
	No IM	**Conv**	**No SFTP**	0.311	0.013	0.039	4.664	0.348	0.024	0.042	6.676	0.348	0.021	0.045	7.769	0.385	0.022	0.047	7.839
			SFTP	0.059	0.010	0.039	4.740	0.045	0.020	0.043	6.795	0.070	0.019	0.046	7.625	0.081	0.020	0.048	7.638
		RFG	**No SFTP**	0.302	0.013	0.038	4.664	0.339	0.024	0.041	6.677	0.339	0.020	0.044	7.768	0.375	0.021	0.046	7.839
			SFTP	0.057	0.010	0.038	4.740	0.044	0.019	0.042	6.795	0.068	0.019	0.045	7.625	0.079	0.020	0.046	7.638

Table F-7
NMHC Final Emission Rates: Model Years 1981 through 1993

			330 ppm				300 ppm				150 ppm				100 ppm				30 ppm			
			LDV		LDT		LDV		LDT		LDV		LDT		LDV		LDT		LDV		LDT	
Year	Fuel	IM	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR
1981	Conv	IM	0.701	0.046	1.379	0.051	0.699	0.047	1.372	0.052	0.684	0.047	1.318	0.053	0.676	0.047	1.288	0.054	0.655	0.048	1.201	0.057
		No IM	0.889	0.095	1.374	0.122	0.886	0.095	1.366	0.123	0.867	0.095	1.303	0.124	0.857	0.095	1.267	0.125	0.829	0.096	1.163	0.128
	RFG	IM	0.607	0.040	1.194	0.045	0.605	0.040	1.187	0.045	0.592	0.040	1.141	0.046	0.585	0.041	1.114	0.047	0.567	0.041	1.039	0.050
		No IM	0.769	0.082	1.189	0.106	0.767	0.082	1.182	0.106	0.750	0.082	1.128	0.107	0.741	0.082	1.096	0.108	0.717	0.083	1.007	0.111
1982	Conv	IM	0.694	0.046	1.379	0.051	0.692	0.046	1.372	0.052	0.677	0.047	1.318	0.053	0.669	0.047	1.288	0.054	0.648	0.048	1.201	0.057
		No IM	0.882	0.094	1.374	0.122	0.879	0.094	1.366	0.123	0.860	0.094	1.303	0.124	0.850	0.094	1.267	0.125	0.822	0.095	1.163	0.128
	RFG	IM	0.601	0.040	1.194	0.045	0.599	0.040	1.187	0.045	0.586	0.040	1.141	0.046	0.579	0.040	1.114	0.047	0.561	0.041	1.039	0.050
		No IM	0.763	0.081	1.189	0.106	0.761	0.081	1.182	0.106	0.744	0.081	1.128	0.107	0.736	0.082	1.096	0.108	0.712	0.082	1.007	0.111
1983	Conv	IM	0.348	0.046	1.377	0.051	0.345	0.046	1.370	0.052	0.331	0.047	1.316	0.053	0.322	0.047	1.286	0.054	0.297	0.047	1.199	0.057
		No IM	0.283	0.087	1.373	0.122	0.280	0.087	1.364	0.122	0.263	0.086	1.301	0.124	0.253	0.087	1.265	0.125	0.225	0.087	1.162	0.128
	RFG	IM	0.301	0.040	1.192	0.045	0.299	0.040	1.185	0.045	0.286	0.040	1.139	0.046	0.279	0.040	1.113	0.047	0.257	0.041	1.038	0.050
		No IM	0.245	0.075	1.188	0.106	0.243	0.075	1.180	0.106	0.228	0.075	1.126	0.107	0.219	0.075	1.095	0.108	0.194	0.075	1.005	0.111
1984	Conv	IM	0.354	0.044	0.544	0.045	0.352	0.044	0.540	0.045	0.338	0.044	0.510	0.046	0.329	0.044	0.492	0.046	0.305	0.045	0.442	0.048
		No IM	0.301	0.082	0.535	0.084	0.299	0.082	0.530	0.084	0.282	0.082	0.494	0.085	0.272	0.082	0.472	0.085	0.244	0.083	0.411	0.087
	RFG	IM	0.307	0.038	0.471	0.039	0.305	0.038	0.467	0.039	0.292	0.038	0.441	0.040	0.285	0.038	0.426	0.040	0.264	0.039	0.383	0.041
		No IM	0.260	0.071	0.463	0.073	0.258	0.071	0.458	0.073	0.244	0.071	0.427	0.073	0.235	0.071	0.409	0.074	0.211	0.071	0.356	0.075
1985	Conv	IM	0.361	0.041	0.536	0.045	0.359	0.041	0.532	0.045	0.345	0.042	0.503	0.046	0.336	0.042	0.486	0.046	0.313	0.042	0.437	0.048
		No IM	0.319	0.078	0.526	0.085	0.317	0.077	0.521	0.085	0.300	0.077	0.486	0.085	0.291	0.077	0.465	0.086	0.263	0.078	0.405	0.087
	RFG	IM	0.313	0.036	0.464	0.039	0.311	0.036	0.461	0.039	0.298	0.036	0.435	0.040	0.291	0.036	0.421	0.040	0.271	0.037	0.379	0.041
		No IM	0.276	0.067	0.455	0.073	0.274	0.067	0.451	0.073	0.260	0.067	0.421	0.074	0.252	0.067	0.403	0.074	0.228	0.067	0.351	0.075
1986	Conv	IM	0.360	0.034	0.515	0.046	0.359	0.034	0.511	0.046	0.346	0.034	0.484	0.047	0.338	0.034	0.468	0.047	0.318	0.034	0.423	0.049
		No IM	0.356	0.063	0.502	0.086	0.354	0.063	0.497	0.086	0.339	0.062	0.464	0.086	0.331	0.062	0.445	0.087	0.307	0.062	0.389	0.088
	RFG	IM	0.312	0.030	0.446	0.040	0.310	0.030	0.442	0.040	0.299	0.030	0.419	0.041	0.293	0.030	0.405	0.041	0.275	0.030	0.366	0.042
		No IM	0.308	0.054	0.434	0.074	0.306	0.054	0.430	0.074	0.294	0.054	0.402	0.075	0.286	0.054	0.385	0.075	0.265	0.054	0.337	0.076
1987	Conv	IM	0.367	0.034	0.496	0.047	0.365	0.034	0.493	0.047	0.352	0.034	0.467	0.048	0.344	0.034	0.453	0.048	0.324	0.034	0.410	0.049
		No IM	0.364	0.062	0.480	0.087	0.362	0.062	0.476	0.087	0.347	0.062	0.445	0.087	0.339	0.062	0.427	0.088	0.314	0.061	0.375	0.089
	RFG	IM	0.317	0.029	0.429	0.041	0.316	0.029	0.426	0.041	0.304	0.029	0.404	0.041	0.298	0.029	0.392	0.042	0.280	0.029	0.355	0.043
		No IM	0.315	0.054	0.415	0.075	0.313	0.054	0.412	0.075	0.300	0.053	0.385	0.076	0.293	0.053	0.370	0.076	0.272	0.053	0.325	0.077
1988	Conv	IM	0.247	0.030	0.360	0.038	0.246	0.030	0.358	0.038	0.237	0.030	0.343	0.037	0.232	0.029	0.334	0.037	0.217	0.029	0.309	0.037
		No IM	0.253	0.048	0.376	0.061	0.252	0.048	0.374	0.061	0.241	0.047	0.356	0.060	0.235	0.047	0.346	0.060	0.219	0.046	0.317	0.059
	RFG	IM	0.214	0.026	0.311	0.033	0.213	0.026	0.310	0.033	0.205	0.026	0.296	0.032	0.201	0.025	0.289	0.032	0.188	0.025	0.267	0.032
		No IM	0.219	0.041	0.325	0.053	0.218	0.041	0.323	0.052	0.209	0.041	0.308	0.052	0.204	0.040	0.299	0.052	0.189	0.040	0.274	0.051
1989	Conv	IM	0.254	0.031	0.352	0.036	0.252	0.031	0.350	0.036	0.243	0.030	0.335	0.036	0.238	0.030	0.327	0.035	0.222	0.030	0.304	0.035
		No IM	0.255	0.049	0.367	0.058	0.254	0.049	0.365	0.058	0.243	0.049	0.348	0.057	0.237	0.049	0.339	0.057	0.220	0.048	0.312	0.056
	RFG	IM	0.219	0.027	0.304	0.031	0.218	0.026	0.303	0.031	0.210	0.026	0.290	0.031	0.206	0.026	0.283	0.031	0.192	0.026	0.263	0.030
		No IM	0.221	0.043	0.318	0.050	0.219	0.043	0.316	0.050	0.210	0.042	0.301	0.049	0.205	0.042	0.293	0.049	0.190	0.042	0.270	0.048
1990	Conv	IM	0.251	0.030	0.344	0.036	0.250	0.030	0.342	0.036	0.241	0.030	0.328	0.035	0.235	0.030	0.320	0.035	0.220	0.029	0.298	0.035
		No IM	0.252	0.048	0.360	0.057	0.251	0.048	0.358	0.057	0.240	0.048	0.342	0.056	0.234	0.047	0.333	0.056	0.217	0.047	0.308	0.055
	RFG	IM	0.217	0.026	0.297	0.031	0.216	0.026	0.296	0.031	0.208	0.026	0.284	0.031	0.204	0.026	0.277	0.030	0.190	0.025	0.258	0.030
		No IM	0.218	0.042	0.312	0.049	0.217	0.042	0.310	0.049	0.208	0.041	0.296	0.048	0.203	0.041	0.288	0.048	0.188	0.041	0.266	0.047
1991	Conv	IM	0.250	0.030	0.334	0.037	0.248	0.030	0.332	0.037	0.239	0.030	0.319	0.036	0.234	0.029	0.312	0.036	0.219	0.029	0.290	0.035
		No IM	0.251	0.048	0.353	0.057	0.250	0.048	0.351	0.057	0.239	0.047	0.336	0.056	0.233	0.047	0.328	0.056	0.216	0.046	0.303	0.055
	RFG	IM	0.216	0.026	0.289	0.032	0.215	0.026	0.287	0.032	0.207	0.026	0.276	0.031	0.202	0.026	0.270	0.031	0.189	0.025	0.251	0.030
		No IM	0.218	0.041	0.306	0.050	0.216	0.041	0.304	0.049	0.207	0.041	0.291	0.049	0.202	0.041	0.284	0.048	0.187	0.040	0.262	0.047
1992	Conv	IM	0.254	0.030	0.339	0.034	0.252	0.030	0.337	0.034	0.243	0.030	0.324	0.034	0.237	0.030	0.317	0.034	0.222	0.030	0.296	0.033
		No IM	0.253	0.049	0.354	0.055	0.251	0.049	0.352	0.055	0.240	0.048	0.338	0.054	0.234	0.048	0.329	0.053	0.216	0.048	0.305	0.052
	RFG	IM	0.220	0.026	0.293	0.030	0.218	0.026	0.292	0.030	0.210	0.026	0.281	0.029	0.205	0.026	0.274	0.029	0.192	0.026	0.256	0.029
		No IM	0.219	0.042	0.307	0.047	0.217	0.042	0.305	0.047	0.208	0.042	0.292	0.047	0.203	0.042	0.285	0.046	0.187	0.041	0.264	0.045
1993	Conv	IM	0.253	0.030	0.338	0.034	0.252	0.030	0.336	0.034	0.242	0.030	0.323	0.033	0.237	0.030	0.316	0.033	0.221	0.030	0.295	0.033
		No IM	0.252	0.049	0.353	0.054	0.251	0.049	0.351	0.054	0.240	0.048	0.336	0.053	0.234	0.048	0.328	0.053	0.216	0.047	0.304	0.052
	RFG	IM	0.219	0.026	0.292	0.029	0.218	0.026	0.291	0.029	0.210	0.026	0.279	0.029	0.205	0.026	0.273	0.029	0.192	0.026	0.255	0.028
		No IM	0.218	0.042	0.305	0.047	0.217	0.042	0.303	0.047	0.208	0.042	0.291	0.046	0.202	0.041	0.284	0.046	0.187	0.041	0.263	0.045

Table F-8
HC* Final Emission Rates: Tier 1 and Later
330 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.129	0.013	0.014	14.807	0.130	0.013	0.015	17.536	0.133	0.013	0.015	17.817	0.135	0.013	0.015	17.816
(0.09 g/mi)			**SFTP**	0.057	0.012	0.014	14.421	0.056	0.012	0.014	17.018	0.061	0.013	0.015	17.797	0.062	0.013	0.015	17.794
		RFG	**No SFTP**	0.110	0.011	0.012	14.892	0.111	0.011	0.013	17.628	0.114	0.011	0.013	17.865	0.116	0.011	0.013	17.863
			SFTP	0.049	0.010	0.012	14.478	0.048	0.011	0.012	17.073	0.052	0.011	0.013	17.843	0.053	0.011	0.013	17.839
	No IM	**Conv**	**No SFTP**	0.129	0.009	0.034	3.707	0.130	0.017	0.034	4.909	0.133	0.017	0.035	5.530	0.135	0.017	0.035	5.531
			SFTP	0.057	0.009	0.034	3.738	0.056	0.016	0.034	4.974	0.061	0.017	0.035	5.532	0.062	0.017	0.035	5.533
		RFG	**No SFTP**	0.110	0.008	0.029	3.701	0.111	0.014	0.029	4.900	0.114	0.014	0.029	5.520	0.116	0.014	0.029	5.521
			SFTP	0.049	0.008	0.029	3.733	0.048	0.014	0.029	4.966	0.052	0.014	0.030	5.523	0.053	0.014	0.030	5.524
LEV	**IM**	**Conv**	**No SFTP**	0.129	0.013	0.014	14.807	0.131	0.014	0.016	18.257	0.169	0.020	0.020	10.000	0.192	0.023	0.021	10.310
			SFTP	0.057	0.012	0.014	14.421	0.065	0.014	0.016	17.635	0.105	0.019	0.019	10.000	0.127	0.022	0.021	6.703
		RFG	**No SFTP**	0.110	0.011	0.012	14.892	0.112	0.012	0.013	18.411	0.145	0.017	0.017	10.000	0.164	0.019	0.018	10.748
			SFTP	0.049	0.010	0.012	14.478	0.056	0.012	0.013	17.730	0.090	0.016	0.016	10.000	0.109	0.018	0.018	7.795
	No IM	**Conv**	**No SFTP**	0.129	0.009	0.034	3.707	0.131	0.018	0.036	4.846	0.169	0.024	0.041	4.907	0.192	0.027	0.044	4.609
			SFTP	0.057	0.009	0.034	3.738	0.065	0.018	0.036	4.899	0.105	0.023	0.041	5.020	0.127	0.026	0.044	4.758
		RFG	**No SFTP**	0.110	0.008	0.029	3.701	0.112	0.015	0.031	4.835	0.145	0.020	0.035	4.881	0.164	0.023	0.037	4.573
			SFTP	0.049	0.008	0.029	3.733	0.056	0.015	0.031	4.890	0.090	0.020	0.035	4.998	0.109	0.022	0.037	4.728
TIER1	**IM**	**Conv**	**No SFTP**	0.193	0.023	0.021	9.184	0.230	0.028	0.024	12.780	0.230	0.028	0.024	13.854	0.268	0.033	0.027	14.248
			SFTP	0.141	0.023	0.021	8.763	0.177	0.028	0.024	12.596	0.177	0.027	0.023	13.665	0.213	0.032	0.026	14.131
		RFG	**No SFTP**	0.165	0.020	0.018	9.297	0.197	0.024	0.021	12.835	0.197	0.024	0.020	13.910	0.229	0.028	0.023	14.284
			SFTP	0.120	0.019	0.018	8.905	0.151	0.023	0.020	12.659	0.151	0.023	0.020	13.730	0.182	0.028	0.022	14.172
	No IM	**Conv**	**No SFTP**	0.193	0.019	0.042	3.112	0.230	0.032	0.046	3.405	0.230	0.033	0.046	3.538	0.268	0.038	0.051	2.794
			SFTP	0.141	0.019	0.042	3.168	0.177	0.031	0.046	3.554	0.177	0.032	0.046	3.738	0.213	0.037	0.050	3.084
		RFG	**No SFTP**	0.165	0.017	0.035	3.094	0.197	0.027	0.039	3.351	0.197	0.028	0.039	3.465	0.229	0.032	0.043	2.684
			SFTP	0.120	0.016	0.035	3.151	0.151	0.027	0.039	3.508	0.151	0.027	0.039	3.676	0.182	0.032	0.043	2.992

***NMHC for Tier 1, NMOG for LEV and lower**

Table F-9
HC* Final Emission Rates: Tier 1 and Later
300 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.127	0.013	0.014	14.735	0.128	0.013	0.015	17.457	0.132	0.013	0.015	17.776	0.134	0.013	0.015	17.775
(0.09 g/mi)			**SFTP**	0.056	0.012	0.014	14.373	0.055	0.012	0.014	16.971	0.060	0.012	0.015	17.758	0.062	0.012	0.015	17.755
		RFG	**No SFTP**	0.109	0.011	0.012	14.815	0.110	0.011	0.012	17.544	0.113	0.011	0.013	17.822	0.114	0.011	0.013	17.820
			SFTP	0.048	0.010	0.012	14.427	0.047	0.011	0.012	17.023	0.051	0.011	0.013	17.802	0.053	0.011	0.013	17.798
	No IM	**Conv**	**No SFTP**	0.127	0.009	0.034	3.713	0.128	0.017	0.034	4.918	0.132	0.017	0.035	5.539	0.134	0.017	0.035	5.540
			SFTP	0.056	0.009	0.034	3.743	0.055	0.016	0.034	4.980	0.060	0.017	0.035	5.541	0.062	0.017	0.035	5.541
		RFG	**No SFTP**	0.109	0.008	0.029	3.707	0.110	0.014	0.029	4.909	0.113	0.014	0.029	5.529	0.114	0.014	0.029	5.530
			SFTP	0.048	0.007	0.029	3.738	0.047	0.014	0.029	4.973	0.051	0.014	0.029	5.531	0.053	0.014	0.030	5.532
LEV	**IM**	**Conv**	**No SFTP**	0.127	0.013	0.014	14.735	0.130	0.014	0.016	18.178	0.168	0.019	0.019	10.000	0.190	0.022	0.021	10.035
			SFTP	0.056	0.012	0.014	14.373	0.065	0.014	0.015	17.585	0.104	0.019	0.019	10.000	0.126	0.021	0.021	5.967
		RFG	**No SFTP**	0.109	0.011	0.012	14.815	0.111	0.012	0.013	18.324	0.144	0.017	0.017	10.000	0.163	0.019	0.018	10.515
			SFTP	0.048	0.010	0.012	14.427	0.055	0.012	0.013	17.677	0.089	0.016	0.016	10.000	0.108	0.018	0.018	7.228
	No IM	**Conv**	**No SFTP**	0.127	0.009	0.034	3.713	0.130	0.018	0.036	4.852	0.168	0.024	0.041	4.921	0.190	0.027	0.044	4.628
			SFTP	0.056	0.009	0.034	3.743	0.065	0.017	0.036	4.904	0.104	0.023	0.041	5.032	0.126	0.026	0.044	4.774
		RFG	**No SFTP**	0.109	0.008	0.029	3.707	0.111	0.015	0.031	4.841	0.144	0.020	0.035	4.895	0.163	0.023	0.037	4.593
			SFTP	0.048	0.007	0.029	3.738	0.055	0.015	0.030	4.895	0.089	0.020	0.035	5.010	0.108	0.022	0.037	4.745
TIER1	**IM**	**Conv**	**No SFTP**	0.189	0.023	0.021	8.972	0.226	0.028	0.024	12.682	0.226	0.028	0.024	13.752	0.263	0.033	0.027	14.182
			SFTP	0.138	0.022	0.021	8.494	0.173	0.027	0.024	12.481	0.173	0.027	0.023	13.545	0.209	0.032	0.026	14.058
		RFG	**No SFTP**	0.161	0.020	0.018	9.101	0.193	0.024	0.020	12.741	0.193	0.024	0.020	13.813	0.225	0.028	0.023	14.222
			SFTP	0.118	0.019	0.018	8.658	0.148	0.023	0.020	12.550	0.148	0.023	0.020	13.617	0.179	0.027	0.022	14.102
	No IM	**Conv**	**No SFTP**	0.189	0.019	0.042	3.143	0.226	0.032	0.046	3.491	0.226	0.032	0.046	3.654	0.263	0.038	0.051	2.967
			SFTP	0.138	0.018	0.042	3.195	0.173	0.031	0.046	3.629	0.173	0.032	0.046	3.838	0.209	0.037	0.050	3.230
		RFG	**No SFTP**	0.161	0.016	0.035	3.125	0.193	0.027	0.039	3.440	0.193	0.027	0.039	3.586	0.225	0.032	0.043	2.866
			SFTP	0.118	0.016	0.035	3.179	0.148	0.026	0.039	3.585	0.148	0.027	0.039	3.780	0.179	0.031	0.043	3.145

***NMHC for Tier 1, NMOG for LEV and lower**

Table F-10
HC* Final Emission Rates: Tier 1 and Later
150 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.116	0.012	0.014	14.310	0.117	0.012	0.014	17.000	0.120	0.012	0.015	17.523	0.122	0.012	0.015	17.523
(0.09 g/mi)			**SFTP**	0.051	0.012	0.014	14.073	0.051	0.012	0.014	16.681	0.055	0.012	0.015	17.514	0.057	0.012	0.015	17.511
		RFG	**No SFTP**	0.099	0.010	0.012	14.362	0.100	0.011	0.012	17.056	0.103	0.010	0.013	17.555	0.104	0.010	0.013	17.555
			SFTP	0.044	0.010	0.011	14.112	0.043	0.010	0.012	16.718	0.047	0.010	0.012	17.545	0.048	0.010	0.013	17.543
	No IM	**Conv**	**No SFTP**	0.116	0.009	0.034	3.749	0.117	0.016	0.034	4.976	0.120	0.016	0.035	5.599	0.122	0.016	0.035	5.600
			SFTP	0.051	0.008	0.033	3.774	0.051	0.015	0.034	5.029	0.055	0.016	0.035	5.598	0.057	0.016	0.035	5.598
		RFG	**No SFTP**	0.099	0.007	0.028	3.744	0.100	0.014	0.029	4.968	0.103	0.014	0.029	5.591	0.104	0.014	0.029	5.591
			SFTP	0.044	0.007	0.028	3.770	0.043	0.013	0.029	5.022	0.047	0.014	0.029	5.590	0.048	0.014	0.029	5.590
LEV	**IM**	**Conv**	**No SFTP**	0.116	0.012	0.014	14.310	0.122	0.014	0.016	17.684	0.158	0.019	0.019	10.000	0.179	0.022	0.021	6.561
			SFTP	0.051	0.012	0.014	14.073	0.061	0.013	0.015	17.262	0.098	0.018	0.018	10.000	0.119	0.021	0.021	10.000
		RFG	**No SFTP**	0.099	0.010	0.012	14.362	0.105	0.012	0.013	17.787	0.135	0.016	0.016	10.000	0.153	0.018	0.018	7.713
			SFTP	0.044	0.010	0.011	14.112	0.052	0.011	0.013	17.331	0.084	0.015	0.015	10.000	0.102	0.018	0.018	10.000
	No IM	**Conv**	**No SFTP**	0.116	0.009	0.034	3.749	0.122	0.018	0.036	4.894	0.158	0.023	0.041	5.020	0.179	0.026	0.044	4.762
			SFTP	0.051	0.008	0.033	3.774	0.061	0.017	0.036	4.941	0.098	0.022	0.041	5.116	0.119	0.025	0.043	4.887
		RFG	**No SFTP**	0.099	0.007	0.028	3.744	0.105	0.015	0.031	4.884	0.135	0.020	0.035	4.997	0.153	0.022	0.037	4.732
			SFTP	0.044	0.007	0.028	3.770	0.052	0.014	0.030	4.932	0.084	0.019	0.034	5.096	0.102	0.021	0.037	4.861
TIER1	**IM**	**Conv**	**No SFTP**	0.170	0.021	0.020	7.246	0.203	0.026	0.023	12.005	0.203	0.026	0.023	13.037	0.237	0.030	0.026	13.758
			SFTP	0.124	0.021	0.020	6.142	0.156	0.025	0.023	11.677	0.156	0.025	0.023	12.685	0.188	0.030	0.025	13.572
		RFG	**No SFTP**	0.146	0.018	0.017	7.540	0.174	0.022	0.020	12.106	0.174	0.022	0.019	13.146	0.202	0.026	0.022	13.819
			SFTP	0.106	0.018	0.017	6.564	0.134	0.021	0.019	11.800	0.134	0.021	0.019	12.819	0.161	0.025	0.022	13.642
	No IM	**Conv**	**No SFTP**	0.170	0.017	0.041	3.276	0.203	0.030	0.046	3.848	0.203	0.030	0.046	4.128	0.237	0.035	0.050	3.648
			SFTP	0.124	0.017	0.041	3.316	0.156	0.029	0.046	3.944	0.156	0.030	0.046	4.253	0.188	0.035	0.050	3.817
		RFG	**No SFTP**	0.146	0.015	0.035	3.262	0.174	0.025	0.039	3.811	0.174	0.026	0.039	4.079	0.202	0.030	0.042	3.580
			SFTP	0.106	0.014	0.035	3.303	0.134	0.025	0.039	3.911	0.134	0.025	0.039	4.210	0.161	0.029	0.042	3.758

***NMHC for Tier 1, NMOG for LEV and lower**

Table F-11
HC* Final Emission Rates: Tier 1 and Later
100 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.110	0.012	0.014	14.123	0.111	0.012	0.014	16.802	0.114	0.012	0.015	17.405	0.115	0.012	0.015	17.405
(0.09 g/mi)			**SFTP**	0.049	0.011	0.013	13.935	0.048	0.012	0.014	16.547	0.052	0.012	0.015	17.400	0.054	0.012	0.015	17.397
		RFG	**No SFTP**	0.094	0.010	0.012	14.165	0.095	0.010	0.012	16.847	0.097	0.010	0.013	17.432	0.099	0.010	0.013	17.432
			SFTP	0.042	0.010	0.011	13.967	0.041	0.010	0.012	16.578	0.045	0.010	0.012	17.426	0.046	0.010	0.012	17.424
	No IM	**Conv**	**No SFTP**	0.110	0.008	0.034	3.769	0.111	0.016	0.034	5.008	0.114	0.016	0.035	5.631	0.115	0.016	0.035	5.632
			SFTP	0.049	0.008	0.033	3.791	0.048	0.015	0.034	5.055	0.052	0.016	0.035	5.628	0.054	0.016	0.035	5.629
		RFG	**No SFTP**	0.094	0.007	0.028	3.764	0.095	0.013	0.029	5.000	0.097	0.013	0.029	5.623	0.099	0.013	0.029	5.624
			SFTP	0.042	0.007	0.028	3.787	0.041	0.013	0.029	5.049	0.045	0.013	0.029	5.621	0.046	0.013	0.029	5.622
LEV	**IM**	**Conv**	**No SFTP**	0.110	0.012	0.014	14.123	0.118	0.014	0.015	17.453	0.153	0.018	0.018	10.000	0.173	0.021	0.021	1.336
			SFTP	0.049	0.011	0.013	13.935	0.059	0.013	0.015	17.102	0.095	0.018	0.018	10.000	0.115	0.020	0.020	10.000
		RFG	**No SFTP**	0.094	0.010	0.012	14.165	0.101	0.012	0.013	17.538	0.131	0.016	0.016	10.000	0.148	0.018	0.017	3.945
			SFTP	0.042	0.010	0.011	13.967	0.051	0.011	0.013	17.161	0.081	0.015	0.015	10.000	0.098	0.017	0.017	10.000
	No IM	**Conv**	**No SFTP**	0.110	0.008	0.034	3.769	0.118	0.017	0.036	4.918	0.153	0.023	0.041	5.074	0.173	0.026	0.044	4.836
			SFTP	0.049	0.008	0.033	3.791	0.059	0.017	0.036	4.962	0.095	0.022	0.041	5.162	0.115	0.025	0.043	4.949
		RFG	**No SFTP**	0.094	0.007	0.028	3.764	0.101	0.015	0.031	4.909	0.131	0.019	0.035	5.053	0.148	0.022	0.037	4.808
			SFTP	0.042	0.007	0.028	3.787	0.051	0.014	0.030	4.954	0.081	0.019	0.034	5.145	0.098	0.021	0.036	4.925
TIER1	**IM**	**Conv**	**No SFTP**	0.164	0.021	0.020	6.185	0.196	0.025	0.023	11.677	0.196	0.025	0.023	12.681	0.228	0.030	0.025	13.565
			SFTP	0.120	0.020	0.020	4.537	0.151	0.025	0.023	11.274	0.151	0.025	0.022	12.241	0.182	0.029	0.025	13.347
		RFG	**No SFTP**	0.141	0.018	0.017	6.610	0.168	0.022	0.019	11.802	0.168	0.021	0.019	12.817	0.195	0.025	0.022	13.637
			SFTP	0.103	0.017	0.017	5.196	0.129	0.021	0.019	11.429	0.129	0.021	0.019	12.413	0.156	0.025	0.021	13.432
	No IM	**Conv**	**No SFTP**	0.164	0.017	0.041	3.315	0.196	0.029	0.046	3.945	0.196	0.030	0.046	4.255	0.228	0.035	0.050	3.824
			SFTP	0.120	0.016	0.041	3.351	0.151	0.029	0.045	4.032	0.151	0.029	0.045	4.366	0.182	0.034	0.050	3.972
		RFG	**No SFTP**	0.141	0.014	0.035	3.301	0.168	0.025	0.039	3.912	0.168	0.025	0.039	4.211	0.195	0.029	0.042	3.763
			SFTP	0.103	0.014	0.035	3.339	0.129	0.024	0.038	4.002	0.129	0.025	0.038	4.327	0.156	0.029	0.042	3.919

***NMHC for Tier 1, NMOG for LEV and lower**

Table F-12
HC* Final Emission Rates: Tier 1 and Later
30 ppm Sulfur

				LDV/T1				LDT2				LDT3				LDT4			
Standard	**IM**	**Fuel**	**SFTP**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**	**ZML**	**DR1**	**DR2**	**FLEX**
LDV LEV	**IM**	**Conv**	**No SFTP**	0.094	0.011	0.013	13.737	0.095	0.011	0.014	16.396	0.097	0.011	0.015	17.147	0.099	0.011	0.015	17.148
(0.09 g/mi)			**SFTP**	0.042	0.010	0.013	13.633	0.042	0.011	0.014	16.252	0.045	0.011	0.014	17.147	0.046	0.011	0.014	17.145
		RFG	**No SFTP**	0.080	0.009	0.011	13.761	0.081	0.010	0.012	16.421	0.083	0.009	0.012	17.163	0.084	0.010	0.013	17.164
			SFTP	0.036	0.009	0.011	13.652	0.036	0.009	0.012	16.272	0.039	0.009	0.012	17.163	0.040	0.009	0.012	17.162
	No IM	**Conv**	**No SFTP**	0.094	0.007	0.034	3.819	0.095	0.015	0.034	5.088	0.097	0.015	0.035	5.713	0.099	0.015	0.035	5.714
			SFTP	0.042	0.007	0.033	3.836	0.042	0.014	0.034	5.122	0.045	0.015	0.034	5.708	0.046	0.015	0.035	5.709
		RFG	**No SFTP**	0.080	0.006	0.028	3.816	0.081	0.013	0.029	5.082	0.083	0.013	0.029	5.707	0.084	0.013	0.029	5.708
			SFTP	0.036	0.006	0.028	3.833	0.036	0.012	0.028	5.118	0.039	0.013	0.029	5.702	0.040	0.013	0.029	5.703
LEV	**IM**	**Conv**	**No SFTP**	0.094	0.011	0.013	13.737	0.107	0.013	0.015	16.947	0.138	0.017	0.019	21.102	0.156	0.020	0.020	10.000
			SFTP	0.042	0.010	0.013	13.633	0.054	0.012	0.015	16.733	0.086	0.017	0.018	19.839	0.104	0.019	0.019	10.000
		RFG	**No SFTP**	0.080	0.009	0.011	13.761	0.091	0.011	0.013	16.999	0.118	0.015	0.016	21.518	0.134	0.017	0.017	10.000
			SFTP	0.036	0.009	0.011	13.652	0.046	0.011	0.013	16.773	0.073	0.014	0.015	20.062	0.089	0.016	0.016	10.000
	No IM	**Conv**	**No SFTP**	0.094	0.007	0.034	3.819	0.107	0.017	0.036	4.984	0.138	0.022	0.041	5.219	0.156	0.025	0.044	5.027
			SFTP	0.042	0.007	0.033	3.836	0.054	0.016	0.036	5.019	0.086	0.021	0.040	5.288	0.104	0.024	0.043	5.114
		RFG	**No SFTP**	0.080	0.006	0.028	3.816	0.091	0.014	0.030	4.976	0.118	0.019	0.035	5.203	0.134	0.021	0.037	5.005
			SFTP	0.036	0.006	0.028	3.833	0.046	0.014	0.030	5.012	0.073	0.018	0.034	5.273	0.089	0.020	0.036	5.095
TIER1	**IM**	**Conv**	**No SFTP**	0.157	0.020	0.020	3.638	0.187	0.024	0.022	11.068	0.187	0.024	0.022	12.005	0.218	0.029	0.025	13.228
			SFTP	0.115	0.020	0.019	0.067	0.144	0.024	0.022	10.504	0.144	0.024	0.022	11.366	0.173	0.028	0.025	12.948
		RFG	**No SFTP**	0.134	0.017	0.017	4.467	0.160	0.021	0.019	11.244	0.160	0.021	0.019	12.202	0.186	0.024	0.021	13.322
			SFTP	0.098	0.017	0.016	1.629	0.123	0.020	0.019	10.729	0.123	0.020	0.019	11.625	0.148	0.024	0.021	13.060
	No IM	**Conv**	**No SFTP**	0.157	0.016	0.041	3.365	0.187	0.028	0.046	4.068	0.187	0.029	0.046	4.413	0.218	0.034	0.050	4.039
			SFTP	0.115	0.016	0.041	3.397	0.144	0.028	0.045	4.143	0.144	0.028	0.045	4.507	0.173	0.033	0.050	4.163
		RFG	**No SFTP**	0.134	0.014	0.035	3.352	0.160	0.024	0.038	4.038	0.160	0.025	0.039	4.374	0.186	0.029	0.042	3.987
			SFTP	0.098	0.013	0.034	3.385	0.123	0.024	0.038	4.116	0.123	0.024	0.038	4.473	0.148	0.028	0.042	4.117

***NMHC for Tier 1, NMOG for LEV and lower**

APPENDIX G

Final Emission Rates by Region, Model Year And Scenario

Table G-1
NOx Final Emission Rates: 47 State Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.481	-	-	-	4.970	-	-	-	7.194	-	-	-
1966	4.481	-	-	-	4.970	-	-	-	7.194	-	-	-
1967	4.481	-	-	-	4.970	-	-	-	7.194	-	-	-
1968	5.488	-	-	-	5.982	-	-	-	7.194	-	-	-
1969	5.488	-	-	-	5.982	-	-	-	7.194	-	-	-
1970	5.488	-	-	-	5.982	-	-	-	8.317	-	-	-
1971	5.488	-	-	-	5.982	-	-	-	8.317	-	-	-
1972	5.488	-	-	-	5.982	-	-	-	8.317	-	-	-
1973	3.839	0.057	-	-	4.336	0.045	-	-	8.317	0.045	-	-
1974	3.839	0.057	-	-	4.336	0.045	-	-	6.271	0.045	-	-
1975	3.374	0.045	-	-	4.147	0.034	-	-	6.271	0.034	-	-
1976	3.374	0.045	-	-	4.147	0.034	-	-	6.271	0.034	-	-
1977	2.655	0.125	-	-	4.147	0.034	-	-	6.271	0.034	-	-
1978	2.655	0.125	-	-	4.147	0.034	-	-	6.271	0.034	-	-
1979	2.655	0.125	-	-	3.113	0.068	-	-	3.113	0.068	-	-
1980	2.334	0.115	-	-	3.113	0.068	-	-	3.113	0.068	-	-
1981	1.383	0.098	-	-	3.081	0.014	-	-	3.081	0.014	-	-
1982	1.372	0.098	-	-	3.081	0.014	-	-	3.081	0.014	-	-
1983	1.243	0.095	-	-	3.077	0.014	-	-	3.077	0.014	-	-
1984	1.247	0.093	-	-	2.447	0.006	-	-	2.447	0.006	-	-
1985	1.251	0.090	-	-	2.323	0.012	-	-	2.323	0.012	-	-
1986	1.270	0.077	-	-	1.968	0.029	-	-	1.968	0.029	-	-
1987	1.269	0.078	-	-	1.650	0.044	-	-	1.650	0.044	-	-
1988	0.856	0.083	-	-	1.266	0.051	-	-	1.650	0.051	-	-
1989	0.855	0.082	-	-	1.174	0.055	-	-	1.650	0.055	-	-
1990	0.789	0.084	-	-	1.123	0.057	-	-	1.650	0.057	-	-
1991	0.782	0.085	-	-	1.094	0.057	-	-	1.650	0.057	-	-
1992	0.770	0.084	-	-	1.055	0.060	-	-	1.650	0.060	-	-
1993	0.770	0.084	-	-	1.036	0.061	-	-	1.650	0.061	-	-
1994	0.719	0.066	0.068	7.200	0.966	0.060	0.058	10.893	1.650	0.060	0.058	10.893
1995	0.668	0.048	0.053	7.200	0.895	0.059	0.055	10.893	1.650	0.059	0.055	10.893
1996	0.643	0.039	0.045	7.200	0.860	0.058	0.054	10.893	1.353	0.058	0.054	10.893
1997	0.643	0.039	0.045	7.200	0.860	0.058	0.054	10.893	1.057	0.058	0.054	10.893
1998	0.643	0.039	0.045	7.200	0.860	0.058	0.054	10.893	1.057	0.058	0.054	10.893
1999	0.668	0.039	0.046	7.211	0.822	0.054	0.052	9.912	1.057	0.054	0.052	9.912
2000	0.524	0.036	0.047	4.476	0.780	0.053	0.052	9.153	1.057	0.053	0.052	9.153
2001	0.791	0.041	0.057	7.747	0.734	0.048	0.054	7.823	1.057	0.048	0.054	7.823
2002	0.649	0.040	0.057	8.169	0.620	0.046	0.055	8.857	0.936	0.046	0.055	8.857
2003	0.450	0.038	0.059	8.760	0.460	0.045	0.056	10.304	0.815	0.045	0.056	10.304
2004	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924
2005	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924
2006	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924
2007	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924
2008	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924
2009	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924
2010 & later	0.365	0.038	0.059	9.013	0.391	0.044	0.056	10.924	0.754	0.044	0.056	10.924

Table G-2
NOx Final Emission Rates: New York Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.390	-	-	-	4.960	-	-	-	7.179	-	-	-
1966	4.390	-	-	-	4.960	-	-	-	7.179	-	-	-
1967	4.390	-	-	-	4.960	-	-	-	7.179	-	-	-
1968	5.376	-	-	-	5.970	-	-	-	7.179	-	-	-
1969	5.376	-	-	-	5.970	-	-	-	7.179	-	-	-
1970	5.376	-	-	-	5.970	-	-	-	8.300	-	-	-
1971	5.376	-	-	-	5.970	-	-	-	8.300	-	-	-
1972	5.376	-	-	-	5.970	-	-	-	8.300	-	-	-
1973	3.761	0.056	-	-	4.327	0.042	-	-	8.300	0.042	-	-
1974	3.761	0.056	-	-	4.327	0.042	-	-	6.258	0.042	-	-
1975	3.306	0.045	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1976	3.306	0.045	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1977	2.601	0.124	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1978	2.601	0.124	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1979	2.601	0.124	-	-	3.107	0.064	-	-	3.107	0.064	-	-
1980	2.287	0.115	-	-	3.107	0.064	-	-	3.107	0.064	-	-
1981	1.354	0.097	-	-	3.075	0.013	-	-	3.075	0.013	-	-
1982	1.341	0.098	-	-	3.075	0.013	-	-	3.075	0.013	-	-
1983	1.220	0.090	-	-	3.071	0.013	-	-	3.071	0.013	-	-
1984	1.223	0.085	-	-	2.442	0.006	-	-	2.442	0.006	-	-
1985	1.227	0.081	-	-	2.319	0.010	-	-	2.319	0.010	-	-
1986	1.242	0.065	-	-	1.965	0.022	-	-	1.965	0.022	-	-
1987	1.242	0.064	-	-	1.649	0.033	-	-	1.649	0.033	-	-
1988	0.839	0.075	-	-	1.256	0.044	-	-	1.649	0.044	-	-
1989	0.838	0.075	-	-	1.164	0.047	-	-	1.649	0.047	-	-
1990	0.774	0.076	-	-	1.113	0.049	-	-	1.649	0.049	-	-
1991	0.768	0.076	-	-	1.083	0.050	-	-	1.649	0.050	-	-
1992	0.756	0.073	-	-	1.024	0.052	-	-	1.649	0.052	-	-
1993	0.756	0.073	-	-	1.005	0.052	-	-	1.649	0.052	-	-
1994	0.692	0.057	0.056	10.947	0.922	0.050	0.047	13.843	1.649	0.050	0.047	13.843
1995	0.629	0.041	0.039	10.947	0.840	0.048	0.042	13.843	1.649	0.048	0.042	13.843
1996	0.597	0.033	0.030	10.947	0.798	0.046	0.039	13.843	1.340	0.046	0.039	13.843
1997	0.597	0.033	0.030	10.947	0.798	0.046	0.039	13.843	1.032	0.046	0.039	13.843
1998	0.597	0.033	0.030	10.947	0.798	0.046	0.039	13.843	1.032	0.046	0.039	13.843
1999	0.631	0.033	0.031	12.699	0.775	0.043	0.038	13.036	1.032	0.043	0.038	13.036
2000	0.666	0.032	0.032	14.451	0.752	0.040	0.037	12.228	1.032	0.040	0.037	12.228
2001	0.603	0.030	0.033	16.054	0.625	0.035	0.037	12.553	1.032	0.035	0.037	12.553
2002	0.495	0.029	0.033	15.321	0.528	0.034	0.037	13.954	0.913	0.034	0.037	13.954
2003	0.344	0.028	0.033	14.295	0.393	0.033	0.037	15.917	0.795	0.033	0.037	15.917
2004	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2005	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2006	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2007	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2008	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2009	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2010 & later	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758

Table G-3
NOx Final Emission Rates: Chicago Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.390	-	-	-	4.960	-	-	-	7.179	-	-	-
1966	4.390	-	-	-	4.960	-	-	-	7.179	-	-	-
1967	4.390	-	-	-	4.960	-	-	-	7.179	-	-	-
1968	5.376	-	-	-	5.970	-	-	-	7.179	-	-	-
1969	5.376	-	-	-	5.970	-	-	-	7.179	-	-	-
1970	5.376	-	-	-	5.970	-	-	-	8.300	-	-	-
1971	5.376	-	-	-	5.970	-	-	-	8.300	-	-	-
1972	5.376	-	-	-	5.970	-	-	-	8.300	-	-	-
1973	3.761	0.056	-	-	4.327	0.042	-	-	8.300	0.042	-	-
1974	3.761	0.056	-	-	4.327	0.042	-	-	6.258	0.042	-	-
1975	3.306	0.045	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1976	3.306	0.045	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1977	2.601	0.124	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1978	2.601	0.124	-	-	4.139	0.032	-	-	6.258	0.032	-	-
1979	2.601	0.124	-	-	3.107	0.064	-	-	3.107	0.064	-	-
1980	2.287	0.115	-	-	3.107	0.064	-	-	3.107	0.064	-	-
1981	1.354	0.097	-	-	3.075	0.013	-	-	3.075	0.013	-	-
1982	1.341	0.098	-	-	3.075	0.013	-	-	3.075	0.013	-	-
1983	1.220	0.090	-	-	3.071	0.013	-	-	3.071	0.013	-	-
1984	1.223	0.085	-	-	2.442	0.006	-	-	2.442	0.006	-	-
1985	1.227	0.081	-	-	2.319	0.010	-	-	2.319	0.010	-	-
1986	1.242	0.065	-	-	1.965	0.022	-	-	1.965	0.022	-	-
1987	1.242	0.064	-	-	1.649	0.033	-	-	1.649	0.033	-	-
1988	0.839	0.075	-	-	1.256	0.044	-	-	1.649	0.044	-	-
1989	0.838	0.075	-	-	1.164	0.047	-	-	1.649	0.047	-	-
1990	0.774	0.076	-	-	1.113	0.049	-	-	1.649	0.049	-	-
1991	0.768	0.076	-	-	1.083	0.050	-	-	1.649	0.050	-	-
1992	0.756	0.073	-	-	1.024	0.052	-	-	1.649	0.052	-	-
1993	0.756	0.073	-	-	1.005	0.052	-	-	1.649	0.052	-	-
1994	0.692	0.057	0.056	10.947	0.922	0.050	0.047	13.843	1.649	0.050	0.047	13.843
1995	0.629	0.041	0.039	10.947	0.840	0.048	0.042	13.843	1.649	0.048	0.042	13.843
1996	0.597	0.033	0.030	10.947	0.798	0.046	0.039	13.843	1.340	0.046	0.039	13.843
1997	0.597	0.033	0.030	10.947	0.798	0.046	0.039	13.843	1.032	0.046	0.039	13.843
1998	0.597	0.033	0.030	10.947	0.798	0.046	0.039	13.843	1.032	0.046	0.039	13.843
1999	0.597	0.033	0.030	10.947	0.750	0.043	0.037	13.259	1.032	0.043	0.037	13.259
2000	0.375	0.030	0.030	10.000	0.697	0.042	0.037	11.840	1.032	0.042	0.037	11.840
2001	0.603	0.030	0.033	16.054	0.625	0.035	0.037	12.553	1.032	0.035	0.037	12.553
2002	0.495	0.029	0.033	15.321	0.528	0.034	0.037	13.954	0.913	0.034	0.037	13.954
2003	0.344	0.028	0.033	14.295	0.393	0.033	0.037	15.917	0.795	0.033	0.037	15.917
2004	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2005	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2006	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2007	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2008	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2009	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758
2010 & later	0.279	0.028	0.033	13.855	0.335	0.032	0.037	16.758	0.736	0.032	0.037	16.758

Table G-4
NOx Final Emission Rates: Atlanta & Charlotte Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.491	-	-	-	4.969	-	-	-	7.193	-	-	-
1966	4.491	-	-	-	4.969	-	-	-	7.193	-	-	-
1967	4.491	-	-	-	4.969	-	-	-	7.193	-	-	-
1968	5.500	-	-	-	5.981	-	-	-	7.193	-	-	-
1969	5.500	-	-	-	5.981	-	-	-	7.193	-	-	-
1970	5.500	-	-	-	5.981	-	-	-	8.316	-	-	-
1971	5.500	-	-	-	5.981	-	-	-	8.316	-	-	-
1972	5.500	-	-	-	5.981	-	-	-	8.316	-	-	-
1973	3.848	0.057	-	-	4.336	0.046	-	-	8.316	0.046	-	-
1974	3.848	0.057	-	-	4.336	0.046	-	-	6.270	0.046	-	-
1975	3.382	0.045	-	-	4.147	0.034	-	-	6.270	0.034	-	-
1976	3.382	0.045	-	-	4.147	0.034	-	-	6.270	0.034	-	-
1977	2.661	0.125	-	-	4.147	0.034	-	-	6.270	0.034	-	-
1978	2.661	0.125	-	-	4.147	0.034	-	-	6.270	0.034	-	-
1979	2.661	0.125	-	-	3.113	0.069	-	-	3.113	0.069	-	-
1980	2.340	0.115	-	-	3.113	0.069	-	-	3.113	0.069	-	-
1981	1.384	0.098	-	-	3.080	0.014	-	-	3.080	0.014	-	-
1982	1.372	0.098	-	-	3.080	0.014	-	-	3.080	0.014	-	-
1983	1.246	0.090	-	-	3.076	0.014	-	-	3.076	0.014	-	-
1984	1.251	0.085	-	-	2.446	0.006	-	-	2.446	0.006	-	-
1985	1.256	0.081	-	-	2.323	0.010	-	-	2.323	0.010	-	-
1986	1.275	0.065	-	-	1.968	0.023	-	-	1.968	0.023	-	-
1987	1.275	0.064	-	-	1.652	0.035	-	-	1.652	0.035	-	-
1988	0.859	0.075	-	-	1.259	0.045	-	-	1.652	0.045	-	-
1989	0.858	0.075	-	-	1.166	0.049	-	-	1.652	0.049	-	-
1990	0.792	0.076	-	-	1.115	0.051	-	-	1.652	0.051	-	-
1991	0.785	0.077	-	-	1.085	0.051	-	-	1.652	0.051	-	-
1992	0.773	0.077	-	-	1.049	0.053	-	-	1.652	0.053	-	-
1993	0.773	0.077	-	-	1.031	0.054	-	-	1.652	0.054	-	-
1994	0.723	0.060	0.059	11.286	0.966	0.052	0.049	13.859	1.652	0.052	0.049	13.859
1995	0.674	0.044	0.041	11.286	0.901	0.051	0.043	13.859	1.652	0.051	0.043	13.859
1996	0.649	0.036	0.032	11.286	0.869	0.050	0.041	13.859	1.356	0.050	0.041	13.859
1997	0.649	0.036	0.032	11.286	0.869	0.050	0.041	13.859	1.060	0.050	0.041	13.859
1998	0.649	0.036	0.032	11.286	0.869	0.050	0.041	13.859	1.060	0.050	0.041	13.859
1999	0.649	0.036	0.032	11.286	0.816	0.047	0.039	13.277	1.060	0.047	0.039	13.277
2000	0.408	0.032	0.032	1.821	0.758	0.046	0.039	11.976	1.060	0.046	0.039	11.976
2001	0.820	0.040	0.041	11.032	0.751	0.041	0.041	12.725	1.060	0.041	0.041	12.725
2002	0.673	0.038	0.041	12.065	0.634	0.040	0.041	14.082	0.939	0.040	0.041	14.082
2003	0.467	0.037	0.042	13.510	0.470	0.038	0.042	15.982	0.817	0.038	0.042	15.982
2004	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796
2005	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796
2006	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796
2007	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796
2008	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796
2009	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796
2010 & later	0.379	0.036	0.042	14.130	0.400	0.037	0.042	16.796	0.757	0.037	0.042	16.796

Table G-5
NOx Final Emission Rates: 47 State with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.180	-	-	-	4.614	-	-	-	6.678	-	-	-
1966	4.180	-	-	-	4.614	-	-	-	6.678	-	-	-
1967	4.180	-	-	-	4.614	-	-	-	6.678	-	-	-
1968	5.120	-	-	-	5.553	-	-	-	6.678	-	-	-
1969	5.120	-	-	-	5.553	-	-	-	6.678	-	-	-
1970	5.120	-	-	-	5.553	-	-	-	7.721	-	-	-
1971	5.120	-	-	-	5.553	-	-	-	7.721	-	-	-
1972	5.120	-	-	-	5.553	-	-	-	7.721	-	-	-
1973	3.582	0.052	-	-	4.025	0.041	-	-	7.721	0.041	-	-
1974	3.582	0.052	-	-	4.025	0.041	-	-	5.821	0.041	-	-
1975	3.148	0.041	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1976	3.148	0.041	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1977	2.477	0.114	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1978	2.477	0.114	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1979	2.477	0.114	-	-	2.890	0.062	-	-	2.890	0.062	-	-
1980	2.178	0.105	-	-	2.890	0.062	-	-	2.890	0.062	-	-
1981	1.290	0.089	-	-	2.860	0.013	-	-	2.860	0.013	-	-
1982	1.280	0.090	-	-	2.860	0.013	-	-	2.860	0.013	-	-
1983	1.160	0.086	-	-	2.856	0.013	-	-	2.856	0.013	-	-
1984	1.164	0.084	-	-	2.272	0.006	-	-	2.272	0.006	-	-
1985	1.167	0.082	-	-	2.157	0.011	-	-	2.157	0.011	-	-
1986	1.183	0.070	-	-	1.826	0.027	-	-	1.826	0.027	-	-
1987	1.183	0.071	-	-	1.531	0.041	-	-	1.531	0.041	-	-
1988	0.798	0.076	-	-	1.177	0.047	-	-	1.531	0.047	-	-
1989	0.797	0.076	-	-	1.091	0.051	-	-	1.531	0.051	-	-
1990	0.736	0.078	-	-	1.044	0.053	-	-	1.531	0.053	-	-
1991	0.730	0.078	-	-	1.016	0.053	-	-	1.531	0.053	-	-
1992	0.719	0.078	-	-	0.983	0.055	-	-	1.531	0.055	-	-
1993	0.719	0.078	-	-	0.966	0.056	-	-	1.531	0.056	-	-
1994	0.667	0.061	0.064	7.034	0.894	0.055	0.055	12.263	1.531	0.055	0.055	12.263
1995	0.614	0.044	0.050	7.034	0.823	0.055	0.053	12.263	1.531	0.055	0.053	12.263
1996	0.588	0.036	0.043	7.034	0.787	0.054	0.052	12.263	1.246	0.054	0.052	12.263
1997	0.588	0.036	0.043	7.034	0.787	0.054	0.052	12.263	0.960	0.054	0.052	12.263
1998	0.588	0.036	0.043	7.034	0.787	0.054	0.052	12.263	0.960	0.054	0.052	12.263
1999	0.573	0.035	0.042	7.199	0.732	0.049	0.050	11.283	0.960	0.049	0.050	11.283
2000	0.403	0.031	0.041	7.270	0.674	0.047	0.049	11.171	0.960	0.047	0.049	11.171
2001	0.350	0.021	0.035	8.906	0.473	0.034	0.043	11.087	0.960	0.034	0.043	11.087
2002	0.287	0.020	0.035	8.878	0.400	0.033	0.043	10.936	0.851	0.033	0.043	10.936
2003	0.199	0.019	0.035	8.837	0.299	0.032	0.043	10.726	0.741	0.032	0.043	10.726
2004	0.121	0.016	0.033	8.797	0.142	0.022	0.038	10.562	0.389	0.022	0.038	10.562
2005	0.081	0.012	0.031	8.775	0.132	0.021	0.038	10.556	0.222	0.021	0.038	10.556
2006	0.059	0.010	0.030	8.762	0.102	0.019	0.036	10.552	0.177	0.019	0.036	10.552
2007	0.059	0.010	0.030	8.762	0.048	0.014	0.034	10.548	0.131	0.014	0.034	10.548
2008	0.059	0.010	0.030	8.762	0.048	0.014	0.034	10.548	0.102	0.014	0.034	10.548
2009	0.059	0.010	0.030	8.762	0.048	0.014	0.034	10.548	0.073	0.014	0.034	10.548
2010 & later	0.059	0.010	0.030	8.762	0.048	0.014	0.034	10.548	0.073	0.014	0.034	10.548

Table G-6
NOx Final Emission Rates: New York with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.172	-	-	-	4.604	-	-	-	6.664	-	-	-
1966	4.172	-	-	-	4.604	-	-	-	6.664	-	-	-
1967	4.172	-	-	-	4.604	-	-	-	6.664	-	-	-
1968	5.109	-	-	-	5.541	-	-	-	6.664	-	-	-
1969	5.109	-	-	-	5.541	-	-	-	6.664	-	-	-
1970	5.109	-	-	-	5.541	-	-	-	7.704	-	-	-
1971	5.109	-	-	-	5.541	-	-	-	7.704	-	-	-
1972	5.109	-	-	-	5.541	-	-	-	7.704	-	-	-
1973	3.574	0.052	-	-	4.017	0.041	-	-	7.704	0.041	-	-
1974	3.574	0.052	-	-	4.017	0.041	-	-	5.809	0.041	-	-
1975	3.142	0.041	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1976	3.142	0.041	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1977	2.472	0.113	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1978	2.472	0.113	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1979	2.472	0.113	-	-	2.884	0.062	-	-	2.884	0.062	-	-
1980	2.173	0.105	-	-	2.884	0.062	-	-	2.884	0.062	-	-
1981	1.286	0.089	-	-	2.854	0.013	-	-	2.854	0.013	-	-
1982	1.275	0.089	-	-	2.854	0.013	-	-	2.854	0.013	-	-
1983	1.159	0.082	-	-	2.851	0.013	-	-	2.851	0.013	-	-
1984	1.162	0.078	-	-	2.267	0.005	-	-	2.267	0.005	-	-
1985	1.166	0.073	-	-	2.153	0.009	-	-	2.153	0.009	-	-
1986	1.182	0.059	-	-	1.824	0.021	-	-	1.824	0.021	-	-
1987	1.182	0.058	-	-	1.530	0.032	-	-	1.530	0.032	-	-
1988	0.798	0.069	-	-	1.167	0.042	-	-	1.530	0.042	-	-
1989	0.797	0.069	-	-	1.082	0.045	-	-	1.530	0.045	-	-
1990	0.736	0.070	-	-	1.034	0.047	-	-	1.530	0.047	-	-
1991	0.730	0.070	-	-	1.007	0.047	-	-	1.530	0.047	-	-
1992	0.718	0.070	-	-	0.974	0.049	-	-	1.530	0.049	-	-
1993	0.718	0.070	-	-	0.956	0.050	-	-	1.530	0.050	-	-
1994	0.661	0.055	0.054	10.661	0.881	0.048	0.045	13.407	1.530	0.048	0.045	13.407
1995	0.603	0.040	0.038	10.661	0.806	0.046	0.041	13.407	1.530	0.046	0.041	13.407
1996	0.574	0.032	0.030	10.661	0.768	0.045	0.038	13.407	1.234	0.045	0.038	13.407
1997	0.574	0.032	0.030	10.661	0.768	0.045	0.038	13.407	0.938	0.045	0.038	13.407
1998	0.574	0.032	0.030	10.661	0.768	0.045	0.038	13.407	0.938	0.045	0.038	13.407
1999	0.523	0.028	0.028	11.627	0.697	0.040	0.036	14.643	0.938	0.040	0.036	14.643
2000	0.471	0.025	0.026	12.593	0.627	0.035	0.034	15.878	0.938	0.035	0.034	15.878
2001	0.341	0.019	0.023	13.789	0.462	0.028	0.031	17.104	0.938	0.028	0.031	17.104
2002	0.280	0.019	0.023	13.698	0.391	0.027	0.031	16.682	0.830	0.027	0.031	16.682
2003	0.194	0.018	0.023	13.571	0.292	0.026	0.032	16.092	0.723	0.026	0.032	16.092
2004	0.118	0.014	0.021	13.378	0.138	0.017	0.028	15.385	0.379	0.017	0.028	15.385
2005	0.079	0.012	0.020	13.241	0.129	0.016	0.027	15.352	0.217	0.016	0.027	15.352
2006	0.057	0.010	0.019	13.165	0.100	0.014	0.026	15.290	0.173	0.014	0.026	15.290
2007	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.128	0.010	0.025	15.195
2008	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.100	0.010	0.025	15.195
2009	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.071	0.010	0.025	15.195
2010 & later	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.071	0.010	0.025	15.195

Table G-7
NOx Final Emission Rates: Chicago with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.172	-	-	-	4.604	-	-	-	6.664	-	-	-
1966	4.172	-	-	-	4.604	-	-	-	6.664	-	-	-
1967	4.172	-	-	-	4.604	-	-	-	6.664	-	-	-
1968	5.109	-	-	-	5.541	-	-	-	6.664	-	-	-
1969	5.109	-	-	-	5.541	-	-	-	6.664	-	-	-
1970	5.109	-	-	-	5.541	-	-	-	7.704	-	-	-
1971	5.109	-	-	-	5.541	-	-	-	7.704	-	-	-
1972	5.109	-	-	-	5.541	-	-	-	7.704	-	-	-
1973	3.574	0.052	-	-	4.017	0.041	-	-	7.704	0.041	-	-
1974	3.574	0.052	-	-	4.017	0.041	-	-	5.809	0.041	-	-
1975	3.142	0.041	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1976	3.142	0.041	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1977	2.472	0.113	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1978	2.472	0.113	-	-	3.842	0.031	-	-	5.809	0.031	-	-
1979	2.472	0.113	-	-	2.884	0.062	-	-	2.884	0.062	-	-
1980	2.173	0.105	-	-	2.884	0.062	-	-	2.884	0.062	-	-
1981	1.286	0.089	-	-	2.854	0.013	-	-	2.854	0.013	-	-
1982	1.275	0.089	-	-	2.854	0.013	-	-	2.854	0.013	-	-
1983	1.159	0.082	-	-	2.851	0.013	-	-	2.851	0.013	-	-
1984	1.162	0.078	-	-	2.267	0.005	-	-	2.267	0.005	-	-
1985	1.166	0.073	-	-	2.153	0.009	-	-	2.153	0.009	-	-
1986	1.182	0.059	-	-	1.824	0.021	-	-	1.824	0.021	-	-
1987	1.182	0.058	-	-	1.530	0.032	-	-	1.530	0.032	-	-
1988	0.798	0.069	-	-	1.167	0.042	-	-	1.530	0.042	-	-
1989	0.797	0.069	-	-	1.082	0.045	-	-	1.530	0.045	-	-
1990	0.736	0.070	-	-	1.034	0.047	-	-	1.530	0.047	-	-
1991	0.730	0.070	-	-	1.007	0.047	-	-	1.530	0.047	-	-
1992	0.718	0.070	-	-	0.974	0.049	-	-	1.530	0.049	-	-
1993	0.718	0.070	-	-	0.956	0.050	-	-	1.530	0.050	-	-
1994	0.661	0.055	0.054	10.661	0.881	0.048	0.045	13.407	1.530	0.048	0.045	13.407
1995	0.603	0.040	0.038	10.661	0.806	0.046	0.041	13.407	1.530	0.046	0.041	13.407
1996	0.574	0.032	0.030	10.661	0.768	0.045	0.038	13.407	1.234	0.045	0.038	13.407
1997	0.574	0.032	0.030	10.661	0.768	0.045	0.038	13.407	0.938	0.045	0.038	13.407
1998	0.574	0.032	0.030	10.661	0.768	0.045	0.038	13.407	0.938	0.045	0.038	13.407
1999	0.574	0.032	0.030	10.661	0.722	0.042	0.036	12.748	0.938	0.042	0.036	12.748
2000	0.361	0.029	0.029	10.000	0.671	0.041	0.036	12.589	0.938	0.041	0.036	12.589
2001	0.341	0.019	0.023	13.789	0.462	0.028	0.031	17.104	0.938	0.028	0.031	17.104
2002	0.280	0.019	0.023	13.698	0.391	0.027	0.031	16.682	0.830	0.027	0.031	16.682
2003	0.194	0.018	0.023	13.571	0.292	0.026	0.032	16.092	0.723	0.026	0.032	16.092
2004	0.118	0.014	0.021	13.378	0.138	0.017	0.028	15.385	0.379	0.017	0.028	15.385
2005	0.079	0.012	0.020	13.241	0.129	0.016	0.027	15.352	0.217	0.016	0.027	15.352
2006	0.057	0.010	0.019	13.165	0.100	0.014	0.026	15.290	0.173	0.014	0.026	15.290
2007	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.128	0.010	0.025	15.195
2008	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.100	0.010	0.025	15.195
2009	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.071	0.010	0.025	15.195
2010 & later	0.057	0.010	0.019	13.165	0.047	0.010	0.025	15.195	0.071	0.010	0.025	15.195

Table G-8
NOx Final Emission Rates: Atl & Cha with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.180	-	-	-	4.613	-	-	-	6.677	-	-	-
1966	4.180	-	-	-	4.613	-	-	-	6.677	-	-	-
1967	4.180	-	-	-	4.613	-	-	-	6.677	-	-	-
1968	5.119	-	-	-	5.552	-	-	-	6.677	-	-	-
1969	5.119	-	-	-	5.552	-	-	-	6.677	-	-	-
1970	5.119	-	-	-	5.552	-	-	-	7.719	-	-	-
1971	5.119	-	-	-	5.552	-	-	-	7.719	-	-	-
1972	5.119	-	-	-	5.552	-	-	-	7.719	-	-	-
1973	3.581	0.052	-	-	4.025	0.041	-	-	7.719	0.041	-	-
1974	3.581	0.052	-	-	4.025	0.041	-	-	5.820	0.041	-	-
1975	3.148	0.041	-	-	3.849	0.031	-	-	5.820	0.031	-	-
1976	3.148	0.041	-	-	3.849	0.031	-	-	5.820	0.031	-	-
1977	2.477	0.114	-	-	3.849	0.031	-	-	5.820	0.031	-	-
1978	2.477	0.114	-	-	3.849	0.031	-	-	5.820	0.031	-	-
1979	2.477	0.114	-	-	2.890	0.062	-	-	2.890	0.062	-	-
1980	2.178	0.105	-	-	2.890	0.062	-	-	2.890	0.062	-	-
1981	1.289	0.089	-	-	2.859	0.013	-	-	2.859	0.013	-	-
1982	1.277	0.089	-	-	2.859	0.013	-	-	2.859	0.013	-	-
1983	1.161	0.082	-	-	2.856	0.013	-	-	2.856	0.013	-	-
1984	1.164	0.078	-	-	2.271	0.005	-	-	2.271	0.005	-	-
1985	1.168	0.074	-	-	2.156	0.009	-	-	2.156	0.009	-	-
1986	1.184	0.059	-	-	1.827	0.021	-	-	1.827	0.021	-	-
1987	1.184	0.058	-	-	1.533	0.032	-	-	1.533	0.032	-	-
1988	0.799	0.069	-	-	1.169	0.042	-	-	1.533	0.042	-	-
1989	0.798	0.069	-	-	1.084	0.045	-	-	1.533	0.045	-	-
1990	0.737	0.070	-	-	1.036	0.047	-	-	1.533	0.047	-	-
1991	0.731	0.070	-	-	1.008	0.047	-	-	1.533	0.047	-	-
1992	0.719	0.071	-	-	0.975	0.049	-	-	1.533	0.049	-	-
1993	0.719	0.071	-	-	0.958	0.050	-	-	1.533	0.050	-	-
1994	0.668	0.056	0.055	10.717	0.890	0.048	0.046	13.437	1.533	0.048	0.046	13.437
1995	0.616	0.041	0.039	10.717	0.823	0.047	0.041	13.437	1.533	0.047	0.041	13.437
1996	0.590	0.033	0.031	10.717	0.789	0.046	0.039	13.437	1.248	0.046	0.039	13.437
1997	0.590	0.033	0.031	10.717	0.789	0.046	0.039	13.437	0.964	0.046	0.039	13.437
1998	0.590	0.033	0.031	10.717	0.789	0.046	0.039	13.437	0.964	0.046	0.039	13.437
1999	0.590	0.033	0.031	10.717	0.742	0.043	0.037	12.784	0.964	0.043	0.037	12.784
2000	0.371	0.030	0.030	10.000	0.689	0.042	0.037	12.612	0.964	0.042	0.037	12.612
2001	0.351	0.020	0.024	13.798	0.474	0.028	0.032	17.182	0.964	0.028	0.032	17.182
2002	0.288	0.019	0.024	13.705	0.402	0.028	0.032	16.737	0.853	0.028	0.032	16.737
2003	0.200	0.018	0.024	13.575	0.300	0.026	0.032	16.114	0.743	0.026	0.032	16.114
2004	0.122	0.015	0.022	13.380	0.142	0.017	0.028	15.386	0.390	0.017	0.028	15.386
2005	0.081	0.012	0.020	13.241	0.132	0.017	0.028	15.353	0.223	0.017	0.028	15.353
2006	0.059	0.010	0.019	13.166	0.103	0.015	0.027	15.291	0.177	0.015	0.027	15.291
2007	0.059	0.010	0.019	13.166	0.049	0.011	0.025	15.195	0.132	0.011	0.025	15.195
2008	0.059	0.010	0.019	13.166	0.049	0.011	0.025	15.195	0.103	0.011	0.025	15.195
2009	0.059	0.010	0.019	13.166	0.049	0.011	0.025	15.195	0.073	0.011	0.025	15.195
2010 & later	0.059	0.010	0.019	13.166	0.049	0.011	0.025	15.195	0.073	0.011	0.025	15.195

Table G-9
NOx Final Emission Rates: 47 State with API 1 Proposal
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.415	-	-	-	4.868	-	-	-	7.045	-	-	-
1966	4.415	-	-	-	4.868	-	-	-	7.045	-	-	-
1967	4.415	-	-	-	4.868	-	-	-	7.045	-	-	-
1968	5.407	-	-	-	5.858	-	-	-	7.045	-	-	-
1969	5.407	-	-	-	5.858	-	-	-	7.045	-	-	-
1970	5.407	-	-	-	5.858	-	-	-	8.145	-	-	-
1971	5.407	-	-	-	5.858	-	-	-	8.145	-	-	-
1972	5.407	-	-	-	5.858	-	-	-	8.145	-	-	-
1973	3.783	0.054	-	-	4.247	0.043	-	-	8.145	0.043	-	-
1974	3.783	0.054	-	-	4.247	0.043	-	-	6.142	0.043	-	-
1975	3.325	0.043	-	-	4.062	0.032	-	-	6.142	0.032	-	-
1976	3.325	0.043	-	-	4.062	0.032	-	-	6.142	0.032	-	-
1977	2.617	0.119	-	-	4.062	0.032	-	-	6.142	0.032	-	-
1978	2.617	0.119	-	-	4.062	0.032	-	-	6.142	0.032	-	-
1979	2.617	0.119	-	-	3.049	0.065	-	-	3.049	0.065	-	-
1980	2.300	0.110	-	-	3.049	0.065	-	-	3.049	0.065	-	-
1981	1.363	0.093	-	-	3.017	0.014	-	-	3.017	0.014	-	-
1982	1.352	0.094	-	-	3.017	0.014	-	-	3.017	0.014	-	-
1983	1.226	0.090	-	-	3.013	0.014	-	-	3.013	0.014	-	-
1984	1.229	0.088	-	-	2.397	0.006	-	-	2.397	0.006	-	-
1985	1.233	0.086	-	-	2.275	0.012	-	-	2.275	0.012	-	-
1986	1.249	0.073	-	-	1.927	0.028	-	-	1.927	0.028	-	-
1987	1.248	0.074	-	-	1.615	0.043	-	-	1.615	0.043	-	-
1988	0.843	0.080	-	-	1.242	0.050	-	-	1.615	0.050	-	-
1989	0.842	0.079	-	-	1.152	0.054	-	-	1.615	0.054	-	-
1990	0.778	0.081	-	-	1.102	0.056	-	-	1.615	0.056	-	-
1991	0.771	0.082	-	-	1.073	0.056	-	-	1.615	0.056	-	-
1992	0.760	0.082	-	-	1.038	0.058	-	-	1.615	0.058	-	-
1993	0.760	0.082	-	-	1.019	0.059	-	-	1.615	0.059	-	-
1994	0.703	0.064	0.067	7.142	0.942	0.058	0.057	11.557	1.615	0.058	0.057	11.557
1995	0.646	0.046	0.051	7.142	0.864	0.057	0.054	11.557	1.615	0.057	0.054	11.557
1996	0.617	0.037	0.044	7.142	0.826	0.056	0.053	11.557	1.312	0.056	0.053	11.557
1997	0.617	0.037	0.044	7.142	0.826	0.056	0.053	11.557	1.008	0.056	0.053	11.557
1998	0.617	0.037	0.044	7.142	0.826	0.056	0.053	11.557	1.008	0.056	0.053	11.557
1999	0.630	0.037	0.044	7.354	0.784	0.052	0.051	10.313	1.008	0.052	0.051	10.313
2000	0.481	0.034	0.045	7.380	0.740	0.050	0.051	9.783	1.008	0.050	0.051	9.783
2001	0.655	0.035	0.050	9.425	0.660	0.044	0.051	7.143	1.008	0.044	0.051	7.143
2002	0.540	0.034	0.051	9.267	0.559	0.043	0.051	8.349	0.892	0.043	0.051	8.349
2003	0.379	0.033	0.052	9.045	0.418	0.041	0.052	10.037	0.777	0.041	0.052	10.037
2004	0.232	0.026	0.050	8.877	0.271	0.036	0.057	10.588	0.597	0.036	0.057	10.588
2005	0.155	0.020	0.047	8.803	0.253	0.035	0.056	10.572	0.347	0.035	0.056	10.572
2006	0.112	0.017	0.045	8.763	0.196	0.030	0.055	10.558	0.304	0.030	0.055	10.558
2007	0.112	0.017	0.045	8.763	0.093	0.023	0.052	10.548	0.251	0.023	0.052	10.548
2008	0.112	0.017	0.045	8.763	0.093	0.023	0.052	10.548	0.196	0.023	0.052	10.548
2009	0.112	0.017	0.045	8.763	0.093	0.023	0.052	10.548	0.140	0.023	0.052	10.548
2010 & later	0.112	0.017	0.045	8.763	0.093	0.023	0.052	10.548	0.140	0.023	0.052	10.548

Table G-10
NOx Final Emission Rates:47 State with API 2 Proposal
Applicable to Calendar Year 2010 and later*

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.241	-	-	-	4.682	-	-	-	6.777	-	-	-
1966	4.241	-	-	-	4.682	-	-	-	6.777	-	-	-
1967	4.241	-	-	-	4.682	-	-	-	6.777	-	-	-
1968	5.193	-	-	-	5.635	-	-	-	6.777	-	-	-
1969	5.193	-	-	-	5.635	-	-	-	6.777	-	-	-
1970	5.193	-	-	-	5.635	-	-	-	7.835	-	-	-
1971	5.193	-	-	-	5.635	-	-	-	7.835	-	-	-
1972	5.193	-	-	-	5.635	-	-	-	7.835	-	-	-
1973	3.633	0.053	-	-	4.085	0.042	-	-	7.835	0.042	-	-
1974	3.633	0.053	-	-	4.085	0.042	-	-	5.907	0.042	-	-
1975	3.193	0.042	-	-	3.907	0.032	-	-	5.907	0.032	-	-
1976	3.193	0.042	-	-	3.907	0.032	-	-	5.907	0.032	-	-
1977	2.513	0.116	-	-	3.907	0.032	-	-	5.907	0.032	-	-
1978	2.513	0.116	-	-	3.907	0.032	-	-	5.907	0.032	-	-
1979	2.513	0.116	-	-	2.933	0.063	-	-	2.933	0.063	-	-
1980	2.209	0.107	-	-	2.933	0.063	-	-	2.933	0.063	-	-
1981	1.309	0.091	-	-	2.902	0.013	-	-	2.902	0.013	-	-
1982	1.298	0.091	-	-	2.902	0.013	-	-	2.902	0.013	-	-
1983	1.177	0.088	-	-	2.898	0.013	-	-	2.898	0.013	-	-
1984	1.180	0.086	-	-	2.305	0.006	-	-	2.305	0.006	-	-
1985	1.184	0.084	-	-	2.188	0.011	-	-	2.188	0.011	-	-
1986	1.200	0.071	-	-	1.853	0.027	-	-	1.853	0.027	-	-
1987	1.200	0.072	-	-	1.554	0.041	-	-	1.554	0.041	-	-
1988	0.810	0.077	-	-	1.194	0.048	-	-	1.554	0.048	-	-
1989	0.809	0.077	-	-	1.107	0.052	-	-	1.554	0.052	-	-
1990	0.747	0.079	-	-	1.059	0.054	-	-	1.554	0.054	-	-
1991	0.741	0.079	-	-	1.031	0.054	-	-	1.554	0.054	-	-
1992	0.729	0.079	-	-	0.998	0.056	-	-	1.554	0.056	-	-
1993	0.729	0.079	-	-	0.980	0.057	-	-	1.554	0.057	-	-
1994	0.677	0.062	0.065	7.067	0.908	0.056	0.055	12.122	1.554	0.056	0.055	12.122
1995	0.625	0.045	0.050	7.067	0.837	0.055	0.053	12.122	1.554	0.055	0.053	12.122
1996	0.599	0.036	0.043	7.067	0.801	0.055	0.052	12.122	1.266	0.055	0.052	12.122
1997	0.599	0.036	0.043	7.067	0.801	0.055	0.052	12.122	0.978	0.055	0.052	12.122
1998	0.599	0.036	0.043	7.067	0.801	0.055	0.052	12.122	0.978	0.055	0.052	12.122
1999	0.592	0.035	0.043	7.193	0.750	0.050	0.050	11.089	0.978	0.050	0.050	11.089
2000	0.427	0.032	0.042	7.196	0.695	0.048	0.049	10.893	0.978	0.048	0.049	10.893
2001	0.443	0.025	0.040	8.612	0.529	0.037	0.045	10.303	0.978	0.037	0.045	10.303
2002	0.369	0.025	0.041	8.700	0.451	0.036	0.046	10.428	0.866	0.036	0.046	10.428
2003	0.267	0.025	0.042	8.823	0.343	0.035	0.047	10.604	0.754	0.035	0.047	10.604
2004	0.167	0.020	0.040	8.832	0.195	0.028	0.046	10.571	0.455	0.028	0.046	10.571
2005	0.111	0.015	0.037	8.787	0.182	0.027	0.045	10.562	0.273	0.027	0.045	10.562
2006	0.081	0.013	0.036	8.762	0.141	0.023	0.044	10.554	0.229	0.023	0.044	10.554
2007	0.081	0.013	0.036	8.762	0.067	0.018	0.041	10.548	0.181	0.018	0.041	10.548
2008	0.081	0.013	0.036	8.762	0.067	0.018	0.041	10.548	0.141	0.018	0.041	10.548
2009	0.081	0.013	0.036	8.762	0.067	0.018	0.041	10.548	0.101	0.018	0.041	10.548
2010 & later	0.081	0.013	0.036	8.762	0.067	0.018	0.041	10.548	0.101	0.018	0.041	10.548

*** API 1 Applies to Calendar Year 2004 through 2009**

Table G-11
NOx Final Emission Rates: 47 State with Default Standards
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	4.180	-	-	-	4.614	-	-	-	6.678	-	-	-
1966	4.180	-	-	-	4.614	-	-	-	6.678	-	-	-
1967	4.180	-	-	-	4.614	-	-	-	6.678	-	-	-
1968	5.120	-	-	-	5.553	-	-	-	6.678	-	-	-
1969	5.120	-	-	-	5.553	-	-	-	6.678	-	-	-
1970	5.120	-	-	-	5.553	-	-	-	7.721	-	-	-
1971	5.120	-	-	-	5.553	-	-	-	7.721	-	-	-
1972	5.120	-	-	-	5.553	-	-	-	7.721	-	-	-
1973	3.582	0.052	-	-	4.025	0.041	-	-	7.721	0.041	-	-
1974	3.582	0.052	-	-	4.025	0.041	-	-	5.821	0.041	-	-
1975	3.148	0.041	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1976	3.148	0.041	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1977	2.477	0.114	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1978	2.477	0.114	-	-	3.850	0.031	-	-	5.821	0.031	-	-
1979	2.477	0.114	-	-	2.890	0.062	-	-	2.890	0.062	-	-
1980	2.178	0.105	-	-	2.890	0.062	-	-	2.890	0.062	-	-
1981	1.290	0.089	-	-	2.860	0.013	-	-	2.860	0.013	-	-
1982	1.280	0.090	-	-	2.860	0.013	-	-	2.860	0.013	-	-
1983	1.160	0.086	-	-	2.856	0.013	-	-	2.856	0.013	-	-
1984	1.164	0.084	-	-	2.272	0.006	-	-	2.272	0.006	-	-
1985	1.167	0.082	-	-	2.157	0.011	-	-	2.157	0.011	-	-
1986	1.183	0.070	-	-	1.826	0.027	-	-	1.826	0.027	-	-
1987	1.183	0.071	-	-	1.531	0.041	-	-	1.531	0.041	-	-
1988	0.798	0.076	-	-	1.177	0.047	-	-	1.531	0.047	-	-
1989	0.797	0.076	-	-	1.091	0.051	-	-	1.531	0.051	-	-
1990	0.736	0.078	-	-	1.044	0.053	-	-	1.531	0.053	-	-
1991	0.730	0.078	-	-	1.016	0.053	-	-	1.531	0.053	-	-
1992	0.719	0.078	-	-	0.983	0.055	-	-	1.531	0.055	-	-
1993	0.719	0.078	-	-	0.966	0.056	-	-	1.531	0.056	-	-
1994	0.667	0.061	0.064	7.034	0.894	0.055	0.055	12.263	1.531	0.055	0.055	12.263
1995	0.614	0.044	0.050	7.034	0.823	0.055	0.053	12.263	1.531	0.055	0.053	12.263
1996	0.588	0.036	0.043	7.034	0.787	0.054	0.052	12.263	1.246	0.054	0.052	12.263
1997	0.588	0.036	0.043	7.034	0.787	0.054	0.052	12.263	0.960	0.054	0.052	12.263
1998	0.588	0.036	0.043	7.034	0.787	0.054	0.052	12.263	0.960	0.054	0.052	12.263
1999	0.573	0.035	0.042	7.199	0.732	0.049	0.050	11.283	0.960	0.049	0.050	11.283
2000	0.403	0.031	0.041	7.270	0.674	0.047	0.049	11.171	0.960	0.047	0.049	11.171
2001	0.350	0.021	0.035	8.906	0.473	0.034	0.043	11.087	0.960	0.034	0.043	11.087
2002	0.287	0.020	0.035	8.878	0.400	0.033	0.043	10.936	0.851	0.033	0.043	10.936
2003	0.199	0.019	0.035	8.837	0.299	0.032	0.043	10.726	0.741	0.032	0.043	10.726
2004	0.144	0.017	0.034	8.810	0.251	0.031	0.043	10.634	0.686	0.031	0.043	10.634
2005	0.126	0.016	0.033	8.800	0.247	0.030	0.043	10.631	0.686	0.030	0.043	10.631
2006	0.117	0.015	0.033	8.795	0.245	0.030	0.043	10.630	0.686	0.030	0.043	10.630
2007	0.117	0.015	0.033	8.795	0.245	0.030	0.043	10.630	0.686	0.030	0.043	10.630
2008	0.117	0.015	0.033	8.795	0.245	0.030	0.043	10.630	0.686	0.030	0.043	10.630
2009	0.117	0.015	0.033	8.795	0.245	0.030	0.043	10.630	0.686	0.030	0.043	10.630
2010 & later	0.117	0.015	0.033	8.795	0.245	0.030	0.043	10.630	0.686	0.030	0.043	10.630

Table G-12
Diesel NOx Final Emission Rates: Baseline and Tier 2/Sulfur
Applicable to All Calender Years

MODEL	Diesel LDV				Diesel LDT1/2				Diesel LDT3/4			
	BASELINE		TIER 2		BASELINE		TIER 2		BASELINE		TIER 2	
YEAR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR
1965	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1966	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1967	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1968	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1969	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1970	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1971	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1972	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1973	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1974	1.460	0.040	1.460	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1975	1.400	0.040	1.400	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1976	1.400	0.040	1.400	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1977	1.400	0.040	1.400	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1978	1.400	0.040	1.400	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1979	1.400	0.040	1.400	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1980	1.400	0.040	1.400	0.040	1.830	0.080	1.830	0.080	1.830	0.080	1.830	0.080
1981	1.310	0.030	1.310	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1982	1.310	0.030	1.310	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1983	1.310	0.030	1.310	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1984	1.310	0.030	1.310	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1985	0.870	0.030	0.870	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1986	0.870	0.030	0.870	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1987	0.870	0.030	0.870	0.030	1.480	0.030	1.480	0.030	1.480	0.030	1.480	0.030
1988	0.870	0.030	0.870	0.030	1.070	0.030	1.070	0.030	1.070	0.030	1.070	0.030
1989	0.870	0.030	0.870	0.030	1.070	0.030	1.070	0.030	1.070	0.030	1.070	0.030
1990	0.870	0.030	0.870	0.030	1.030	0.030	1.030	0.030	1.030	0.030	1.030	0.030
1991	0.870	0.030	0.870	0.030	1.030	0.030	1.030	0.030	1.030	0.030	1.030	0.030
1992	0.870	0.030	0.870	0.030	1.030	0.030	1.030	0.030	1.030	0.030	1.030	0.030
1993	0.870	0.030	0.870	0.030	1.030	0.030	1.030	0.030	1.030	0.030	1.030	0.030
1994	0.661	0.023	0.661	0.023	1.030	0.030	1.030	0.030	1.030	0.030	1.030	0.030
1995	0.452	0.016	0.452	0.016	1.030	0.030	1.030	0.030	1.030	0.030	1.030	0.030
1996	0.348	0.012	0.348	0.012	0.863	0.025	0.863	0.025	0.863	0.025	0.863	0.025
1997	0.348	0.012	0.348	0.012	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
1998	0.348	0.012	0.348	0.012	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
1999	0.348	0.012	0.348	0.012	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
2000	0.174	0.006	0.174	0.006	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
2001	0.174	0.006	0.174	0.006	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
2002	0.174	0.006	0.174	0.006	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
2003	0.174	0.006	0.174	0.006	0.697	0.020	0.697	0.020	0.697	0.020	0.697	0.020
2004	0.174	0.006	0.041	0.001	0.697	0.020	0.182	0.005	0.697	0.020	0.310	0.009
2005	0.174	0.006	0.041	0.001	0.697	0.020	0.182	0.005	0.697	0.020	0.242	0.007
2006	0.174	0.006	0.041	0.001	0.697	0.020	0.138	0.004	0.697	0.020	0.182	0.005
2007	0.174	0.006	0.041	0.001	0.697	0.020	0.042	0.001	0.697	0.020	0.121	0.004
2008	0.174	0.006	0.041	0.001	0.697	0.020	0.042	0.001	0.697	0.020	0.082	0.002
2009	0.174	0.006	0.041	0.001	0.697	0.020	0.042	0.001	0.697	0.020	0.042	0.001
2010 & later	0.174	0.006	0.041	0.001	0.697	0.020	0.042	0.001	0.697	0.020	0.042	0.001

Table G-13
Exhaust VOC Final Emission Rates: 47 State Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	8.362	0.182	-	-	9.628	0.175	-	-	12.420	0.175	-	-
1966	8.362	0.182	-	-	9.628	0.175	-	-	12.420	0.175	-	-
1967	8.362	0.182	-	-	9.628	0.175	-	-	12.420	0.175	-	-
1968	5.251	0.253	-	-	6.235	0.243	-	-	12.420	0.243	-	-
1969	5.251	0.253	-	-	6.235	0.243	-	-	12.420	0.243	-	-
1970	3.674	0.375	-	-	4.514	0.359	-	-	8.460	0.359	-	-
1971	3.674	0.375	-	-	4.514	0.359	-	-	8.460	0.359	-	-
1972	4.093	0.162	-	-	4.947	0.165	-	-	8.460	0.165	-	-
1973	4.093	0.162	-	-	4.947	0.165	-	-	8.460	0.165	-	-
1974	4.093	0.162	-	-	4.947	0.165	-	-	8.460	0.165	-	-
1975	1.692	0.284	-	-	3.070	0.262	-	-	8.460	0.262	-	-
1976	1.692	0.284	-	-	3.070	0.262	-	-	8.460	0.262	-	-
1977	1.692	0.284	-	-	3.070	0.262	-	-	8.460	0.262	-	-
1978	1.692	0.284	-	-	3.070	0.262	-	-	8.460	0.262	-	-
1979	1.692	0.284	-	-	2.118	0.272	-	-	2.118	0.272	-	-
1980	0.997	0.208	-	-	2.118	0.272	-	-	2.118	0.272	-	-
1981	0.785	0.071	-	-	1.352	0.088	-	-	1.352	0.088	-	-
1982	0.778	0.070	-	-	1.352	0.088	-	-	1.352	0.088	-	-
1983	0.305	0.067	-	-	1.351	0.088	-	-	1.351	0.088	-	-
1984	0.318	0.063	-	-	0.529	0.065	-	-	0.529	0.065	-	-
1985	0.331	0.060	-	-	0.521	0.065	-	-	0.521	0.065	-	-
1986	0.350	0.048	-	-	0.499	0.066	-	-	0.499	0.066	-	-
1987	0.357	0.048	-	-	0.479	0.067	-	-	0.479	0.067	-	-
1988	0.245	0.039	-	-	0.362	0.049	-	-	0.479	0.049	-	-
1989	0.248	0.040	-	-	0.354	0.047	-	-	0.479	0.047	-	-
1990	0.246	0.039	-	-	0.346	0.046	-	-	0.479	0.046	-	-
1991	0.245	0.039	-	-	0.338	0.047	-	-	0.479	0.047	-	-
1992	0.247	0.039	-	-	0.339	0.044	-	-	0.479	0.044	-	-
1993	0.247	0.039	-	-	0.338	0.044	-	-	0.479	0.044	-	-
1994	0.223	0.032	0.036	5.917	0.288	0.037	0.040	6.512	0.479	0.037	0.040	6.512
1995	0.198	0.024	0.033	5.917	0.239	0.031	0.036	6.512	0.479	0.031	0.036	6.512
1996	0.186	0.021	0.032	5.917	0.214	0.027	0.034	6.512	0.358	0.027	0.034	6.512
1997	0.186	0.021	0.032	5.917	0.214	0.027	0.034	6.512	0.238	0.027	0.034	6.512
1998	0.186	0.021	0.032	5.917	0.214	0.027	0.034	6.512	0.238	0.027	0.034	6.512
1999	0.176	0.019	0.030	6.434	0.194	0.024	0.032	6.645	0.238	0.024	0.032	6.645
2000	0.095	0.013	0.026	8.103	0.168	0.022	0.031	7.470	0.238	0.022	0.031	7.470
2001	0.107	0.010	0.024	8.950	0.110	0.015	0.026	10.167	0.238	0.015	0.026	10.167
2002	0.090	0.010	0.024	8.909	0.094	0.014	0.026	10.149	0.217	0.014	0.026	10.149
2003	0.065	0.010	0.024	8.852	0.071	0.014	0.025	10.123	0.196	0.014	0.025	10.123
2004	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111
2005	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111
2006	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111
2007	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111
2008	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111
2009	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111
2010 & later	0.055	0.010	0.024	8.828	0.061	0.014	0.025	10.111	0.185	0.014	0.025	10.111

Table G-14
Exhaust VOC Final Emission Rates: New York Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	8.160	0.180	-	-	9.467	0.172	-	-	12.212	0.172	-	-
1966	8.160	0.180	-	-	9.467	0.172	-	-	12.212	0.172	-	-
1967	8.160	0.180	-	-	9.467	0.172	-	-	12.212	0.172	-	-
1968	5.125	0.250	-	-	6.130	0.239	-	-	12.212	0.239	-	-
1969	5.125	0.250	-	-	6.130	0.239	-	-	12.212	0.239	-	-
1970	3.586	0.370	-	-	4.438	0.353	-	-	8.318	0.353	-	-
1971	3.586	0.370	-	-	4.438	0.353	-	-	8.318	0.353	-	-
1972	3.995	0.160	-	-	4.864	0.162	-	-	8.318	0.162	-	-
1973	3.995	0.160	-	-	4.864	0.162	-	-	8.318	0.162	-	-
1974	3.995	0.160	-	-	4.864	0.162	-	-	8.318	0.162	-	-
1975	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1976	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1977	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1978	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1979	1.651	0.280	-	-	2.083	0.267	-	-	2.083	0.267	-	-
1980	0.973	0.205	-	-	2.083	0.267	-	-	2.083	0.267	-	-
1981	0.592	0.040	-	-	1.194	0.046	-	-	1.194	0.046	-	-
1982	0.586	0.040	-	-	1.194	0.046	-	-	1.194	0.046	-	-
1983	0.286	0.040	-	-	1.192	0.046	-	-	1.192	0.046	-	-
1984	0.292	0.038	-	-	0.471	0.040	-	-	0.471	0.040	-	-
1985	0.298	0.036	-	-	0.464	0.040	-	-	0.464	0.040	-	-
1986	0.299	0.030	-	-	0.446	0.041	-	-	0.446	0.041	-	-
1987	0.304	0.029	-	-	0.429	0.041	-	-	0.429	0.041	-	-
1988	0.205	0.026	-	-	0.311	0.032	-	-	0.429	0.032	-	-
1989	0.210	0.027	-	-	0.304	0.031	-	-	0.429	0.031	-	-
1990	0.208	0.026	-	-	0.297	0.031	-	-	0.429	0.031	-	-
1991	0.207	0.026	-	-	0.289	0.031	-	-	0.429	0.031	-	-
1992	0.210	0.026	-	-	0.281	0.029	-	-	0.429	0.029	-	-
1993	0.210	0.026	-	-	0.279	0.029	-	-	0.429	0.029	-	-
1994	0.184	0.023	0.022	7.540	0.235	0.026	0.025	9.617	0.429	0.026	0.025	9.617
1995	0.158	0.020	0.019	7.540	0.190	0.023	0.021	9.617	0.429	0.023	0.021	9.617
1996	0.146	0.018	0.017	7.540	0.167	0.021	0.019	9.617	0.318	0.021	0.019	9.617
1997	0.146	0.018	0.017	7.540	0.167	0.021	0.019	9.617	0.207	0.021	0.019	9.617
1998	0.146	0.018	0.017	7.540	0.167	0.021	0.019	9.617	0.207	0.021	0.019	9.617
1999	0.119	0.014	0.014	11.497	0.129	0.015	0.015	13.519	0.207	0.015	0.015	13.519
2000	0.105	0.011	0.012	13.544	0.110	0.012	0.013	15.501	0.207	0.012	0.013	15.501
2001	0.085	0.010	0.012	14.300	0.090	0.011	0.013	16.172	0.207	0.011	0.013	16.172
2002	0.072	0.010	0.012	14.237	0.077	0.011	0.013	16.123	0.189	0.011	0.013	16.123
2003	0.052	0.010	0.011	14.149	0.058	0.011	0.013	16.053	0.170	0.011	0.013	16.053
2004	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2005	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2006	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2007	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2008	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2009	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2010 & later	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024

Table G-15
Exhaust VOC Final Emission Rates: Chicago Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	8.160	0.180	-	-	9.467	0.172	-	-	12.212	0.172	-	-
1966	8.160	0.180	-	-	9.467	0.172	-	-	12.212	0.172	-	-
1967	8.160	0.180	-	-	9.467	0.172	-	-	12.212	0.172	-	-
1968	5.125	0.250	-	-	6.130	0.239	-	-	12.212	0.239	-	-
1969	5.125	0.250	-	-	6.130	0.239	-	-	12.212	0.239	-	-
1970	3.586	0.370	-	-	4.438	0.353	-	-	8.318	0.353	-	-
1971	3.586	0.370	-	-	4.438	0.353	-	-	8.318	0.353	-	-
1972	3.995	0.160	-	-	4.864	0.162	-	-	8.318	0.162	-	-
1973	3.995	0.160	-	-	4.864	0.162	-	-	8.318	0.162	-	-
1974	3.995	0.160	-	-	4.864	0.162	-	-	8.318	0.162	-	-
1975	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1976	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1977	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1978	1.651	0.280	-	-	3.018	0.258	-	-	8.318	0.258	-	-
1979	1.651	0.280	-	-	2.083	0.267	-	-	2.083	0.267	-	-
1980	0.973	0.205	-	-	2.083	0.267	-	-	2.083	0.267	-	-
1981	0.592	0.040	-	-	1.194	0.046	-	-	1.194	0.046	-	-
1982	0.586	0.040	-	-	1.194	0.046	-	-	1.194	0.046	-	-
1983	0.286	0.040	-	-	1.192	0.046	-	-	1.192	0.046	-	-
1984	0.292	0.038	-	-	0.471	0.040	-	-	0.471	0.040	-	-
1985	0.298	0.036	-	-	0.464	0.040	-	-	0.464	0.040	-	-
1986	0.299	0.030	-	-	0.446	0.041	-	-	0.446	0.041	-	-
1987	0.304	0.029	-	-	0.429	0.041	-	-	0.429	0.041	-	-
1988	0.205	0.026	-	-	0.311	0.032	-	-	0.429	0.032	-	-
1989	0.210	0.027	-	-	0.304	0.031	-	-	0.429	0.031	-	-
1990	0.208	0.026	-	-	0.297	0.031	-	-	0.429	0.031	-	-
1991	0.207	0.026	-	-	0.289	0.031	-	-	0.429	0.031	-	-
1992	0.210	0.026	-	-	0.281	0.029	-	-	0.429	0.029	-	-
1993	0.210	0.026	-	-	0.279	0.029	-	-	0.429	0.029	-	-
1994	0.184	0.023	0.022	7.540	0.235	0.026	0.025	9.617	0.429	0.026	0.025	9.617
1995	0.158	0.020	0.019	7.540	0.190	0.023	0.021	9.617	0.429	0.023	0.021	9.617
1996	0.146	0.018	0.017	7.540	0.167	0.021	0.019	9.617	0.318	0.021	0.019	9.617
1997	0.146	0.018	0.017	7.540	0.167	0.021	0.019	9.617	0.207	0.021	0.019	9.617
1998	0.146	0.018	0.017	7.540	0.167	0.021	0.019	9.617	0.207	0.021	0.019	9.617
1999	0.146	0.018	0.017	7.540	0.162	0.020	0.019	8.381	0.207	0.020	0.019	8.381
2000	0.063	0.012	0.013	11.847	0.142	0.019	0.018	9.720	0.207	0.019	0.018	9.720
2001	0.085	0.010	0.012	14.300	0.090	0.011	0.013	16.172	0.207	0.011	0.013	16.172
2002	0.072	0.010	0.012	14.237	0.077	0.011	0.013	16.123	0.189	0.011	0.013	16.123
2003	0.052	0.010	0.011	14.149	0.058	0.011	0.013	16.053	0.170	0.011	0.013	16.053
2004	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2005	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2006	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2007	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2008	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2009	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024
2010 & later	0.044	0.010	0.011	14.112	0.050	0.011	0.013	16.024	0.161	0.011	0.013	16.024

Table G-16
Exhaust VOC Final Emission Rates: Atlanta & Charlotte Baseline
Applicable to Calendar Year 2000 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	8.379	0.181	-	-	9.486	0.167	-	-	12.236	0.167	-	-
1966	8.379	0.181	-	-	9.486	0.167	-	-	12.236	0.167	-	-
1967	8.379	0.181	-	-	9.486	0.167	-	-	12.236	0.167	-	-
1968	5.262	0.251	-	-	6.142	0.232	-	-	12.236	0.232	-	-
1969	5.262	0.251	-	-	6.142	0.232	-	-	12.236	0.232	-	-
1970	3.682	0.371	-	-	4.447	0.343	-	-	8.334	0.343	-	-
1971	3.682	0.371	-	-	4.447	0.343	-	-	8.334	0.343	-	-
1972	4.102	0.160	-	-	4.874	0.157	-	-	8.334	0.157	-	-
1973	4.102	0.160	-	-	4.874	0.157	-	-	8.334	0.157	-	-
1974	4.102	0.160	-	-	4.874	0.157	-	-	8.334	0.157	-	-
1975	1.696	0.281	-	-	3.024	0.250	-	-	8.334	0.250	-	-
1976	1.696	0.281	-	-	3.024	0.250	-	-	8.334	0.250	-	-
1977	1.696	0.281	-	-	3.024	0.250	-	-	8.334	0.250	-	-
1978	1.696	0.281	-	-	3.024	0.250	-	-	8.334	0.250	-	-
1979	1.696	0.281	-	-	2.087	0.259	-	-	2.087	0.259	-	-
1980	0.999	0.206	-	-	2.087	0.259	-	-	2.087	0.259	-	-
1981	0.701	0.046	-	-	1.379	0.051	-	-	1.379	0.051	-	-
1982	0.694	0.046	-	-	1.379	0.051	-	-	1.379	0.051	-	-
1983	0.348	0.046	-	-	1.377	0.051	-	-	1.377	0.051	-	-
1984	0.354	0.044	-	-	0.544	0.045	-	-	0.544	0.045	-	-
1985	0.361	0.041	-	-	0.536	0.045	-	-	0.536	0.045	-	-
1986	0.360	0.034	-	-	0.515	0.046	-	-	0.515	0.046	-	-
1987	0.367	0.034	-	-	0.496	0.047	-	-	0.496	0.047	-	-
1988	0.247	0.030	-	-	0.360	0.038	-	-	0.496	0.038	-	-
1989	0.254	0.031	-	-	0.352	0.036	-	-	0.496	0.036	-	-
1990	0.251	0.030	-	-	0.344	0.036	-	-	0.496	0.036	-	-
1991	0.250	0.030	-	-	0.334	0.037	-	-	0.496	0.037	-	-
1992	0.254	0.030	-	-	0.339	0.034	-	-	0.496	0.034	-	-
1993	0.253	0.030	-	-	0.338	0.034	-	-	0.496	0.034	-	-
1994	0.229	0.028	0.027	9.184	0.291	0.031	0.030	9.285	0.496	0.031	0.030	9.285
1995	0.205	0.025	0.023	9.184	0.245	0.028	0.026	9.285	0.496	0.028	0.026	9.285
1996	0.193	0.023	0.021	9.184	0.221	0.027	0.024	9.285	0.369	0.027	0.024	9.285
1997	0.193	0.023	0.021	9.184	0.221	0.027	0.024	9.285	0.243	0.027	0.024	9.285
1998	0.193	0.023	0.021	9.184	0.221	0.027	0.024	9.285	0.243	0.027	0.024	9.285
1999	0.193	0.023	0.021	9.184	0.215	0.026	0.023	7.929	0.243	0.026	0.023	7.929
2000	0.082	0.015	0.016	12.724	0.188	0.024	0.022	9.351	0.243	0.024	0.022	9.351
2001	0.111	0.013	0.014	14.711	0.114	0.014	0.015	16.130	0.243	0.014	0.015	16.130
2002	0.093	0.012	0.014	14.614	0.097	0.014	0.015	16.083	0.221	0.014	0.015	16.083
2003	0.068	0.012	0.014	14.479	0.073	0.014	0.015	16.017	0.199	0.014	0.015	16.017
2004	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989
2005	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989
2006	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989
2007	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989
2008	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989
2009	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989
2010 & later	0.057	0.012	0.014	14.421	0.063	0.013	0.015	15.989	0.189	0.013	0.015	15.989

Table G-17
Exhaust VOC Final Emission Rates: New York with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	7.808	0.185	-	-	8.241	0.185	-	-	10.631	0.185	-	-
1966	7.808	0.185	-	-	8.241	0.185	-	-	10.631	0.185	-	-
1967	7.808	0.185	-	-	8.241	0.185	-	-	10.631	0.185	-	-
1968	4.904	0.258	-	-	5.336	0.258	-	-	10.631	0.258	-	-
1969	4.904	0.258	-	-	5.336	0.258	-	-	10.631	0.258	-	-
1970	3.431	0.381	-	-	3.864	0.381	-	-	7.241	0.381	-	-
1971	3.431	0.381	-	-	3.864	0.381	-	-	7.241	0.381	-	-
1972	3.822	0.165	-	-	4.234	0.175	-	-	7.241	0.175	-	-
1973	3.822	0.165	-	-	4.234	0.175	-	-	7.241	0.175	-	-
1974	3.822	0.165	-	-	4.234	0.175	-	-	7.241	0.175	-	-
1975	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1976	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1977	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1978	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1979	1.580	0.288	-	-	1.813	0.288	-	-	1.813	0.288	-	-
1980	0.931	0.211	-	-	1.813	0.288	-	-	1.813	0.288	-	-
1981	0.567	0.041	-	-	1.039	0.050	-	-	1.039	0.050	-	-
1982	0.561	0.041	-	-	1.039	0.050	-	-	1.039	0.050	-	-
1983	0.257	0.041	-	-	1.038	0.050	-	-	1.038	0.050	-	-
1984	0.264	0.039	-	-	0.383	0.041	-	-	0.383	0.041	-	-
1985	0.271	0.037	-	-	0.379	0.041	-	-	0.379	0.041	-	-
1986	0.275	0.030	-	-	0.366	0.042	-	-	0.366	0.042	-	-
1987	0.280	0.029	-	-	0.355	0.043	-	-	0.355	0.043	-	-
1988	0.188	0.025	-	-	0.267	0.032	-	-	0.355	0.032	-	-
1989	0.192	0.026	-	-	0.263	0.030	-	-	0.355	0.030	-	-
1990	0.190	0.025	-	-	0.258	0.030	-	-	0.355	0.030	-	-
1991	0.189	0.025	-	-	0.251	0.030	-	-	0.355	0.030	-	-
1992	0.192	0.026	-	-	0.256	0.029	-	-	0.355	0.029	-	-
1993	0.192	0.026	-	-	0.255	0.028	-	-	0.355	0.028	-	-
1994	0.169	0.022	0.022	4.467	0.215	0.025	0.024	9.617	0.355	0.025	0.024	9.617
1995	0.145	0.019	0.018	4.467	0.174	0.022	0.020	9.617	0.355	0.022	0.020	9.617
1996	0.134	0.017	0.017	4.467	0.154	0.020	0.018	9.617	0.262	0.020	0.018	9.617
1997	0.134	0.017	0.017	4.467	0.154	0.020	0.018	9.617	0.168	0.020	0.018	9.617
1998	0.134	0.017	0.017	4.467	0.154	0.020	0.018	9.617	0.168	0.020	0.018	9.617
1999	0.103	0.013	0.013	9.858	0.115	0.014	0.015	13.519	0.168	0.014	0.015	13.519
2000	0.087	0.010	0.012	12.646	0.096	0.012	0.013	15.501	0.168	0.012	0.013	15.501
2001	0.069	0.009	0.011	13.734	0.077	0.011	0.012	16.172	0.168	0.011	0.012	16.172
2002	0.058	0.009	0.011	13.707	0.066	0.010	0.012	16.123	0.153	0.010	0.012	16.123
2003	0.043	0.009	0.011	13.669	0.050	0.010	0.012	16.053	0.139	0.010	0.012	16.053
2004	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.084	0.009	0.011	15.643
2005	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.065	0.009	0.011	15.643
2006	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.060	0.009	0.011	15.643
2007	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.056	0.009	0.011	15.643
2008	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.047	0.009	0.011	15.643
2009	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.039	0.009	0.011	15.643
2010 & later	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.039	0.009	0.011	15.643

Table G-18
Exhaust VOC Final Emission Rates: 47 State with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	7.825	0.186	-	-	8.258	0.186	-	-	10.653	0.186	-	-
1966	7.825	0.186	-	-	8.258	0.186	-	-	10.653	0.186	-	-
1967	7.825	0.186	-	-	8.258	0.186	-	-	10.653	0.186	-	-
1968	4.914	0.258	-	-	5.348	0.258	-	-	10.653	0.258	-	-
1969	4.914	0.258	-	-	5.348	0.258	-	-	10.653	0.258	-	-
1970	3.438	0.382	-	-	3.872	0.382	-	-	7.256	0.382	-	-
1971	3.438	0.382	-	-	3.872	0.382	-	-	7.256	0.382	-	-
1972	3.830	0.165	-	-	4.243	0.175	-	-	7.256	0.175	-	-
1973	3.830	0.165	-	-	4.243	0.175	-	-	7.256	0.175	-	-
1974	3.830	0.165	-	-	4.243	0.175	-	-	7.256	0.175	-	-
1975	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1976	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1977	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1978	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1979	1.583	0.289	-	-	1.817	0.289	-	-	1.817	0.289	-	-
1980	0.933	0.212	-	-	1.817	0.289	-	-	1.817	0.289	-	-
1981	0.734	0.072	-	-	1.160	0.093	-	-	1.160	0.093	-	-
1982	0.728	0.072	-	-	1.160	0.093	-	-	1.160	0.093	-	-
1983	0.254	0.067	-	-	1.158	0.093	-	-	1.158	0.093	-	-
1984	0.268	0.064	-	-	0.418	0.067	-	-	0.418	0.067	-	-
1985	0.281	0.060	-	-	0.413	0.068	-	-	0.413	0.068	-	-
1986	0.306	0.048	-	-	0.398	0.068	-	-	0.398	0.068	-	-
1987	0.313	0.048	-	-	0.385	0.069	-	-	0.385	0.069	-	-
1988	0.214	0.037	-	-	0.308	0.048	-	-	0.385	0.048	-	-
1989	0.217	0.039	-	-	0.303	0.045	-	-	0.385	0.045	-	-
1990	0.214	0.038	-	-	0.298	0.044	-	-	0.385	0.044	-	-
1991	0.214	0.038	-	-	0.292	0.045	-	-	0.385	0.045	-	-
1992	0.215	0.039	-	-	0.295	0.042	-	-	0.385	0.042	-	-
1993	0.215	0.038	-	-	0.294	0.042	-	-	0.385	0.042	-	-
1994	0.190	0.030	0.035	3.600	0.247	0.035	0.038	6.512	0.385	0.035	0.038	6.512
1995	0.166	0.022	0.032	3.600	0.200	0.028	0.035	6.512	0.385	0.028	0.035	6.512
1996	0.154	0.018	0.030	3.600	0.176	0.024	0.033	6.512	0.289	0.024	0.033	6.512
1997	0.154	0.018	0.030	3.600	0.176	0.024	0.033	6.512	0.193	0.024	0.033	6.512
1998	0.154	0.018	0.030	3.600	0.176	0.024	0.033	6.512	0.193	0.024	0.033	6.512
1999	0.143	0.016	0.029	4.434	0.160	0.021	0.031	6.645	0.193	0.021	0.031	6.645
2000	0.073	0.011	0.025	6.967	0.138	0.019	0.030	7.470	0.193	0.019	0.030	7.470
2001	0.079	0.009	0.023	8.546	0.089	0.013	0.025	10.167	0.193	0.013	0.025	10.167
2002	0.067	0.009	0.023	8.535	0.076	0.013	0.025	10.149	0.176	0.013	0.025	10.149
2003	0.049	0.009	0.023	8.521	0.058	0.013	0.025	10.123	0.159	0.013	0.025	10.123
2004	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.096	0.012	0.024	9.976
2005	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.075	0.012	0.024	9.976
2006	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.069	0.012	0.024	9.976
2007	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.064	0.012	0.024	9.976
2008	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.054	0.012	0.024	9.976
2009	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.045	0.012	0.024	9.976
2010 & later	0.041	0.008	0.023	8.515	0.041	0.012	0.024	9.976	0.045	0.012	0.024	9.976

Table G-19
Exhaust VOC Final Emission Rates: Chicago with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	7.808	0.185	-	-	8.241	0.185	-	-	10.631	0.185	-	-
1966	7.808	0.185	-	-	8.241	0.185	-	-	10.631	0.185	-	-
1967	7.808	0.185	-	-	8.241	0.185	-	-	10.631	0.185	-	-
1968	4.904	0.258	-	-	5.336	0.258	-	-	10.631	0.258	-	-
1969	4.904	0.258	-	-	5.336	0.258	-	-	10.631	0.258	-	-
1970	3.431	0.381	-	-	3.864	0.381	-	-	7.241	0.381	-	-
1971	3.431	0.381	-	-	3.864	0.381	-	-	7.241	0.381	-	-
1972	3.822	0.165	-	-	4.234	0.175	-	-	7.241	0.175	-	-
1973	3.822	0.165	-	-	4.234	0.175	-	-	7.241	0.175	-	-
1974	3.822	0.165	-	-	4.234	0.175	-	-	7.241	0.175	-	-
1975	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1976	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1977	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1978	1.580	0.288	-	-	2.628	0.278	-	-	7.241	0.278	-	-
1979	1.580	0.288	-	-	1.813	0.288	-	-	1.813	0.288	-	-
1980	0.931	0.211	-	-	1.813	0.288	-	-	1.813	0.288	-	-
1981	0.567	0.041	-	-	1.039	0.050	-	-	1.039	0.050	-	-
1982	0.561	0.041	-	-	1.039	0.050	-	-	1.039	0.050	-	-
1983	0.257	0.041	-	-	1.038	0.050	-	-	1.038	0.050	-	-
1984	0.264	0.039	-	-	0.383	0.041	-	-	0.383	0.041	-	-
1985	0.271	0.037	-	-	0.379	0.041	-	-	0.379	0.041	-	-
1986	0.275	0.030	-	-	0.366	0.042	-	-	0.366	0.042	-	-
1987	0.280	0.029	-	-	0.355	0.043	-	-	0.355	0.043	-	-
1988	0.188	0.025	-	-	0.267	0.032	-	-	0.355	0.032	-	-
1989	0.192	0.026	-	-	0.263	0.030	-	-	0.355	0.030	-	-
1990	0.190	0.025	-	-	0.258	0.030	-	-	0.355	0.030	-	-
1991	0.189	0.025	-	-	0.251	0.030	-	-	0.355	0.030	-	-
1992	0.192	0.026	-	-	0.256	0.029	-	-	0.355	0.029	-	-
1993	0.192	0.026	-	-	0.255	0.028	-	-	0.355	0.028	-	-
1994	0.169	0.022	0.022	4.467	0.215	0.025	0.024	9.617	0.355	0.025	0.024	9.617
1995	0.145	0.019	0.018	4.467	0.174	0.022	0.020	9.617	0.355	0.022	0.020	9.617
1996	0.134	0.017	0.017	4.467	0.154	0.020	0.018	9.617	0.262	0.020	0.018	9.617
1997	0.134	0.017	0.017	4.467	0.154	0.020	0.018	9.617	0.168	0.020	0.018	9.617
1998	0.134	0.017	0.017	4.467	0.154	0.020	0.018	9.617	0.168	0.020	0.018	9.617
1999	0.134	0.017	0.017	4.467	0.149	0.019	0.018	8.381	0.168	0.019	0.018	8.381
2000	0.055	0.011	0.013	10.045	0.130	0.018	0.017	9.720	0.168	0.018	0.017	9.720
2001	0.069	0.009	0.011	13.734	0.077	0.011	0.012	16.172	0.168	0.011	0.012	16.172
2002	0.058	0.009	0.011	13.707	0.066	0.010	0.012	16.123	0.153	0.010	0.012	16.123
2003	0.043	0.009	0.011	13.669	0.050	0.010	0.012	16.053	0.139	0.010	0.012	16.053
2004	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.084	0.009	0.011	15.643
2005	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.065	0.009	0.011	15.643
2006	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.060	0.009	0.011	15.643
2007	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.056	0.009	0.011	15.643
2008	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.047	0.009	0.011	15.643
2009	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.039	0.009	0.011	15.643
2010 & later	0.036	0.009	0.011	13.652	0.036	0.009	0.011	15.643	0.039	0.009	0.011	15.643

Table G-20
Exhaust VOC Final Emission Rates: Atl & Cha with Tier 2 & Sulfur
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	7.824	0.186	-	-	8.257	0.186	-	-	10.651	0.186	-	-
1966	7.824	0.186	-	-	8.257	0.186	-	-	10.651	0.186	-	-
1967	7.824	0.186	-	-	8.257	0.186	-	-	10.651	0.186	-	-
1968	4.913	0.258	-	-	5.347	0.258	-	-	10.651	0.258	-	-
1969	4.913	0.258	-	-	5.347	0.258	-	-	10.651	0.258	-	-
1970	3.438	0.382	-	-	3.871	0.382	-	-	7.255	0.382	-	-
1971	3.438	0.382	-	-	3.871	0.382	-	-	7.255	0.382	-	-
1972	3.830	0.165	-	-	4.243	0.175	-	-	7.255	0.175	-	-
1973	3.830	0.165	-	-	4.243	0.175	-	-	7.255	0.175	-	-
1974	3.830	0.165	-	-	4.243	0.175	-	-	7.255	0.175	-	-
1975	1.583	0.289	-	-	2.633	0.279	-	-	7.255	0.279	-	-
1976	1.583	0.289	-	-	2.633	0.279	-	-	7.255	0.279	-	-
1977	1.583	0.289	-	-	2.633	0.279	-	-	7.255	0.279	-	-
1978	1.583	0.289	-	-	2.633	0.279	-	-	7.255	0.279	-	-
1979	1.583	0.289	-	-	1.816	0.289	-	-	1.816	0.289	-	-
1980	0.933	0.212	-	-	1.816	0.289	-	-	1.816	0.289	-	-
1981	0.655	0.048	-	-	1.201	0.057	-	-	1.201	0.057	-	-
1982	0.648	0.048	-	-	1.201	0.057	-	-	1.201	0.057	-	-
1983	0.297	0.047	-	-	1.199	0.057	-	-	1.199	0.057	-	-
1984	0.305	0.045	-	-	0.442	0.048	-	-	0.442	0.048	-	-
1985	0.313	0.042	-	-	0.437	0.048	-	-	0.437	0.048	-	-
1986	0.318	0.034	-	-	0.423	0.049	-	-	0.423	0.049	-	-
1987	0.324	0.034	-	-	0.410	0.049	-	-	0.410	0.049	-	-
1988	0.217	0.029	-	-	0.309	0.037	-	-	0.410	0.037	-	-
1989	0.222	0.030	-	-	0.304	0.035	-	-	0.410	0.035	-	-
1990	0.220	0.029	-	-	0.298	0.035	-	-	0.410	0.035	-	-
1991	0.219	0.029	-	-	0.290	0.035	-	-	0.410	0.035	-	-
1992	0.222	0.030	-	-	0.296	0.033	-	-	0.410	0.033	-	-
1993	0.221	0.030	-	-	0.295	0.033	-	-	0.410	0.033	-	-
1994	0.195	0.026	0.026	3.638	0.249	0.029	0.028	9.285	0.410	0.029	0.028	9.285
1995	0.170	0.022	0.022	3.638	0.203	0.025	0.024	9.285	0.410	0.025	0.024	9.285
1996	0.157	0.020	0.020	3.638	0.180	0.023	0.022	9.285	0.304	0.023	0.022	9.285
1997	0.157	0.020	0.020	3.638	0.180	0.023	0.022	9.285	0.197	0.023	0.022	9.285
1998	0.157	0.020	0.020	3.638	0.180	0.023	0.022	9.285	0.197	0.023	0.022	9.285
1999	0.157	0.020	0.020	3.638	0.174	0.023	0.021	7.929	0.197	0.023	0.021	7.929
2000	0.064	0.013	0.015	9.563	0.152	0.021	0.020	9.351	0.197	0.021	0.020	9.351
2001	0.081	0.011	0.013	13.711	0.091	0.012	0.015	16.130	0.197	0.012	0.015	16.130
2002	0.068	0.011	0.013	13.685	0.077	0.012	0.015	16.083	0.179	0.012	0.015	16.083
2003	0.050	0.011	0.013	13.648	0.059	0.012	0.014	16.017	0.162	0.012	0.014	16.017
2004	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.098	0.011	0.013	15.624
2005	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.076	0.011	0.013	15.624
2006	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.071	0.011	0.013	15.624
2007	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.065	0.011	0.013	15.624
2008	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.055	0.011	0.013	15.624
2009	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.046	0.011	0.013	15.624
2010 & later	0.042	0.010	0.013	13.633	0.042	0.011	0.013	15.624	0.046	0.011	0.013	15.624

Table G-21
Exhaust VOC Final Emission Rates: 47 State with API 1 Proposal
Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	8.217	-	-	-	9.244	-	-	-	11.925	-	-	-
1966	8.217	-	-	-	9.244	-	-	-	11.925	-	-	-
1967	8.217	-	-	-	9.244	-	-	-	11.925	-	-	-
1968	5.160	-	-	-	5.986	-	-	-	11.925	-	-	-
1969	5.160	-	-	-	5.986	-	-	-	11.925	-	-	-
1970	3.610	-	-	-	4.334	-	-	-	8.122	-	-	-
1971	3.610	-	-	-	4.334	-	-	-	8.122	-	-	-
1972	4.022	-	-	-	4.750	-	-	-	8.122	-	-	-
1973	4.022	0.163	-	-	4.750	0.167	-	-	8.122	0.167	-	-
1974	4.022	0.163	-	-	4.750	0.167	-	-	8.122	0.167	-	-
1975	1.663	0.284	-	-	2.947	0.265	-	-	8.122	0.265	-	-
1976	1.663	0.284	-	-	2.947	0.265	-	-	8.122	0.265	-	-
1977	1.663	0.284	-	-	2.947	0.265	-	-	8.122	0.265	-	-
1978	1.663	0.284	-	-	2.947	0.265	-	-	8.122	0.265	-	-
1979	1.663	0.284	-	-	2.033	0.275	-	-	2.033	0.275	-	-
1980	0.980	0.208	-	-	2.033	0.275	-	-	2.033	0.275	-	-
1981	0.771	0.071	-	-	1.298	0.089	-	-	1.298	0.089	-	-
1982	0.764	0.071	-	-	1.298	0.089	-	-	1.298	0.089	-	-
1983	0.293	0.067	-	-	1.297	0.089	-	-	1.297	0.089	-	-
1984	0.306	0.063	-	-	0.499	0.065	-	-	0.499	0.065	-	-
1985	0.319	0.060	-	-	0.492	0.066	-	-	0.492	0.066	-	-
1986	0.339	0.048	-	-	0.471	0.067	-	-	0.471	0.067	-	-
1987	0.346	0.048	-	-	0.453	0.068	-	-	0.453	0.068	-	-
1988	0.237	0.038	-	-	0.347	0.049	-	-	0.453	0.049	-	-
1989	0.241	0.040	-	-	0.339	0.046	-	-	0.453	0.046	-	-
1990	0.238	0.039	-	-	0.333	0.046	-	-	0.453	0.046	-	-
1991	0.237	0.038	-	-	0.325	0.046	-	-	0.453	0.046	-	-
1992	0.239	0.039	-	-	0.328	0.044	-	-	0.453	0.044	-	-
1993	0.239	0.039	-	-	0.327	0.043	-	-	0.453	0.043	-	-
1994	0.212	0.031	0.036	5.355	0.274	0.036	0.039	7.198	0.453	0.036	0.039	7.198
1995	0.184	0.023	0.033	5.355	0.222	0.029	0.036	7.198	0.453	0.029	0.036	7.198
1996	0.171	0.019	0.031	5.355	0.196	0.026	0.034	7.198	0.334	0.026	0.034	7.198
1997	0.171	0.019	0.031	5.355	0.196	0.026	0.034	7.198	0.215	0.026	0.034	7.198
1998	0.171	0.019	0.031	5.355	0.196	0.026	0.034	7.198	0.215	0.026	0.034	7.198
1999	0.161	0.018	0.030	5.940	0.179	0.023	0.032	7.455	0.215	0.023	0.032	7.455
2000	0.088	0.012	0.026	7.830	0.155	0.021	0.030	8.125	0.215	0.021	0.030	8.125
2001	0.100	0.010	0.024	8.809	0.105	0.014	0.025	10.481	0.215	0.014	0.025	10.481
2002	0.084	0.010	0.024	8.784	0.089	0.014	0.025	10.440	0.195	0.014	0.025	10.440
2003	0.061	0.010	0.024	8.748	0.068	0.014	0.025	10.383	0.176	0.014	0.025	10.383
2004	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.115	0.013	0.024	10.175
2005	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.088	0.013	0.024	10.175
2006	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.082	0.013	0.024	10.175
2007	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.076	0.013	0.024	10.175
2008	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.066	0.013	0.024	10.175
2009	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.056	0.013	0.024	10.175
2010 & later	0.052	0.010	0.024	8.733	0.051	0.013	0.024	10.175	0.056	0.013	0.024	10.175

Table G-22
Exhaust VOC Final Emission Rates: 47 State with API 2 Proposal
Applicable to Calendar Year 2010 and Later*

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	7.932	-	-	-	8.521	-	-	-	10.992	-	-	-
1966	7.932	-	-	-	8.521	-	-	-	10.992	-	-	-
1967	7.932	-	-	-	8.521	-	-	-	10.992	-	-	-
1968	4.981	-	-	-	5.518	-	-	-	10.992	-	-	-
1969	4.981	-	-	-	5.518	-	-	-	10.992	-	-	-
1970	3.485	-	-	-	3.995	-	-	-	7.487	-	-	-
1971	3.485	-	-	-	3.995	-	-	-	7.487	-	-	-
1972	3.883	-	-	-	4.378	-	-	-	7.487	-	-	-
1973	3.883	0.165	-	-	4.378	0.173	-	-	7.487	0.173	-	-
1974	3.883	0.165	-	-	4.378	0.173	-	-	7.487	0.173	-	-
1975	1.605	0.288	-	-	2.717	0.275	-	-	7.487	0.275	-	-
1976	1.605	0.288	-	-	2.717	0.275	-	-	7.487	0.275	-	-
1977	1.605	0.288	-	-	2.717	0.275	-	-	7.487	0.275	-	-
1978	1.605	0.288	-	-	2.717	0.275	-	-	7.487	0.275	-	-
1979	1.605	0.288	-	-	1.874	0.286	-	-	1.874	0.286	-	-
1980	0.946	0.211	-	-	1.874	0.286	-	-	1.874	0.286	-	-
1981	0.744	0.072	-	-	1.197	0.092	-	-	1.197	0.092	-	-
1982	0.738	0.071	-	-	1.197	0.092	-	-	1.197	0.092	-	-
1983	0.264	0.067	-	-	1.195	0.092	-	-	1.195	0.092	-	-
1984	0.278	0.064	-	-	0.439	0.067	-	-	0.439	0.067	-	-
1985	0.291	0.060	-	-	0.434	0.067	-	-	0.434	0.067	-	-
1986	0.315	0.048	-	-	0.417	0.068	-	-	0.417	0.068	-	-
1987	0.322	0.048	-	-	0.403	0.069	-	-	0.403	0.069	-	-
1988	0.220	0.038	-	-	0.318	0.048	-	-	0.403	0.048	-	-
1989	0.223	0.039	-	-	0.312	0.045	-	-	0.403	0.045	-	-
1990	0.221	0.038	-	-	0.307	0.045	-	-	0.403	0.045	-	-
1991	0.220	0.038	-	-	0.301	0.045	-	-	0.403	0.045	-	-
1992	0.222	0.039	-	-	0.304	0.043	-	-	0.403	0.043	-	-
1993	0.221	0.039	-	-	0.303	0.042	-	-	0.403	0.042	-	-
1994	0.197	0.030	0.035	4.068	0.255	0.035	0.039	6.693	0.403	0.035	0.039	6.693
1995	0.172	0.022	0.032	4.068	0.208	0.028	0.035	6.693	0.403	0.028	0.035	6.693
1996	0.160	0.018	0.031	4.068	0.184	0.025	0.033	6.693	0.302	0.025	0.033	6.693
1997	0.160	0.018	0.031	4.068	0.184	0.025	0.033	6.693	0.201	0.025	0.033	6.693
1998	0.160	0.018	0.031	4.068	0.184	0.025	0.033	6.693	0.201	0.025	0.033	6.693
1999	0.150	0.017	0.029	4.837	0.166	0.022	0.032	6.862	0.201	0.022	0.032	6.862
2000	0.078	0.011	0.025	7.211	0.144	0.020	0.030	7.649	0.201	0.020	0.030	7.649
2001	0.085	0.009	0.024	8.633	0.093	0.013	0.025	10.269	0.201	0.013	0.025	10.269
2002	0.072	0.009	0.024	8.624	0.080	0.013	0.025	10.251	0.183	0.013	0.025	10.251
2003	0.053	0.009	0.023	8.612	0.061	0.013	0.025	10.225	0.165	0.013	0.025	10.225
2004	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.102	0.012	0.024	10.061
2005	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.080	0.012	0.024	10.061
2006	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.074	0.012	0.024	10.061
2007	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.069	0.012	0.024	10.061
2008	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.059	0.012	0.024	10.061
2009	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.049	0.012	0.024	10.061
2010 & later	0.046	0.009	0.023	8.607	0.045	0.012	0.024	10.061	0.049	0.012	0.024	10.061

*** API 1 Applies to Calendar Year 2004 through 2009**

Table G-23

Exhaust VOC Final Emission Rates: 47 State with Default Standards

Applicable to Calendar Year 2004 and Later

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex	ZML	DR1	DR2	Flex
1965	7.825	0.186	-	-	8.258	0.186	-	-	10.653	0.186	-	-
1966	7.825	0.186	-	-	8.258	0.186	-	-	10.653	0.186	-	-
1967	7.825	0.186	-	-	8.258	0.186	-	-	10.653	0.186	-	-
1968	4.914	0.258	-	-	5.348	0.258	-	-	10.653	0.258	-	-
1969	4.914	0.258	-	-	5.348	0.258	-	-	10.653	0.258	-	-
1970	3.438	0.382	-	-	3.872	0.382	-	-	7.256	0.382	-	-
1971	3.438	0.382	-	-	3.872	0.382	-	-	7.256	0.382	-	-
1972	3.830	0.165	-	-	4.243	0.175	-	-	7.256	0.175	-	-
1973	3.830	0.165	-	-	4.243	0.175	-	-	7.256	0.175	-	-
1974	3.830	0.165	-	-	4.243	0.175	-	-	7.256	0.175	-	-
1975	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1976	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1977	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1978	1.583	0.289	-	-	2.633	0.279	-	-	7.256	0.279	-	-
1979	1.583	0.289	-	-	1.817	0.289	-	-	1.817	0.289	-	-
1980	0.933	0.212	-	-	1.817	0.289	-	-	1.817	0.289	-	-
1981	0.734	0.072	-	-	1.160	0.093	-	-	1.160	0.093	-	-
1982	0.728	0.072	-	-	1.160	0.093	-	-	1.160	0.093	-	-
1983	0.254	0.067	-	-	1.158	0.093	-	-	1.158	0.093	-	-
1984	0.268	0.064	-	-	0.418	0.067	-	-	0.418	0.067	-	-
1985	0.281	0.060	-	-	0.413	0.068	-	-	0.413	0.068	-	-
1986	0.306	0.048	-	-	0.398	0.068	-	-	0.398	0.068	-	-
1987	0.313	0.048	-	-	0.385	0.069	-	-	0.385	0.069	-	-
1988	0.214	0.037	-	-	0.308	0.048	-	-	0.385	0.048	-	-
1989	0.217	0.039	-	-	0.303	0.045	-	-	0.385	0.045	-	-
1990	0.214	0.038	-	-	0.298	0.044	-	-	0.385	0.044	-	-
1991	0.214	0.038	-	-	0.292	0.045	-	-	0.385	0.045	-	-
1992	0.215	0.039	-	-	0.295	0.042	-	-	0.385	0.042	-	-
1993	0.215	0.038	-	-	0.294	0.042	-	-	0.385	0.042	-	-
1994	0.190	0.030	0.035	3.600	0.247	0.035	0.038	6.512	0.385	0.035	0.038	6.512
1995	0.166	0.022	0.032	3.600	0.200	0.028	0.035	6.512	0.385	0.028	0.035	6.512
1996	0.154	0.018	0.030	3.600	0.176	0.024	0.033	6.512	0.289	0.024	0.033	6.512
1997	0.154	0.018	0.030	3.600	0.176	0.024	0.033	6.512	0.193	0.024	0.033	6.512
1998	0.154	0.018	0.030	3.600	0.176	0.024	0.033	6.512	0.193	0.024	0.033	6.512
1999	0.143	0.016	0.029	4.434	0.160	0.021	0.031	6.645	0.193	0.021	0.031	6.645
2000	0.073	0.011	0.025	6.967	0.138	0.019	0.030	7.470	0.193	0.019	0.030	7.470
2001	0.079	0.009	0.023	8.546	0.089	0.013	0.025	10.167	0.193	0.013	0.025	10.167
2002	0.067	0.009	0.023	8.535	0.076	0.013	0.025	10.149	0.176	0.013	0.025	10.149
2003	0.049	0.009	0.023	8.521	0.058	0.013	0.025	10.123	0.159	0.013	0.025	10.123
2004	0.046	0.009	0.024	8.108	0.051	0.013	0.025	10.014	0.172	0.013	0.025	10.014
2005	0.050	0.010	0.024	7.701	0.052	0.013	0.025	9.916	0.150	0.013	0.025	9.916
2006	0.053	0.010	0.024	7.479	0.053	0.013	0.025	9.863	0.150	0.013	0.025	9.863
2007	0.053	0.010	0.024	7.479	0.053	0.013	0.025	9.863	0.150	0.013	0.025	9.863
2008	0.053	0.010	0.024	7.479	0.053	0.013	0.025	9.863	0.150	0.013	0.025	9.863
2009	0.053	0.010	0.024	7.479	0.053	0.013	0.025	9.863	0.150	0.013	0.025	9.863
2010 & later	0.053	0.010	0.024	7.479	0.053	0.013	0.025	9.863	0.150	0.013	0.025	9.863

Table G-24
Exhaust VOC Final Emission Rates: Diesel
Applicable to All Calendar Years

MODEL	Diesel LDV				Diesel LDT1/2				Diesel LDT3/4			
	BASELINE		TIER 2		BASELINE		TIER 2		BASELINE		TIER 2	
YEAR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR	ZML	DR
1965	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1966	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1967	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1968	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1969	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1970	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1971	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1972	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1973	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1974	1.267	0.080	1.267	0.080	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1975	0.409	0.070	0.409	0.070	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1976	0.409	0.070	0.409	0.070	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1977	0.409	0.070	0.409	0.070	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1978	0.409	0.070	0.409	0.070	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1979	0.409	0.070	0.409	0.070	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1980	0.279	0.030	0.279	0.030	0.826	0.080	0.826	0.080	0.826	0.080	0.826	0.080
1981	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1982	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1983	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1984	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1985	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1986	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1987	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1988	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1989	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1990	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1991	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1992	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1993	0.279	0.030	0.279	0.030	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1994	0.235	0.025	0.235	0.025	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1995	0.192	0.021	0.192	0.021	0.413	0.040	0.413	0.040	0.413	0.040	0.413	0.040
1996	0.170	0.018	0.170	0.018	0.333	0.032	0.333	0.032	0.333	0.032	0.333	0.032
1997	0.170	0.018	0.170	0.018	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
1998	0.170	0.018	0.170	0.018	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
1999	0.170	0.018	0.170	0.018	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
2000	0.051	0.005	0.051	0.005	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
2001	0.051	0.005	0.051	0.005	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
2002	0.051	0.005	0.051	0.005	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
2003	0.051	0.005	0.051	0.005	0.253	0.025	0.253	0.025	0.253	0.025	0.253	0.025
2004	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.110	0.011
2005	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.100	0.010
2006	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.090	0.009
2007	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.081	0.008
2008	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.063	0.006
2009	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.046	0.005
2010 & later	0.051	0.005	0.051	0.005	0.253	0.025	0.046	0.005	0.253	0.025	0.046	0.005

Table G-25
Gasoline $PM_{2.5}$ Final Emission Rates

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	30 ppm	150 ppm	330 ppm	47 BASE	30 ppm	150 ppm	330 ppm	47 BASE	30 ppm	150 ppm	330 ppm	47 BASE
1965	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1966	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1967	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1968	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1969	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1970	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1971	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1972	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1973	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1974	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1975	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1976	0.012	0.014	0.016	0.016	0.013	0.014	0.015	0.015	0.152	0.153	0.154	0.154
1977	0.011	0.012	0.015	0.015	0.012	0.013	0.015	0.015	0.152	0.153	0.154	0.154
1978	0.011	0.013	0.016	0.016	0.012	0.013	0.015	0.015	0.152	0.153	0.154	0.154
1979	0.011	0.013	0.016	0.016	0.013	0.014	0.016	0.016	0.023	0.024	0.027	0.027
1980	0.016	0.019	0.023	0.022	0.013	0.014	0.016	0.016	0.023	0.024	0.027	0.027
1981	0.005	0.010	0.017	0.016	0.013	0.017	0.021	0.020	0.017	0.020	0.025	0.024
1982	0.005	0.010	0.017	0.016	0.015	0.018	0.023	0.022	0.019	0.022	0.027	0.026
1983	0.005	0.009	0.016	0.015	0.015	0.018	0.023	0.022	0.019	0.022	0.028	0.027
1984	0.005	0.009	0.016	0.015	0.018	0.023	0.029	0.028	0.020	0.025	0.032	0.031
1985	0.005	0.009	0.016	0.015	0.018	0.023	0.029	0.028	0.020	0.025	0.031	0.030
1986	0.005	0.008	0.013	0.012	0.015	0.018	0.024	0.023	0.017	0.021	0.026	0.025
1987	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.006	0.010	0.015	0.014
1988	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.006	0.009	0.014	0.013
1989	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.006	0.009	0.014	0.013
1990	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.005	0.009	0.014	0.013
1991	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.005	0.009	0.014	0.013
1992	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.005	0.009	0.014	0.013
1993	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.005	0.009	0.014	0.013
1994	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.005	0.009	0.014	0.013
1995	0.005	0.008	0.012	0.011	0.005	0.009	0.014	0.013	0.005	0.009	0.014	0.013
1996	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.014	0.013
1997	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.014	0.013
1998	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
1999	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2000	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2001	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2002	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2003	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2004	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2005	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2006	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2007	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2008	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2009	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014
2010 & later	0.005	0.008	0.012	0.011	0.005	0.009	0.015	0.014	0.005	0.009	0.015	0.014

Table G-26
Gasoline SOx Final Emission Rates

MODEL	Gasoline LDV				Gasoline LDT1/2				Gasoline LDT3/4			
YEAR	30 ppm	150 ppm	330 ppm	47 BASE	30 ppm	150 ppm	330 ppm	47 BASE	30 ppm	150 ppm	330 ppm	47 BASE
1965	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1966	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1967	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1968	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1969	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1970	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1971	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1972	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1973	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1974	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1975	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1976	0.011	0.055	0.121	0.112	0.013	0.067	0.147	0.136	0.013	0.067	0.148	0.137
1977	0.011	0.053	0.116	0.108	0.012	0.062	0.136	0.126	0.012	0.062	0.137	0.127
1978	0.010	0.048	0.106	0.098	0.013	0.063	0.139	0.129	0.013	0.064	0.140	0.130
1979	0.010	0.048	0.105	0.097	0.013	0.065	0.144	0.133	0.013	0.065	0.143	0.133
1980	0.008	0.041	0.090	0.083	0.010	0.052	0.115	0.107	0.010	0.052	0.115	0.107
1981	0.007	0.037	0.082	0.076	0.010	0.048	0.105	0.097	0.010	0.048	0.105	0.097
1982	0.007	0.036	0.080	0.074	0.009	0.047	0.103	0.096	0.009	0.047	0.103	0.096
1983	0.007	0.037	0.081	0.075	0.009	0.046	0.101	0.094	0.009	0.046	0.101	0.094
1984	0.007	0.036	0.079	0.073	0.009	0.047	0.102	0.095	0.009	0.047	0.102	0.095
1985	0.007	0.035	0.077	0.071	0.009	0.046	0.102	0.095	0.009	0.046	0.102	0.095
1986	0.007	0.034	0.076	0.070	0.009	0.045	0.098	0.091	0.009	0.045	0.098	0.091
1987	0.007	0.034	0.075	0.070	0.009	0.045	0.098	0.091	0.009	0.045	0.098	0.091
1988	0.007	0.034	0.075	0.070	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
1989	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1990	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1991	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1992	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1993	0.007	0.034	0.075	0.070	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
1994	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.046	0.100	0.093
1995	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1996	0.007	0.034	0.075	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1997	0.007	0.034	0.076	0.070	0.009	0.045	0.100	0.093	0.009	0.045	0.100	0.093
1998	0.007	0.034	0.076	0.070	0.009	0.046	0.100	0.093	0.009	0.046	0.101	0.094
1999	0.007	0.034	0.076	0.070	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2000	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2001	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2002	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2003	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2004	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2005	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2006	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2007	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2008	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2009	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093
2010 & later	0.007	0.035	0.076	0.071	0.009	0.046	0.100	0.093	0.009	0.046	0.100	0.093

Table G-27
Diesel $PM_{2.5}$ and SOx Final Emission Rates

MODEL	Diesel LDV				Diesel LDT1/2				Diesel LDT3/4			
	PM2.5		SOx		PM2.5		SOx		PM2.5		SOx	
YEAR	BASE	TIER 2	BASE	TIER 2	BASE	TIER 2	BASE	TIER 2	BASE	TIER 2	BASE	TIER 2
1965	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1966	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1967	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1968	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1969	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1970	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1971	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1972	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1973	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1974	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1975	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1976	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1977	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1978	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1979	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1980	0.621	0.621	0.112	0.112	0.616	0.616	0.135	0.135	0.616	0.616	0.135	0.135
1981	0.215	0.215	0.112	0.112	0.256	0.256	0.135	0.135	0.256	0.256	0.135	0.135
1982	0.212	0.212	0.112	0.112	0.298	0.298	0.135	0.135	0.298	0.298	0.135	0.135
1983	0.212	0.212	0.112	0.112	0.298	0.298	0.135	0.135	0.298	0.298	0.135	0.135
1984	0.212	0.212	0.112	0.112	0.298	0.298	0.135	0.135	0.298	0.298	0.135	0.135
1985	0.211	0.211	0.112	0.112	0.301	0.301	0.135	0.135	0.301	0.301	0.135	0.135
1986	0.211	0.211	0.112	0.112	0.301	0.301	0.135	0.135	0.301	0.301	0.135	0.135
1987	0.100	0.100	0.112	0.112	0.279	0.279	0.135	0.135	0.279	0.279	0.135	0.135
1988	0.100	0.100	0.112	0.112	0.240	0.240	0.135	0.135	0.240	0.240	0.135	0.135
1989	0.100	0.100	0.112	0.112	0.240	0.240	0.135	0.135	0.240	0.240	0.135	0.135
1990	0.100	0.100	0.112	0.112	0.240	0.240	0.135	0.135	0.240	0.240	0.135	0.135
1991	0.097	0.097	0.110	0.110	0.243	0.243	0.134	0.134	0.243	0.243	0.134	0.134
1992	0.098	0.098	0.108	0.108	0.243	0.243	0.133	0.133	0.243	0.243	0.133	0.133
1993	0.098	0.098	0.106	0.106	0.243	0.243	0.132	0.132	0.243	0.243	0.132	0.132
1994	0.118	0.118	0.104	0.104	0.120	0.120	0.131	0.131	0.120	0.120	0.131	0.131
1995	0.118	0.118	0.103	0.103	0.120	0.120	0.130	0.130	0.120	0.120	0.130	0.130
1996	0.092	0.092	0.101	0.101	0.120	0.120	0.129	0.129	0.120	0.120	0.129	0.129
1997	0.092	0.092	0.100	0.100	0.100	0.100	0.128	0.128	0.100	0.100	0.128	0.128
1998	0.092	0.092	0.098	0.098	0.100	0.100	0.127	0.127	0.100	0.100	0.127	0.127
1999	0.092	0.092	0.097	0.097	0.100	0.100	0.126	0.126	0.100	0.100	0.126	0.126
2000	0.092	0.092	0.096	0.096	0.100	0.100	0.124	0.124	0.100	0.100	0.124	0.124
2001	0.092	0.092	0.095	0.095	0.100	0.100	0.123	0.123	0.100	0.100	0.123	0.123
2002	0.092	0.092	0.094	0.094	0.100	0.100	0.123	0.123	0.100	0.100	0.123	0.123
2003	0.092	0.092	0.094	0.094	0.100	0.100	0.122	0.122	0.100	0.100	0.122	0.122
2004	0.092	0.060	0.093	0.093	0.100	0.060	0.121	0.121	0.100	0.051	0.121	0.121
2005	0.092	0.028	0.093	0.093	0.100	0.060	0.121	0.121	0.100	0.040	0.121	0.121
2006	0.092	0.010	0.092	0.092	0.100	0.044	0.121	0.121	0.100	0.030	0.121	0.121
2007	0.092	0.010	0.092	0.092	0.100	0.010	0.120	0.120	0.100	0.020	0.120	0.120
2008	0.092	0.010	0.092	0.092	0.100	0.010	0.120	0.120	0.100	0.015	0.120	0.120
2009	0.092	0.010	0.091	0.091	0.100	0.010	0.120	0.120	0.100	0.010	0.120	0.120
2010 & later	0.092	0.010	0.091	0.091	0.100	0.010	0.119	0.119	0.100	0.010	0.119	0.119

APPENDIX H
Diesel Sales Fractions

Table H-1
Diesel Sales Fractions

MODEL YEAR	LDV		LDT1/2		LDT3/4	
	No Growth	Increased Growth	No Growth	Increased Growth	No Growth	Increased Growth
1965	0.007	0.007	0.117	0.117	0.000	0.000
1966	0.007	0.007	0.117	0.117	0.000	0.000
1967	0.007	0.007	0.117	0.117	0.000	0.000
1968	0.007	0.007	0.117	0.117	0.000	0.000
1969	0.007	0.007	0.117	0.117	0.000	0.000
1970	0.007	0.007	0.117	0.117	0.000	0.000
1971	0.007	0.007	0.117	0.117	0.000	0.000
1972	0.007	0.007	0.117	0.117	0.000	0.000
1973	0.007	0.007	0.117	0.117	0.000	0.000
1974	0.007	0.007	0.117	0.117	0.000	0.000
1975	0.015	0.015	0.104	0.104	0.000	0.000
1976	0.014	0.014	0.019	0.019	0.000	0.000
1977	0.009	0.009	0.000	0.000	0.000	0.000
1978	0.011	0.011	0.026	0.026	0.000	0.000
1979	0.027	0.027	0.032	0.032	0.001	0.001
1980	0.039	0.039	0.044	0.044	0.001	0.001
1981	0.071	0.071	0.062	0.062	0.001	0.001
1982	0.051	0.051	0.066	0.066	0.026	0.026
1983	0.024	0.024	0.022	0.022	0.021	0.021
1984	0.016	0.016	0.012	0.012	0.017	0.017
1985	0.010	0.010	0.005	0.005	0.013	0.013
1986	0.003	0.003	0.003	0.003	0.012	0.012
1987	0.003	0.003	0.001	0.001	0.008	0.008
1988	0.000	0.000	0.000	0.000	0.007	0.007
1989	0.000	0.000	0.000	0.000	0.008	0.008
1990	0.000	0.000	0.000	0.000	0.010	0.010
1991	0.001	0.001	0.000	0.000	0.013	0.013
1992	0.001	0.001	0.000	0.000	0.011	0.011
1993	0.000	0.000	0.000	0.000	0.014	0.014
1994	0.000	0.000	0.000	0.000	0.011	0.011
1995	0.001	0.001	0.000	0.000	0.011	0.011
1996	0.001	0.001	0.000	0.000	0.013	0.013
1997	0.001	0.001	0.000	0.000	0.013	0.013
1998	0.001	0.001	0.000	0.000	0.013	0.013
1999	0.001	0.001	0.000	0.000	0.013	0.013
2000	0.001	0.001	0.000	0.000	0.013	0.013
2001	0.001	0.001	0.000	0.000	0.013	0.200
2002	0.001	0.001	0.000	0.000	0.013	0.400
2003	0.001	0.001	0.000	0.000	0.013	0.600
2004	0.001	0.001	0.000	0.000	0.013	0.800
2005	0.001	0.001	0.000	0.000	0.013	1.000
2006	0.001	0.001	0.000	0.066	0.013	1.000
2007	0.001	0.001	0.000	0.132	0.013	1.000
2008	0.001	0.001	0.000	0.197	0.013	1.000
2009	0.001	0.001	0.000	0.263	0.013	1.000
2010 & later	0.001	0.001	0.000	0.329	0.013	1.000

APPENDIX I
Travel Fractions

Table I-1
Travel Fractions

Age	LDV				LDT1/2				LDT3/4			
	Registration Distribution	Unadjusted Mileage Rate	July 1st Mileage Rate	Travel Fraction	Registration Distribution	Unadjusted Mileage Rate	July 1st Mileage Rate	Travel Fraction	Registration Distribution	Unadjusted Mileage Rate	July 1st Mileage Rate	Travel Fraction
1	0.036	14,910	14,910	**0.051**	0.039	19,496	19,496	**0.061**	0.040	21,331	21,331	**0.070**
2	0.072	14,174	14,358	**0.098**	0.079	18,384	18,662	**0.117**	0.074	19,865	20,232	**0.124**
3	0.072	13,475	13,650	**0.093**	0.078	17,308	17,577	**0.110**	0.069	18,500	18,841	**0.107**
4	0.072	12,810	12,976	**0.088**	0.077	16,267	16,527	**0.102**	0.064	17,228	17,546	**0.093**
5	0.072	12,178	12,336	**0.084**	0.076	15,260	15,512	**0.094**	0.060	16,044	16,340	**0.081**
6	0.071	11,577	11,727	**0.079**	0.073	14,289	14,532	**0.085**	0.055	14,942	15,218	**0.070**
7	0.070	11,006	11,149	**0.074**	0.070	13,352	13,586	**0.076**	0.052	13,915	14,172	**0.061**
8	0.069	10,463	10,599	**0.069**	0.067	12,451	12,676	**0.067**	0.048	12,959	13,198	**0.053**
9	0.067	9,947	10,076	**0.064**	0.062	11,584	11,801	**0.058**	0.045	12,068	12,291	**0.046**
10	0.064	9,456	9,579	**0.058**	0.057	10,752	10,960	**0.049**	0.042	11,239	11,446	**0.040**
11	0.060	8,989	9,106	**0.052**	0.051	9,955	10,154	**0.041**	0.039	10,466	10,659	**0.034**
12	0.055	8,546	8,657	**0.045**	0.044	9,194	9,384	**0.033**	0.036	9,747	9,927	**0.030**
13	0.047	8,124	8,230	**0.036**	0.038	8,467	8,649	**0.026**	0.034	9,077	9,245	**0.026**
14	0.037	7,723	7,823	**0.027**	0.031	7,775	7,948	**0.020**	0.031	8,453	8,609	**0.023**
15	0.029	7,342	7,437	**0.021**	0.025	7,118	7,282	**0.015**	0.029	7,872	8,017	**0.020**
16	0.023	6,980	7,071	**0.016**	0.020	6,496	6,652	**0.010**	0.027	7,331	7,466	**0.017**
17	0.018	6,636	6,722	**0.012**	0.015	5,909	6,056	**0.007**	0.025	6,827	6,953	**0.015**
18	0.015	6,308	6,390	**0.009**	0.011	5,356	5,494	**0.005**	0.024	6,358	6,475	**0.013**
19	0.012	5,997	6,075	**0.007**	0.009	4,839	4,968	**0.003**	0.022	5,921	6,030	**0.011**
20	0.009	5,701	5,775	**0.005**	0.008	4,357	4,478	**0.003**	0.021	5,514	5,616	**0.010**
21	0.007	5,420	5,490	**0.004**	0.008	3,909	4,021	**0.003**	0.019	5,135	5,230	**0.008**
22	0.006	5,152	5,219	**0.003**	0.008	3,497	3,600	**0.002**	0.018	4,782	4,870	**0.007**
23	0.005	4,898	4,962	**0.002**	0.007	3,120	3,214	**0.002**	0.017	4,454	4,536	**0.006**
24	0.004	4,656	4,717	**0.002**	0.007	2,777	2,863	**0.002**	0.015	4,148	4,225	**0.005**
25	0.010	4,427	4,484	**0.004**	0.040	2,470	2,547	**0.008**	0.095	3,863	3,934	**0.031**

APPENDIX J
Tampering Effects

Table J-1
NOx Tampering Adjustments by Calender Year (gram/mile)

Calender Year	Ozone Transport Region						Non-Ozone Transport Region						47-State Composite		
	IM			No IM			IM			No IM					
	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4
1990	0.184	0.311	0.264	0.187	0.317	0.268	0.184	0.311	0.264	0.187	0.317	0.268	0.186	0.314	0.266
1991	0.161	0.290	0.287	0.169	0.305	0.297	0.161	0.290	0.287	0.169	0.305	0.297	0.165	0.298	0.292
1992	0.141	0.276	0.295	0.150	0.296	0.308	0.141	0.276	0.295	0.150	0.296	0.308	0.146	0.287	0.302
1993	0.121	0.261	0.296	0.130	0.286	0.313	0.121	0.261	0.296	0.130	0.286	0.313	0.126	0.274	0.305
1994	0.102	0.242	0.284	0.113	0.272	0.306	0.102	0.242	0.284	0.113	0.272	0.306	0.108	0.258	0.296
1995	0.085	0.217	0.255	0.096	0.251	0.283	0.085	0.217	0.255	0.096	0.251	0.283	0.091	0.235	0.270
1996	0.071	0.196	0.234	0.083	0.235	0.268	0.071	0.196	0.234	0.083	0.235	0.268	0.077	0.216	0.252
1997	0.060	0.179	0.222	0.073	0.223	0.263	0.060	0.179	0.222	0.073	0.223	0.263	0.067	0.202	0.244
1998	0.051	0.160	0.203	0.065	0.210	0.252	0.051	0.159	0.203	0.064	0.210	0.252	0.058	0.186	0.229
1999	0.044	0.142	0.179	0.058	0.198	0.236	0.045	0.142	0.179	0.059	0.199	0.236	0.052	0.172	0.209
2000	0.039	0.126	0.160	0.052	0.186	0.223	0.040	0.127	0.160	0.054	0.189	0.223	0.047	0.159	0.193
2001	0.033	0.111	0.147	0.046	0.172	0.214	0.035	0.114	0.147	0.050	0.179	0.214	0.042	0.147	0.182
2002	0.028	0.097	0.135	0.041	0.158	0.205	0.031	0.103	0.135	0.045	0.168	0.205	0.037	0.135	0.172
2003	0.023	0.086	0.126	0.035	0.145	0.198	0.028	0.094	0.126	0.041	0.159	0.198	0.033	0.125	0.164
2004	0.020	0.076	0.119	0.030	0.132	0.193	0.024	0.084	0.119	0.036	0.148	0.193	0.029	0.114	0.158
2005	0.017	0.065	0.112	0.026	0.117	0.188	0.020	0.075	0.112	0.032	0.137	0.188	0.025	0.103	0.152
2006	0.014	0.057	0.106	0.022	0.106	0.184	0.017	0.066	0.106	0.027	0.123	0.184	0.021	0.092	0.147
2007	0.012	0.050	0.103	0.019	0.096	0.181	0.015	0.058	0.103	0.024	0.110	0.181	0.019	0.082	0.144
2008	0.010	0.045	0.101	0.016	0.086	0.180	0.013	0.051	0.101	0.021	0.100	0.180	0.016	0.074	0.142
2009	0.008	0.038	0.099	0.013	0.075	0.179	0.011	0.046	0.099	0.018	0.091	0.179	0.013	0.066	0.141
2010	0.006	0.031	0.098	0.010	0.060	0.177	0.010	0.041	0.098	0.015	0.082	0.177	0.011	0.058	0.139
2011	0.004	0.023	0.097	0.007	0.046	0.177	0.007	0.035	0.097	0.012	0.070	0.177	0.008	0.048	0.139
2012	0.003	0.017	0.097	0.005	0.035	0.177	0.005	0.028	0.097	0.008	0.056	0.177	0.006	0.038	0.139
2013	0.002	0.013	0.096	0.004	0.026	0.176	0.004	0.021	0.096	0.006	0.042	0.176	0.004	0.028	0.138
2014	0.002	0.009	0.097	0.003	0.019	0.177	0.002	0.016	0.097	0.004	0.031	0.177	0.003	0.021	0.139
2015	0.001	0.007	0.097	0.002	0.014	0.177	0.002	0.012	0.097	0.003	0.023	0.177	0.002	0.016	0.139
2016	0.001	0.006	0.097	0.002	0.011	0.177	0.001	0.008	0.097	0.002	0.017	0.177	0.002	0.012	0.139
2017	0.001	0.004	0.096	0.001	0.007	0.176	0.001	0.006	0.096	0.002	0.013	0.176	0.001	0.008	0.138
2018	0.001	0.002	0.096	0.001	0.005	0.177	0.000	0.004	0.096	0.001	0.009	0.177	0.001	0.006	0.138
2019	0.001	0.001	0.096	0.001	0.003	0.176	0.000	0.004	0.096	0.000	0.007	0.176	0.000	0.005	0.138
2020 & later	0.000	0.001	0.096	0.000	0.002	0.177	0.000	0.002	0.096	0.000	0.004	0.177	0.000	0.003	0.138

Table J-2
NMHC Tampering Adjustments by Calender Year (gram/mile)

Calender	Ozone Transport Region						Non-Ozone Transport Region						47-State Composite		
	IM			No IM			IM			No IM					
Year	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4	LDV	LDT1/2	LDT3/4
1990	0.309	0.661	0.650	0.312	0.682	0.667	0.309	0.661	0.650	0.312	0.682	0.667	0.311	0.672	0.659
1991	0.266	0.595	0.704	0.274	0.640	0.745	0.266	0.595	0.704	0.274	0.640	0.745	0.270	0.619	0.726
1992	0.191	0.476	0.554	0.197	0.513	0.591	0.191	0.476	0.554	0.197	0.513	0.591	0.194	0.496	0.574
1993	0.157	0.418	0.483	0.164	0.460	0.526	0.157	0.418	0.483	0.164	0.460	0.526	0.161	0.440	0.506
1994	0.129	0.356	0.417	0.137	0.404	0.471	0.129	0.356	0.417	0.137	0.404	0.471	0.133	0.381	0.445
1995	0.103	0.293	0.335	0.112	0.350	0.406	0.103	0.293	0.335	0.112	0.350	0.406	0.108	0.323	0.372
1996	0.082	0.243	0.284	0.092	0.306	0.369	0.082	0.244	0.284	0.092	0.307	0.369	0.087	0.277	0.329
1997	0.065	0.201	0.246	0.075	0.270	0.338	0.065	0.202	0.246	0.075	0.271	0.338	0.070	0.238	0.294
1998	0.051	0.161	0.204	0.062	0.233	0.299	0.051	0.161	0.204	0.062	0.233	0.299	0.057	0.199	0.254
1999	0.040	0.130	0.171	0.051	0.204	0.269	0.040	0.131	0.171	0.051	0.205	0.269	0.046	0.169	0.222
2000	0.032	0.107	0.150	0.043	0.181	0.251	0.032	0.107	0.150	0.043	0.183	0.251	0.038	0.147	0.203
2001	0.025	0.086	0.134	0.036	0.160	0.238	0.025	0.088	0.134	0.037	0.166	0.238	0.031	0.128	0.188
2002	0.020	0.069	0.113	0.030	0.142	0.220	0.020	0.072	0.113	0.031	0.150	0.220	0.026	0.111	0.169
2003	0.015	0.055	0.090	0.025	0.124	0.199	0.016	0.059	0.090	0.027	0.135	0.199	0.021	0.097	0.147
2004	0.013	0.044	0.076	0.021	0.109	0.187	0.014	0.049	0.076	0.024	0.123	0.187	0.019	0.085	0.134
2005	0.010	0.037	0.069	0.018	0.097	0.182	0.012	0.041	0.069	0.021	0.111	0.182	0.016	0.075	0.128
2006	0.008	0.030	0.063	0.015	0.086	0.177	0.010	0.035	0.063	0.018	0.100	0.177	0.013	0.066	0.123
2007	0.007	0.026	0.058	0.013	0.077	0.174	0.009	0.030	0.058	0.016	0.090	0.174	0.012	0.059	0.119
2008	0.005	0.023	0.057	0.010	0.070	0.172	0.007	0.026	0.057	0.014	0.081	0.172	0.010	0.053	0.117
2009	0.004	0.019	0.055	0.008	0.060	0.171	0.006	0.023	0.055	0.012	0.074	0.171	0.008	0.047	0.116
2010	0.004	0.015	0.054	0.007	0.048	0.170	0.005	0.021	0.054	0.010	0.067	0.170	0.007	0.041	0.115
2011	0.003	0.012	0.054	0.005	0.038	0.170	0.004	0.017	0.054	0.008	0.056	0.170	0.006	0.034	0.115
2012	0.002	0.008	0.053	0.003	0.027	0.170	0.003	0.014	0.053	0.006	0.044	0.170	0.004	0.026	0.114
2013	0.001	0.007	0.053	0.003	0.021	0.169	0.002	0.010	0.053	0.004	0.034	0.169	0.003	0.020	0.114
2014	0.001	0.005	0.053	0.002	0.016	0.169	0.002	0.008	0.053	0.003	0.025	0.169	0.002	0.015	0.114
2015	0.001	0.003	0.053	0.002	0.011	0.169	0.001	0.005	0.053	0.002	0.018	0.169	0.002	0.010	0.114
2016	0.001	0.002	0.052	0.001	0.008	0.169	0.001	0.005	0.052	0.002	0.015	0.169	0.001	0.009	0.113
2017	0.001	0.002	0.053	0.001	0.006	0.169	0.001	0.003	0.053	0.001	0.011	0.169	0.001	0.006	0.114
2018	0.000	0.001	0.052	0.000	0.003	0.169	0.000	0.002	0.052	0.001	0.007	0.169	0.000	0.004	0.113
2019	0.000	0.000	0.052	0.000	0.002	0.169	0.000	0.001	0.052	0.001	0.005	0.169	0.000	0.002	0.113
2020 & later	0.000	0.000	0.053	0.000	0.001	0.169	0.000	0.001	0.053	0.000	0.003	0.169	0.000	0.002	0.114

APPENDIX K
Vehicle Miles Traveled (VMT)

Table K-1
Vehicle Miles Traveled (VMT)

	Total Light-Duty VMT (Millions)					Sales Fraction			VMT Fraction			47-State VMT (Millions)		
Year	**47-State**	**New York**	**Chicago**	**Atlanta**	**Charlotte**	**LDV**	**LDT1/2**	**LDT3/4**	**LDV**	**LDT1/2**	**LDT3/4**	**LDV**	**LDT1/2**	**LDT3/4**
1990	1,760,451	40,818	18,087	14,463	1,796	0.698	0.227	0.076	0.689	0.233	0.078	1,212,903	410,661	136,887
1995	1,965,126	44,020	20,297	16,993	2,282	0.613	0.290	0.097	0.623	0.283	0.094	1,223,526	556,199	185,400
2000	2,163,711	47,223	22,508	19,522	2,767	0.532	0.351	0.117	0.547	0.340	0.113	1,183,030	735,511	245,170
2001	2,205,237	47,864	22,950	20,028	2,864	0.516	0.363	0.121	0.531	0.352	0.117	1,170,598	775,979	258,660
2002	2,246,666	48,504	23,392	20,534	2,961	0.500	0.375	0.125	0.515	0.364	0.121	1,157,778	816,666	272,222
2003	2,290,959	49,145	23,834	21,040	3,058	0.484	0.387	0.129	0.499	0.375	0.125	1,144,317	859,981	286,660
2004	2,333,415	49,785	24,276	21,546	3,155	0.468	0.399	0.133	0.484	0.387	0.129	1,128,752	903,497	301,166
2005	2,375,786	50,426	24,718	22,052	3,252	0.452	0.411	0.137	0.468	0.399	0.133	1,112,233	947,665	315,888
2006	2,419,553	51,066	25,160	22,558	3,349	0.436	0.423	0.141	0.452	0.411	0.137	1,094,230	993,992	331,331
2007	2,463,240	51,707	25,602	23,064	3,446	0.420	0.435	0.145	0.436	0.423	0.141	1,074,694	1,041,410	347,137
2008	2,507,779	52,348	26,044	23,570	3,543	0.404	0.447	0.149	0.420	0.435	0.145	1,054,251	1,090,145	363,382
2009	2,553,290	52,988	26,486	24,075	3,640	0.404	0.447	0.149	0.406	0.445	0.148	1,037,375	1,136,936	378,979
2010	2,598,733	53,629	26,928	24,581	3,737	0.404	0.447	0.149	0.394	0.455	0.152	1,023,400	1,181,500	393,833
2011	2,653,306	54,269	27,370	25,087	3,834	0.404	0.447	0.149	0.383	0.463	0.154	1,015,609	1,228,273	409,424
2012	2,709,026	54,910	27,812	25,593	3,931	0.404	0.447	0.149	0.373	0.470	0.157	1,011,183	1,273,382	424,461
2013	2,765,915	55,550	28,254	26,099	4,028	0.404	0.447	0.149	0.365	0.476	0.159	1,009,358	1,317,418	439,139
2014	2,823,999	56,191	28,696	26,605	4,125	0.404	0.447	0.149	0.358	0.482	0.161	1,010,447	1,360,164	453,388
2015	2,883,303	56,831	29,138	27,111	4,222	0.404	0.447	0.149	0.352	0.486	0.162	1,014,347	1,401,717	467,239
2016	2,943,853	57,472	29,580	27,617	4,319	0.404	0.447	0.149	0.347	0.490	0.163	1,020,507	1,442,509	480,836
2017	3,004,402	58,112	30,022	28,123	4,416	0.404	0.447	0.149	0.342	0.493	0.164	1,028,760	1,481,732	493,911
2018	3,064,952	58,753	30,464	28,628	4,513	0.404	0.447	0.149	0.339	0.496	0.165	1,038,715	1,519,678	506,559
2019	3,125,501	59,394	30,906	29,134	4,610	0.404	0.447	0.149	0.336	0.498	0.166	1,050,303	1,556,398	518,799
2020	3,186,050	60,034	31,348	29,640	4,707	0.404	0.447	0.149	0.334	0.500	0.167	1,063,942	1,591,581	530,527
2021	3,246,600	60,675	31,790	30,146	4,804	0.404	0.447	0.149	0.332	0.501	0.167	1,078,548	1,626,038	542,013
2022	3,307,149	61,315	32,232	30,652	4,901	0.404	0.447	0.149	0.331	0.502	0.167	1,094,241	1,659,681	553,227
2023	3,367,698	61,956	32,674	31,158	4,998	0.404	0.447	0.149	0.330	0.503	0.168	1,110,813	1,692,664	564,221
2024	3,428,248	62,596	33,116	31,664	5,095	0.404	0.447	0.149	0.329	0.503	0.168	1,128,087	1,725,120	575,040
2025	3,488,797	63,237	33,558	32,170	5,192	0.404	0.447	0.149	0.328	0.504	0.168	1,145,919	1,757,158	585,719
2026	3,549,347	63,877	34,000	32,676	5,289	0.404	0.447	0.149	0.328	0.504	0.168	1,164,189	1,788,868	596,289
2027	3,609,896	64,518	34,442	33,182	5,386	0.404	0.447	0.149	0.328	0.504	0.168	1,182,847	1,820,287	606,762
2028	3,670,445	65,159	34,884	33,687	5,483	0.404	0.447	0.149	0.327	0.504	0.168	1,201,711	1,851,550	617,183
2029	3,730,995	65,799	35,326	34,193	5,580	0.404	0.447	0.149	0.327	0.505	0.168	1,220,780	1,882,661	627,554
2030	3,791,544	66,440	35,768	34,699	5,677	0.404	0.447	0.149	0.327	0.505	0.168	1,240,007	1,913,653	637,884

APPENDIX L
Inventory Results

Table L-1
NOx - 47 State Annual

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	3,370,689	2.90	1,312,027	3.64	549,235	2.70	5,231,951	2.52	3,370,689	2.90	1,312,027	3.64	549,235	2.70	5,231,951
1995	1.85	2,499,403	2.10	1,290,125	2.98	608,774	2.03	4,401,896	1.85	2,499,403	2.10	1,290,125	2.98	608,774	2.03	4,401,896
2000	1.42	1,857,518	1.70	1,376,923	2.35	634,942	1.62	3,869,383	1.42	1,857,518	1.70	1,376,923	2.35	634,942	1.62	3,869,383
2001	1.37	1,762,275	1.64	1,403,290	2.27	648,610	1.57	3,814,175	1.37	1,762,275	1.64	1,403,290	2.27	648,610	1.57	3,814,175
2002	1.31	1,677,426	1.58	1,420,024	2.20	661,277	1.52	3,758,726	1.31	1,677,426	1.58	1,420,024	2.20	661,277	1.52	3,758,726
2003	1.25	1,577,811	1.50	1,423,863	2.06	651,222	1.45	3,652,896	1.25	1,577,811	1.50	1,423,863	2.06	651,222	1.45	3,652,896
2004	1.18	1,464,846	1.42	1,412,348	2.00	662,460	1.38	3,539,655	0.97	1,203,341	1.23	1,226,543	1.83	607,260	1.18	3,037,144
2005	1.10	1,352,809	1.33	1,385,444	1.90	660,629	1.30	3,398,882	0.87	1,067,566	1.11	1,164,729	1.68	585,153	1.08	2,817,448
2006	1.04	1,255,469	1.25	1,370,781	1.85	675,246	1.24	3,301,495	0.78	942,861	1.01	1,106,658	1.56	571,283	0.98	2,620,803
2007	0.99	1,167,934	1.18	1,358,345	1.81	692,250	1.19	3,218,530	0.70	826,705	0.91	1,040,370	1.45	555,721	0.89	2,422,796
2008	0.94	1,090,670	1.12	1,343,382	1.75	702,548	1.13	3,136,600	0.62	721,576	0.80	963,275	1.32	530,671	0.80	2,215,523
2009	0.90	1,026,748	1.07	1,335,414	1.73	722,278	1.10	3,084,440	0.55	629,896	0.71	891,151	1.23	511,812	0.72	2,032,859
2010	0.86	972,385	1.02	1,327,395	1.71	741,858	1.06	3,041,639	0.49	549,364	0.63	818,212	1.13	491,739	0.65	1,859,316
2011	0.83	930,327	0.98	1,323,174	1.69	763,870	1.03	3,017,371	0.43	481,192	0.55	748,594	1.05	473,562	0.58	1,703,348
2012	0.80	895,750	0.94	1,318,077	1.68	784,781	1.00	2,998,608	0.38	422,025	0.48	680,056	0.97	455,504	0.52	1,557,585
2013	0.78	870,112	0.91	1,319,035	1.66	805,189	0.98	2,994,336	0.34	374,682	0.43	619,896	0.91	438,209	0.47	1,432,786
2014	0.76	849,770	0.88	1,325,476	1.65	826,327	0.96	3,001,573	0.30	335,499	0.38	569,031	0.85	423,167	0.43	1,327,697
2015	0.75	836,572	0.87	1,337,476	1.64	846,758	0.95	3,020,806	0.27	304,843	0.34	528,019	0.79	409,063	0.39	1,241,925
2016	0.74	828,752	0.85	1,354,388	1.64	867,267	0.94	3,050,407	0.25	280,616	0.31	496,208	0.75	396,588	0.36	1,173,411
2017	0.73	826,257	0.84	1,374,483	1.63	886,614	0.93	3,087,354	0.23	262,746	0.29	472,333	0.71	384,814	0.34	1,119,893
2018	0.72	825,135	0.83	1,395,003	1.62	906,484	0.93	3,126,621	0.22	247,579	0.27	453,440	0.67	375,266	0.32	1,076,284
2019	0.71	827,699	0.83	1,419,097	1.62	925,309	0.92	3,172,105	0.20	236,941	0.26	441,900	0.64	366,342	0.30	1,045,184
2020	0.71	834,251	0.82	1,442,704	1.61	944,196	0.92	3,221,151	0.20	230,439	0.25	433,166	0.61	359,433	0.29	1,023,038
2021	0.71	843,612	0.82	1,470,652	1.61	962,622	0.92	3,276,886	0.19	227,216	0.24	431,373	0.59	353,384	0.28	1,011,973
2022	0.71	854,315	0.82	1,498,298	1.61	980,636	0.91	3,333,250	0.19	225,588	0.24	431,564	0.57	347,967	0.28	1,005,119
2023	0.71	866,235	0.82	1,524,308	1.61	998,449	0.91	3,388,993	0.18	225,055	0.23	431,271	0.55	343,534	0.27	999,860
2024	0.71	878,289	0.82	1,550,902	1.60	1,016,120	0.91	3,445,311	0.18	224,804	0.23	432,808	0.54	340,016	0.26	997,627
2025	0.71	893,264	0.81	1,577,444	1.60	1,033,694	0.91	3,504,402	0.18	225,408	0.22	430,898	0.52	337,342	0.26	993,647
2026	0.71	905,989	0.81	1,603,083	1.60	1,048,941	0.91	3,558,013	0.18	227,464	0.22	434,643	0.51	333,364	0.25	995,472
2027	0.70	919,118	0.81	1,628,058	1.59	1,064,447	0.91	3,611,623	0.18	229,823	0.22	438,349	0.49	330,378	0.25	998,551
2028	0.70	933,247	0.81	1,654,702	1.59	1,081,380	0.91	3,669,329	0.18	232,337	0.22	439,542	0.46	313,738	0.24	985,618
2029	0.70	948,057	0.81	1,682,505	1.59	1,099,549	0.91	3,730,110	0.17	235,340	0.21	445,770	0.45	312,792	0.24	993,902
2030	0.70	962,988	0.81	1,710,202	1.59	1,117,650	0.91	3,790,840	0.17	238,730	0.21	451,419	0.45	314,346	0.24	1,004,495

Table L-2
NOx - 47 State API 1

YEAR	Baseline								With Proposed Tier 2 Standards & API 1 Sulfur Program							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	3,370,689	2.90	1,312,027	3.64	549,235	2.70	5,231,951	2.52	3,370,689	2.90	1,312,027	3.64	549,235	2.70	5,231,951
1995	1.85	2,499,403	2.10	1,290,125	2.98	608,774	2.03	4,401,896	1.85	2,499,403	2.10	1,290,125	2.98	608,774	2.03	4,401,896
2000	1.42	1,857,518	1.70	1,376,923	2.35	634,942	1.62	3,869,383	1.42	1,857,518	1.70	1,376,923	2.35	634,942	1.62	3,869,383
2001	1.37	1,762,275	1.64	1,403,290	2.27	648,610	1.57	3,814,175	1.37	1,762,275	1.64	1,403,290	2.27	648,610	1.57	3,814,175
2002	1.31	1,677,426	1.58	1,420,024	2.20	661,277	1.52	3,758,726	1.31	1,677,426	1.58	1,420,024	2.20	661,277	1.52	3,758,726
2003	1.25	1,577,811	1.50	1,423,863	2.06	651,222	1.45	3,652,896	1.25	1,577,811	1.50	1,423,863	2.06	651,222	1.45	3,652,896
2004	1.18	1,464,846	1.42	1,412,348	2.00	662,460	1.38	3,539,655	1.10	1,372,162	1.35	1,349,010	1.92	638,563	1.31	3,359,735
2005	1.10	1,352,809	1.33	1,385,444	1.90	660,629	1.30	3,398,882	1.01	1,240,736	1.25	1,305,782	1.79	622,648	1.21	3,169,167
2006	1.04	1,255,469	1.25	1,370,781	1.85	675,246	1.24	3,301,495	0.93	1,116,815	1.16	1,267,029	1.68	614,252	1.12	2,998,096
2007	0.99	1,167,934	1.18	1,358,345	1.81	692,250	1.19	3,218,530	0.84	999,787	1.06	1,216,193	1.58	604,664	1.04	2,820,644
2008	0.94	1,090,670	1.12	1,343,382	1.75	702,548	1.13	3,136,600	0.77	892,910	0.96	1,150,124	1.46	584,686	0.95	2,627,720
2009	0.90	1,026,748	1.07	1,335,414	1.73	722,278	1.10	3,084,440	0.70	799,373	0.87	1,087,158	1.36	569,938	0.87	2,456,469
2010	0.86	972,385	1.02	1,327,395	1.71	741,858	1.06	3,041,639	0.64	717,192	0.78	1,021,219	1.27	553,127	0.80	2,291,539
2011	0.83	930,327	0.98	1,323,174	1.69	763,870	1.03	3,017,371	0.58	647,793	0.71	957,840	1.19	538,353	0.73	2,143,986
2012	0.80	895,750	0.94	1,318,077	1.68	784,781	1.00	2,998,608	0.53	587,045	0.64	894,406	1.12	523,657	0.67	2,005,108
2013	0.78	870,112	0.91	1,319,035	1.66	805,189	0.98	2,994,336	0.48	536,960	0.58	838,544	1.05	509,792	0.62	1,885,296
2014	0.76	849,770	0.88	1,325,476	1.65	826,327	0.96	3,001,573	0.44	493,873	0.53	791,454	1.00	498,233	0.57	1,783,559
2015	0.75	836,572	0.87	1,337,476	1.64	846,758	0.95	3,020,806	0.41	459,204	0.49	753,753	0.95	487,725	0.54	1,700,682
2016	0.74	828,752	0.85	1,354,388	1.64	867,267	0.94	3,050,407	0.38	431,555	0.46	724,974	0.90	478,996	0.50	1,635,525
2017	0.73	826,257	0.84	1,374,483	1.63	886,614	0.93	3,087,354	0.36	411,280	0.43	703,862	0.87	471,040	0.48	1,586,182
2018	0.72	825,135	0.83	1,395,003	1.62	906,484	0.93	3,126,621	0.34	394,657	0.41	687,468	0.83	465,354	0.46	1,547,479
2019	0.71	827,699	0.83	1,419,097	1.62	925,309	0.92	3,172,105	0.33	383,510	0.40	678,756	0.80	460,267	0.44	1,522,532
2020	0.71	834,251	0.82	1,442,704	1.61	944,196	0.92	3,221,151	0.32	377,365	0.38	673,489	0.78	456,766	0.43	1,507,620
2021	0.71	843,612	0.82	1,470,652	1.61	962,622	0.92	3,276,886	0.32	375,061	0.38	675,738	0.76	454,111	0.42	1,504,910
2022	0.71	854,315	0.82	1,498,298	1.61	980,636	0.91	3,333,250	0.31	374,765	0.37	680,364	0.74	452,399	0.41	1,507,528
2023	0.71	866,235	0.82	1,524,308	1.61	998,449	0.91	3,388,993	0.31	376,086	0.37	685,304	0.73	451,568	0.41	1,512,958
2024	0.71	878,289	0.82	1,550,902	1.60	1,016,120	0.91	3,445,311	0.30	377,854	0.36	692,314	0.71	451,546	0.40	1,521,714
2025	0.71	893,264	0.81	1,577,444	1.60	1,033,694	0.91	3,504,402	0.30	382,292	0.36	699,305	0.70	452,266	0.40	1,533,863
2026	0.71	905,989	0.81	1,603,083	1.60	1,048,941	0.91	3,558,013	0.30	385,791	0.36	707,070	0.69	451,492	0.39	1,544,353
2027	0.70	919,118	0.81	1,628,058	1.59	1,064,447	0.91	3,611,623	0.30	389,816	0.36	714,595	0.68	451,648	0.39	1,556,058
2028	0.70	933,247	0.81	1,654,702	1.59	1,081,380	0.91	3,669,329	0.30	394,063	0.35	722,849	0.66	445,802	0.39	1,562,714
2029	0.70	948,057	0.81	1,682,505	1.59	1,099,549	0.91	3,730,110	0.30	399,129	0.35	733,006	0.65	446,575	0.38	1,578,710
2030	0.70	962,988	0.81	1,710,202	1.59	1,117,650	0.91	3,790,840	0.30	404,867	0.35	742,195	0.64	451,127	0.38	1,598,189

Table L-3
NOx - 47 State API 2

YEAR	Baseline								With Proposed Tier 2 Standards & API 2 Sulfur Program							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	3,370,689	2.90	1,312,027	3.64	549,235	**2.70**	**5,231,951**	2.52	3,370,689	2.90	1,312,027	3.64	549,235	**2.70**	**5,231,951**
1995	1.85	2,499,403	2.10	1,290,125	2.98	608,774	**2.03**	**4,401,896**	1.85	2,499,403	2.10	1,290,125	2.98	608,774	**2.03**	**4,401,896**
2000	1.42	1,857,518	1.70	1,376,923	2.35	634,942	**1.62**	**3,869,383**	1.42	1,857,518	1.70	1,376,923	2.35	634,942	**1.62**	**3,869,383**
2001	1.37	1,762,275	1.64	1,403,290	2.27	648,610	**1.57**	**3,814,175**	1.37	1,762,275	1.64	1,403,290	2.27	648,610	**1.57**	**3,814,175**
2002	1.31	1,677,426	1.58	1,420,024	2.20	661,277	**1.52**	**3,758,726**	1.31	1,677,426	1.58	1,420,024	2.20	661,277	**1.52**	**3,758,726**
2003	1.25	1,577,811	1.50	1,423,863	2.06	651,222	**1.45**	**3,652,896**	1.25	1,577,811	1.50	1,423,863	2.06	651,222	**1.45**	**3,652,896**
2004	1.18	1,464,846	1.42	1,412,348	2.00	662,460	**1.38**	**3,539,655**	1.10	1,372,162	1.35	1,349,010	1.92	638,563	**1.31**	**3,359,735**
2005	1.10	1,352,809	1.33	1,385,444	1.90	660,629	**1.30**	**3,398,882**	1.01	1,240,736	1.25	1,305,782	1.79	622,648	**1.21**	**3,169,167**
2006	1.04	1,255,469	1.25	1,370,781	1.85	675,246	**1.24**	**3,301,495**	0.93	1,116,815	1.16	1,267,029	1.68	614,252	**1.12**	**2,998,096**
2007	0.99	1,167,934	1.18	1,358,345	1.81	692,250	**1.19**	**3,218,530**	0.84	999,787	1.06	1,216,193	1.58	604,664	**1.04**	**2,820,644**
2008	0.94	1,090,670	1.12	1,343,382	1.75	702,548	**1.13**	**3,136,600**	0.77	892,910	0.96	1,150,124	1.46	584,686	**0.95**	**2,627,720**
2009	0.90	1,026,748	1.07	1,335,414	1.73	722,278	**1.10**	**3,084,440**	0.70	799,373	0.87	1,087,158	1.36	569,938	**0.87**	**2,456,469**
2010	0.86	972,385	1.02	1,327,395	1.71	741,858	**1.06**	**3,041,639**	0.54	611,729	0.69	894,536	1.19	515,063	**0.71**	**2,021,327**
2011	0.83	930,327	0.98	1,323,174	1.69	763,870	**1.03**	**3,017,371**	0.49	543,796	0.61	828,411	1.10	498,472	**0.64**	**1,870,679**
2012	0.80	895,750	0.94	1,318,077	1.68	784,781	**1.00**	**2,998,608**	0.43	484,743	0.54	762,881	1.03	481,961	**0.58**	**1,729,585**
2013	0.78	870,112	0.91	1,319,035	1.66	805,189	**0.98**	**2,994,336**	0.39	437,131	0.49	705,406	0.96	466,235	**0.53**	**1,608,772**
2014	0.76	849,770	0.88	1,325,476	1.65	826,327	**0.96**	**3,001,573**	0.36	397,241	0.44	656,967	0.91	452,774	**0.48**	**1,506,982**
2015	0.75	836,572	0.87	1,337,476	1.64	846,758	**0.95**	**3,020,806**	0.33	365,733	0.40	618,117	0.85	440,289	**0.45**	**1,424,139**
2016	0.74	828,752	0.85	1,354,388	1.64	867,267	**0.94**	**3,050,407**	0.30	340,736	0.37	588,258	0.81	429,484	**0.42**	**1,358,477**
2017	0.73	826,257	0.84	1,374,483	1.63	886,614	**0.93**	**3,087,354**	0.28	322,369	0.35	566,111	0.77	419,402	**0.39**	**1,307,882**
2018	0.72	825,135	0.83	1,395,003	1.62	906,484	**0.93**	**3,126,621**	0.27	307,001	0.33	548,778	0.74	411,554	**0.38**	**1,267,334**
2019	0.71	827,699	0.83	1,419,097	1.62	925,309	**0.92**	**3,172,105**	0.26	296,462	0.31	538,789	0.71	404,312	**0.36**	**1,239,564**
2020	0.71	834,251	0.82	1,442,704	1.61	944,196	**0.92**	**3,221,151**	0.25	290,337	0.30	531,692	0.68	398,993	**0.35**	**1,221,022**
2021	0.71	843,612	0.82	1,470,652	1.61	962,622	**0.92**	**3,276,886**	0.24	287,663	0.30	531,661	0.66	394,509	**0.34**	**1,213,832**
2022	0.71	854,315	0.82	1,498,298	1.61	980,636	**0.91**	**3,333,250**	0.24	286,716	0.29	533,751	0.64	390,670	**0.33**	**1,211,137**
2023	0.71	866,235	0.82	1,524,308	1.61	998,449	**0.91**	**3,388,993**	0.23	287,026	0.29	535,623	0.62	387,769	**0.33**	**1,210,417**
2024	0.71	878,289	0.82	1,550,902	1.60	1,016,120	**0.91**	**3,445,311**	0.23	287,671	0.28	539,425	0.61	385,735	**0.32**	**1,212,830**
2025	0.71	893,264	0.81	1,577,444	1.60	1,033,694	**0.91**	**3,504,402**	0.23	289,774	0.28	540,799	0.60	384,498	**0.32**	**1,215,072**
2026	0.71	905,989	0.81	1,603,083	1.60	1,048,941	**0.91**	**3,558,013**	0.23	292,601	0.28	546,511	0.58	381,880	**0.31**	**1,220,993**
2027	0.70	919,118	0.81	1,628,058	1.59	1,064,447	**0.91**	**3,611,623**	0.23	295,809	0.28	552,161	0.57	380,212	**0.31**	**1,228,181**
2028	0.70	933,247	0.81	1,654,702	1.59	1,081,380	**0.91**	**3,669,329**	0.23	299,097	0.27	556,490	0.54	367,428	**0.30**	**1,223,015**
2029	0.70	948,057	0.81	1,682,505	1.59	1,099,549	**0.91**	**3,730,110**	0.23	302,952	0.27	564,339	0.53	367,972	**0.30**	**1,235,262**
2030	0.70	962,988	0.81	1,710,202	1.59	1,117,650	**0.91**	**3,790,840**	0.22	307,310	0.27	571,449	0.53	370,793	**0.30**	**1,249,552**

Table L-4
NOx - 47 State Default Stds

YEAR	Baseline								With Default Tier 2 Standards & Proposed Sulfur Program							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	3,370,689	2.90	1,312,027	3.64	549,235	**2.70**	**5,231,951**	2.52	3,370,689	2.90	1,312,027	3.64	549,235	**2.70**	**5,231,951**
1995	1.85	2,499,403	2.10	1,290,125	2.98	608,774	**2.03**	**4,401,896**	1.85	2,499,403	2.10	1,290,125	2.98	608,774	**2.03**	**4,401,896**
2000	1.42	1,857,518	1.70	1,376,923	2.35	634,942	**1.62**	**3,869,383**	1.42	1,857,518	1.70	1,376,923	2.35	634,942	**1.62**	**3,869,383**
2001	1.37	1,762,275	1.64	1,403,290	2.27	648,610	**1.57**	**3,814,175**	1.37	1,762,275	1.64	1,403,290	2.27	648,610	**1.57**	**3,814,175**
2002	1.31	1,677,426	1.58	1,420,024	2.20	661,277	**1.52**	**3,758,726**	1.31	1,677,426	1.58	1,420,024	2.20	661,277	**1.52**	**3,758,726**
2003	1.25	1,577,811	1.50	1,423,863	2.06	651,222	**1.45**	**3,652,896**	1.25	1,577,811	1.50	1,423,863	2.06	651,222	**1.45**	**3,652,896**
2004	1.18	1,464,846	1.42	1,412,348	2.00	662,460	**1.38**	**3,539,655**	0.97	1,204,854	1.24	1,233,644	1.85	614,760	**1.19**	**3,053,258**
2005	1.10	1,352,809	1.33	1,385,444	1.90	660,629	**1.30**	**3,398,882**	0.88	1,073,714	1.14	1,188,622	1.76	613,385	**1.10**	**2,875,721**
2006	1.04	1,255,469	1.25	1,370,781	1.85	675,246	**1.24**	**3,301,495**	0.79	956,080	1.05	1,152,261	1.72	627,113	**1.03**	**2,735,454**
2007	0.99	1,167,934	1.18	1,358,345	1.81	692,250	**1.19**	**3,218,530**	0.72	847,862	0.97	1,116,577	1.68	643,071	**0.96**	**2,607,509**
2008	0.94	1,090,670	1.12	1,343,382	1.75	702,548	**1.13**	**3,136,600**	0.65	750,595	0.90	1,077,970	1.63	652,949	**0.90**	**2,481,514**
2009	0.90	1,026,748	1.07	1,335,414	1.73	722,278	**1.10**	**3,084,440**	0.58	666,728	0.84	1,047,373	1.61	671,370	**0.85**	**2,385,471**
2010	0.86	972,385	1.02	1,327,395	1.71	741,858	**1.06**	**3,041,639**	0.53	593,915	0.78	1,017,915	1.59	689,552	**0.80**	**2,301,381**
2011	0.83	930,327	0.98	1,323,174	1.69	763,870	**1.03**	**3,017,371**	0.48	533,456	0.73	992,953	1.57	710,036	**0.76**	**2,236,445**
2012	0.80	895,750	0.94	1,318,077	1.68	784,781	**1.00**	**2,998,608**	0.43	481,813	0.69	968,718	1.56	729,583	**0.73**	**2,180,115**
2013	0.78	870,112	0.91	1,319,035	1.66	805,189	**0.98**	**2,994,336**	0.40	441,694	0.66	951,587	1.55	748,650	**0.70**	**2,141,931**
2014	0.76	849,770	0.88	1,325,476	1.65	826,327	**0.96**	**3,001,573**	0.37	409,414	0.63	941,387	1.54	768,475	**0.68**	**2,119,276**
2015	0.75	836,572	0.87	1,337,476	1.64	846,758	**0.95**	**3,020,806**	0.34	385,292	0.61	938,115	1.53	787,617	**0.66**	**2,111,025**
2016	0.74	828,752	0.85	1,354,388	1.64	867,267	**0.94**	**3,050,407**	0.33	367,046	0.59	940,871	1.52	806,824	**0.65**	**2,114,741**
2017	0.73	826,257	0.84	1,374,483	1.63	886,614	**0.93**	**3,087,354**	0.31	354,432	0.58	947,964	1.52	824,922	**0.64**	**2,127,317**
2018	0.72	825,135	0.83	1,395,003	1.62	906,484	**0.93**	**3,126,621**	0.30	343,758	0.57	956,525	1.51	843,550	**0.63**	**2,143,834**
2019	0.71	827,699	0.83	1,419,097	1.62	925,309	**0.92**	**3,172,105**	0.29	336,996	0.56	969,113	1.51	861,168	**0.63**	**2,167,277**
2020	0.71	834,251	0.82	1,442,704	1.61	944,196	**0.92**	**3,221,151**	0.28	333,971	0.56	981,366	1.50	879,125	**0.62**	**2,194,461**
2021	0.71	843,612	0.82	1,470,652	1.61	962,622	**0.92**	**3,276,886**	0.28	333,860	0.56	998,075	1.50	896,594	**0.62**	**2,228,529**
2022	0.71	854,315	0.82	1,498,298	1.61	980,636	**0.91**	**3,333,250**	0.28	335,098	0.55	1,014,847	1.50	913,393	**0.62**	**2,263,338**
2023	0.71	866,235	0.82	1,524,308	1.61	998,449	**0.91**	**3,388,993**	0.28	337,244	0.55	1,029,862	1.50	930,007	**0.62**	**2,297,112**
2024	0.71	878,289	0.82	1,550,902	1.60	1,016,120	**0.91**	**3,445,311**	0.27	339,529	0.55	1,045,747	1.49	946,486	**0.62**	**2,331,762**
2025	0.71	893,264	0.81	1,577,444	1.60	1,033,694	**0.91**	**3,504,402**	0.27	342,560	0.55	1,057,590	1.49	962,875	**0.61**	**2,363,025**
2026	0.71	905,989	0.81	1,603,083	1.60	1,048,941	**0.91**	**3,558,013**	0.27	346,960	0.55	1,074,737	1.49	977,128	**0.61**	**2,398,825**
2027	0.70	919,118	0.81	1,628,058	1.59	1,064,447	**0.91**	**3,611,623**	0.27	351,602	0.54	1,091,524	1.48	991,621	**0.61**	**2,434,748**
2028	0.70	933,247	0.81	1,654,702	1.59	1,081,380	**0.91**	**3,669,329**	0.27	356,574	0.54	1,109,239	1.48	1,007,432	**0.61**	**2,473,245**
2029	0.70	948,057	0.81	1,682,505	1.59	1,099,549	**0.91**	**3,730,110**	0.27	361,935	0.54	1,127,676	1.48	1,024,347	**0.61**	**2,513,958**
2030	0.70	962,988	0.81	1,710,202	1.59	1,117,650	**0.91**	**3,790,840**	0.27	367,497	0.54	1,146,140	1.48	1,041,210	**0.61**	**2,554,846**

Table L-5
Exhaust VOC - 47 State Annual

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.32	3,098,858	3.04	1,374,163	4.64	700,419	2.67	5,173,440	2.32	3,098,858	3.04	1,374,163	4.64	700,419	2.67	5,173,440
1995	1.14	1,531,878	1.58	970,397	2.87	585,926	1.43	3,088,201	1.14	1,531,878	1.58	970,397	2.87	585,926	1.43	3,088,201
2000	0.65	851,250	0.94	759,861	1.81	489,359	0.88	2,100,470	0.65	851,250	0.94	759,861	1.81	489,359	0.88	2,100,470
2001	0.59	764,356	0.86	732,163	1.67	476,666	0.81	1,973,185	0.59	764,356	0.86	732,163	1.67	476,666	0.81	1,973,185
2002	0.54	687,928	0.78	698,663	1.54	461,854	0.75	1,848,445	0.54	687,928	0.78	698,663	1.54	461,854	0.75	1,848,445
2003	0.49	617,926	0.70	661,021	1.32	416,558	0.67	1,695,505	0.49	617,926	0.70	661,021	1.32	416,558	0.67	1,695,505
2004	0.44	544,492	0.63	627,380	1.23	406,710	0.61	1,578,581	0.41	507,044	0.58	581,016	1.17	387,125	0.57	1,475,185
2005	0.39	475,955	0.54	560,365	1.00	349,489	0.53	1,385,808	0.36	439,695	0.49	512,846	0.93	323,172	0.49	1,275,713
2006	0.35	427,248	0.49	534,263	0.95	348,668	0.49	1,310,180	0.33	393,496	0.44	486,370	0.87	316,176	0.45	1,196,042
2007	0.32	382,102	0.44	510,307	0.91	349,572	0.46	1,241,981	0.29	349,316	0.40	461,604	0.81	310,046	0.41	1,120,966
2008	0.29	342,310	0.40	477,705	0.84	337,503	0.42	1,157,518	0.27	310,903	0.36	427,951	0.72	290,029	0.37	1,028,882
2009	0.27	308,916	0.37	458,901	0.82	341,382	0.39	1,109,199	0.24	278,649	0.33	407,761	0.68	284,604	0.35	971,014
2010	0.25	280,117	0.34	441,412	0.79	345,087	0.37	1,066,616	0.22	250,760	0.30	388,843	0.64	278,167	0.32	917,770
2011	0.23	257,130	0.31	424,802	0.78	350,228	0.35	1,032,160	0.20	228,474	0.27	370,425	0.60	273,003	0.30	871,902
2012	0.21	237,337	0.29	404,151	0.76	354,920	0.33	996,408	0.19	209,197	0.25	347,421	0.57	267,567	0.28	824,185
2013	0.20	223,276	0.27	392,758	0.74	359,635	0.32	975,670	0.18	195,603	0.23	333,957	0.54	262,209	0.26	791,769
2014	0.19	212,995	0.26	384,928	0.73	364,626	0.31	962,550	0.17	185,681	0.22	323,936	0.52	257,490	0.25	767,107
2015	0.18	205,285	0.25	379,454	0.72	369,680	0.30	954,419	0.16	178,189	0.20	316,212	0.49	253,055	0.24	747,456
2016	0.18	200,481	0.24	379,378	0.71	374,735	0.29	954,594	0.15	173,485	0.20	314,010	0.47	248,948	0.23	736,443
2017	0.17	197,067	0.23	379,713	0.70	380,188	0.29	956,968	0.15	170,044	0.19	312,200	0.45	245,672	0.22	727,916
2018	0.17	194,279	0.23	379,237	0.69	385,239	0.28	958,754	0.15	167,160	0.18	309,709	0.43	242,410	0.21	719,279
2019	0.17	193,401	0.22	381,071	0.68	390,528	0.28	965,001	0.14	166,106	0.18	309,655	0.42	239,808	0.21	715,569
2020	0.16	193,370	0.22	384,827	0.66	387,805	0.28	966,003	0.14	165,806	0.18	311,663	0.39	229,325	0.20	706,794
2021	0.16	194,633	0.22	391,295	0.65	385,928	0.27	971,856	0.14	166,746	0.18	316,476	0.37	220,086	0.20	703,308
2022	0.16	196,390	0.22	397,758	0.65	393,563	0.27	987,711	0.14	168,140	0.18	321,364	0.36	221,087	0.19	710,591
2023	0.16	198,356	0.22	403,274	0.64	401,075	0.27	1,002,705	0.14	169,705	0.17	325,423	0.36	222,284	0.19	717,413
2024	0.16	200,017	0.22	408,923	0.64	408,491	0.27	1,017,431	0.14	170,978	0.17	329,617	0.35	223,677	0.19	724,272
2025	0.16	202,808	0.21	412,835	0.64	415,835	0.27	1,031,478	0.14	173,270	0.17	332,292	0.35	225,259	0.19	730,821
2026	0.16	205,852	0.21	419,866	0.64	422,701	0.27	1,048,419	0.14	175,882	0.17	337,810	0.34	226,673	0.19	740,366
2027	0.16	208,978	0.21	426,781	0.64	429,571	0.27	1,065,331	0.14	178,564	0.17	343,247	0.34	228,299	0.19	750,110
2028	0.16	212,246	0.21	433,927	0.64	436,691	0.27	1,082,863	0.14	181,360	0.17	348,401	0.33	225,029	0.19	754,791
2029	0.16	215,614	0.21	441,218	0.64	444,028	0.27	1,100,860	0.14	184,238	0.17	354,255	0.33	227,987	0.19	766,480
2030	0.16	219,010	0.21	448,481	0.64	451,338	0.27	1,118,828	0.14	187,140	0.17	360,087	0.33	230,746	0.19	777,973

Table L-6
Exhaust VOC - 47 State API 1

YEAR	Baseline								With Proposed Tier 2 Standards & API 1 Sulfur Program							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.32	3,098,858	3.04	1,374,163	4.64	700,419	2.67	5,173,440	2.32	3,098,858	3.04	1,374,163	4.64	700,419	2.67	5,173,440
1995	1.14	1,531,878	1.58	970,397	2.87	585,926	1.43	3,088,201	1.14	1,531,878	1.58	970,397	2.87	585,926	1.43	3,088,201
2000	0.65	851,250	0.94	759,861	1.81	489,359	0.88	2,100,470	0.65	851,250	0.94	759,861	1.81	489,359	0.88	2,100,470
2001	0.59	764,356	0.86	732,163	1.67	476,666	0.81	1,973,185	0.59	764,356	0.86	732,163	1.67	476,666	0.81	1,973,185
2002	0.54	687,928	0.78	698,663	1.54	461,854	0.75	1,848,445	0.54	687,928	0.78	698,663	1.54	461,854	0.75	1,848,445
2003	0.49	617,926	0.70	661,021	1.32	416,558	0.67	1,695,505	0.49	617,926	0.70	661,021	1.32	416,558	0.67	1,695,505
2004	0.44	544,492	0.63	627,380	1.23	406,710	0.61	1,578,581	0.43	528,831	0.61	606,988	1.19	396,096	0.60	1,531,915
2005	0.39	475,955	0.54	560,365	1.00	349,489	0.53	1,385,808	0.38	461,146	0.52	539,090	0.96	333,936	0.51	1,334,171
2006	0.35	427,248	0.49	534,263	0.95	348,668	0.49	1,310,180	0.34	413,655	0.47	512,573	0.90	327,003	0.47	1,253,231
2007	0.32	382,102	0.44	510,307	0.91	349,572	0.46	1,241,981	0.31	369,417	0.42	487,718	0.84	320,928	0.43	1,178,063
2008	0.29	342,310	0.40	477,705	0.84	337,503	0.42	1,157,518	0.28	330,708	0.38	454,031	0.75	301,001	0.39	1,085,740
2009	0.27	308,916	0.37	458,901	0.82	341,382	0.39	1,109,199	0.26	298,314	0.35	433,992	0.71	295,934	0.37	1,028,240
2010	0.25	280,117	0.34	441,412	0.79	345,087	0.37	1,066,616	0.24	270,407	0.32	415,387	0.67	290,295	0.34	976,089
2011	0.23	257,130	0.31	424,802	0.78	350,228	0.35	1,032,160	0.22	248,184	0.29	397,458	0.63	285,720	0.32	931,361
2012	0.21	237,337	0.29	404,151	0.76	354,920	0.33	996,408	0.21	229,016	0.27	375,329	0.60	280,632	0.30	884,977
2013	0.20	223,276	0.27	392,758	0.74	359,635	0.32	975,670	0.19	215,461	0.25	362,443	0.57	275,704	0.28	853,609
2014	0.19	212,995	0.26	384,928	0.73	364,626	0.31	962,550	0.18	205,570	0.24	353,062	0.54	271,066	0.27	829,698
2015	0.18	205,285	0.25	379,454	0.72	369,680	0.30	954,419	0.18	198,145	0.22	346,023	0.52	266,614	0.26	810,782
2016	0.18	200,481	0.24	379,378	0.71	374,735	0.29	954,594	0.17	193,546	0.22	344,452	0.50	262,478	0.25	800,475
2017	0.17	197,067	0.23	379,713	0.70	380,188	0.29	956,968	0.17	190,261	0.21	343,327	0.48	259,192	0.24	792,781
2018	0.17	194,279	0.23	379,237	0.69	385,239	0.28	958,754	0.16	187,533	0.20	341,396	0.46	255,946	0.23	784,875
2019	0.17	193,401	0.22	381,071	0.68	390,528	0.28	965,001	0.16	186,678	0.20	341,910	0.44	253,377	0.23	781,965
2020	0.16	193,370	0.22	384,827	0.66	387,805	0.28	966,003	0.16	186,644	0.20	344,541	0.42	243,065	0.22	774,251
2021	0.16	194,633	0.22	391,295	0.65	385,928	0.27	971,856	0.16	187,888	0.20	350,037	0.39	234,002	0.22	771,928
2022	0.16	196,390	0.22	397,758	0.65	393,563	0.27	987,711	0.16	189,604	0.19	355,592	0.39	235,048	0.21	780,244
2023	0.16	198,356	0.22	403,274	0.64	401,075	0.27	1,002,705	0.16	191,519	0.19	360,253	0.38	236,309	0.21	788,081
2024	0.16	200,017	0.22	408,923	0.64	408,491	0.27	1,017,431	0.16	193,151	0.19	365,098	0.38	237,780	0.21	796,029
2025	0.16	202,808	0.21	412,835	0.64	415,835	0.27	1,031,478	0.16	195,846	0.19	368,382	0.37	239,456	0.21	803,684
2026	0.16	205,852	0.21	419,866	0.64	422,701	0.27	1,048,419	0.15	198,792	0.19	374,528	0.37	240,939	0.21	814,259
2027	0.16	208,978	0.21	426,781	0.64	429,571	0.27	1,065,331	0.15	201,817	0.19	380,581	0.36	242,651	0.21	825,049
2028	0.16	212,246	0.21	433,927	0.64	436,691	0.27	1,082,863	0.15	204,975	0.19	386,427	0.35	239,960	0.21	831,362
2029	0.16	215,614	0.21	441,218	0.64	444,028	0.27	1,100,860	0.15	208,228	0.19	392,920	0.35	242,877	0.21	844,024
2030	0.16	219,010	0.21	448,481	0.64	451,338	0.27	1,118,828	0.15	211,507	0.19	399,388	0.35	245,657	0.20	856,552

Table L-7
Exhaust VOC - 47 State API 2

YEAR	Baseline								With Proposed Tier 2 Standards & API 2 Sulfur Program							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.32	3,098,858	3.04	1,374,163	4.64	700,419	**2.67**	**5,173,440**	2.32	3,098,858	3.04	1,374,163	4.64	700,419	**2.67**	**5,173,440**
1995	1.14	1,531,878	1.58	970,397	2.87	585,926	**1.43**	**3,088,201**	1.14	1,531,878	1.58	970,397	2.87	585,926	**1.43**	**3,088,201**
2000	0.65	851,250	0.94	759,861	1.81	489,359	**0.88**	**2,100,470**	0.65	851,250	0.94	759,861	1.81	489,359	**0.88**	**2,100,470**
2001	0.59	764,356	0.86	732,163	1.67	476,666	**0.81**	**1,973,185**	0.59	764,356	0.86	732,163	1.67	476,666	**0.81**	**1,973,185**
2002	0.54	687,928	0.78	698,663	1.54	461,854	**0.75**	**1,848,445**	0.54	687,928	0.78	698,663	1.54	461,854	**0.75**	**1,848,445**
2003	0.49	617,926	0.70	661,021	1.32	416,558	**0.67**	**1,695,505**	0.49	617,926	0.70	661,021	1.32	416,558	**0.67**	**1,695,505**
2004	0.44	544,492	0.63	627,380	1.23	406,710	**0.61**	**1,578,581**	0.43	528,831	0.61	606,988	1.19	396,096	**0.60**	**1,531,915**
2005	0.39	475,955	0.54	560,365	1.00	349,489	**0.53**	**1,385,808**	0.38	461,146	0.52	539,090	0.96	333,936	**0.51**	**1,334,171**
2006	0.35	427,248	0.49	534,263	0.95	348,668	**0.49**	**1,310,180**	0.34	413,655	0.47	512,573	0.90	327,003	**0.47**	**1,253,231**
2007	0.32	382,102	0.44	510,307	0.91	349,572	**0.46**	**1,241,981**	0.31	369,417	0.42	487,718	0.84	320,928	**0.43**	**1,178,063**
2008	0.29	342,310	0.40	477,705	0.84	337,503	**0.42**	**1,157,518**	0.28	330,708	0.38	454,031	0.75	301,001	**0.39**	**1,085,740**
2009	0.27	308,916	0.37	458,901	0.82	341,382	**0.39**	**1,109,199**	0.26	298,314	0.35	433,992	0.71	295,934	**0.37**	**1,028,240**
2010	0.25	280,117	0.34	441,412	0.79	345,087	**0.37**	**1,066,616**	0.23	258,129	0.31	398,611	0.65	282,408	**0.33**	**939,148**
2011	0.23	257,130	0.31	424,802	0.78	350,228	**0.35**	**1,032,160**	0.21	235,889	0.28	380,478	0.62	277,600	**0.31**	**893,967**
2012	0.21	237,337	0.29	404,151	0.76	354,920	**0.33**	**996,408**	0.19	216,676	0.25	357,855	0.58	272,384	**0.28**	**846,916**
2013	0.20	223,276	0.27	392,758	0.74	359,635	**0.32**	**975,670**	0.18	203,136	0.24	344,697	0.55	267,223	**0.27**	**815,057**
2014	0.19	212,995	0.26	384,928	0.73	364,626	**0.31**	**962,550**	0.17	193,273	0.22	334,999	0.53	262,574	**0.25**	**790,846**
2015	0.18	205,285	0.25	379,454	0.72	369,680	**0.30**	**954,419**	0.17	185,850	0.21	327,606	0.50	258,166	**0.24**	**771,622**
2016	0.18	200,481	0.24	379,378	0.71	374,735	**0.29**	**954,594**	0.16	181,222	0.20	325,717	0.48	254,075	**0.23**	**761,015**
2017	0.17	197,067	0.23	379,713	0.70	380,188	**0.29**	**956,968**	0.16	177,869	0.20	324,227	0.46	250,820	**0.23**	**752,915**
2018	0.17	194,279	0.23	379,237	0.69	385,239	**0.28**	**958,754**	0.15	175,075	0.19	322,029	0.44	247,586	**0.22**	**744,690**
2019	0.17	193,401	0.22	381,071	0.68	390,528	**0.28**	**965,001**	0.15	174,121	0.19	322,258	0.43	245,016	**0.22**	**741,396**
2020	0.16	193,370	0.22	384,827	0.66	387,805	**0.28**	**966,003**	0.15	173,938	0.18	324,540	0.40	234,631	**0.21**	**733,109**
2021	0.16	194,633	0.22	391,295	0.65	385,928	**0.27**	**971,856**	0.15	175,002	0.18	329,628	0.38	225,487	**0.20**	**730,116**
2022	0.16	196,390	0.22	397,758	0.65	393,563	**0.27**	**987,711**	0.15	176,526	0.18	334,782	0.37	226,516	**0.20**	**737,824**
2023	0.16	198,356	0.22	403,274	0.64	401,075	**0.27**	**1,002,705**	0.15	178,228	0.18	339,079	0.37	227,748	**0.20**	**745,055**
2024	0.16	200,017	0.22	408,923	0.64	408,491	**0.27**	**1,017,431**	0.14	179,641	0.18	343,530	0.36	229,180	**0.20**	**752,351**
2025	0.16	202,808	0.21	412,835	0.64	415,835	**0.27**	**1,031,478**	0.14	182,081	0.18	346,423	0.36	230,807	**0.20**	**759,312**
2026	0.16	205,852	0.21	419,866	0.64	422,701	**0.27**	**1,048,419**	0.14	184,835	0.18	352,208	0.35	232,257	**0.20**	**769,299**
2027	0.16	208,978	0.21	426,781	0.64	429,571	**0.27**	**1,065,331**	0.14	187,661	0.18	357,908	0.35	233,923	**0.20**	**779,492**
2028	0.16	212,246	0.21	433,927	0.64	436,691	**0.27**	**1,082,863**	0.14	190,602	0.18	363,344	0.34	230,817	**0.19**	**784,763**
2029	0.16	215,614	0.21	441,218	0.64	444,028	**0.27**	**1,100,860**	0.14	193,627	0.18	369,449	0.34	233,849	**0.19**	**796,925**
2030	0.16	219,010	0.21	448,481	0.64	451,338	**0.27**	**1,118,828**	0.14	196,676	0.18	375,531	0.34	236,621	**0.19**	**808,828**

Table L-8
Exhaust VOC - 47 State Default

YEAR	Baseline								With Default Tier 2 Standards & Proposed Sulfur Program							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.32	3,098,858	3.04	1,374,163	4.64	700,419	**2.67**	**5,173,440**	2.32	3,098,858	3.04	1,374,163	4.64	700,419	**2.67**	**5,173,440**
1995	1.14	1,531,878	1.58	970,397	2.87	585,926	**1.43**	**3,088,201**	1.14	1,531,878	1.58	970,397	2.87	585,926	**1.43**	**3,088,201**
2000	0.65	851,250	0.94	759,861	1.81	489,359	**0.88**	**2,100,470**	0.65	851,250	0.94	759,861	1.81	489,359	**0.88**	**2,100,470**
2001	0.59	764,356	0.86	732,163	1.67	476,666	**0.81**	**1,973,185**	0.59	764,356	0.86	732,163	1.67	476,666	**0.81**	**1,973,185**
2002	0.54	687,928	0.78	698,663	1.54	461,854	**0.75**	**1,848,445**	0.54	687,928	0.78	698,663	1.54	461,854	**0.75**	**1,848,445**
2003	0.49	617,926	0.70	661,021	1.32	416,558	**0.67**	**1,695,505**	0.49	617,926	0.70	661,021	1.32	416,558	**0.67**	**1,695,505**
2004	0.44	544,492	0.63	627,380	1.23	406,710	**0.61**	**1,578,581**	0.41	507,344	0.58	581,689	1.17	389,089	**0.57**	**1,478,122**
2005	0.39	475,955	0.54	560,365	1.00	349,489	**0.53**	**1,385,808**	0.36	440,939	0.49	515,264	0.95	329,708	**0.49**	**1,285,910**
2006	0.35	427,248	0.49	534,263	0.95	348,668	**0.49**	**1,310,180**	0.33	396,216	0.45	491,042	0.90	328,017	**0.46**	**1,215,275**
2007	0.32	382,102	0.44	510,307	0.91	349,572	**0.46**	**1,241,981**	0.30	353,740	0.41	468,952	0.86	327,996	**0.42**	**1,150,688**
2008	0.29	342,310	0.40	477,705	0.84	337,503	**0.42**	**1,157,518**	0.27	317,061	0.36	438,308	0.79	314,983	**0.39**	**1,070,352**
2009	0.27	308,916	0.37	458,901	0.82	341,382	**0.39**	**1,109,199**	0.25	286,567	0.34	421,363	0.76	317,880	**0.36**	**1,025,810**
2010	0.25	280,117	0.34	441,412	0.79	345,087	**0.37**	**1,066,616**	0.23	260,542	0.31	405,775	0.74	320,627	**0.34**	**986,943**
2011	0.23	257,130	0.31	424,802	0.78	350,228	**0.35**	**1,032,160**	0.22	240,991	0.29	390,897	0.72	324,743	**0.33**	**956,630**
2012	0.21	237,337	0.29	404,151	0.76	354,920	**0.33**	**996,408**	0.20	224,613	0.26	371,447	0.70	328,426	**0.31**	**924,487**
2013	0.20	223,276	0.27	392,758	0.74	359,635	**0.32**	**975,670**	0.19	213,780	0.25	361,405	0.69	332,146	**0.30**	**907,331**
2014	0.19	212,995	0.26	384,928	0.73	364,626	**0.31**	**962,550**	0.19	206,474	0.24	354,601	0.67	336,162	**0.29**	**897,237**
2015	0.18	205,285	0.25	379,454	0.72	369,680	**0.30**	**954,419**	0.18	201,435	0.23	349,839	0.66	340,262	**0.28**	**891,535**
2016	0.18	200,481	0.24	379,378	0.71	374,735	**0.29**	**954,594**	0.18	198,956	0.22	350,322	0.65	344,373	**0.28**	**893,651**
2017	0.17	197,067	0.23	379,713	0.70	380,188	**0.29**	**956,968**	0.17	197,448	0.21	350,890	0.64	348,918	**0.27**	**897,255**
2018	0.17	194,279	0.23	379,237	0.69	385,239	**0.28**	**958,754**	0.17	196,195	0.21	350,481	0.63	353,085	**0.27**	**899,761**
2019	0.17	193,401	0.22	381,071	0.68	390,528	**0.28**	**965,001**	0.17	196,526	0.21	352,239	0.63	357,520	**0.26**	**906,286**
2020	0.16	193,370	0.22	384,827	0.66	387,805	**0.28**	**966,003**	0.17	197,446	0.20	355,810	0.60	353,662	**0.26**	**906,918**
2021	0.16	194,633	0.22	391,295	0.65	385,928	**0.27**	**971,856**	0.17	199,460	0.20	361,998	0.59	350,704	**0.25**	**912,162**
2022	0.16	196,390	0.22	397,758	0.65	393,563	**0.27**	**987,711**	0.17	201,826	0.20	368,135	0.59	357,648	**0.25**	**927,609**
2023	0.16	198,356	0.22	403,274	0.64	401,075	**0.27**	**1,002,705**	0.17	204,288	0.20	373,385	0.59	364,478	**0.25**	**942,151**
2024	0.16	200,017	0.22	408,923	0.64	408,491	**0.27**	**1,017,431**	0.17	206,397	0.20	378,728	0.59	371,222	**0.25**	**956,347**
2025	0.16	202,808	0.21	412,835	0.64	415,835	**0.27**	**1,031,478**	0.17	209,480	0.20	382,518	0.59	377,898	**0.25**	**969,897**
2026	0.16	205,852	0.21	419,866	0.64	422,701	**0.27**	**1,048,419**	0.17	212,850	0.20	389,122	0.58	384,174	**0.25**	**986,146**
2027	0.16	208,978	0.21	426,781	0.64	429,571	**0.27**	**1,065,331**	0.17	216,263	0.20	395,618	0.58	390,451	**0.25**	**1,002,332**
2028	0.16	212,246	0.21	433,927	0.64	436,691	**0.27**	**1,082,863**	0.17	219,856	0.20	402,366	0.58	397,387	**0.25**	**1,019,609**
2029	0.16	215,614	0.21	441,218	0.64	444,028	**0.27**	**1,100,860**	0.17	223,490	0.20	409,219	0.58	403,518	**0.25**	**1,036,227**
2030	0.16	219,010	0.21	448,481	0.64	451,338	**0.27**	**1,118,828**	0.17	227,077	0.20	416,002	0.58	410,161	**0.25**	**1,053,239**

Table L-9
Evap VOC - 47 State Annual

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	3.08	4,121,651	2.92	1,321,629	4.78	721,176	**3.18**	**6,164,456**	3.08	4,121,651	2.92	1,321,629	4.78	721,176	**3.18**	**6,164,456**
1995	1.19	1,600,162	1.20	737,846	1.69	344,897	**1.24**	**2,682,905**	1.19	1,600,162	1.20	737,846	1.69	344,897	**1.24**	**2,682,905**
2000	0.65	845,817	0.73	592,134	0.86	233,148	**0.70**	**1,671,099**	0.65	845,817	0.73	592,134	0.86	233,148	**0.70**	**1,671,099**
2001	0.60	779,704	0.69	588,116	0.82	233,534	**0.66**	**1,601,354**	0.60	779,704	0.69	588,116	0.82	233,534	**0.66**	**1,601,354**
2002	0.56	714,567	0.64	580,436	0.78	232,685	**0.62**	**1,527,688**	0.56	714,567	0.64	580,436	0.78	232,685	**0.62**	**1,527,688**
2003	0.52	650,320	0.60	570,662	0.73	231,237	**0.58**	**1,452,218**	0.52	650,320	0.60	570,662	0.73	231,237	**0.58**	**1,452,218**
2004	0.48	599,121	0.56	557,092	0.71	235,118	**0.54**	**1,391,331**	0.48	598,822	0.56	556,718	0.71	235,118	**0.54**	**1,390,659**
2005	0.45	556,705	0.52	546,955	0.68	236,800	**0.51**	**1,340,459**	0.45	555,185	0.52	545,659	0.68	236,800	**0.51**	**1,337,644**
2006	0.43	519,738	0.50	545,378	0.65	237,361	**0.49**	**1,302,477**	0.43	516,515	0.49	542,050	0.65	237,361	**0.49**	**1,295,926**
2007	0.41	483,002	0.47	541,729	0.62	237,143	**0.46**	**1,261,874**	0.40	478,139	0.47	536,179	0.62	237,143	**0.46**	**1,251,461**
2008	0.39	451,956	0.45	543,020	0.59	235,715	**0.45**	**1,230,690**	0.38	444,683	0.44	534,464	0.59	235,364	**0.44**	**1,214,511**
2009	0.37	423,212	0.43	541,233	0.56	232,768	**0.43**	**1,197,213**	0.36	413,593	0.42	529,446	0.56	232,037	**0.42**	**1,175,077**
2010	0.35	396,291	0.41	536,370	0.53	228,316	**0.41**	**1,160,977**	0.34	384,373	0.40	521,145	0.52	227,177	**0.40**	**1,132,695**
2011	0.34	381,984	0.40	537,779	0.51	228,812	**0.39**	**1,148,575**	0.33	368,290	0.38	520,429	0.50	226,983	**0.38**	**1,115,701**
2012	0.33	369,079	0.38	536,976	0.49	228,358	**0.38**	**1,134,413**	0.32	353,585	0.37	517,410	0.48	225,794	**0.37**	**1,096,789**
2013	0.33	362,790	0.37	540,361	0.47	229,546	**0.37**	**1,132,697**	0.31	345,891	0.36	518,327	0.47	226,431	**0.36**	**1,090,649**
2014	0.32	357,553	0.36	542,217	0.46	230,067	**0.36**	**1,129,837**	0.30	339,201	0.35	517,618	0.45	226,374	**0.35**	**1,083,193**
2015	0.32	353,283	0.35	542,625	0.45	229,958	**0.35**	**1,125,865**	0.30	333,420	0.33	515,369	0.44	225,660	**0.34**	**1,074,448**
2016	0.31	353,194	0.35	551,256	0.44	231,108	**0.35**	**1,135,558**	0.30	332,092	0.33	521,871	0.43	226,212	**0.33**	**1,080,176**
2017	0.31	353,798	0.34	558,890	0.43	231,699	**0.35**	**1,144,387**	0.29	331,399	0.32	527,334	0.42	226,185	**0.33**	**1,084,918**
2018	0.31	354,948	0.34	565,659	0.42	231,794	**0.34**	**1,152,402**	0.29	331,193	0.32	531,889	0.40	225,641	**0.32**	**1,088,723**
2019	0.31	356,609	0.33	571,602	0.40	231,416	**0.34**	**1,159,627**	0.29	331,438	0.31	535,575	0.39	224,603	**0.32**	**1,091,616**
2020	0.31	358,910	0.33	576,624	0.39	230,533	**0.33**	**1,166,066**	0.28	332,247	0.31	538,308	0.38	223,044	**0.31**	**1,093,599**
2021	0.31	363,466	0.33	587,932	0.39	234,357	**0.33**	**1,185,754**	0.28	336,305	0.31	548,321	0.38	226,538	**0.31**	**1,111,164**
2022	0.31	368,378	0.33	598,896	0.39	238,014	**0.33**	**1,205,288**	0.28	340,686	0.31	557,991	0.38	229,862	**0.31**	**1,128,540**
2023	0.31	373,574	0.33	609,574	0.39	241,530	**0.33**	**1,224,677**	0.28	345,327	0.30	567,372	0.37	233,041	**0.31**	**1,145,739**
2024	0.30	378,995	0.33	620,015	0.39	244,923	**0.33**	**1,243,933**	0.28	350,170	0.30	576,510	0.37	236,093	**0.31**	**1,162,773**
2025	0.30	384,591	0.33	630,259	0.38	248,211	**0.33**	**1,263,060**	0.28	355,169	0.30	585,443	0.37	239,035	**0.31**	**1,179,648**
2026	0.30	390,321	0.32	640,339	0.38	251,406	**0.33**	**1,282,067**	0.28	360,288	0.30	594,203	0.37	241,880	**0.31**	**1,196,371**
2027	0.30	396,170	0.32	650,269	0.38	254,516	**0.33**	**1,300,954**	0.28	365,509	0.30	602,802	0.37	244,633	**0.30**	**1,212,945**
2028	0.30	402,074	0.32	660,099	0.38	257,558	**0.33**	**1,319,731**	0.28	370,777	0.30	611,287	0.36	247,315	**0.30**	**1,229,379**
2029	0.30	408,034	0.32	669,828	0.38	260,535	**0.33**	**1,338,397**	0.28	376,090	0.30	619,658	0.36	249,925	**0.30**	**1,245,673**
2030	0.30	414,033	0.32	679,471	0.37	263,451	**0.32**	**1,356,955**	0.28	381,433	0.30	627,928	0.36	252,468	**0.30**	**1,261,829**

Table L-10
PM2.5 - 47 State Annual
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.019	25,360	0.027	12,059	0.030	4,520	**0.022**	**41,938**	0.019	25,360	0.027	12,059	0.030	4,520	**0.022**	**41,938**
1995	0.015	19,932	0.019	11,435	0.023	4,705	**0.017**	**36,072**	0.015	19,932	0.019	11,435	0.023	4,705	**0.017**	**36,072**
2000	0.012	16,000	0.015	11,937	0.023	6,136	**0.014**	**34,072**	0.012	16,000	0.015	11,937	0.023	6,136	**0.014**	**34,072**
2001	0.012	15,580	0.014	12,392	0.022	6,170	**0.014**	**34,143**	0.012	15,580	0.014	12,392	0.022	6,170	**0.014**	**34,143**
2002	0.012	15,250	0.015	13,062	0.021	6,216	**0.014**	**34,528**	0.012	15,250	0.015	13,062	0.021	6,216	**0.014**	**34,528**
2003	0.012	14,984	0.014	13,727	0.017	5,244	**0.013**	**33,954**	0.012	14,984	0.014	13,727	0.017	5,244	**0.013**	**33,954**
2004	0.012	14,729	0.014	14,432	0.016	5,451	**0.013**	**34,612**	0.005	6,614	0.006	5,509	0.008	2,581	**0.006**	**14,703**
2005	0.012	14,359	0.014	15,053	0.016	5,640	**0.013**	**35,051**	0.005	6,358	0.005	5,610	0.007	2,541	**0.006**	**14,509**
2006	0.012	14,059	0.014	15,806	0.016	5,955	**0.013**	**35,820**	0.005	6,196	0.005	5,863	0.007	2,657	**0.006**	**14,716**
2007	0.012	13,750	0.014	16,435	0.016	6,180	**0.013**	**36,365**	0.005	6,035	0.005	5,981	0.007	2,662	**0.005**	**14,678**
2008	0.012	13,464	0.014	17,216	0.016	6,449	**0.013**	**37,129**	0.005	5,897	0.005	6,222	0.007	2,685	**0.005**	**14,804**
2009	0.012	13,233	0.014	17,921	0.016	6,656	**0.013**	**37,810**	0.005	5,785	0.005	6,436	0.006	2,695	**0.005**	**14,916**
2010	0.012	13,032	0.014	18,558	0.016	6,819	**0.013**	**38,409**	0.005	5,693	0.005	6,628	0.006	2,679	**0.005**	**14,999**
2011	0.012	12,927	0.014	19,197	0.015	6,917	**0.013**	**39,041**	0.005	5,641	0.005	6,773	0.006	2,570	**0.005**	**14,984**
2012	0.012	12,870	0.014	19,898	0.015	7,151	**0.013**	**39,919**	0.005	5,609	0.005	7,018	0.006	2,618	**0.005**	**15,245**
2013	0.012	12,847	0.014	20,592	0.015	7,404	**0.013**	**40,843**	0.005	5,594	0.005	7,261	0.006	2,676	**0.005**	**15,531**
2014	0.012	12,861	0.014	21,264	0.015	7,651	**0.013**	**41,777**	0.005	5,595	0.005	7,496	0.005	2,725	**0.005**	**15,817**
2015	0.012	12,911	0.014	21,918	0.015	7,895	**0.013**	**42,724**	0.005	5,613	0.005	7,726	0.005	2,791	**0.005**	**16,129**
2016	0.012	12,990	0.014	22,559	0.015	8,117	**0.013**	**43,666**	0.005	5,643	0.005	7,950	0.005	2,840	**0.005**	**16,433**
2017	0.012	13,095	0.014	23,176	0.015	8,347	**0.013**	**44,618**	0.005	5,685	0.005	8,167	0.005	2,905	**0.005**	**16,757**
2018	0.012	13,221	0.014	23,772	0.015	8,530	**0.013**	**45,523**	0.005	5,738	0.005	8,376	0.005	2,928	**0.005**	**17,042**
2019	0.012	13,369	0.014	24,349	0.015	8,739	**0.013**	**46,457**	0.005	5,800	0.005	8,578	0.005	2,985	**0.005**	**17,363**
2020	0.012	13,543	0.014	24,912	0.015	8,943	**0.013**	**47,397**	0.005	5,874	0.005	8,772	0.005	3,043	**0.005**	**17,690**
2021	0.012	13,729	0.014	25,451	0.015	9,134	**0.014**	**48,314**	0.005	5,954	0.005	8,962	0.005	3,094	**0.005**	**18,009**
2022	0.012	13,929	0.014	25,978	0.015	9,339	**0.014**	**49,246**	0.005	6,039	0.005	9,147	0.005	3,148	**0.005**	**18,335**
2023	0.012	14,140	0.014	26,494	0.015	9,525	**0.014**	**50,158**	0.005	6,130	0.005	9,329	0.005	3,202	**0.005**	**18,662**
2024	0.012	14,359	0.014	27,002	0.015	9,708	**0.014**	**51,069**	0.005	6,225	0.005	9,508	0.005	3,256	**0.005**	**18,989**
2025	0.012	14,586	0.014	27,503	0.015	9,888	**0.014**	**51,978**	0.005	6,323	0.005	9,685	0.005	3,310	**0.005**	**19,318**
2026	0.012	14,819	0.014	28,000	0.015	10,066	**0.014**	**52,885**	0.005	6,424	0.005	9,859	0.005	3,364	**0.005**	**19,647**
2027	0.012	15,057	0.014	28,491	0.015	10,243	**0.014**	**53,791**	0.005	6,526	0.005	10,032	0.005	3,418	**0.005**	**19,977**
2028	0.012	15,297	0.014	28,981	0.015	10,419	**0.014**	**54,696**	0.005	6,630	0.005	10,205	0.005	3,461	**0.005**	**20,296**
2029	0.012	15,539	0.014	29,468	0.015	10,594	**0.014**	**55,601**	0.005	6,735	0.005	10,376	0.005	3,514	**0.005**	**20,625**
2030	0.012	15,784	0.014	29,953	0.015	10,769	**0.014**	**56,505**	0.005	6,841	0.005	10,547	0.005	3,568	**0.005**	**20,956**

Table L-11
PM2.5 - 47 State Annual
"Increased Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.019	25,360	0.027	12,059	0.030	4,520	**0.022**	**41,938**	0.019	25,360	0.027	12,059	0.030	4,520	**0.022**	**41,938**
1995	0.015	19,932	0.019	11,435	0.023	4,705	**0.017**	**36,072**	0.015	19,932	0.019	11,435	0.023	4,705	**0.017**	**36,072**
2000	0.012	16,000	0.015	11,937	0.023	6,136	**0.014**	**34,072**	0.012	16,000	0.015	11,937	0.023	6,136	**0.014**	**34,072**
2001	0.012	15,580	0.014	12,392	0.023	6,491	**0.014**	**34,463**	0.012	15,580	0.014	12,392	0.023	6,491	**0.014**	**34,463**
2002	0.012	15,250	0.015	13,062	0.025	7,510	**0.014**	**35,822**	0.012	15,250	0.015	13,062	0.025	7,510	**0.014**	**35,822**
2003	0.012	14,984	0.014	13,727	0.026	8,202	**0.015**	**36,912**	0.012	14,984	0.014	13,727	0.026	8,202	**0.015**	**36,912**
2004	0.012	14,729	0.014	14,432	0.032	10,770	**0.016**	**39,932**	0.005	6,614	0.006	5,509	0.023	7,577	**0.008**	**19,700**
2005	0.012	14,359	0.014	15,053	0.040	14,027	**0.017**	**43,439**	0.005	6,358	0.005	5,610	0.025	8,728	**0.008**	**20,696**
2006	0.012	14,059	0.015	16,185	0.048	17,703	**0.018**	**47,947**	0.005	6,196	0.006	6,037	0.027	9,713	**0.008**	**21,946**
2007	0.012	13,750	0.016	17,987	0.055	21,170	**0.019**	**52,907**	0.005	6,035	0.006	6,376	0.026	10,067	**0.008**	**22,478**
2008	0.012	13,464	0.017	20,794	0.061	24,576	**0.021**	**58,834**	0.005	5,897	0.006	6,728	0.025	10,061	**0.008**	**22,686**
2009	0.012	13,233	0.019	24,408	0.066	27,765	**0.023**	**65,405**	0.005	5,785	0.006	7,103	0.023	9,773	**0.008**	**22,661**
2010	0.012	13,032	0.022	28,853	0.071	30,741	**0.025**	**72,626**	0.005	5,693	0.006	7,504	0.022	9,345	**0.008**	**22,542**
2011	0.012	12,927	0.025	33,775	0.074	33,579	**0.027**	**80,281**	0.005	5,641	0.006	7,883	0.020	8,879	**0.008**	**22,403**
2012	0.012	12,870	0.028	38,708	0.078	36,403	**0.029**	**87,981**	0.005	5,609	0.006	8,357	0.018	8,599	**0.008**	**22,566**
2013	0.012	12,847	0.030	43,531	0.081	39,114	**0.031**	**95,492**	0.005	5,594	0.006	8,819	0.017	8,363	**0.007**	**22,776**
2014	0.012	12,861	0.032	48,171	0.083	41,686	**0.033**	**102,718**	0.005	5,595	0.006	9,262	0.016	8,147	**0.007**	**23,004**
2015	0.012	12,911	0.034	52,583	0.086	44,128	**0.034**	**109,622**	0.005	5,613	0.006	9,685	0.015	7,977	**0.007**	**23,275**
2016	0.012	12,990	0.036	56,742	0.088	46,438	**0.036**	**116,171**	0.005	5,643	0.006	10,090	0.015	7,818	**0.007**	**23,550**
2017	0.012	13,095	0.037	60,587	0.089	48,632	**0.037**	**122,314**	0.005	5,685	0.006	10,469	0.014	7,699	**0.007**	**23,853**
2018	0.012	13,221	0.038	64,108	0.091	50,666	**0.038**	**127,996**	0.005	5,738	0.006	10,825	0.014	7,560	**0.007**	**24,123**
2019	0.012	13,369	0.039	67,301	0.092	52,622	**0.039**	**133,293**	0.005	5,800	0.007	11,158	0.013	7,476	**0.007**	**24,435**
2020	0.012	13,543	0.040	70,170	0.093	54,465	**0.039**	**138,177**	0.005	5,874	0.007	11,468	0.013	7,412	**0.007**	**24,754**
2021	0.012	13,729	0.041	72,744	0.094	56,215	**0.040**	**142,687**	0.005	5,954	0.007	11,760	0.012	7,358	**0.007**	**25,072**
2022	0.012	13,929	0.041	75,058	0.095	57,901	**0.040**	**146,888**	0.005	6,039	0.007	12,037	0.012	7,325	**0.007**	**25,401**
2023	0.012	14,140	0.041	77,151	0.096	59,501	**0.041**	**150,791**	0.005	6,130	0.007	12,301	0.012	7,306	**0.007**	**25,737**
2024	0.012	14,359	0.042	79,066	0.096	61,039	**0.041**	**154,464**	0.005	6,225	0.007	12,557	0.012	7,301	**0.007**	**26,083**
2025	0.012	14,586	0.042	80,849	0.097	62,794	**0.041**	**158,230**	0.005	6,323	0.007	12,806	0.012	7,609	**0.007**	**26,738**
2026	0.012	14,819	0.042	82,541	0.098	64,489	**0.041**	**161,850**	0.005	6,424	0.007	13,049	0.012	7,912	**0.007**	**27,385**
2027	0.012	15,057	0.042	84,171	0.099	66,111	**0.042**	**165,338**	0.005	6,526	0.007	13,287	0.012	8,189	**0.007**	**28,003**
2028	0.012	15,297	0.042	85,766	0.099	67,671	**0.042**	**168,733**	0.005	6,630	0.007	13,523	0.011	7,748	**0.007**	**27,901**
2029	0.012	15,539	0.042	87,338	0.100	69,175	**0.042**	**172,052**	0.005	6,735	0.007	13,756	0.011	7,702	**0.007**	**28,194**
2030	0.012	15,784	0.042	88,971	0.100	70,314	**0.042**	**175,068**	0.005	6,841	0.007	14,025	0.011	7,526	**0.007**	**28,393**

Table L-12
PM10 - 47 State Annual
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.020	27,402	0.029	13,033	0.032	4,876	**0.023**	**45,312**	0.020	27,402	0.029	13,033	0.032	4,876	**0.023**	**45,312**
1995	0.016	21,510	0.020	12,342	0.025	5,076	**0.018**	**38,929**	0.016	21,510	0.020	12,342	0.025	5,076	**0.018**	**38,929**
2000	0.013	17,254	0.016	12,871	0.024	6,619	**0.015**	**36,744**	0.013	17,254	0.016	12,871	0.024	6,619	**0.015**	**36,744**
2001	0.013	16,800	0.016	13,361	0.023	6,656	**0.015**	**36,817**	0.013	16,800	0.016	13,361	0.023	6,656	**0.015**	**36,817**
2002	0.013	16,443	0.016	14,084	0.022	6,706	**0.015**	**37,232**	0.013	16,443	0.016	14,084	0.022	6,706	**0.015**	**37,232**
2003	0.013	16,156	0.016	14,800	0.018	5,658	**0.014**	**36,614**	0.013	16,156	0.016	14,800	0.018	5,658	**0.014**	**36,614**
2004	0.013	15,881	0.016	15,561	0.018	5,881	**0.015**	**37,323**	0.006	7,132	0.006	5,941	0.008	2,787	**0.006**	**15,861**
2005	0.013	15,481	0.016	16,228	0.017	6,084	**0.014**	**37,794**	0.006	6,856	0.006	6,050	0.008	2,744	**0.006**	**15,649**
2006	0.013	15,157	0.016	17,041	0.018	6,425	**0.014**	**38,623**	0.006	6,681	0.006	6,322	0.008	2,869	**0.006**	**15,872**
2007	0.013	14,824	0.015	17,718	0.017	6,667	**0.014**	**39,209**	0.005	6,507	0.006	6,448	0.008	2,874	**0.006**	**15,830**
2008	0.012	14,516	0.015	18,560	0.017	6,957	**0.014**	**40,033**	0.005	6,358	0.006	6,708	0.007	2,899	**0.006**	**15,964**
2009	0.012	14,266	0.015	19,319	0.017	7,181	**0.014**	**40,766**	0.005	6,237	0.006	6,939	0.007	2,908	**0.006**	**16,084**
2010	0.012	14,049	0.015	20,006	0.017	7,356	**0.014**	**41,412**	0.005	6,137	0.005	7,145	0.007	2,891	**0.006**	**16,173**
2011	0.012	13,936	0.015	20,694	0.017	7,463	**0.014**	**42,093**	0.005	6,082	0.005	7,301	0.006	2,773	**0.006**	**16,156**
2012	0.012	13,875	0.015	21,450	0.016	7,715	**0.014**	**43,039**	0.005	6,047	0.005	7,566	0.006	2,824	**0.006**	**16,437**
2013	0.012	13,850	0.015	22,198	0.017	7,987	**0.014**	**44,035**	0.005	6,031	0.005	7,827	0.006	2,888	**0.005**	**16,746**
2014	0.012	13,865	0.015	22,923	0.017	8,254	**0.014**	**45,043**	0.005	6,032	0.005	8,081	0.006	2,940	**0.005**	**17,053**
2015	0.012	13,919	0.015	23,628	0.017	8,517	**0.014**	**46,064**	0.005	6,051	0.005	8,328	0.006	3,011	**0.005**	**17,390**
2016	0.012	14,004	0.015	24,319	0.017	8,757	**0.015**	**47,080**	0.005	6,083	0.005	8,570	0.006	3,063	**0.005**	**17,717**
2017	0.012	14,117	0.015	24,984	0.017	9,005	**0.015**	**48,106**	0.005	6,129	0.005	8,803	0.006	3,134	**0.005**	**18,066**
2018	0.012	14,254	0.015	25,626	0.016	9,201	**0.015**	**49,081**	0.005	6,185	0.005	9,029	0.006	3,158	**0.005**	**18,372**
2019	0.012	14,413	0.015	26,248	0.016	9,427	**0.015**	**50,089**	0.005	6,253	0.005	9,247	0.006	3,219	**0.005**	**18,719**
2020	0.012	14,600	0.015	26,855	0.016	9,647	**0.015**	**51,102**	0.005	6,332	0.005	9,456	0.006	3,282	**0.005**	**19,071**
2021	0.012	14,801	0.015	27,436	0.016	9,854	**0.015**	**52,091**	0.005	6,418	0.005	9,661	0.006	3,336	**0.005**	**19,415**
2022	0.012	15,016	0.015	28,004	0.017	10,075	**0.015**	**53,095**	0.005	6,511	0.005	9,861	0.006	3,395	**0.005**	**19,766**
2023	0.012	15,243	0.015	28,560	0.017	10,275	**0.015**	**54,079**	0.005	6,609	0.005	10,057	0.006	3,453	**0.005**	**20,118**
2024	0.012	15,481	0.015	29,108	0.017	10,472	**0.015**	**55,061**	0.005	6,711	0.005	10,250	0.006	3,511	**0.005**	**20,472**
2025	0.012	15,725	0.015	29,649	0.017	10,667	**0.015**	**56,041**	0.005	6,816	0.005	10,440	0.006	3,569	**0.005**	**20,826**
2026	0.012	15,976	0.015	30,184	0.017	10,859	**0.015**	**57,019**	0.005	6,925	0.005	10,628	0.006	3,627	**0.005**	**21,180**
2027	0.012	16,232	0.015	30,714	0.017	11,050	**0.015**	**57,996**	0.005	7,036	0.005	10,815	0.006	3,685	**0.005**	**21,536**
2028	0.012	16,491	0.015	31,241	0.017	11,240	**0.015**	**58,972**	0.005	7,147	0.005	11,001	0.005	3,731	**0.005**	**21,880**
2029	0.012	16,753	0.015	31,766	0.017	11,429	**0.015**	**59,947**	0.005	7,261	0.005	11,186	0.005	3,789	**0.005**	**22,235**
2030	0.012	17,016	0.015	32,289	0.017	11,617	**0.015**	**60,922**	0.005	7,375	0.005	11,370	0.005	3,847	**0.005**	**22,591**

Table L-13
PM10 - 47 State Annual
"Increased Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.020	27,402	0.029	13,033	0.032	4,876	**0.023**	**45,312**	0.020	27,402	0.029	13,033	0.032	4,876	**0.023**	**45,312**
1995	0.016	21,510	0.020	12,342	0.025	5,076	**0.018**	**38,929**	0.016	21,510	0.020	12,342	0.025	5,076	**0.018**	**38,929**
2000	0.013	17,254	0.016	12,871	0.024	6,619	**0.015**	**36,744**	0.013	17,254	0.016	12,871	0.024	6,619	**0.015**	**36,744**
2001	0.013	16,800	0.016	13,361	0.025	7,005	**0.015**	**37,166**	0.013	16,800	0.016	13,361	0.025	7,005	**0.015**	**37,166**
2002	0.013	16,443	0.016	14,084	0.027	8,114	**0.016**	**38,641**	0.013	16,443	0.016	14,084	0.027	8,114	**0.016**	**38,641**
2003	0.013	16,156	0.016	14,800	0.028	8,877	**0.016**	**39,833**	0.013	16,156	0.016	14,800	0.028	8,877	**0.016**	**39,833**
2004	0.013	15,881	0.016	15,561	0.035	11,671	**0.017**	**43,113**	0.006	7,132	0.006	5,941	0.025	8,221	**0.008**	**21,295**
2005	0.013	15,481	0.016	16,228	0.044	15,215	**0.018**	**46,924**	0.006	6,856	0.006	6,050	0.027	9,473	**0.009**	**22,379**
2006	0.013	15,157	0.016	17,453	0.053	19,213	**0.019**	**51,823**	0.006	6,681	0.006	6,512	0.029	10,545	**0.009**	**23,737**
2007	0.013	14,824	0.017	19,407	0.060	22,984	**0.021**	**57,215**	0.005	6,507	0.006	6,878	0.029	10,932	**0.009**	**24,317**
2008	0.012	14,516	0.019	22,454	0.067	26,688	**0.023**	**63,658**	0.005	6,358	0.006	7,260	0.027	10,926	**0.009**	**24,543**
2009	0.012	14,266	0.021	26,380	0.072	30,157	**0.025**	**70,803**	0.005	6,237	0.006	7,667	0.025	10,613	**0.009**	**24,517**
2010	0.012	14,049	0.024	31,211	0.077	33,396	**0.027**	**78,656**	0.005	6,137	0.006	8,103	0.023	10,150	**0.009**	**24,390**
2011	0.012	13,936	0.027	36,563	0.081	36,483	**0.030**	**86,982**	0.005	6,082	0.006	8,516	0.021	9,645	**0.008**	**24,242**
2012	0.012	13,875	0.030	41,924	0.085	39,556	**0.032**	**95,355**	0.005	6,047	0.006	9,031	0.020	9,342	**0.008**	**24,420**
2013	0.012	13,850	0.032	47,167	0.088	42,503	**0.034**	**103,520**	0.005	6,031	0.007	9,533	0.019	9,086	**0.008**	**24,649**
2014	0.012	13,865	0.035	52,211	0.091	45,301	**0.036**	**111,376**	0.005	6,032	0.007	10,015	0.018	8,851	**0.008**	**24,898**
2015	0.012	13,919	0.037	57,006	0.093	47,956	**0.037**	**118,882**	0.005	6,051	0.007	10,475	0.017	8,667	**0.008**	**25,192**
2016	0.012	14,004	0.039	61,527	0.095	50,469	**0.039**	**126,000**	0.005	6,083	0.007	10,914	0.016	8,494	**0.008**	**25,492**
2017	0.012	14,117	0.040	65,705	0.097	52,855	**0.040**	**132,677**	0.005	6,129	0.007	11,326	0.015	8,365	**0.008**	**25,820**
2018	0.012	14,254	0.042	69,531	0.099	55,067	**0.041**	**138,852**	0.005	6,185	0.007	11,713	0.015	8,215	**0.008**	**26,113**
2019	0.012	14,413	0.043	73,001	0.100	57,194	**0.042**	**144,609**	0.005	6,253	0.007	12,074	0.014	8,124	**0.008**	**26,451**
2020	0.012	14,600	0.043	76,118	0.101	59,197	**0.043**	**149,915**	0.005	6,332	0.007	12,410	0.014	8,055	**0.008**	**26,797**
2021	0.012	14,801	0.044	78,914	0.102	61,100	**0.043**	**154,815**	0.005	6,418	0.007	12,728	0.013	7,996	**0.008**	**27,142**
2022	0.012	15,016	0.045	81,427	0.103	62,934	**0.044**	**159,377**	0.005	6,511	0.007	13,028	0.013	7,960	**0.008**	**27,499**
2023	0.012	15,243	0.045	83,700	0.104	64,673	**0.044**	**163,616**	0.005	6,609	0.007	13,314	0.013	7,940	**0.008**	**27,863**
2024	0.012	15,481	0.045	85,779	0.105	66,345	**0.044**	**167,605**	0.005	6,711	0.007	13,591	0.013	7,935	**0.007**	**28,236**
2025	0.012	15,725	0.045	87,715	0.106	68,255	**0.045**	**171,695**	0.005	6,816	0.007	13,861	0.013	8,270	**0.008**	**28,947**
2026	0.012	15,976	0.045	89,551	0.107	70,098	**0.045**	**175,626**	0.005	6,925	0.007	14,124	0.013	8,600	**0.008**	**29,649**
2027	0.012	16,232	0.046	91,320	0.107	71,862	**0.045**	**179,414**	0.005	7,036	0.007	14,382	0.013	8,902	**0.008**	**30,319**
2028	0.012	16,491	0.046	93,051	0.108	73,558	**0.045**	**183,100**	0.005	7,147	0.007	14,637	0.012	8,422	**0.007**	**30,207**
2029	0.012	16,753	0.046	94,757	0.109	75,193	**0.045**	**186,703**	0.005	7,261	0.007	14,890	0.012	8,373	**0.007**	**30,523**
2030	0.012	17,016	0.046	96,529	0.109	76,431	**0.045**	**189,977**	0.005	7,375	0.007	15,182	0.012	8,181	**0.007**	**30,737**

Table L-14
SOx - 47 State Annual

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.078	103,986	0.101	45,916	0.093	14,015	0.084	163,917	0.078	103,986	0.101	45,916	0.093	14,015	0.084	163,917
1995	0.076	103,005	0.100	61,218	0.097	19,830	0.085	184,053	0.076	103,005	0.100	61,218	0.097	19,830	0.085	184,053
2000	0.071	91,984	0.093	75,673	0.096	25,810	0.081	193,467	0.071	91,984	0.093	75,673	0.096	25,810	0.081	193,467
2001	0.070	90,879	0.093	79,700	0.095	27,059	0.081	197,638	0.070	90,879	0.093	79,700	0.095	27,059	0.081	197,638
2002	0.070	89,782	0.093	83,842	0.095	28,425	0.082	202,049	0.070	89,782	0.093	83,842	0.095	28,425	0.082	202,049
2003	0.070	88,719	0.093	88,267	0.095	29,883	0.082	206,869	0.070	88,719	0.093	88,267	0.095	29,883	0.082	206,869
2004	0.070	87,464	0.093	92,509	0.094	31,099	0.082	211,072	0.007	8,889	0.009	9,059	0.010	3,478	0.008	21,426
2005	0.070	86,194	0.093	96,958	0.093	32,508	0.082	215,659	0.007	8,750	0.009	9,502	0.010	3,647	0.008	21,899
2006	0.070	84,833	0.093	101,681	0.093	34,077	0.083	220,591	0.007	8,584	0.009	9,947	0.011	3,845	0.008	22,375
2007	0.070	83,364	0.093	106,501	0.093	35,674	0.083	225,539	0.007	8,410	0.009	10,363	0.010	4,018	0.008	22,791
2008	0.070	81,812	0.093	111,492	0.093	37,346	0.083	230,651	0.007	8,243	0.009	10,832	0.010	4,197	0.008	23,272
2009	0.070	80,531	0.093	116,275	0.093	38,940	0.084	235,747	0.007	8,106	0.009	11,287	0.010	4,370	0.008	23,763
2010	0.070	79,473	0.093	120,802	0.093	40,420	0.084	240,694	0.007	7,993	0.009	11,726	0.010	4,538	0.008	24,257
2011	0.070	78,889	0.093	125,590	0.093	42,019	0.084	246,499	0.007	7,932	0.009	12,187	0.010	4,710	0.008	24,829
2012	0.070	78,565	0.093	130,226	0.093	43,586	0.085	252,378	0.007	7,896	0.009	12,633	0.010	4,881	0.009	25,410
2013	0.070	78,439	0.093	134,730	0.093	45,090	0.085	258,259	0.007	7,882	0.009	13,070	0.010	5,052	0.009	26,004
2014	0.071	78,535	0.093	139,103	0.093	46,553	0.085	264,190	0.007	7,891	0.009	13,494	0.010	5,219	0.009	26,603
2015	0.071	78,846	0.093	143,353	0.093	47,975	0.085	270,174	0.007	7,921	0.009	13,906	0.010	5,382	0.009	27,210
2016	0.071	79,332	0.093	147,526	0.093	49,368	0.085	276,225	0.007	7,969	0.009	14,311	0.010	5,534	0.009	27,814
2017	0.071	79,978	0.093	151,539	0.093	50,712	0.085	282,229	0.007	8,033	0.009	14,700	0.010	5,689	0.009	28,422
2018	0.071	80,756	0.093	155,419	0.093	52,007	0.085	288,181	0.007	8,111	0.009	15,076	0.010	5,827	0.009	29,015
2019	0.071	81,659	0.093	159,175	0.093	53,260	0.085	294,094	0.007	8,202	0.009	15,440	0.010	5,967	0.009	29,610
2020	0.071	82,722	0.093	162,773	0.093	54,464	0.085	299,959	0.007	8,308	0.009	15,789	0.010	6,106	0.009	30,203
2021	0.071	83,862	0.093	166,298	0.093	55,642	0.085	305,802	0.007	8,422	0.009	16,131	0.010	6,237	0.009	30,790
2022	0.071	85,083	0.093	169,740	0.093	56,808	0.085	311,632	0.007	8,545	0.009	16,465	0.010	6,365	0.009	31,375
2023	0.071	86,372	0.093	173,114	0.093	57,920	0.086	317,405	0.007	8,674	0.009	16,792	0.010	6,490	0.009	31,957
2024	0.071	87,716	0.093	176,433	0.093	59,030	0.086	323,178	0.007	8,809	0.009	17,114	0.010	6,614	0.009	32,537
2025	0.071	89,102	0.093	179,710	0.093	60,125	0.086	328,937	0.007	8,948	0.009	17,432	0.010	6,736	0.009	33,116
2026	0.071	90,523	0.093	182,953	0.093	61,210	0.086	334,685	0.007	9,091	0.009	17,747	0.010	6,857	0.009	33,695
2027	0.071	91,973	0.093	186,166	0.093	62,285	0.086	340,424	0.007	9,236	0.009	18,058	0.010	6,977	0.009	34,272
2028	0.071	93,440	0.093	189,363	0.093	63,354	0.086	346,158	0.007	9,384	0.009	18,369	0.010	7,097	0.009	34,849
2029	0.071	94,923	0.093	192,545	0.093	64,418	0.086	351,886	0.007	9,533	0.009	18,677	0.010	7,216	0.009	35,426
2030	0.071	96,418	0.093	195,715	0.093	65,479	0.086	357,611	0.007	9,683	0.009	18,985	0.010	7,334	0.009	36,002

Table L-15
NOx - Atlanta Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	27,693	2.90	10,779	3.64	4,512	**2.70**	**42,984**	2.52	27,693	2.90	10,779	3.64	4,512	**2.70**	**42,984**
1995	1.79	20,921	2.04	10,812	2.91	5,150	**1.97**	**36,882**	1.79	20,921	2.04	10,812	2.91	5,150	**1.97**	**36,882**
2000	1.36	16,028	1.61	11,764	2.25	5,475	**1.55**	**33,267**	1.36	16,028	1.61	11,764	2.25	5,475	**1.55**	**33,267**
2001	1.30	15,249	1.55	12,023	2.16	5,605	**1.49**	**32,877**	1.30	15,249	1.55	12,023	2.16	5,605	**1.49**	**32,877**
2002	1.26	14,643	1.49	12,229	2.09	5,726	**1.44**	**32,598**	1.26	14,643	1.49	12,229	2.09	5,726	**1.44**	**32,598**
2003	1.20	13,866	1.41	12,301	1.94	5,631	**1.37**	**31,799**	1.20	13,866	1.41	12,301	1.94	5,631	**1.37**	**31,799**
2004	1.13	12,938	1.33	12,239	1.87	5,735	**1.30**	**30,912**	0.92	10,593	1.15	10,539	1.71	5,231	**1.11**	**26,362**
2005	1.05	11,997	1.24	12,041	1.77	5,717	**1.22**	**29,755**	0.83	9,414	1.03	10,005	1.55	5,025	**1.01**	**24,445**
2006	1.00	11,190	1.17	11,939	1.72	5,848	**1.17**	**28,977**	0.74	8,328	0.93	9,498	1.44	4,893	**0.91**	**22,719**
2007	0.94	10,456	1.10	11,852	1.68	6,004	**1.11**	**28,313**	0.66	7,309	0.83	8,910	1.33	4,749	**0.82**	**20,967**
2008	0.90	9,807	1.04	11,710	1.62	6,093	**1.06**	**27,611**	0.58	6,384	0.73	8,201	1.20	4,511	**0.74**	**19,096**
2009	0.86	9,263	0.99	11,651	1.59	6,267	**1.02**	**27,181**	0.52	5,569	0.64	7,543	1.10	4,331	**0.66**	**17,443**
2010	0.83	8,814	0.94	11,595	1.57	6,438	**0.99**	**26,846**	0.45	4,854	0.56	6,879	1.01	4,137	**0.59**	**15,871**
2011	0.80	8,431	0.90	11,544	1.55	6,604	**0.96**	**26,579**	0.40	4,217	0.49	6,222	0.92	3,944	**0.52**	**14,383**
2012	0.77	8,128	0.87	11,490	1.53	6,771	**0.94**	**26,389**	0.35	3,672	0.42	5,580	0.85	3,760	**0.46**	**13,012**
2013	0.75	7,893	0.84	11,474	1.52	6,931	**0.91**	**26,298**	0.31	3,225	0.36	4,999	0.78	3,578	**0.41**	**11,803**
2014	0.73	7,689	0.81	11,507	1.51	7,095	**0.90**	**26,291**	0.27	2,843	0.32	4,504	0.73	3,415	**0.37**	**10,762**
2015	0.72	7,558	0.80	11,577	1.50	7,249	**0.88**	**26,384**	0.24	2,552	0.28	4,093	0.67	3,256	**0.33**	**9,901**
2016	0.71	7,462	0.78	11,674	1.49	7,401	**0.87**	**26,537**	0.22	2,312	0.25	3,753	0.63	3,109	**0.30**	**9,173**
2017	0.70	7,420	0.77	11,817	1.48	7,544	**0.86**	**26,781**	0.20	2,136	0.23	3,505	0.58	2,970	**0.28**	**8,611**
2018	0.69	7,387	0.76	11,960	1.47	7,690	**0.86**	**27,036**	0.19	1,983	0.21	3,302	0.55	2,851	**0.26**	**8,136**
2019	0.69	7,394	0.76	12,147	1.47	7,832	**0.85**	**27,373**	0.17	1,879	0.20	3,179	0.52	2,746	**0.24**	**7,804**
2020	0.68	7,439	0.75	12,313	1.46	7,970	**0.85**	**27,721**	0.17	1,813	0.19	3,067	0.49	2,653	**0.23**	**7,534**
2021	0.68	7,506	0.75	12,523	1.46	8,107	**0.85**	**28,136**	0.16	1,775	0.18	3,024	0.46	2,574	**0.22**	**7,373**
2022	0.68	7,586	0.75	12,731	1.46	8,240	**0.85**	**28,558**	0.16	1,752	0.18	3,000	0.44	2,504	**0.21**	**7,256**
2023	0.68	7,676	0.75	12,923	1.46	8,373	**0.84**	**28,971**	0.15	1,740	0.17	2,975	0.42	2,444	**0.21**	**7,159**
2024	0.68	7,762	0.75	13,120	1.45	8,504	**0.84**	**29,386**	0.15	1,727	0.17	2,968	0.41	2,393	**0.20**	**7,088**
2025	0.68	7,891	0.75	13,323	1.45	8,635	**0.84**	**29,848**	0.15	1,726	0.16	2,920	0.39	2,351	**0.20**	**6,997**
2026	0.68	7,988	0.74	13,514	1.45	8,746	**0.84**	**30,248**	0.15	1,736	0.16	2,930	0.38	2,299	**0.19**	**6,966**
2027	0.68	8,090	0.74	13,698	1.44	8,856	**0.84**	**30,644**	0.15	1,750	0.16	2,941	0.37	2,254	**0.19**	**6,944**
2028	0.67	8,201	0.74	13,900	1.44	8,980	**0.84**	**31,081**	0.15	1,764	0.16	2,929	0.33	2,084	**0.18**	**6,778**
2029	0.67	8,319	0.74	14,113	1.44	9,117	**0.84**	**31,549**	0.14	1,784	0.16	2,964	0.32	2,058	**0.18**	**6,806**
2030	0.67	8,438	0.74	14,325	1.44	9,254	**0.84**	**32,018**	0.14	1,806	0.16	2,993	0.32	2,057	**0.18**	**6,857**

Table L-16
Exhaust VOC - Atlanta Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.27	24,929	2.94	10,949	4.54	5,633	**2.60**	**41,510**	2.27	24,929	2.94	10,949	4.54	5,633	**2.60**	**41,510**
1995	1.03	12,046	1.40	7,438	2.62	4,637	**1.29**	**24,121**	1.03	12,046	1.40	7,438	2.62	4,637	**1.29**	**24,121**
2000	0.59	6,981	0.82	6,028	1.59	3,877	**0.78**	**16,886**	0.59	6,981	0.82	6,028	1.59	3,877	**0.78**	**16,886**
2001	0.54	6,318	0.75	5,854	1.46	3,783	**0.72**	**15,954**	0.54	6,318	0.75	5,854	1.46	3,783	**0.72**	**15,954**
2002	0.49	5,748	0.68	5,612	1.34	3,668	**0.66**	**15,028**	0.49	5,748	0.68	5,612	1.34	3,668	**0.66**	**15,028**
2003	0.45	5,206	0.61	5,320	1.13	3,266	**0.59**	**13,791**	0.45	5,206	0.61	5,320	1.13	3,266	**0.59**	**13,791**
2004	0.40	4,628	0.55	5,058	1.04	3,192	**0.54**	**12,878**	0.36	4,122	0.50	4,604	0.99	3,042	**0.50**	**11,768**
2005	0.36	4,063	0.46	4,448	0.81	2,631	**0.46**	**11,142**	0.31	3,569	0.41	3,954	0.74	2,380	**0.41**	**9,903**
2006	0.33	3,696	0.42	4,256	0.78	2,643	**0.43**	**10,595**	0.29	3,221	0.37	3,755	0.68	2,327	**0.37**	**9,303**
2007	0.30	3,352	0.38	4,080	0.74	2,664	**0.40**	**10,096**	0.26	2,899	0.33	3,569	0.63	2,274	**0.34**	**8,742**
2008	0.28	3,037	0.34	3,842	0.69	2,606	**0.37**	**9,484**	0.24	2,608	0.29	3,319	0.57	2,133	**0.31**	**8,060**
2009	0.26	2,771	0.31	3,700	0.67	2,648	**0.34**	**9,119**	0.22	2,365	0.27	3,164	0.53	2,084	**0.29**	**7,613**
2010	0.24	2,535	0.29	3,581	0.66	2,690	**0.32**	**8,806**	0.20	2,151	0.25	3,029	0.49	2,029	**0.27**	**7,208**
2011	0.22	2,338	0.27	3,450	0.64	2,735	**0.31**	**8,523**	0.19	1,973	0.23	2,881	0.46	1,975	**0.25**	**6,829**
2012	0.21	2,169	0.25	3,315	0.63	2,772	**0.29**	**8,256**	0.17	1,818	0.21	2,724	0.43	1,916	**0.23**	**6,459**
2013	0.19	2,042	0.23	3,217	0.62	2,813	**0.28**	**8,071**	0.16	1,703	0.19	2,607	0.41	1,862	**0.21**	**6,172**
2014	0.19	1,951	0.22	3,165	0.61	2,852	**0.27**	**7,969**	0.15	1,623	0.18	2,535	0.38	1,810	**0.20**	**5,968**
2015	0.18	1,875	0.21	3,117	0.60	2,890	**0.26**	**7,882**	0.15	1,553	0.17	2,467	0.36	1,760	**0.19**	**5,780**
2016	0.17	1,828	0.21	3,122	0.59	2,924	**0.26**	**7,874**	0.14	1,512	0.16	2,452	0.34	1,709	**0.19**	**5,673**
2017	0.17	1,797	0.20	3,113	0.58	2,967	**0.25**	**7,878**	0.14	1,484	0.16	2,424	0.33	1,672	**0.18**	**5,580**
2018	0.17	1,765	0.20	3,117	0.58	3,000	**0.25**	**7,882**	0.14	1,452	0.15	2,407	0.31	1,630	**0.17**	**5,489**
2019	0.16	1,754	0.20	3,127	0.57	3,038	**0.25**	**7,919**	0.13	1,440	0.15	2,398	0.30	1,596	**0.17**	**5,435**
2020	0.16	1,755	0.19	3,162	0.56	3,027	**0.24**	**7,944**	0.13	1,439	0.15	2,417	0.28	1,512	**0.16**	**5,368**
2021	0.16	1,762	0.19	3,207	0.54	3,018	**0.24**	**7,988**	0.13	1,445	0.15	2,447	0.26	1,433	**0.16**	**5,326**
2022	0.16	1,775	0.19	3,252	0.54	3,071	**0.24**	**8,098**	0.13	1,455	0.15	2,478	0.25	1,428	**0.16**	**5,362**
2023	0.16	1,791	0.19	3,294	0.54	3,124	**0.24**	**8,209**	0.13	1,468	0.15	2,508	0.25	1,426	**0.16**	**5,401**
2024	0.16	1,800	0.19	3,334	0.54	3,175	**0.24**	**8,310**	0.13	1,475	0.14	2,534	0.24	1,425	**0.16**	**5,434**
2025	0.16	1,823	0.19	3,349	0.54	3,227	**0.24**	**8,398**	0.13	1,493	0.14	2,540	0.24	1,426	**0.15**	**5,459**
2026	0.16	1,847	0.19	3,399	0.54	3,273	**0.24**	**8,520**	0.13	1,513	0.14	2,577	0.24	1,426	**0.15**	**5,516**
2027	0.16	1,872	0.19	3,449	0.54	3,320	**0.24**	**8,641**	0.13	1,534	0.14	2,614	0.23	1,427	**0.15**	**5,575**
2028	0.16	1,898	0.19	3,501	0.54	3,369	**0.24**	**8,769**	0.13	1,556	0.14	2,648	0.22	1,388	**0.15**	**5,591**
2029	0.16	1,926	0.19	3,555	0.54	3,421	**0.24**	**8,902**	0.13	1,578	0.14	2,688	0.22	1,401	**0.15**	**5,667**
2030	0.16	1,953	0.19	3,609	0.54	3,472	**0.24**	**9,034**	0.13	1,600	0.14	2,729	0.22	1,413	**0.15**	**5,742**

Table L-17
Evap VOC - Atlanta Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.81	30,833	2.55	9,483	4.61	5,717	2.89	46,034	2.81	30,833	2.55	9,483	4.61	5,717	2.89	46,034
1995	1.19	13,837	1.20	6,380	1.69	2,982	1.24	23,200	1.19	13,837	1.20	6,380	1.69	2,982	1.24	23,200
2000	0.52	6,107	0.57	4,177	0.67	1,622	0.55	11,905	0.52	6,107	0.57	4,177	0.67	1,622	0.55	11,905
2001	0.47	5,563	0.53	4,107	0.62	1,598	0.51	11,267	0.47	5,563	0.53	4,107	0.62	1,598	0.51	11,267
2002	0.43	5,020	0.49	4,001	0.57	1,561	0.47	10,582	0.43	5,020	0.49	4,001	0.57	1,561	0.47	10,582
2003	0.39	4,472	0.44	3,865	0.52	1,512	0.42	9,849	0.39	4,472	0.44	3,865	0.52	1,512	0.42	9,849
2004	0.35	4,055	0.40	3,706	0.50	1,527	0.39	9,288	0.35	4,055	0.40	3,706	0.50	1,527	0.39	9,288
2005	0.33	3,710	0.37	3,568	0.47	1,522	0.36	8,800	0.32	3,687	0.37	3,558	0.47	1,522	0.36	8,768
2006	0.30	3,419	0.34	3,509	0.44	1,508	0.34	8,436	0.30	3,385	0.34	3,473	0.44	1,508	0.34	8,366
2007	0.28	3,128	0.32	3,429	0.42	1,487	0.32	8,043	0.28	3,084	0.31	3,364	0.42	1,487	0.31	7,935
2008	0.26	2,887	0.30	3,399	0.39	1,456	0.30	7,742	0.26	2,822	0.29	3,309	0.39	1,453	0.29	7,584
2009	0.25	2,660	0.28	3,344	0.36	1,411	0.28	7,415	0.24	2,573	0.27	3,226	0.36	1,406	0.27	7,206
2010	0.23	2,444	0.27	3,265	0.33	1,355	0.26	7,063	0.22	2,337	0.25	3,117	0.33	1,347	0.25	6,800
2011	0.22	2,329	0.25	3,220	0.31	1,338	0.25	6,886	0.21	2,202	0.24	3,053	0.31	1,321	0.24	6,575
2012	0.21	2,222	0.24	3,156	0.30	1,313	0.24	6,691	0.20	2,074	0.22	2,970	0.29	1,286	0.22	6,331
2013	0.21	2,166	0.23	3,129	0.28	1,297	0.23	6,592	0.19	2,005	0.21	2,919	0.28	1,267	0.22	6,191
2014	0.20	2,116	0.22	3,089	0.27	1,276	0.22	6,481	0.19	1,941	0.20	2,853	0.26	1,241	0.21	6,036
2015	0.20	2,071	0.21	3,036	0.26	1,249	0.21	6,357	0.18	1,882	0.19	2,775	0.25	1,211	0.20	5,867
2016	0.20	2,060	0.20	3,055	0.25	1,233	0.21	6,348	0.18	1,862	0.19	2,774	0.24	1,189	0.19	5,825
2017	0.19	2,053	0.20	3,067	0.24	1,213	0.20	6,333	0.17	1,845	0.18	2,767	0.23	1,164	0.19	5,776
2018	0.19	2,049	0.20	3,073	0.23	1,189	0.20	6,311	0.17	1,831	0.18	2,754	0.22	1,135	0.18	5,720
2019	0.19	2,048	0.19	3,074	0.22	1,162	0.20	6,284	0.17	1,820	0.17	2,735	0.21	1,102	0.18	5,657
2020	0.19	2,051	0.19	3,068	0.21	1,132	0.19	6,251	0.17	1,811	0.17	2,709	0.20	1,066	0.17	5,587
2021	0.19	2,072	0.19	3,122	0.21	1,146	0.19	6,340	0.17	1,828	0.17	2,749	0.19	1,077	0.17	5,655
2022	0.19	2,095	0.19	3,174	0.21	1,160	0.19	6,429	0.17	1,847	0.16	2,788	0.19	1,087	0.17	5,722
2023	0.19	2,120	0.19	3,225	0.20	1,173	0.19	6,517	0.16	1,867	0.16	2,824	0.19	1,097	0.17	5,788
2024	0.19	2,145	0.19	3,274	0.20	1,185	0.19	6,604	0.16	1,888	0.16	2,859	0.19	1,105	0.17	5,853
2025	0.19	2,172	0.19	3,322	0.20	1,197	0.19	6,691	0.16	1,910	0.16	2,893	0.19	1,113	0.17	5,917
2026	0.19	2,200	0.19	3,369	0.20	1,208	0.19	6,777	0.16	1,933	0.16	2,926	0.19	1,121	0.17	5,980
2027	0.19	2,228	0.19	3,416	0.20	1,218	0.19	6,862	0.16	1,956	0.16	2,958	0.18	1,128	0.17	6,042
2028	0.19	2,256	0.18	3,462	0.20	1,229	0.19	6,947	0.16	1,979	0.16	2,990	0.18	1,134	0.16	6,103
2029	0.19	2,285	0.18	3,507	0.20	1,239	0.19	7,031	0.16	2,003	0.16	3,020	0.18	1,140	0.16	6,163
2030	0.19	2,314	0.18	3,552	0.19	1,248	0.19	7,115	0.16	2,026	0.16	3,050	0.18	1,145	0.16	6,222

Table L-18
PM2.5 - Atlanta Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.019	208	0.027	99	0.030	37	**0.022**	**345**	0.019	208	0.027	99	0.030	37	**0.022**	**345**
1995	0.015	172	0.019	99	0.023	41	**0.017**	**312**	0.015	172	0.019	99	0.023	41	**0.017**	**312**
2000	0.013	151	0.015	113	0.023	57	**0.015**	**321**	0.013	151	0.015	113	0.023	57	**0.015**	**321**
2001	0.013	148	0.015	118	0.022	58	**0.015**	**324**	0.013	148	0.015	118	0.022	58	**0.015**	**324**
2002	0.012	146	0.015	126	0.021	59	**0.015**	**330**	0.012	146	0.015	126	0.021	59	**0.015**	**330**
2003	0.012	144	0.015	133	0.017	50	**0.014**	**327**	0.012	144	0.015	133	0.017	50	**0.014**	**327**
2004	0.012	142	0.015	140	0.017	53	**0.014**	**335**	0.005	61	0.006	51	0.008	24	**0.006**	**136**
2005	0.012	139	0.015	147	0.017	55	**0.014**	**341**	0.005	59	0.005	52	0.007	24	**0.006**	**135**
2006	0.012	137	0.015	155	0.017	58	**0.014**	**351**	0.005	58	0.005	55	0.007	25	**0.006**	**137**
2007	0.012	135	0.015	162	0.017	61	**0.014**	**358**	0.005	57	0.005	56	0.007	25	**0.005**	**137**
2008	0.012	132	0.015	171	0.017	64	**0.014**	**367**	0.005	55	0.005	58	0.007	25	**0.005**	**139**
2009	0.012	131	0.015	178	0.017	66	**0.014**	**375**	0.005	55	0.005	61	0.006	25	**0.005**	**141**
2010	0.012	129	0.015	185	0.016	68	**0.014**	**382**	0.005	54	0.005	63	0.006	25	**0.005**	**142**
2011	0.012	128	0.015	192	0.016	69	**0.014**	**388**	0.005	53	0.005	64	0.006	24	**0.005**	**142**
2012	0.012	127	0.015	199	0.016	71	**0.014**	**397**	0.005	53	0.005	66	0.006	25	**0.005**	**144**
2013	0.012	127	0.015	205	0.016	73	**0.014**	**405**	0.005	53	0.005	69	0.006	25	**0.005**	**147**
2014	0.012	127	0.015	212	0.016	76	**0.014**	**414**	0.005	53	0.005	71	0.005	26	**0.005**	**149**
2015	0.012	127	0.015	218	0.016	78	**0.014**	**423**	0.005	53	0.005	73	0.005	26	**0.005**	**152**
2016	0.012	127	0.015	224	0.016	80	**0.014**	**431**	0.005	53	0.005	75	0.005	27	**0.005**	**154**
2017	0.012	128	0.015	229	0.016	82	**0.014**	**439**	0.005	53	0.005	76	0.005	27	**0.005**	**157**
2018	0.012	129	0.015	235	0.016	84	**0.014**	**447**	0.005	54	0.005	78	0.005	27	**0.005**	**159**
2019	0.012	130	0.015	240	0.016	86	**0.014**	**456**	0.005	54	0.005	80	0.005	28	**0.005**	**162**
2020	0.012	132	0.015	245	0.016	87	**0.014**	**464**	0.005	55	0.005	82	0.005	28	**0.005**	**165**
2021	0.012	133	0.015	250	0.016	89	**0.014**	**472**	0.005	55	0.005	83	0.005	29	**0.005**	**167**
2022	0.012	135	0.015	254	0.016	91	**0.014**	**480**	0.005	56	0.005	85	0.005	29	**0.005**	**170**
2023	0.012	137	0.015	259	0.016	93	**0.014**	**488**	0.005	57	0.005	86	0.005	30	**0.005**	**173**
2024	0.012	139	0.015	263	0.016	94	**0.014**	**496**	0.005	57	0.005	88	0.005	30	**0.005**	**175**
2025	0.012	141	0.015	268	0.016	96	**0.014**	**504**	0.005	58	0.005	89	0.005	31	**0.005**	**178**
2026	0.012	143	0.015	272	0.016	97	**0.014**	**512**	0.005	59	0.005	91	0.005	31	**0.005**	**181**
2027	0.012	145	0.015	277	0.016	99	**0.014**	**520**	0.005	60	0.005	92	0.005	31	**0.005**	**184**
2028	0.012	147	0.015	281	0.016	101	**0.014**	**528**	0.005	61	0.005	94	0.005	32	**0.005**	**186**
2029	0.012	149	0.015	285	0.016	102	**0.014**	**536**	0.005	62	0.005	95	0.005	32	**0.005**	**189**
2030	0.012	151	0.015	290	0.016	104	**0.014**	**544**	0.005	63	0.005	97	0.005	33	**0.005**	**192**

Table L-19
PM10 - Atlanta Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.020	225	0.029	107	0.032	40	**0.023**	**372**	0.020	225	0.029	107	0.032	40	**0.023**	**372**
1995	0.016	186	0.020	107	0.025	44	**0.018**	**336**	0.016	186	0.020	107	0.025	44	**0.018**	**336**
2000	0.014	163	0.017	122	0.025	62	**0.016**	**346**	0.014	163	0.017	122	0.025	62	**0.016**	**346**
2001	0.014	159	0.016	128	0.024	62	**0.016**	**349**	0.014	159	0.016	128	0.024	62	**0.016**	**349**
2002	0.013	157	0.016	135	0.023	63	**0.016**	**356**	0.013	157	0.016	135	0.023	63	**0.016**	**356**
2003	0.013	155	0.016	143	0.019	54	**0.015**	**352**	0.013	155	0.016	143	0.019	54	**0.015**	**352**
2004	0.013	153	0.016	151	0.019	57	**0.015**	**361**	0.006	66	0.006	55	0.008	26	**0.006**	**146**
2005	0.013	150	0.016	159	0.018	59	**0.015**	**368**	0.006	64	0.006	56	0.008	25	**0.006**	**145**
2006	0.013	148	0.016	167	0.018	63	**0.015**	**378**	0.006	62	0.006	59	0.008	27	**0.006**	**148**
2007	0.013	145	0.016	175	0.018	65	**0.015**	**386**	0.005	61	0.006	60	0.008	27	**0.006**	**148**
2008	0.013	143	0.016	184	0.018	69	**0.015**	**395**	0.005	60	0.006	63	0.007	27	**0.006**	**150**
2009	0.013	141	0.016	192	0.018	71	**0.015**	**404**	0.005	59	0.006	65	0.007	27	**0.006**	**152**
2010	0.013	139	0.016	200	0.018	73	**0.015**	**412**	0.005	58	0.005	68	0.007	27	**0.006**	**153**
2011	0.013	138	0.016	207	0.017	74	**0.015**	**419**	0.005	58	0.005	69	0.006	26	**0.006**	**153**
2012	0.013	137	0.016	214	0.017	77	**0.015**	**428**	0.005	57	0.005	71	0.006	27	**0.006**	**155**
2013	0.013	137	0.016	221	0.017	79	**0.015**	**437**	0.005	57	0.005	74	0.006	27	**0.005**	**158**
2014	0.013	137	0.016	228	0.017	82	**0.015**	**446**	0.005	57	0.005	76	0.006	28	**0.005**	**161**
2015	0.013	137	0.016	235	0.017	84	**0.015**	**456**	0.005	57	0.005	78	0.006	28	**0.005**	**164**
2016	0.013	137	0.016	241	0.017	86	**0.015**	**465**	0.005	57	0.005	80	0.006	29	**0.005**	**166**
2017	0.013	138	0.016	247	0.017	89	**0.015**	**474**	0.005	57	0.005	82	0.006	29	**0.005**	**169**
2018	0.013	139	0.016	253	0.017	90	**0.015**	**482**	0.005	58	0.005	84	0.006	29	**0.005**	**172**
2019	0.013	141	0.016	258	0.017	92	**0.015**	**491**	0.005	58	0.005	86	0.006	30	**0.005**	**174**
2020	0.013	142	0.016	264	0.017	94	**0.015**	**500**	0.005	59	0.005	88	0.006	31	**0.005**	**177**
2021	0.013	144	0.016	269	0.017	96	**0.015**	**509**	0.005	60	0.005	90	0.006	31	**0.005**	**180**
2022	0.013	146	0.016	274	0.017	98	**0.015**	**518**	0.005	60	0.005	91	0.006	31	**0.005**	**183**
2023	0.013	148	0.016	279	0.017	100	**0.015**	**527**	0.005	61	0.005	93	0.006	32	**0.005**	**186**
2024	0.013	150	0.016	284	0.017	102	**0.015**	**535**	0.005	62	0.005	95	0.006	32	**0.005**	**189**
2025	0.013	152	0.016	289	0.017	103	**0.015**	**544**	0.005	63	0.005	96	0.006	33	**0.005**	**192**
2026	0.013	154	0.016	294	0.017	105	**0.015**	**553**	0.005	64	0.005	98	0.006	33	**0.005**	**195**
2027	0.013	156	0.016	298	0.017	107	**0.015**	**561**	0.005	65	0.005	99	0.006	34	**0.005**	**198**
2028	0.013	158	0.016	303	0.017	108	**0.015**	**570**	0.005	66	0.005	101	0.005	34	**0.005**	**201**
2029	0.013	161	0.016	308	0.017	110	**0.015**	**578**	0.005	67	0.005	103	0.005	35	**0.005**	**204**
2030	0.013	163	0.016	312	0.017	112	**0.015**	**587**	0.005	67	0.005	104	0.005	35	**0.005**	**207**

Table L-20
SOx - Atlanta Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.078	854	0.101	377	0.093	115	**0.084**	**1,347**	0.078	854	0.101	377	0.093	115	**0.084**	**1,347**
1995	0.076	890	0.100	529	0.097	171	**0.085**	**1,590**	0.076	890	0.100	529	0.097	171	**0.085**	**1,590**
2000	0.076	895	0.101	736	0.103	251	**0.087**	**1,883**	0.076	895	0.101	736	0.103	251	**0.087**	**1,883**
2001	0.076	890	0.100	781	0.102	265	**0.088**	**1,936**	0.076	890	0.100	781	0.102	265	**0.088**	**1,936**
2002	0.076	885	0.100	826	0.102	280	**0.088**	**1,991**	0.076	885	0.100	826	0.102	280	**0.088**	**1,991**
2003	0.076	879	0.100	874	0.102	296	**0.088**	**2,048**	0.076	879	0.100	874	0.102	296	**0.088**	**2,048**
2004	0.076	871	0.100	921	0.101	309	**0.088**	**2,101**	0.007	82	0.009	84	0.010	32	**0.008**	**198**
2005	0.076	863	0.100	970	0.101	325	**0.089**	**2,158**	0.007	81	0.009	88	0.010	34	**0.008**	**203**
2006	0.076	853	0.100	1,022	0.100	342	**0.089**	**2,217**	0.007	80	0.009	93	0.011	36	**0.008**	**209**
2007	0.076	842	0.100	1,075	0.100	360	**0.090**	**2,276**	0.007	79	0.009	97	0.010	38	**0.008**	**213**
2008	0.076	829	0.100	1,130	0.100	378	**0.090**	**2,336**	0.007	77	0.009	102	0.010	39	**0.008**	**219**
2009	0.076	819	0.100	1,182	0.100	395	**0.090**	**2,396**	0.007	76	0.009	106	0.010	41	**0.008**	**224**
2010	0.076	810	0.100	1,232	0.100	412	**0.091**	**2,454**	0.007	76	0.009	111	0.010	43	**0.008**	**229**
2011	0.076	804	0.100	1,280	0.100	428	**0.091**	**2,512**	0.007	75	0.009	115	0.010	45	**0.008**	**235**
2012	0.076	800	0.100	1,326	0.100	443	**0.091**	**2,569**	0.007	75	0.009	119	0.010	46	**0.009**	**240**
2013	0.076	798	0.100	1,370	0.100	458	**0.091**	**2,626**	0.007	74	0.009	123	0.010	48	**0.009**	**245**
2014	0.076	797	0.100	1,412	0.100	472	**0.091**	**2,682**	0.007	74	0.009	127	0.010	49	**0.009**	**251**
2015	0.076	799	0.100	1,453	0.100	486	**0.092**	**2,737**	0.007	74	0.009	131	0.010	51	**0.009**	**256**
2016	0.076	802	0.100	1,492	0.100	499	**0.092**	**2,792**	0.007	75	0.009	134	0.010	52	**0.009**	**261**
2017	0.076	807	0.100	1,529	0.100	511	**0.092**	**2,847**	0.007	75	0.009	138	0.010	53	**0.009**	**266**
2018	0.076	813	0.100	1,565	0.100	523	**0.092**	**2,901**	0.007	76	0.009	141	0.010	54	**0.009**	**271**
2019	0.076	820	0.100	1,599	0.100	534	**0.092**	**2,954**	0.007	76	0.009	144	0.010	56	**0.009**	**276**
2020	0.076	829	0.100	1,632	0.100	545	**0.092**	**3,007**	0.007	77	0.009	147	0.010	57	**0.009**	**281**
2021	0.076	839	0.100	1,664	0.100	556	**0.092**	**3,060**	0.007	78	0.009	150	0.010	58	**0.009**	**286**
2022	0.076	850	0.100	1,696	0.100	567	**0.092**	**3,112**	0.007	79	0.009	153	0.010	59	**0.009**	**291**
2023	0.076	861	0.100	1,726	0.100	577	**0.092**	**3,164**	0.007	80	0.009	155	0.010	60	**0.009**	**296**
2024	0.076	873	0.100	1,756	0.100	587	**0.092**	**3,216**	0.007	81	0.009	158	0.010	61	**0.009**	**301**
2025	0.076	885	0.100	1,786	0.100	597	**0.092**	**3,268**	0.007	83	0.009	161	0.010	62	**0.009**	**305**
2026	0.076	898	0.100	1,815	0.100	607	**0.092**	**3,320**	0.007	84	0.009	163	0.010	63	**0.009**	**310**
2027	0.076	911	0.100	1,844	0.100	616	**0.092**	**3,372**	0.007	85	0.009	166	0.010	64	**0.009**	**315**
2028	0.076	924	0.100	1,873	0.100	626	**0.092**	**3,423**	0.007	86	0.009	169	0.010	65	**0.009**	**320**
2029	0.076	937	0.100	1,902	0.100	636	**0.092**	**3,475**	0.007	87	0.009	171	0.010	66	**0.009**	**325**
2030	0.076	951	0.100	1,930	0.100	645	**0.092**	**3,526**	0.007	89	0.009	174	0.010	67	**0.009**	**329**

Table L-21
NOx - Charlotte Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	3,440	2.90	1,339	3.64	560	**2.70**	**5,339**	2.52	3,440	2.90	1,339	3.64	560	**2.70**	**5,339**
1995	1.79	2,809	2.04	1,452	2.91	691	**1.97**	**4,952**	1.79	2,809	2.04	1,452	2.91	691	**1.97**	**4,952**
2000	1.36	2,271	1.61	1,667	2.25	776	**1.55**	**4,714**	1.36	2,271	1.61	1,667	2.25	776	**1.55**	**4,714**
2001	1.30	2,180	1.55	1,719	2.16	801	**1.49**	**4,701**	1.30	2,180	1.55	1,719	2.16	801	**1.49**	**4,701**
2002	1.26	2,111	1.49	1,763	2.09	826	**1.44**	**4,700**	1.26	2,111	1.49	1,763	2.09	826	**1.44**	**4,700**
2003	1.20	2,015	1.41	1,788	1.94	818	**1.37**	**4,621**	1.20	2,015	1.41	1,788	1.94	818	**1.37**	**4,621**
2004	1.13	1,894	1.33	1,792	1.87	840	**1.30**	**4,526**	0.92	1,551	1.15	1,543	1.71	766	**1.11**	**3,860**
2005	1.05	1,769	1.24	1,775	1.77	843	**1.22**	**4,388**	0.83	1,388	1.03	1,475	1.55	741	**1.01**	**3,605**
2006	1.00	1,661	1.17	1,772	1.72	868	**1.17**	**4,302**	0.74	1,236	0.93	1,410	1.44	726	**0.91**	**3,373**
2007	0.94	1,562	1.10	1,771	1.68	897	**1.11**	**4,230**	0.66	1,092	0.83	1,331	1.33	709	**0.82**	**3,133**
2008	0.90	1,474	1.04	1,760	1.62	916	**1.06**	**4,150**	0.58	960	0.73	1,233	1.20	678	**0.74**	**2,870**
2009	0.86	1,400	0.99	1,761	1.59	947	**1.02**	**4,109**	0.52	842	0.64	1,140	1.10	655	**0.66**	**2,637**
2010	0.83	1,340	0.94	1,763	1.57	979	**0.99**	**4,081**	0.45	738	0.56	1,046	1.01	629	**0.59**	**2,413**
2011	0.80	1,288	0.90	1,764	1.55	1,009	**0.96**	**4,062**	0.40	644	0.49	951	0.92	603	**0.52**	**2,198**
2012	0.77	1,248	0.87	1,765	1.53	1,040	**0.94**	**4,053**	0.35	564	0.42	857	0.85	577	**0.46**	**1,998**
2013	0.75	1,218	0.84	1,771	1.52	1,070	**0.91**	**4,059**	0.31	498	0.36	772	0.78	552	**0.41**	**1,822**
2014	0.73	1,192	0.81	1,784	1.51	1,100	**0.90**	**4,076**	0.27	441	0.32	698	0.73	529	**0.37**	**1,669**
2015	0.72	1,177	0.80	1,803	1.50	1,129	**0.88**	**4,109**	0.24	397	0.28	637	0.67	507	**0.33**	**1,542**
2016	0.71	1,167	0.78	1,826	1.49	1,158	**0.87**	**4,150**	0.22	362	0.25	587	0.63	486	**0.30**	**1,435**
2017	0.70	1,165	0.77	1,856	1.48	1,185	**0.86**	**4,205**	0.20	335	0.23	550	0.58	466	**0.28**	**1,352**
2018	0.69	1,164	0.76	1,885	1.47	1,212	**0.86**	**4,262**	0.19	313	0.21	521	0.55	449	**0.26**	**1,283**
2019	0.69	1,170	0.76	1,922	1.47	1,239	**0.85**	**4,331**	0.17	297	0.20	503	0.52	434	**0.24**	**1,235**
2020	0.68	1,181	0.75	1,955	1.46	1,266	**0.85**	**4,402**	0.17	288	0.19	487	0.49	421	**0.23**	**1,196**
2021	0.68	1,196	0.75	1,996	1.46	1,292	**0.85**	**4,484**	0.16	283	0.18	482	0.46	410	**0.22**	**1,175**
2022	0.68	1,213	0.75	2,036	1.46	1,318	**0.85**	**4,566**	0.16	280	0.18	480	0.44	400	**0.21**	**1,160**
2023	0.68	1,231	0.75	2,073	1.46	1,343	**0.84**	**4,647**	0.15	279	0.17	477	0.42	392	**0.21**	**1,148**
2024	0.68	1,249	0.75	2,111	1.45	1,368	**0.84**	**4,729**	0.15	278	0.17	478	0.41	385	**0.20**	**1,141**
2025	0.68	1,274	0.75	2,150	1.45	1,394	**0.84**	**4,817**	0.15	279	0.16	471	0.39	379	**0.20**	**1,129**
2026	0.68	1,293	0.74	2,187	1.45	1,416	**0.84**	**4,896**	0.15	281	0.16	474	0.38	372	**0.19**	**1,128**
2027	0.68	1,313	0.74	2,224	1.44	1,438	**0.84**	**4,974**	0.15	284	0.16	477	0.37	366	**0.19**	**1,127**
2028	0.67	1,335	0.74	2,262	1.44	1,462	**0.84**	**5,059**	0.15	287	0.16	477	0.33	339	**0.18**	**1,103**
2029	0.67	1,358	0.74	2,303	1.44	1,488	**0.84**	**5,149**	0.14	291	0.16	484	0.32	336	**0.18**	**1,111**
2030	0.67	1,381	0.74	2,344	1.44	1,514	**0.84**	**5,239**	0.14	296	0.16	490	0.32	337	**0.18**	**1,122**

Table L-22
Exhaust VOC - Charlotte Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.27	3,096	2.94	1,360	4.54	700	**2.60**	**5,156**	2.27	3,096	2.94	1,360	4.54	700	**2.60**	**5,156**
1995	1.03	1,617	1.40	999	2.62	623	**1.29**	**3,239**	1.03	1,617	1.40	999	2.62	623	**1.29**	**3,239**
2000	0.59	989	0.82	854	1.59	549	**0.78**	**2,393**	0.59	989	0.82	854	1.59	549	**0.78**	**2,393**
2001	0.54	903	0.75	837	1.46	541	**0.72**	**2,281**	0.54	903	0.75	837	1.46	541	**0.72**	**2,281**
2002	0.49	829	0.68	809	1.34	529	**0.66**	**2,167**	0.49	829	0.68	809	1.34	529	**0.66**	**2,167**
2003	0.45	757	0.61	773	1.13	475	**0.59**	**2,004**	0.45	757	0.61	773	1.13	475	**0.59**	**2,004**
2004	0.40	678	0.55	741	1.04	467	**0.54**	**1,886**	0.36	604	0.50	674	0.99	445	**0.50**	**1,723**
2005	0.36	599	0.46	656	0.81	388	**0.46**	**1,643**	0.31	526	0.41	583	0.74	351	**0.41**	**1,460**
2006	0.33	549	0.42	632	0.78	392	**0.43**	**1,573**	0.29	478	0.37	558	0.68	345	**0.37**	**1,381**
2007	0.30	501	0.38	610	0.74	398	**0.40**	**1,508**	0.26	433	0.33	533	0.63	340	**0.34**	**1,306**
2008	0.28	456	0.34	577	0.69	392	**0.37**	**1,426**	0.24	392	0.29	499	0.57	321	**0.31**	**1,212**
2009	0.26	419	0.31	559	0.67	400	**0.34**	**1,379**	0.22	358	0.27	478	0.53	315	**0.29**	**1,151**
2010	0.24	385	0.29	544	0.66	409	**0.32**	**1,339**	0.20	327	0.25	460	0.49	308	**0.27**	**1,096**
2011	0.22	357	0.27	527	0.64	418	**0.31**	**1,302**	0.19	301	0.23	440	0.46	302	**0.25**	**1,044**
2012	0.21	333	0.25	509	0.63	426	**0.29**	**1,268**	0.17	279	0.21	418	0.43	294	**0.23**	**992**
2013	0.19	315	0.23	496	0.62	434	**0.28**	**1,246**	0.16	263	0.19	402	0.41	287	**0.21**	**953**
2014	0.19	303	0.22	491	0.61	442	**0.27**	**1,235**	0.15	252	0.18	393	0.38	281	**0.20**	**925**
2015	0.18	292	0.21	485	0.60	450	**0.26**	**1,228**	0.15	242	0.17	384	0.36	274	**0.19**	**900**
2016	0.17	286	0.21	488	0.59	457	**0.26**	**1,231**	0.14	236	0.16	383	0.34	267	**0.19**	**887**
2017	0.17	282	0.20	489	0.58	466	**0.25**	**1,237**	0.14	233	0.16	381	0.33	263	**0.18**	**876**
2018	0.17	278	0.20	491	0.58	473	**0.25**	**1,243**	0.14	229	0.15	379	0.31	257	**0.17**	**865**
2019	0.16	278	0.20	495	0.57	481	**0.25**	**1,253**	0.13	228	0.15	379	0.30	253	**0.17**	**860**
2020	0.16	279	0.19	502	0.56	481	**0.24**	**1,262**	0.13	229	0.15	384	0.28	240	**0.16**	**852**
2021	0.16	281	0.19	511	0.54	481	**0.24**	**1,273**	0.13	230	0.15	390	0.26	228	**0.16**	**849**
2022	0.16	284	0.19	520	0.54	491	**0.24**	**1,295**	0.13	233	0.15	396	0.25	228	**0.16**	**857**
2023	0.16	287	0.19	528	0.54	501	**0.24**	**1,317**	0.13	235	0.15	402	0.25	229	**0.16**	**866**
2024	0.16	290	0.19	536	0.54	511	**0.24**	**1,337**	0.13	237	0.14	408	0.24	229	**0.16**	**874**
2025	0.16	294	0.19	540	0.54	521	**0.24**	**1,355**	0.13	241	0.14	410	0.24	230	**0.15**	**881**
2026	0.16	299	0.19	550	0.54	530	**0.24**	**1,379**	0.13	245	0.14	417	0.24	231	**0.15**	**893**
2027	0.16	304	0.19	560	0.54	539	**0.24**	**1,403**	0.13	249	0.14	424	0.23	232	**0.15**	**905**
2028	0.16	309	0.19	570	0.54	548	**0.24**	**1,427**	0.13	253	0.14	431	0.22	226	**0.15**	**910**
2029	0.16	314	0.19	580	0.54	558	**0.24**	**1,453**	0.13	258	0.14	439	0.22	229	**0.15**	**925**
2030	0.16	320	0.19	590	0.54	568	**0.24**	**1,478**	0.13	262	0.14	446	0.22	231	**0.15**	**940**

Table L-23
Evap VOC - Charlotte Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.81	3,830	2.55	1,178	4.61	710	**2.89**	**5,718**	2.81	3,830	2.55	1,178	4.61	710	**2.89**	**5,718**
1995	1.19	1,858	1.20	857	1.69	400	**1.24**	**3,115**	1.19	1,858	1.20	857	1.69	400	**1.24**	**3,115**
2000	0.52	865	0.57	592	0.67	230	**0.55**	**1,687**	0.52	865	0.57	592	0.67	230	**0.55**	**1,687**
2001	0.47	795	0.53	587	0.62	228	**0.51**	**1,611**	0.47	795	0.53	587	0.62	228	**0.51**	**1,611**
2002	0.43	724	0.49	577	0.57	225	**0.47**	**1,526**	0.43	724	0.49	577	0.57	225	**0.47**	**1,526**
2003	0.39	650	0.44	562	0.52	220	**0.42**	**1,431**	0.39	650	0.44	562	0.52	220	**0.42**	**1,431**
2004	0.35	594	0.40	543	0.50	224	**0.39**	**1,360**	0.35	594	0.40	543	0.50	224	**0.39**	**1,360**
2005	0.33	547	0.37	526	0.47	224	**0.36**	**1,298**	0.32	544	0.37	525	0.47	224	**0.36**	**1,293**
2006	0.30	507	0.34	521	0.44	224	**0.34**	**1,252**	0.30	502	0.34	516	0.44	224	**0.34**	**1,242**
2007	0.28	467	0.32	512	0.42	222	**0.32**	**1,202**	0.28	461	0.31	503	0.42	222	**0.31**	**1,185**
2008	0.26	434	0.30	511	0.39	219	**0.30**	**1,164**	0.26	424	0.29	497	0.39	218	**0.29**	**1,140**
2009	0.25	402	0.28	506	0.36	213	**0.28**	**1,121**	0.24	389	0.27	488	0.36	213	**0.27**	**1,089**
2010	0.23	371	0.27	496	0.33	206	**0.26**	**1,074**	0.22	355	0.25	474	0.33	205	**0.25**	**1,034**
2011	0.22	356	0.25	492	0.31	204	**0.25**	**1,052**	0.21	336	0.24	467	0.31	202	**0.24**	**1,005**
2012	0.21	341	0.24	485	0.30	202	**0.24**	**1,028**	0.20	319	0.22	456	0.29	198	**0.22**	**972**
2013	0.21	334	0.23	483	0.28	200	**0.23**	**1,017**	0.19	309	0.21	450	0.28	195	**0.22**	**955**
2014	0.20	328	0.22	479	0.27	198	**0.22**	**1,005**	0.19	301	0.20	442	0.26	192	**0.21**	**936**
2015	0.20	323	0.21	473	0.26	195	**0.21**	**990**	0.18	293	0.19	432	0.25	189	**0.20**	**914**
2016	0.20	322	0.20	478	0.25	193	**0.21**	**993**	0.18	291	0.19	434	0.24	186	**0.19**	**911**
2017	0.19	322	0.20	482	0.24	190	**0.20**	**994**	0.17	290	0.18	435	0.23	183	**0.19**	**907**
2018	0.19	323	0.20	484	0.23	187	**0.20**	**995**	0.17	289	0.18	434	0.22	179	**0.18**	**902**
2019	0.19	324	0.19	486	0.22	184	**0.20**	**994**	0.17	288	0.17	433	0.21	174	**0.18**	**895**
2020	0.19	326	0.19	487	0.21	180	**0.19**	**993**	0.17	288	0.17	430	0.20	169	**0.17**	**887**
2021	0.19	330	0.19	498	0.21	183	**0.19**	**1,010**	0.17	291	0.17	438	0.19	172	**0.17**	**901**
2022	0.19	335	0.19	508	0.21	185	**0.19**	**1,028**	0.17	295	0.16	446	0.19	174	**0.17**	**915**
2023	0.19	340	0.19	517	0.20	188	**0.19**	**1,045**	0.16	299	0.16	453	0.19	176	**0.17**	**928**
2024	0.19	345	0.19	527	0.20	191	**0.19**	**1,063**	0.16	304	0.16	460	0.19	178	**0.17**	**942**
2025	0.19	351	0.19	536	0.20	193	**0.19**	**1,080**	0.16	308	0.16	467	0.19	180	**0.17**	**955**
2026	0.19	356	0.19	545	0.20	196	**0.19**	**1,097**	0.16	313	0.16	474	0.19	181	**0.17**	**968**
2027	0.19	362	0.19	554	0.20	198	**0.19**	**1,114**	0.16	317	0.16	480	0.18	183	**0.17**	**981**
2028	0.19	367	0.18	563	0.20	200	**0.19**	**1,131**	0.16	322	0.16	487	0.18	185	**0.16**	**993**
2029	0.19	373	0.18	572	0.20	202	**0.19**	**1,147**	0.16	327	0.16	493	0.18	186	**0.16**	**1,006**
2030	0.19	379	0.18	581	0.19	204	**0.19**	**1,164**	0.16	332	0.16	499	0.18	187	**0.16**	**1,018**

Table L-24
PM2.5 - Charlotte Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.019	26	0.027	12	0.030	5	**0.022**	**43**	0.019	26	0.027	12	0.030	5	**0.022**	**43**
1995	0.015	23	0.019	13	0.023	5	**0.017**	**42**	0.015	23	0.019	13	0.023	5	**0.017**	**42**
2000	0.013	21	0.015	16	0.023	8	**0.015**	**45**	0.013	21	0.015	16	0.023	8	**0.015**	**45**
2001	0.013	21	0.015	17	0.022	8	**0.015**	**46**	0.013	21	0.015	17	0.022	8	**0.015**	**46**
2002	0.012	21	0.015	18	0.021	8	**0.015**	**48**	0.012	21	0.015	18	0.021	8	**0.015**	**48**
2003	0.012	21	0.015	19	0.017	7	**0.014**	**47**	0.012	21	0.015	19	0.017	7	**0.014**	**47**
2004	0.012	21	0.015	21	0.017	8	**0.014**	**49**	0.005	9	0.006	7	0.008	3	**0.006**	**20**
2005	0.012	21	0.015	22	0.017	8	**0.014**	**50**	0.005	9	0.005	8	0.007	3	**0.006**	**20**
2006	0.012	20	0.015	23	0.017	9	**0.014**	**52**	0.005	9	0.005	8	0.007	4	**0.006**	**20**
2007	0.012	20	0.015	24	0.017	9	**0.014**	**53**	0.005	8	0.005	8	0.007	4	**0.005**	**21**
2008	0.012	20	0.015	26	0.017	10	**0.014**	**55**	0.005	8	0.005	9	0.007	4	**0.005**	**21**
2009	0.012	20	0.015	27	0.017	10	**0.014**	**57**	0.005	8	0.005	9	0.006	4	**0.005**	**21**
2010	0.012	20	0.015	28	0.016	10	**0.014**	**58**	0.005	8	0.005	10	0.006	4	**0.005**	**22**
2011	0.012	20	0.015	29	0.016	10	**0.014**	**59**	0.005	8	0.005	10	0.006	4	**0.005**	**22**
2012	0.012	20	0.015	30	0.016	11	**0.014**	**61**	0.005	8	0.005	10	0.006	4	**0.005**	**22**
2013	0.012	20	0.015	32	0.016	11	**0.014**	**63**	0.005	8	0.005	11	0.006	4	**0.005**	**23**
2014	0.012	20	0.015	33	0.016	12	**0.014**	**64**	0.005	8	0.005	11	0.005	4	**0.005**	**23**
2015	0.012	20	0.015	34	0.016	12	**0.014**	**66**	0.005	8	0.005	11	0.005	4	**0.005**	**24**
2016	0.012	20	0.015	35	0.016	13	**0.014**	**67**	0.005	8	0.005	12	0.005	4	**0.005**	**24**
2017	0.012	20	0.015	36	0.016	13	**0.014**	**69**	0.005	8	0.005	12	0.005	4	**0.005**	**25**
2018	0.012	20	0.015	37	0.016	13	**0.014**	**71**	0.005	8	0.005	12	0.005	4	**0.005**	**25**
2019	0.012	21	0.015	38	0.016	14	**0.014**	**72**	0.005	9	0.005	13	0.005	4	**0.005**	**26**
2020	0.012	21	0.015	39	0.016	14	**0.014**	**74**	0.005	9	0.005	13	0.005	4	**0.005**	**26**
2021	0.012	21	0.015	40	0.016	14	**0.014**	**75**	0.005	9	0.005	13	0.005	5	**0.005**	**27**
2022	0.012	22	0.015	41	0.016	15	**0.014**	**77**	0.005	9	0.005	14	0.005	5	**0.005**	**27**
2023	0.012	22	0.015	42	0.016	15	**0.014**	**78**	0.005	9	0.005	14	0.005	5	**0.005**	**28**
2024	0.012	22	0.015	42	0.016	15	**0.014**	**80**	0.005	9	0.005	14	0.005	5	**0.005**	**28**
2025	0.012	23	0.015	43	0.016	15	**0.014**	**81**	0.005	9	0.005	14	0.005	5	**0.005**	**29**
2026	0.012	23	0.015	44	0.016	16	**0.014**	**83**	0.005	10	0.005	15	0.005	5	**0.005**	**29**
2027	0.012	24	0.015	45	0.016	16	**0.014**	**84**	0.005	10	0.005	15	0.005	5	**0.005**	**30**
2028	0.012	24	0.015	46	0.016	16	**0.014**	**86**	0.005	10	0.005	15	0.005	5	**0.005**	**30**
2029	0.012	24	0.015	47	0.016	17	**0.014**	**88**	0.005	10	0.005	16	0.005	5	**0.005**	**31**
2030	0.012	25	0.015	47	0.016	17	**0.014**	**89**	0.005	10	0.005	16	0.005	5	**0.005**	**31**

Table L-25
PM10 - Charlotte Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.020	28	0.029	13	0.032	5	**0.023**	**46**	0.020	28	0.029	13	0.032	5	**0.023**	**46**
1995	0.016	25	0.020	14	0.025	6	**0.018**	**45**	0.016	25	0.020	14	0.025	6	**0.018**	**45**
2000	0.014	23	0.017	17	0.025	9	**0.016**	**49**	0.014	23	0.017	17	0.025	9	**0.016**	**49**
2001	0.014	23	0.016	18	0.024	9	**0.016**	**50**	0.014	23	0.016	18	0.024	9	**0.016**	**50**
2002	0.013	23	0.016	20	0.023	9	**0.016**	**51**	0.013	23	0.016	20	0.023	9	**0.016**	**51**
2003	0.013	23	0.016	21	0.019	8	**0.015**	**51**	0.013	23	0.016	21	0.019	8	**0.015**	**51**
2004	0.013	22	0.016	22	0.019	8	**0.015**	**53**	0.006	10	0.006	8	0.008	4	**0.006**	**21**
2005	0.013	22	0.016	23	0.018	9	**0.015**	**54**	0.006	9	0.006	8	0.008	4	**0.006**	**21**
2006	0.013	22	0.016	25	0.018	9	**0.015**	**56**	0.006	9	0.006	9	0.008	4	**0.006**	**22**
2007	0.013	22	0.016	26	0.018	10	**0.015**	**58**	0.005	9	0.006	9	0.008	4	**0.006**	**22**
2008	0.013	21	0.016	28	0.018	10	**0.015**	**59**	0.005	9	0.006	9	0.007	4	**0.006**	**23**
2009	0.013	21	0.016	29	0.018	11	**0.015**	**61**	0.005	9	0.006	10	0.007	4	**0.006**	**23**
2010	0.013	21	0.016	30	0.018	11	**0.015**	**63**	0.005	9	0.005	10	0.007	4	**0.006**	**23**
2011	0.013	21	0.016	32	0.017	11	**0.015**	**64**	0.005	9	0.005	11	0.006	4	**0.006**	**23**
2012	0.013	21	0.016	33	0.017	12	**0.015**	**66**	0.005	9	0.005	11	0.006	4	**0.006**	**24**
2013	0.013	21	0.016	34	0.017	12	**0.015**	**67**	0.005	9	0.005	11	0.006	4	**0.005**	**24**
2014	0.013	21	0.016	35	0.017	13	**0.015**	**69**	0.005	9	0.005	12	0.006	4	**0.005**	**25**
2015	0.013	21	0.016	37	0.017	13	**0.015**	**71**	0.005	9	0.005	12	0.006	4	**0.005**	**25**
2016	0.013	21	0.016	38	0.017	14	**0.015**	**73**	0.005	9	0.005	13	0.006	4	**0.005**	**26**
2017	0.013	22	0.016	39	0.017	14	**0.015**	**74**	0.005	9	0.005	13	0.006	5	**0.005**	**27**
2018	0.013	22	0.016	40	0.017	14	**0.015**	**76**	0.005	9	0.005	13	0.006	5	**0.005**	**27**
2019	0.013	22	0.016	41	0.017	15	**0.015**	**78**	0.005	9	0.005	14	0.006	5	**0.005**	**28**
2020	0.013	23	0.016	42	0.017	15	**0.015**	**79**	0.005	9	0.005	14	0.006	5	**0.005**	**28**
2021	0.013	23	0.016	43	0.017	15	**0.015**	**81**	0.005	9	0.005	14	0.006	5	**0.005**	**29**
2022	0.013	23	0.016	44	0.017	16	**0.015**	**83**	0.005	10	0.005	15	0.006	5	**0.005**	**29**
2023	0.013	24	0.016	45	0.017	16	**0.015**	**84**	0.005	10	0.005	15	0.006	5	**0.005**	**30**
2024	0.013	24	0.016	46	0.017	16	**0.015**	**86**	0.005	10	0.005	15	0.006	5	**0.005**	**30**
2025	0.013	24	0.016	47	0.017	17	**0.015**	**88**	0.005	10	0.005	16	0.006	5	**0.005**	**31**
2026	0.013	25	0.016	48	0.017	17	**0.015**	**89**	0.005	10	0.005	16	0.006	5	**0.005**	**32**
2027	0.013	25	0.016	48	0.017	17	**0.015**	**91**	0.005	10	0.005	16	0.006	5	**0.005**	**32**
2028	0.013	26	0.016	49	0.017	18	**0.015**	**93**	0.005	11	0.005	16	0.005	6	**0.005**	**33**
2029	0.013	26	0.016	50	0.017	18	**0.015**	**94**	0.005	11	0.005	17	0.005	6	**0.005**	**33**
2030	0.013	27	0.016	51	0.017	18	**0.015**	**96**	0.005	11	0.005	17	0.005	6	**0.005**	**34**

Table L-26
SOx - Charlotte Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.078	106	0.101	47	0.093	14	**0.084**	**167**	0.078	106	0.101	47	0.093	14	**0.084**	**167**
1995	0.076	119	0.100	71	0.097	23	**0.085**	**213**	0.076	119	0.100	71	0.097	23	**0.085**	**213**
2000	0.076	127	0.101	104	0.103	36	**0.087**	**267**	0.076	127	0.101	104	0.103	36	**0.087**	**267**
2001	0.076	127	0.100	112	0.102	38	**0.088**	**277**	0.076	127	0.100	112	0.102	38	**0.088**	**277**
2002	0.076	128	0.100	119	0.102	40	**0.088**	**287**	0.076	128	0.100	119	0.102	40	**0.088**	**287**
2003	0.076	128	0.100	127	0.102	43	**0.088**	**298**	0.076	128	0.100	127	0.102	43	**0.088**	**298**
2004	0.076	128	0.100	135	0.101	45	**0.088**	**308**	0.007	12	0.009	12	0.010	5	**0.008**	**29**
2005	0.076	127	0.100	143	0.101	48	**0.089**	**318**	0.007	12	0.009	13	0.010	5	**0.008**	**30**
2006	0.076	127	0.100	152	0.100	51	**0.089**	**329**	0.007	12	0.009	14	0.011	5	**0.008**	**31**
2007	0.076	126	0.100	161	0.100	54	**0.090**	**340**	0.007	12	0.009	14	0.010	6	**0.008**	**32**
2008	0.076	125	0.100	170	0.100	57	**0.090**	**351**	0.007	12	0.009	15	0.010	6	**0.008**	**33**
2009	0.076	124	0.100	179	0.100	60	**0.090**	**362**	0.007	12	0.009	16	0.010	6	**0.008**	**34**
2010	0.076	123	0.100	187	0.100	63	**0.091**	**373**	0.007	11	0.009	17	0.010	7	**0.008**	**35**
2011	0.076	123	0.100	196	0.100	65	**0.091**	**384**	0.007	11	0.009	18	0.010	7	**0.008**	**36**
2012	0.076	123	0.100	204	0.100	68	**0.091**	**395**	0.007	11	0.009	18	0.010	7	**0.009**	**37**
2013	0.076	123	0.100	211	0.100	71	**0.091**	**405**	0.007	11	0.009	19	0.010	7	**0.009**	**38**
2014	0.076	124	0.100	219	0.100	73	**0.091**	**416**	0.007	12	0.009	20	0.010	8	**0.009**	**39**
2015	0.076	124	0.100	226	0.100	76	**0.092**	**426**	0.007	12	0.009	20	0.010	8	**0.009**	**40**
2016	0.076	125	0.100	233	0.100	78	**0.092**	**437**	0.007	12	0.009	21	0.010	8	**0.009**	**41**
2017	0.076	127	0.100	240	0.100	80	**0.092**	**447**	0.007	12	0.009	22	0.010	8	**0.009**	**42**
2018	0.076	128	0.100	247	0.100	82	**0.092**	**457**	0.007	12	0.009	22	0.010	9	**0.009**	**43**
2019	0.076	130	0.100	253	0.100	85	**0.092**	**467**	0.007	12	0.009	23	0.010	9	**0.009**	**44**
2020	0.076	132	0.100	259	0.100	87	**0.092**	**478**	0.007	12	0.009	23	0.010	9	**0.009**	**45**
2021	0.076	134	0.100	265	0.100	89	**0.092**	**488**	0.007	12	0.009	24	0.010	9	**0.009**	**46**
2022	0.076	136	0.100	271	0.100	91	**0.092**	**498**	0.007	13	0.009	24	0.010	9	**0.009**	**46**
2023	0.076	138	0.100	277	0.100	93	**0.092**	**508**	0.007	13	0.009	25	0.010	10	**0.009**	**47**
2024	0.076	140	0.100	283	0.100	94	**0.092**	**518**	0.007	13	0.009	25	0.010	10	**0.009**	**48**
2025	0.076	143	0.100	288	0.100	96	**0.092**	**527**	0.007	13	0.009	26	0.010	10	**0.009**	**49**
2026	0.076	145	0.100	294	0.100	98	**0.092**	**537**	0.007	14	0.009	26	0.010	10	**0.009**	**50**
2027	0.076	148	0.100	299	0.100	100	**0.092**	**547**	0.007	14	0.009	27	0.010	10	**0.009**	**51**
2028	0.076	150	0.100	305	0.100	102	**0.092**	**557**	0.007	14	0.009	27	0.010	11	**0.009**	**52**
2029	0.076	153	0.100	310	0.100	104	**0.092**	**567**	0.007	14	0.009	28	0.010	11	**0.009**	**53**
2030	0.076	156	0.100	316	0.100	106	**0.092**	**577**	0.007	14	0.009	28	0.010	11	**0.009**	**54**

Table L-27
NOx - Chicago Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	34,631	2.90	13,480	3.64	5,643	**2.70**	**53,754**	2.52	34,631	2.90	13,480	3.64	5,643	**2.70**	**53,754**
1995	1.79	24,989	2.04	12,914	2.91	6,151	**1.97**	**44,054**	1.79	24,989	2.04	12,914	2.91	6,151	**1.97**	**44,054**
2000	1.31	17,828	1.54	13,005	2.21	6,204	**1.49**	**37,037**	1.31	17,828	1.54	13,005	2.21	6,204	**1.49**	**37,037**
2001	1.24	16,679	1.47	13,108	2.12	6,298	**1.43**	**36,085**	1.24	16,679	1.47	13,108	2.12	6,298	**1.43**	**36,085**
2002	1.18	15,645	1.40	13,121	2.04	6,382	**1.36**	**35,149**	1.18	15,645	1.40	13,121	2.04	6,382	**1.36**	**35,149**
2003	1.11	14,502	1.32	13,002	1.89	6,221	**1.28**	**33,725**	1.11	14,502	1.32	13,002	1.89	6,221	**1.28**	**33,725**
2004	1.02	13,261	1.23	12,763	1.82	6,290	**1.21**	**32,314**	0.91	11,766	1.13	11,671	1.68	5,814	**1.09**	**29,252**
2005	0.94	12,043	1.14	12,390	1.72	6,233	**1.13**	**30,667**	0.81	10,389	1.01	11,011	1.53	5,552	**0.99**	**26,952**
2006	0.88	10,997	1.06	12,125	1.67	6,334	**1.06**	**29,455**	0.73	9,133	0.91	10,391	1.42	5,376	**0.90**	**24,901**
2007	0.82	10,055	1.00	11,881	1.62	6,463	**1.01**	**28,399**	0.65	7,967	0.81	9,695	1.31	5,191	**0.81**	**22,853**
2008	0.76	9,226	0.93	11,586	1.57	6,519	**0.95**	**27,331**	0.57	6,920	0.71	8,876	1.18	4,906	**0.72**	**20,702**
2009	0.72	8,527	0.88	11,391	1.54	6,666	**0.91**	**26,584**	0.51	6,005	0.63	8,126	1.08	4,688	**0.64**	**18,818**
2010	0.68	7,942	0.83	11,207	1.51	6,809	**0.87**	**25,958**	0.45	5,208	0.55	7,377	0.99	4,458	**0.57**	**17,043**
2011	0.64	7,441	0.79	11,037	1.49	6,948	**0.84**	**25,426**	0.39	4,503	0.48	6,643	0.91	4,232	**0.51**	**15,378**
2012	0.61	7,034	0.75	10,874	1.48	7,090	**0.82**	**24,999**	0.34	3,902	0.41	5,933	0.84	4,018	**0.45**	**13,854**
2013	0.59	6,717	0.73	10,757	1.46	7,224	**0.79**	**24,698**	0.30	3,413	0.36	5,294	0.77	3,809	**0.40**	**12,516**
2014	0.57	6,447	0.70	10,699	1.45	7,363	**0.77**	**24,510**	0.26	2,996	0.31	4,751	0.71	3,621	**0.36**	**11,369**
2015	0.55	6,262	0.68	10,686	1.44	7,492	**0.76**	**24,440**	0.24	2,679	0.28	4,301	0.66	3,441	**0.32**	**10,421**
2016	0.54	6,116	0.67	10,702	1.43	7,620	**0.75**	**24,438**	0.21	2,417	0.25	3,929	0.61	3,274	**0.30**	**9,620**
2017	0.53	6,033	0.66	10,775	1.42	7,737	**0.74**	**24,545**	0.20	2,226	0.22	3,656	0.57	3,117	**0.27**	**8,999**
2018	0.52	5,957	0.65	10,847	1.42	7,858	**0.73**	**24,662**	0.18	2,057	0.21	3,430	0.54	2,982	**0.25**	**8,469**
2019	0.52	5,924	0.65	10,967	1.41	7,976	**0.73**	**24,867**	0.17	1,942	0.19	3,290	0.51	2,863	**0.24**	**8,095**
2020	0.51	5,928	0.64	11,068	1.41	8,085	**0.73**	**25,080**	0.16	1,868	0.18	3,162	0.48	2,754	**0.23**	**7,784**
2021	0.51	5,956	0.64	11,217	1.40	8,193	**0.72**	**25,366**	0.16	1,824	0.18	3,109	0.45	2,659	**0.22**	**7,592**
2022	0.51	5,996	0.64	11,366	1.40	8,305	**0.72**	**25,667**	0.15	1,795	0.17	3,076	0.43	2,580	**0.21**	**7,451**
2023	0.51	6,045	0.64	11,499	1.39	8,415	**0.72**	**25,959**	0.15	1,778	0.17	3,042	0.42	2,512	**0.20**	**7,332**
2024	0.51	6,091	0.63	11,639	1.39	8,525	**0.72**	**26,255**	0.15	1,760	0.16	3,026	0.40	2,454	**0.20**	**7,241**
2025	0.51	6,165	0.63	11,768	1.39	8,634	**0.72**	**26,568**	0.14	1,755	0.16	2,970	0.39	2,405	**0.19**	**7,130**
2026	0.51	6,227	0.63	11,907	1.39	8,724	**0.72**	**26,857**	0.14	1,761	0.16	2,973	0.37	2,347	**0.19**	**7,081**
2027	0.51	6,291	0.63	12,040	1.38	8,813	**0.71**	**27,143**	0.14	1,770	0.16	2,976	0.36	2,296	**0.19**	**7,041**
2028	0.51	6,363	0.63	12,188	1.38	8,914	**0.71**	**27,465**	0.14	1,780	0.15	2,958	0.33	2,120	**0.18**	**6,857**
2029	0.51	6,439	0.63	12,346	1.38	9,030	**0.71**	**27,815**	0.14	1,796	0.15	2,986	0.32	2,089	**0.18**	**6,870**
2030	0.51	6,517	0.63	12,503	1.38	9,145	**0.71**	**28,165**	0.14	1,814	0.15	3,009	0.31	2,083	**0.18**	**6,906**

Table L-28
Exhaust VOC - Chicago Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.27	31,175	2.94	13,692	4.54	7,044	**2.60**	**51,910**	2.27	31,175	2.94	13,692	4.54	7,044	**2.60**	**51,910**
1995	0.99	13,787	1.35	8,574	2.58	5,440	**1.24**	**27,801**	0.99	13,787	1.35	8,574	2.58	5,440	**1.24**	**27,801**
2000	0.51	6,933	0.72	6,109	1.49	4,192	**0.69**	**17,234**	0.51	6,933	0.72	6,109	1.49	4,192	**0.69**	**17,234**
2001	0.46	6,168	0.66	5,839	1.36	4,040	**0.63**	**16,047**	0.46	6,168	0.66	5,839	1.36	4,040	**0.63**	**16,047**
2002	0.42	5,519	0.59	5,516	1.24	3,869	**0.58**	**14,904**	0.42	5,519	0.59	5,516	1.24	3,869	**0.58**	**14,904**
2003	0.38	4,921	0.52	5,155	1.03	3,382	**0.51**	**13,458**	0.38	4,921	0.52	5,155	1.03	3,382	**0.51**	**13,458**
2004	0.33	4,299	0.47	4,845	0.94	3,263	**0.46**	**12,408**	0.31	4,059	0.45	4,623	0.90	3,125	**0.44**	**11,807**
2005	0.29	3,693	0.38	4,120	0.70	2,550	**0.38**	**10,364**	0.27	3,457	0.36	3,867	0.64	2,335	**0.35**	**9,660**
2006	0.27	3,327	0.34	3,913	0.67	2,539	**0.35**	**9,779**	0.25	3,100	0.32	3,648	0.60	2,270	**0.33**	**9,018**
2007	0.24	2,992	0.31	3,725	0.64	2,537	**0.33**	**9,254**	0.23	2,773	0.29	3,445	0.55	2,207	**0.30**	**8,425**
2008	0.22	2,689	0.28	3,482	0.59	2,459	**0.30**	**8,630**	0.21	2,479	0.26	3,184	0.50	2,062	**0.27**	**7,725**
2009	0.21	2,438	0.26	3,338	0.57	2,480	**0.28**	**8,256**	0.19	2,235	0.23	3,019	0.46	2,005	**0.25**	**7,260**
2010	0.19	2,218	0.24	3,217	0.56	2,503	**0.27**	**7,938**	0.17	2,022	0.21	2,875	0.43	1,945	**0.23**	**6,842**
2011	0.18	2,035	0.22	3,084	0.54	2,528	**0.25**	**7,646**	0.16	1,844	0.19	2,718	0.41	1,888	**0.21**	**6,450**
2012	0.16	1,878	0.20	2,946	0.53	2,546	**0.24**	**7,370**	0.15	1,691	0.18	2,556	0.38	1,824	**0.20**	**6,071**
2013	0.15	1,759	0.19	2,842	0.52	2,569	**0.23**	**7,170**	0.14	1,576	0.16	2,428	0.36	1,767	**0.19**	**5,772**
2014	0.15	1,676	0.18	2,785	0.51	2,590	**0.22**	**7,051**	0.13	1,495	0.15	2,349	0.34	1,713	**0.18**	**5,557**
2015	0.14	1,602	0.17	2,727	0.50	2,612	**0.22**	**6,940**	0.13	1,424	0.15	2,271	0.32	1,661	**0.17**	**5,357**
2016	0.14	1,557	0.17	2,721	0.49	2,629	**0.21**	**6,907**	0.12	1,381	0.14	2,249	0.30	1,609	**0.16**	**5,239**
2017	0.13	1,526	0.17	2,699	0.49	2,656	**0.21**	**6,881**	0.12	1,351	0.14	2,211	0.29	1,571	**0.16**	**5,132**
2018	0.13	1,491	0.16	2,688	0.48	2,673	**0.20**	**6,851**	0.12	1,315	0.13	2,185	0.27	1,526	**0.15**	**5,027**
2019	0.13	1,476	0.16	2,683	0.48	2,696	**0.20**	**6,854**	0.11	1,301	0.13	2,167	0.26	1,491	**0.15**	**4,959**
2020	0.13	1,472	0.16	2,704	0.46	2,669	**0.20**	**6,846**	0.11	1,295	0.13	2,177	0.24	1,410	**0.14**	**4,882**
2021	0.13	1,475	0.16	2,736	0.45	2,646	**0.20**	**6,856**	0.11	1,297	0.13	2,198	0.23	1,334	**0.14**	**4,829**
2022	0.13	1,481	0.16	2,767	0.45	2,685	**0.20**	**6,933**	0.11	1,302	0.12	2,220	0.22	1,326	**0.14**	**4,848**
2023	0.13	1,491	0.15	2,796	0.45	2,723	**0.19**	**7,010**	0.11	1,310	0.12	2,239	0.22	1,321	**0.14**	**4,871**
2024	0.12	1,495	0.15	2,823	0.45	2,761	**0.19**	**7,079**	0.11	1,313	0.12	2,257	0.22	1,318	**0.13**	**4,888**
2025	0.12	1,510	0.15	2,831	0.45	2,798	**0.19**	**7,139**	0.11	1,326	0.12	2,256	0.21	1,316	**0.13**	**4,898**
2026	0.12	1,527	0.15	2,867	0.45	2,831	**0.19**	**7,224**	0.11	1,340	0.12	2,284	0.21	1,313	**0.13**	**4,936**
2027	0.12	1,544	0.15	2,902	0.45	2,864	**0.19**	**7,310**	0.11	1,355	0.12	2,310	0.21	1,312	**0.13**	**4,977**
2028	0.12	1,562	0.15	2,939	0.45	2,900	**0.19**	**7,400**	0.11	1,371	0.12	2,335	0.20	1,275	**0.13**	**4,980**
2029	0.12	1,580	0.15	2,977	0.45	2,937	**0.19**	**7,495**	0.11	1,387	0.12	2,365	0.20	1,284	**0.13**	**5,036**
2030	0.12	1,599	0.15	3,015	0.45	2,975	**0.19**	**7,589**	0.11	1,404	0.12	2,395	0.19	1,292	**0.13**	**5,092**

Table L-29
Evap VOC - Chicago Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	34,657	2.32	10,790	4.26	6,601	2.61	52,048	2.52	34,657	2.32	10,790	4.26	6,601	2.61	52,048
1995	1.19	16,528	1.20	7,621	1.69	3,562	1.24	27,711	1.19	16,528	1.20	7,621	1.69	3,562	1.24	27,711
2000	0.35	4,788	0.44	3,702	0.51	1,420	0.40	9,910	0.35	4,788	0.44	3,702	0.51	1,420	0.40	9,910
2001	0.32	4,297	0.40	3,596	0.47	1,386	0.37	9,279	0.32	4,297	0.40	3,596	0.47	1,386	0.37	9,279
2002	0.29	3,814	0.37	3,459	0.43	1,340	0.33	8,612	0.29	3,814	0.37	3,459	0.43	1,340	0.33	8,612
2003	0.25	3,333	0.33	3,294	0.39	1,285	0.30	7,912	0.25	3,333	0.33	3,294	0.39	1,285	0.30	7,912
2004	0.23	2,977	0.30	3,098	0.37	1,285	0.28	7,360	0.23	2,977	0.30	3,088	0.37	1,285	0.27	7,350
2005	0.21	2,691	0.27	2,934	0.35	1,268	0.25	6,894	0.21	2,679	0.27	2,913	0.35	1,268	0.25	6,859
2006	0.20	2,452	0.25	2,843	0.33	1,238	0.24	6,533	0.19	2,427	0.25	2,808	0.33	1,238	0.23	6,473
2007	0.18	2,216	0.23	2,732	0.30	1,201	0.22	6,150	0.18	2,179	0.23	2,685	0.30	1,201	0.21	6,065
2008	0.17	2,019	0.21	2,675	0.28	1,163	0.20	5,858	0.16	1,963	0.21	2,600	0.28	1,161	0.20	5,724
2009	0.15	1,835	0.20	2,596	0.26	1,115	0.19	5,545	0.15	1,759	0.19	2,492	0.26	1,109	0.18	5,360
2010	0.14	1,660	0.19	2,497	0.24	1,057	0.18	5,214	0.13	1,566	0.18	2,362	0.23	1,048	0.17	4,976
2011	0.14	1,559	0.17	2,430	0.22	1,031	0.17	5,020	0.13	1,449	0.16	2,283	0.22	1,015	0.16	4,748
2012	0.13	1,465	0.16	2,349	0.21	999	0.16	4,813	0.12	1,339	0.15	2,190	0.20	975	0.15	4,504
2013	0.12	1,417	0.16	2,304	0.20	979	0.15	4,700	0.11	1,284	0.14	2,121	0.19	949	0.14	4,355
2014	0.12	1,373	0.15	2,250	0.19	955	0.14	4,578	0.11	1,234	0.13	2,041	0.18	919	0.13	4,194
2015	0.12	1,333	0.14	2,186	0.18	926	0.14	4,446	0.11	1,186	0.13	1,952	0.17	885	0.13	4,023
2016	0.12	1,322	0.14	2,182	0.17	904	0.14	4,409	0.10	1,164	0.12	1,930	0.16	857	0.12	3,952
2017	0.12	1,314	0.13	2,174	0.16	879	0.13	4,368	0.10	1,144	0.12	1,903	0.15	827	0.12	3,874
2018	0.12	1,309	0.13	2,161	0.15	851	0.13	4,321	0.10	1,127	0.11	1,871	0.14	794	0.11	3,792
2019	0.11	1,305	0.13	2,144	0.15	821	0.13	4,270	0.10	1,110	0.11	1,836	0.13	758	0.11	3,704
2020	0.11	1,304	0.12	2,123	0.14	788	0.12	4,215	0.10	1,096	0.10	1,795	0.13	719	0.10	3,611
2021	0.11	1,312	0.12	2,157	0.14	794	0.12	4,263	0.09	1,102	0.10	1,820	0.12	722	0.10	3,645
2022	0.11	1,321	0.12	2,190	0.13	800	0.12	4,311	0.09	1,110	0.10	1,844	0.12	725	0.10	3,678
2023	0.11	1,332	0.12	2,221	0.13	805	0.12	4,358	0.09	1,118	0.10	1,866	0.12	727	0.10	3,711
2024	0.11	1,343	0.12	2,252	0.13	809	0.12	4,404	0.09	1,127	0.10	1,888	0.12	729	0.10	3,744
2025	0.11	1,355	0.12	2,282	0.13	814	0.12	4,451	0.09	1,136	0.10	1,910	0.12	730	0.10	3,775
2026	0.11	1,367	0.12	2,312	0.13	817	0.12	4,496	0.09	1,146	0.10	1,930	0.12	730	0.10	3,807
2027	0.11	1,380	0.12	2,341	0.13	821	0.12	4,542	0.09	1,156	0.10	1,951	0.11	731	0.10	3,837
2028	0.11	1,392	0.12	2,370	0.13	824	0.12	4,587	0.09	1,166	0.10	1,971	0.11	731	0.10	3,867
2029	0.11	1,405	0.12	2,399	0.13	827	0.12	4,631	0.09	1,176	0.10	1,990	0.11	730	0.10	3,897
2030	0.11	1,418	0.12	2,428	0.13	829	0.12	4,675	0.09	1,186	0.10	2,010	0.11	730	0.10	3,926

Table L-30
PM2.5 - Chicago Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.019	261	0.027	124	0.030	46	**0.022**	**431**	0.019	261	0.027	124	0.030	46	**0.022**	**431**
1995	0.015	206	0.019	118	0.023	49	**0.017**	**372**	0.015	206	0.019	118	0.023	49	**0.017**	**372**
2000	0.009	118	0.010	84	0.018	51	**0.010**	**253**	0.009	118	0.010	84	0.018	51	**0.010**	**253**
2001	0.009	114	0.010	86	0.017	51	**0.010**	**251**	0.009	114	0.010	86	0.017	51	**0.010**	**251**
2002	0.008	112	0.010	90	0.016	50	**0.010**	**252**	0.008	112	0.010	90	0.016	50	**0.010**	**252**
2003	0.008	110	0.010	94	0.012	39	**0.009**	**243**	0.008	110	0.010	94	0.012	39	**0.009**	**243**
2004	0.008	108	0.010	98	0.012	40	**0.009**	**247**	0.005	69	0.006	57	0.008	27	**0.006**	**153**
2005	0.008	105	0.009	102	0.011	41	**0.009**	**248**	0.005	66	0.005	58	0.007	26	**0.006**	**151**
2006	0.008	102	0.009	106	0.011	43	**0.009**	**252**	0.005	64	0.005	61	0.007	28	**0.006**	**153**
2007	0.008	100	0.009	110	0.011	45	**0.009**	**254**	0.005	63	0.005	62	0.007	28	**0.005**	**153**
2008	0.008	98	0.009	115	0.011	46	**0.009**	**259**	0.005	61	0.005	65	0.007	28	**0.005**	**154**
2009	0.008	96	0.009	119	0.011	47	**0.009**	**262**	0.005	60	0.005	67	0.006	28	**0.005**	**155**
2010	0.008	95	0.009	123	0.011	48	**0.009**	**265**	0.005	59	0.005	69	0.006	28	**0.005**	**155**
2011	0.008	93	0.009	126	0.010	48	**0.009**	**267**	0.005	58	0.005	70	0.006	27	**0.005**	**155**
2012	0.008	92	0.009	130	0.010	49	**0.009**	**271**	0.005	58	0.005	72	0.006	27	**0.005**	**157**
2013	0.008	92	0.009	134	0.010	51	**0.009**	**276**	0.005	57	0.005	74	0.006	27	**0.005**	**159**
2014	0.008	91	0.009	137	0.010	52	**0.009**	**281**	0.005	57	0.005	76	0.005	28	**0.005**	**161**
2015	0.008	91	0.009	141	0.010	53	**0.009**	**285**	0.005	57	0.005	78	0.005	28	**0.005**	**163**
2016	0.008	91	0.009	144	0.010	55	**0.009**	**290**	0.005	57	0.005	80	0.005	29	**0.005**	**165**
2017	0.008	92	0.009	147	0.010	56	**0.009**	**294**	0.005	57	0.005	82	0.005	29	**0.005**	**167**
2018	0.008	92	0.009	150	0.010	57	**0.009**	**298**	0.005	57	0.005	83	0.005	29	**0.005**	**169**
2019	0.008	93	0.009	153	0.010	58	**0.009**	**303**	0.005	57	0.005	85	0.005	30	**0.005**	**172**
2020	0.008	93	0.009	155	0.010	59	**0.009**	**307**	0.005	58	0.005	86	0.005	30	**0.005**	**174**
2021	0.008	94	0.009	158	0.010	60	**0.009**	**312**	0.005	58	0.005	88	0.005	30	**0.005**	**176**
2022	0.008	95	0.009	160	0.010	61	**0.009**	**316**	0.005	59	0.005	89	0.005	31	**0.005**	**179**
2023	0.008	96	0.009	163	0.010	61	**0.009**	**320**	0.005	59	0.005	91	0.005	31	**0.005**	**181**
2024	0.008	97	0.009	165	0.010	62	**0.009**	**325**	0.005	60	0.005	92	0.005	31	**0.005**	**183**
2025	0.008	98	0.009	168	0.010	63	**0.009**	**329**	0.005	61	0.005	93	0.005	32	**0.005**	**186**
2026	0.008	99	0.009	170	0.010	64	**0.009**	**333**	0.005	62	0.005	94	0.005	32	**0.005**	**188**
2027	0.008	101	0.009	172	0.010	65	**0.009**	**338**	0.005	62	0.005	96	0.005	33	**0.005**	**191**
2028	0.008	102	0.009	175	0.010	66	**0.009**	**342**	0.005	63	0.005	97	0.005	33	**0.005**	**193**
2029	0.008	103	0.009	177	0.010	67	**0.009**	**347**	0.005	64	0.005	98	0.005	33	**0.005**	**195**
2030	0.008	104	0.009	179	0.010	68	**0.009**	**351**	0.005	65	0.005	99	0.005	34	**0.005**	**198**

Table L-31
PM10 - Chicago Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.020	282	0.029	134	0.032	50	**0.023**	**466**	0.020	282	0.029	134	0.032	50	**0.023**	**466**
1995	0.016	222	0.020	127	0.025	52	**0.018**	**402**	0.016	222	0.020	127	0.025	52	**0.018**	**402**
2000	0.009	127	0.011	91	0.020	55	**0.011**	**273**	0.009	127	0.011	91	0.020	55	**0.011**	**273**
2001	0.009	123	0.010	93	0.018	55	**0.011**	**271**	0.009	123	0.010	93	0.018	55	**0.011**	**271**
2002	0.009	121	0.010	97	0.017	54	**0.011**	**272**	0.009	121	0.010	97	0.017	54	**0.011**	**272**
2003	0.009	118	0.010	101	0.013	42	**0.010**	**262**	0.009	118	0.010	101	0.013	42	**0.010**	**262**
2004	0.009	116	0.010	106	0.013	43	**0.010**	**266**	0.006	74	0.006	62	0.008	29	**0.006**	**165**
2005	0.009	113	0.010	110	0.012	44	**0.010**	**267**	0.006	71	0.006	63	0.008	29	**0.006**	**163**
2006	0.009	110	0.010	115	0.012	47	**0.010**	**272**	0.006	69	0.006	66	0.008	30	**0.006**	**165**
2007	0.009	108	0.010	118	0.012	48	**0.010**	**274**	0.005	68	0.006	67	0.008	30	**0.006**	**165**
2008	0.009	105	0.010	124	0.012	50	**0.010**	**279**	0.005	66	0.006	70	0.007	30	**0.006**	**166**
2009	0.009	104	0.010	128	0.012	51	**0.010**	**283**	0.005	65	0.006	72	0.007	30	**0.006**	**167**
2010	0.009	102	0.010	132	0.012	52	**0.010**	**286**	0.005	64	0.005	74	0.007	30	**0.006**	**168**
2011	0.009	101	0.010	136	0.011	52	**0.010**	**288**	0.005	63	0.005	75	0.006	29	**0.006**	**167**
2012	0.009	100	0.010	140	0.011	53	**0.010**	**293**	0.005	62	0.005	78	0.006	29	**0.006**	**169**
2013	0.009	99	0.010	144	0.011	55	**0.010**	**298**	0.005	62	0.005	80	0.006	29	**0.005**	**171**
2014	0.009	99	0.010	148	0.011	56	**0.010**	**303**	0.005	61	0.005	82	0.006	30	**0.005**	**173**
2015	0.009	98	0.010	151	0.011	58	**0.010**	**308**	0.005	61	0.005	84	0.006	30	**0.005**	**176**
2016	0.009	99	0.010	155	0.011	59	**0.010**	**312**	0.005	61	0.005	86	0.006	31	**0.005**	**178**
2017	0.009	99	0.010	158	0.011	60	**0.010**	**317**	0.005	61	0.005	88	0.006	31	**0.005**	**181**
2018	0.009	99	0.010	162	0.011	61	**0.010**	**322**	0.005	61	0.005	90	0.006	31	**0.005**	**183**
2019	0.009	100	0.010	165	0.011	62	**0.010**	**327**	0.005	62	0.005	91	0.006	32	**0.005**	**185**
2020	0.009	101	0.010	167	0.011	63	**0.010**	**331**	0.005	62	0.005	93	0.006	32	**0.005**	**188**
2021	0.009	101	0.010	170	0.011	64	**0.010**	**336**	0.005	63	0.005	95	0.006	33	**0.005**	**190**
2022	0.009	102	0.010	173	0.011	65	**0.010**	**341**	0.005	63	0.005	96	0.006	33	**0.005**	**193**
2023	0.009	104	0.010	176	0.011	66	**0.010**	**345**	0.005	64	0.005	98	0.006	34	**0.005**	**195**
2024	0.009	105	0.010	178	0.011	67	**0.010**	**350**	0.005	65	0.005	99	0.006	34	**0.005**	**198**
2025	0.009	106	0.010	181	0.011	68	**0.010**	**355**	0.005	66	0.005	100	0.006	34	**0.005**	**200**
2026	0.009	107	0.010	183	0.011	69	**0.010**	**360**	0.005	66	0.005	102	0.006	35	**0.005**	**203**
2027	0.009	108	0.010	186	0.011	70	**0.010**	**364**	0.005	67	0.005	103	0.006	35	**0.005**	**205**
2028	0.009	110	0.010	188	0.011	71	**0.010**	**369**	0.005	68	0.005	105	0.005	35	**0.005**	**208**
2029	0.009	111	0.010	191	0.011	72	**0.010**	**374**	0.005	69	0.005	106	0.005	36	**0.005**	**211**
2030	0.009	112	0.010	193	0.011	73	**0.010**	**378**	0.005	70	0.005	107	0.005	36	**0.005**	**213**

Table L-32
SOx - Chicago Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.078	1,068	0.101	472	0.093	144	**0.084**	**1,684**	0.078	1,068	0.101	472	0.093	144	**0.084**	**1,684**
1995	0.076	1,063	0.100	632	0.097	205	**0.085**	**1,899**	0.076	1,063	0.100	632	0.097	205	**0.085**	**1,899**
2000	0.035	468	0.046	386	0.048	134	**0.040**	**989**	0.035	468	0.046	386	0.048	134	**0.040**	**989**
2001	0.035	463	0.046	408	0.047	141	**0.040**	**1,012**	0.035	463	0.046	408	0.047	141	**0.040**	**1,012**
2002	0.035	459	0.046	430	0.047	148	**0.040**	**1,036**	0.035	459	0.046	430	0.047	148	**0.040**	**1,036**
2003	0.035	453	0.046	452	0.047	156	**0.040**	**1,061**	0.035	453	0.046	452	0.047	156	**0.040**	**1,061**
2004	0.035	448	0.046	475	0.047	162	**0.041**	**1,084**	0.007	92	0.009	94	0.010	36	**0.008**	**223**
2005	0.035	442	0.046	498	0.047	170	**0.041**	**1,110**	0.007	91	0.009	99	0.010	38	**0.008**	**228**
2006	0.035	435	0.046	523	0.047	178	**0.041**	**1,136**	0.007	89	0.009	103	0.011	40	**0.008**	**233**
2007	0.035	428	0.046	547	0.047	186	**0.041**	**1,161**	0.007	87	0.009	108	0.010	42	**0.008**	**237**
2008	0.035	420	0.046	573	0.047	195	**0.041**	**1,188**	0.007	86	0.009	112	0.010	44	**0.008**	**242**
2009	0.035	413	0.046	597	0.047	203	**0.042**	**1,213**	0.007	84	0.009	117	0.010	45	**0.008**	**246**
2010	0.035	408	0.046	620	0.047	211	**0.042**	**1,238**	0.007	83	0.009	121	0.010	47	**0.008**	**251**
2011	0.035	403	0.046	642	0.047	218	**0.042**	**1,263**	0.007	82	0.009	126	0.010	49	**0.008**	**256**
2012	0.035	400	0.046	662	0.047	225	**0.042**	**1,288**	0.007	81	0.009	130	0.010	50	**0.009**	**261**
2013	0.035	397	0.046	682	0.047	232	**0.042**	**1,311**	0.007	81	0.009	134	0.010	52	**0.009**	**266**
2014	0.035	396	0.046	700	0.047	238	**0.042**	**1,335**	0.007	80	0.009	137	0.010	53	**0.009**	**270**
2015	0.035	396	0.046	718	0.047	244	**0.042**	**1,358**	0.007	80	0.009	141	0.010	54	**0.009**	**275**
2016	0.035	396	0.046	735	0.047	250	**0.042**	**1,380**	0.007	80	0.009	144	0.010	56	**0.009**	**279**
2017	0.035	397	0.046	751	0.047	255	**0.042**	**1,403**	0.007	80	0.009	147	0.010	57	**0.009**	**284**
2018	0.035	399	0.046	766	0.047	261	**0.042**	**1,425**	0.007	81	0.009	150	0.010	58	**0.009**	**288**
2019	0.035	401	0.046	780	0.047	265	**0.042**	**1,447**	0.007	81	0.009	153	0.010	59	**0.009**	**293**
2020	0.035	404	0.046	794	0.047	270	**0.042**	**1,468**	0.007	82	0.009	155	0.010	60	**0.009**	**297**
2021	0.035	408	0.046	807	0.047	275	**0.043**	**1,490**	0.007	82	0.009	158	0.010	61	**0.009**	**301**
2022	0.035	412	0.046	820	0.047	279	**0.043**	**1,511**	0.007	83	0.009	160	0.010	62	**0.009**	**306**
2023	0.035	416	0.046	833	0.047	283	**0.043**	**1,532**	0.007	84	0.009	163	0.010	63	**0.009**	**310**
2024	0.035	421	0.046	845	0.047	287	**0.043**	**1,554**	0.007	85	0.009	165	0.010	64	**0.009**	**314**
2025	0.035	426	0.046	857	0.047	292	**0.043**	**1,575**	0.007	86	0.009	168	0.010	65	**0.009**	**319**
2026	0.035	431	0.046	869	0.047	296	**0.043**	**1,595**	0.007	87	0.009	170	0.010	66	**0.009**	**323**
2027	0.035	436	0.046	881	0.047	300	**0.043**	**1,616**	0.007	88	0.009	172	0.010	67	**0.009**	**327**
2028	0.035	441	0.046	892	0.047	304	**0.043**	**1,637**	0.007	89	0.009	175	0.010	67	**0.009**	**331**
2029	0.035	447	0.046	904	0.047	308	**0.043**	**1,658**	0.007	90	0.009	177	0.010	68	**0.009**	**335**
2030	0.035	452	0.046	915	0.047	311	**0.043**	**1,679**	0.007	91	0.009	179	0.010	69	**0.009**	**340**

Table L-33
NOx - New York Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	78,152	2.90	30,420	3.64	12,734	**2.70**	**121,307**	2.52	78,152	2.90	30,420	3.64	12,734	**2.70**	**121,307**
1995	1.79	54,195	2.04	28,008	2.91	13,340	**1.97**	**95,543**	1.79	54,195	2.04	28,008	2.91	13,340	**1.97**	**95,543**
2000	1.33	37,890	1.55	27,381	2.21	13,016	**1.50**	**78,287**	1.33	37,890	1.55	27,381	2.21	13,016	**1.50**	**78,287**
2001	1.27	35,619	1.48	27,447	2.12	13,135	**1.44**	**76,200**	1.27	35,619	1.48	27,447	2.12	13,135	**1.44**	**76,200**
2002	1.20	33,196	1.40	27,244	2.04	13,234	**1.38**	**73,673**	1.20	33,196	1.40	27,244	2.04	13,234	**1.38**	**73,673**
2003	1.13	30,552	1.32	26,789	1.89	12,827	**1.30**	**70,168**	1.13	30,552	1.32	26,789	1.89	12,827	**1.30**	**70,168**
2004	1.05	27,823	1.23	26,133	1.82	12,901	**1.22**	**66,857**	0.91	24,050	1.11	23,515	1.68	11,923	**1.08**	**59,489**
2005	0.97	25,173	1.14	25,171	1.72	12,717	**1.13**	**63,061**	0.81	21,122	0.99	21,983	1.53	11,326	**0.98**	**54,431**
2006	0.90	22,873	1.06	24,504	1.67	12,855	**1.07**	**60,233**	0.72	18,451	0.89	20,624	1.42	10,911	**0.89**	**49,986**
2007	0.84	20,808	0.99	23,893	1.62	13,052	**1.01**	**57,753**	0.64	15,995	0.79	19,136	1.31	10,483	**0.80**	**45,614**
2008	0.78	18,992	0.93	23,220	1.57	13,103	**0.96**	**55,315**	0.57	13,808	0.70	17,462	1.18	9,861	**0.71**	**41,132**
2009	0.74	17,456	0.87	22,654	1.54	13,337	**0.92**	**53,447**	0.50	11,911	0.61	15,850	1.08	9,378	**0.64**	**37,139**
2010	0.69	16,136	0.82	22,115	1.51	13,561	**0.88**	**51,811**	0.44	10,248	0.53	14,252	0.99	8,879	**0.56**	**33,380**
2011	0.66	15,038	0.78	21,606	1.49	13,777	**0.84**	**50,421**	0.39	8,835	0.46	12,698	0.91	8,391	**0.50**	**29,924**
2012	0.63	14,124	0.75	21,201	1.48	13,998	**0.81**	**49,323**	0.34	7,641	0.40	11,285	0.84	7,933	**0.44**	**26,859**
2013	0.60	13,372	0.72	20,952	1.46	14,203	**0.79**	**48,527**	0.30	6,649	0.35	10,084	0.77	7,489	**0.40**	**24,223**
2014	0.58	12,783	0.70	20,769	1.45	14,418	**0.77**	**47,970**	0.26	5,854	0.30	9,026	0.71	7,091	**0.35**	**21,971**
2015	0.56	12,311	0.68	20,710	1.44	14,613	**0.76**	**47,634**	0.24	5,192	0.27	8,186	0.66	6,710	**0.32**	**20,089**
2016	0.55	11,974	0.67	20,745	1.43	14,804	**0.75**	**47,523**	0.21	4,687	0.24	7,536	0.61	6,361	**0.29**	**18,584**
2017	0.54	11,745	0.66	20,802	1.42	14,977	**0.74**	**47,524**	0.20	4,301	0.22	6,990	0.57	6,033	**0.27**	**17,323**
2018	0.53	11,562	0.65	20,862	1.42	15,156	**0.73**	**47,580**	0.18	3,983	0.20	6,533	0.54	5,751	**0.25**	**16,267**
2019	0.52	11,446	0.64	20,984	1.41	15,328	**0.73**	**47,758**	0.17	3,750	0.19	6,208	0.51	5,501	**0.24**	**15,459**
2020	0.52	11,382	0.64	21,168	1.41	15,483	**0.73**	**48,033**	0.16	3,574	0.18	6,009	0.48	5,273	**0.22**	**14,857**
2021	0.51	11,390	0.64	21,381	1.40	15,637	**0.72**	**48,408**	0.16	3,478	0.18	5,888	0.45	5,075	**0.22**	**14,441**
2022	0.51	11,423	0.64	21,592	1.40	15,798	**0.72**	**48,813**	0.15	3,412	0.17	5,806	0.43	4,908	**0.21**	**14,126**
2023	0.51	11,478	0.63	21,783	1.39	15,957	**0.72**	**49,217**	0.15	3,362	0.17	5,714	0.42	4,763	**0.20**	**13,839**
2024	0.51	11,547	0.63	21,976	1.39	16,113	**0.72**	**49,636**	0.15	3,330	0.16	5,647	0.40	4,639	**0.20**	**13,616**
2025	0.51	11,618	0.63	22,141	1.39	16,269	**0.72**	**50,029**	0.14	3,306	0.16	5,562	0.39	4,532	**0.19**	**13,400**
2026	0.51	11,698	0.63	22,334	1.39	16,389	**0.72**	**50,422**	0.14	3,308	0.16	5,550	0.37	4,410	**0.19**	**13,268**
2027	0.51	11,784	0.63	22,518	1.38	16,508	**0.71**	**50,809**	0.14	3,315	0.15	5,539	0.36	4,300	**0.18**	**13,154**
2028	0.51	11,884	0.63	22,729	1.38	16,650	**0.71**	**51,264**	0.14	3,325	0.15	5,488	0.33	3,959	**0.18**	**12,772**
2029	0.51	11,994	0.63	22,959	1.38	16,819	**0.71**	**51,772**	0.14	3,344	0.15	5,524	0.32	3,890	**0.18**	**12,759**
2030	0.51	12,105	0.63	23,188	1.38	16,987	**0.71**	**52,280**	0.14	3,370	0.15	5,551	0.31	3,870	**0.17**	**12,792**

Table L-34
Exhaust VOC - New York Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.27	70,352	2.94	30,898	4.54	15,896	**2.60**	**117,146**	2.27	70,352	2.94	30,898	4.54	15,896	**2.60**	**117,146**
1995	0.99	29,901	1.35	18,595	2.58	11,799	**1.24**	**60,295**	0.99	29,901	1.35	18,595	2.58	11,799	**1.24**	**60,295**
2000	0.51	14,507	0.72	12,685	1.49	8,796	**0.69**	**35,988**	0.51	14,507	0.72	12,685	1.49	8,796	**0.69**	**35,988**
2001	0.46	12,864	0.64	11,927	1.36	8,426	**0.63**	**33,218**	0.46	12,864	0.64	11,927	1.36	8,426	**0.63**	**33,218**
2002	0.41	11,427	0.57	11,130	1.24	8,022	**0.57**	**30,580**	0.41	11,427	0.57	11,130	1.24	8,022	**0.57**	**30,580**
2003	0.37	10,089	0.50	10,267	1.03	6,974	**0.50**	**27,330**	0.37	10,089	0.50	10,267	1.03	6,974	**0.50**	**27,330**
2004	0.33	8,746	0.45	9,530	0.94	6,693	**0.45**	**24,969**	0.31	8,226	0.43	9,074	0.90	6,408	**0.43**	**23,709**
2005	0.29	7,431	0.36	8,007	0.70	5,203	**0.37**	**20,641**	0.27	6,924	0.34	7,490	0.64	4,763	**0.35**	**19,177**
2006	0.26	6,646	0.33	7,519	0.67	5,152	**0.34**	**19,317**	0.24	6,161	0.30	6,980	0.60	4,607	**0.32**	**17,748**
2007	0.24	5,936	0.30	7,130	0.64	5,123	**0.32**	**18,189**	0.22	5,472	0.27	6,560	0.55	4,458	**0.29**	**16,490**
2008	0.22	5,299	0.26	6,644	0.59	4,943	**0.29**	**16,886**	0.20	4,857	0.24	6,042	0.50	4,145	**0.26**	**15,044**
2009	0.20	4,775	0.24	6,319	0.57	4,962	**0.27**	**16,056**	0.18	4,351	0.22	5,677	0.46	4,012	**0.24**	**14,041**
2010	0.19	4,344	0.22	6,022	0.56	4,984	**0.26**	**15,349**	0.17	3,935	0.20	5,338	0.43	3,874	**0.22**	**13,147**
2011	0.17	3,971	0.21	5,785	0.54	5,012	**0.25**	**14,767**	0.16	3,578	0.18	5,058	0.41	3,743	**0.21**	**12,378**
2012	0.16	3,654	0.19	5,489	0.53	5,027	**0.23**	**14,169**	0.14	3,273	0.17	4,716	0.38	3,602	**0.19**	**11,591**
2013	0.15	3,412	0.18	5,376	0.52	5,050	**0.23**	**13,838**	0.14	3,043	0.16	4,561	0.36	3,475	**0.18**	**11,079**
2014	0.15	3,239	0.18	5,268	0.51	5,072	**0.22**	**13,580**	0.13	2,880	0.15	4,414	0.34	3,354	**0.17**	**10,649**
2015	0.14	3,109	0.17	5,187	0.50	5,094	**0.21**	**13,391**	0.13	2,758	0.14	4,298	0.32	3,240	**0.16**	**10,296**
2016	0.14	3,013	0.17	5,144	0.49	5,107	**0.21**	**13,265**	0.12	2,668	0.14	4,227	0.30	3,125	**0.16**	**10,021**
2017	0.13	2,944	0.16	5,159	0.49	5,141	**0.21**	**13,244**	0.12	2,602	0.13	4,213	0.29	3,040	**0.15**	**9,856**
2018	0.13	2,867	0.16	5,125	0.48	5,155	**0.20**	**13,147**	0.12	2,527	0.13	4,155	0.27	2,943	**0.15**	**9,626**
2019	0.13	2,831	0.16	5,099	0.48	5,180	**0.20**	**13,110**	0.11	2,492	0.13	4,108	0.26	2,866	**0.14**	**9,465**
2020	0.13	2,814	0.16	5,125	0.46	5,112	**0.20**	**13,051**	0.11	2,475	0.12	4,115	0.24	2,700	**0.14**	**9,290**
2021	0.13	2,811	0.15	5,169	0.45	5,050	**0.19**	**13,030**	0.11	2,471	0.12	4,143	0.23	2,546	**0.14**	**9,160**
2022	0.13	2,815	0.15	5,214	0.45	5,107	**0.19**	**13,136**	0.11	2,474	0.12	4,172	0.22	2,523	**0.14**	**9,169**
2023	0.13	2,817	0.15	5,225	0.45	5,163	**0.19**	**13,205**	0.11	2,474	0.12	4,169	0.22	2,505	**0.13**	**9,147**
2024	0.12	2,829	0.15	5,257	0.45	5,218	**0.19**	**13,304**	0.11	2,483	0.12	4,187	0.22	2,490	**0.13**	**9,160**
2025	0.12	2,846	0.15	5,300	0.45	5,272	**0.19**	**13,418**	0.11	2,498	0.12	4,217	0.21	2,480	**0.13**	**9,194**
2026	0.12	2,868	0.15	5,351	0.45	5,318	**0.19**	**13,537**	0.11	2,517	0.12	4,255	0.21	2,466	**0.13**	**9,239**
2027	0.12	2,891	0.15	5,400	0.45	5,365	**0.19**	**13,657**	0.11	2,538	0.12	4,292	0.21	2,457	**0.13**	**9,287**
2028	0.12	2,917	0.15	5,453	0.45	5,416	**0.19**	**13,786**	0.11	2,560	0.12	4,325	0.20	2,381	**0.13**	**9,266**
2029	0.12	2,944	0.15	5,508	0.45	5,471	**0.19**	**13,923**	0.11	2,584	0.12	4,369	0.20	2,391	**0.13**	**9,344**
2030	0.12	2,971	0.15	5,563	0.45	5,526	**0.19**	**14,060**	0.11	2,608	0.12	4,412	0.19	2,401	**0.13**	**9,421**

Table L-35
Evap VOC - New York Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	2.52	78,210	2.32	24,350	4.26	14,897	2.61	117,456	2.52	78,210	2.32	24,350	4.26	14,897	2.61	117,456
1995	1.19	35,845	1.20	16,528	1.69	7,726	1.24	60,099	1.19	35,845	1.20	16,528	1.69	7,726	1.24	60,099
2000	0.35	10,047	0.44	7,768	0.51	2,979	0.40	20,793	0.35	10,047	0.44	7,768	0.51	2,979	0.40	20,793
2001	0.32	8,962	0.40	7,500	0.47	2,890	0.37	19,352	0.32	8,962	0.40	7,500	0.47	2,890	0.37	19,352
2002	0.29	7,908	0.37	7,171	0.43	2,779	0.33	17,858	0.29	7,908	0.37	7,171	0.43	2,779	0.33	17,858
2003	0.25	6,873	0.33	6,792	0.39	2,650	0.30	16,315	0.25	6,873	0.33	6,792	0.39	2,650	0.30	16,315
2004	0.23	6,106	0.30	6,353	0.37	2,635	0.28	15,094	0.23	6,106	0.30	6,332	0.37	2,635	0.27	15,073
2005	0.21	5,491	0.27	5,986	0.35	2,587	0.25	14,064	0.21	5,465	0.27	5,942	0.35	2,587	0.25	13,993
2006	0.20	4,977	0.25	5,770	0.33	2,513	0.24	13,259	0.19	4,926	0.25	5,700	0.33	2,513	0.23	13,139
2007	0.18	4,476	0.23	5,518	0.30	2,426	0.22	12,420	0.18	4,401	0.23	5,422	0.30	2,426	0.21	12,249
2008	0.17	4,059	0.21	5,376	0.28	2,338	0.20	11,774	0.16	3,946	0.21	5,226	0.28	2,333	0.20	11,504
2009	0.15	3,670	0.20	5,193	0.26	2,231	0.19	11,094	0.15	3,520	0.19	4,985	0.26	2,219	0.18	10,724
2010	0.14	3,306	0.19	4,972	0.24	2,105	0.18	10,383	0.13	3,119	0.18	4,703	0.23	2,087	0.17	9,910
2011	0.14	3,091	0.17	4,818	0.22	2,045	0.17	9,954	0.13	2,874	0.16	4,528	0.22	2,012	0.16	9,414
2012	0.13	2,892	0.16	4,637	0.21	1,973	0.16	9,502	0.12	2,643	0.15	4,324	0.20	1,925	0.15	8,893
2013	0.12	2,786	0.16	4,530	0.20	1,925	0.15	9,241	0.11	2,525	0.14	4,171	0.19	1,867	0.14	8,562
2014	0.12	2,689	0.15	4,405	0.19	1,870	0.14	8,964	0.11	2,416	0.13	3,998	0.18	1,800	0.13	8,213
2015	0.12	2,601	0.14	4,264	0.18	1,807	0.14	8,671	0.11	2,314	0.13	3,807	0.17	1,726	0.13	7,847
2016	0.12	2,569	0.14	4,240	0.17	1,757	0.14	8,567	0.10	2,262	0.12	3,750	0.16	1,666	0.12	7,678
2017	0.12	2,544	0.13	4,208	0.16	1,702	0.13	8,454	0.10	2,215	0.12	3,684	0.15	1,601	0.12	7,500
2018	0.12	2,524	0.13	4,168	0.15	1,642	0.13	8,334	0.10	2,173	0.11	3,609	0.14	1,531	0.11	7,313
2019	0.11	2,508	0.13	4,121	0.15	1,578	0.13	8,207	0.10	2,134	0.11	3,527	0.13	1,456	0.11	7,118
2020	0.11	2,497	0.12	4,066	0.14	1,510	0.12	8,073	0.10	2,099	0.10	3,438	0.13	1,377	0.10	6,915
2021	0.11	2,504	0.12	4,117	0.14	1,516	0.12	8,137	0.09	2,104	0.10	3,474	0.12	1,379	0.10	6,957
2022	0.11	2,514	0.12	4,165	0.13	1,522	0.12	8,201	0.09	2,111	0.10	3,507	0.12	1,379	0.10	6,998
2023	0.11	2,525	0.12	4,212	0.13	1,526	0.12	8,263	0.09	2,120	0.10	3,539	0.12	1,379	0.10	7,037
2024	0.11	2,538	0.12	4,257	0.13	1,530	0.12	8,325	0.09	2,130	0.10	3,569	0.12	1,377	0.10	7,076
2025	0.11	2,553	0.12	4,301	0.13	1,533	0.12	8,387	0.09	2,141	0.10	3,599	0.12	1,375	0.10	7,114
2026	0.11	2,568	0.12	4,344	0.13	1,535	0.12	8,447	0.09	2,152	0.10	3,627	0.12	1,372	0.10	7,151
2027	0.11	2,584	0.12	4,386	0.13	1,537	0.12	8,507	0.09	2,165	0.10	3,654	0.11	1,369	0.10	7,188
2028	0.11	2,601	0.12	4,427	0.13	1,539	0.12	8,567	0.09	2,178	0.10	3,681	0.11	1,365	0.10	7,223
2029	0.11	2,618	0.12	4,469	0.13	1,540	0.12	8,626	0.09	2,190	0.10	3,707	0.11	1,360	0.10	7,258
2030	0.11	2,635	0.12	4,510	0.13	1,540	0.12	8,684	0.09	2,204	0.10	3,733	0.11	1,355	0.10	7,292

Table L-36
PM2.5 - New York Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.019	588	0.027	280	0.030	105	**0.022**	**972**	0.019	588	0.027	280	0.030	105	**0.022**	**972**
1995	0.015	446	0.019	256	0.023	105	**0.017**	**807**	0.015	446	0.019	256	0.023	105	**0.017**	**807**
2000	0.009	247	0.010	177	0.018	108	**0.010**	**532**	0.009	247	0.010	177	0.018	108	**0.010**	**532**
2001	0.009	239	0.010	180	0.017	106	**0.010**	**524**	0.009	239	0.010	180	0.017	106	**0.010**	**524**
2002	0.008	232	0.010	187	0.016	104	**0.010**	**523**	0.008	232	0.010	187	0.016	104	**0.010**	**523**
2003	0.008	226	0.010	194	0.012	81	**0.009**	**501**	0.008	226	0.010	194	0.012	81	**0.009**	**501**
2004	0.008	221	0.010	202	0.012	82	**0.009**	**506**	0.005	141	0.006	118	0.008	55	**0.006**	**314**
2005	0.008	214	0.009	208	0.011	84	**0.009**	**505**	0.005	135	0.005	119	0.007	54	**0.006**	**308**
2006	0.008	208	0.009	216	0.011	88	**0.009**	**512**	0.005	131	0.005	124	0.007	56	**0.006**	**311**
2007	0.008	202	0.009	222	0.011	90	**0.009**	**514**	0.005	127	0.005	126	0.007	56	**0.005**	**308**
2008	0.008	197	0.009	230	0.011	93	**0.009**	**520**	0.005	123	0.005	130	0.007	56	**0.005**	**309**
2009	0.008	192	0.009	238	0.011	95	**0.009**	**525**	0.005	120	0.005	134	0.006	56	**0.005**	**310**
2010	0.008	188	0.009	244	0.011	96	**0.009**	**528**	0.005	117	0.005	137	0.006	55	**0.005**	**310**
2011	0.008	185	0.009	249	0.010	95	**0.009**	**530**	0.005	115	0.005	139	0.006	53	**0.005**	**306**
2012	0.008	183	0.009	256	0.010	97	**0.009**	**536**	0.005	114	0.005	142	0.006	53	**0.005**	**309**
2013	0.008	181	0.009	262	0.010	100	**0.009**	**543**	0.005	112	0.005	146	0.006	54	**0.005**	**312**
2014	0.008	179	0.009	268	0.010	102	**0.009**	**550**	0.005	111	0.005	149	0.005	54	**0.005**	**315**
2015	0.008	178	0.009	274	0.010	104	**0.009**	**556**	0.005	111	0.005	152	0.005	55	**0.005**	**318**
2016	0.008	178	0.009	279	0.010	106	**0.009**	**563**	0.005	110	0.005	155	0.005	55	**0.005**	**321**
2017	0.008	177	0.009	284	0.010	108	**0.009**	**570**	0.005	110	0.005	158	0.005	56	**0.005**	**324**
2018	0.008	177	0.009	289	0.010	109	**0.009**	**575**	0.005	110	0.005	161	0.005	56	**0.005**	**327**
2019	0.008	178	0.009	293	0.010	111	**0.009**	**582**	0.005	110	0.005	163	0.005	57	**0.005**	**330**
2020	0.008	179	0.009	298	0.010	112	**0.009**	**588**	0.005	111	0.005	165	0.005	57	**0.005**	**333**
2021	0.008	180	0.009	301	0.010	114	**0.009**	**595**	0.005	111	0.005	167	0.005	58	**0.005**	**337**
2022	0.008	181	0.009	305	0.010	115	**0.009**	**601**	0.005	112	0.005	170	0.005	58	**0.005**	**340**
2023	0.008	182	0.009	309	0.010	117	**0.009**	**608**	0.005	113	0.005	172	0.005	59	**0.005**	**343**
2024	0.008	184	0.009	312	0.010	118	**0.009**	**614**	0.005	114	0.005	174	0.005	59	**0.005**	**347**
2025	0.008	185	0.009	316	0.010	119	**0.009**	**620**	0.005	115	0.005	176	0.005	60	**0.005**	**350**
2026	0.008	187	0.009	319	0.010	120	**0.009**	**627**	0.005	116	0.005	177	0.005	61	**0.005**	**354**
2027	0.008	188	0.009	323	0.010	122	**0.009**	**633**	0.005	117	0.005	179	0.005	61	**0.005**	**357**
2028	0.008	190	0.009	326	0.010	123	**0.009**	**639**	0.005	118	0.005	181	0.005	61	**0.005**	**360**
2029	0.008	192	0.009	329	0.010	124	**0.009**	**645**	0.005	119	0.005	183	0.005	62	**0.005**	**364**
2030	0.008	194	0.009	333	0.010	125	**0.009**	**652**	0.005	120	0.005	185	0.005	63	**0.005**	**367**

Table L-37
PM10 - New York Summer
"No Growth" Diesel Scenario

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.020	635	0.029	302	0.032	113	**0.023**	**1,051**	0.020	635	0.029	302	0.032	113	**0.023**	**1,051**
1995	0.016	481	0.020	276	0.025	114	**0.018**	**871**	0.016	481	0.020	276	0.025	114	**0.018**	**871**
2000	0.009	267	0.011	190	0.020	116	**0.011**	**573**	0.009	267	0.011	190	0.020	116	**0.011**	**573**
2001	0.009	257	0.010	194	0.018	114	**0.011**	**565**	0.009	257	0.010	194	0.018	114	**0.011**	**565**
2002	0.009	250	0.010	202	0.017	113	**0.011**	**564**	0.009	250	0.010	202	0.017	113	**0.011**	**564**
2003	0.009	244	0.010	209	0.013	87	**0.010**	**540**	0.009	244	0.010	209	0.013	87	**0.010**	**540**
2004	0.009	238	0.010	218	0.013	89	**0.010**	**545**	0.006	152	0.006	127	0.008	59	**0.006**	**338**
2005	0.009	230	0.010	224	0.012	90	**0.010**	**545**	0.006	146	0.006	128	0.008	58	**0.006**	**332**
2006	0.009	224	0.010	233	0.012	95	**0.010**	**552**	0.006	141	0.006	133	0.008	61	**0.006**	**335**
2007	0.009	218	0.010	239	0.012	97	**0.010**	**554**	0.005	137	0.006	135	0.008	60	**0.006**	**332**
2008	0.009	212	0.010	248	0.012	100	**0.010**	**561**	0.005	133	0.006	140	0.007	61	**0.006**	**333**
2009	0.009	207	0.010	256	0.012	102	**0.010**	**566**	0.005	129	0.006	144	0.007	60	**0.006**	**334**
2010	0.009	203	0.010	263	0.012	104	**0.010**	**570**	0.005	127	0.005	147	0.007	60	**0.006**	**334**
2011	0.009	200	0.010	269	0.011	103	**0.010**	**571**	0.005	124	0.005	149	0.006	57	**0.006**	**330**
2012	0.009	197	0.010	276	0.011	105	**0.010**	**578**	0.005	123	0.005	153	0.006	57	**0.006**	**333**
2013	0.009	195	0.010	283	0.011	108	**0.010**	**585**	0.005	121	0.005	157	0.006	58	**0.005**	**336**
2014	0.009	193	0.010	289	0.011	110	**0.010**	**593**	0.005	120	0.005	161	0.006	58	**0.005**	**339**
2015	0.009	192	0.010	295	0.011	112	**0.010**	**600**	0.005	119	0.005	164	0.006	59	**0.005**	**343**
2016	0.009	191	0.010	301	0.011	114	**0.010**	**607**	0.005	119	0.005	167	0.006	60	**0.005**	**346**
2017	0.009	191	0.010	307	0.011	116	**0.010**	**614**	0.005	119	0.005	170	0.006	61	**0.005**	**349**
2018	0.009	191	0.010	312	0.011	118	**0.010**	**620**	0.005	119	0.005	173	0.006	61	**0.005**	**352**
2019	0.009	192	0.010	316	0.011	119	**0.010**	**627**	0.005	119	0.005	176	0.006	61	**0.005**	**356**
2020	0.009	193	0.010	321	0.011	121	**0.010**	**635**	0.005	119	0.005	178	0.006	62	**0.005**	**359**
2021	0.009	194	0.010	325	0.011	123	**0.010**	**641**	0.005	120	0.005	181	0.006	62	**0.005**	**363**
2022	0.009	195	0.010	329	0.011	124	**0.010**	**648**	0.005	121	0.005	183	0.006	63	**0.005**	**366**
2023	0.009	196	0.010	333	0.011	126	**0.010**	**655**	0.005	122	0.005	185	0.006	64	**0.005**	**370**
2024	0.009	198	0.010	337	0.011	127	**0.010**	**662**	0.005	123	0.005	187	0.006	64	**0.005**	**374**
2025	0.009	200	0.010	341	0.011	129	**0.010**	**669**	0.005	124	0.005	189	0.006	65	**0.005**	**377**
2026	0.009	201	0.010	344	0.011	130	**0.010**	**676**	0.005	125	0.005	191	0.006	65	**0.005**	**381**
2027	0.009	203	0.010	348	0.011	131	**0.010**	**682**	0.005	126	0.005	193	0.006	66	**0.005**	**385**
2028	0.009	205	0.010	352	0.011	133	**0.010**	**689**	0.005	127	0.005	195	0.005	66	**0.005**	**388**
2029	0.009	207	0.010	355	0.011	134	**0.010**	**696**	0.005	128	0.005	197	0.005	67	**0.005**	**392**
2030	0.009	209	0.010	359	0.011	135	**0.010**	**703**	0.005	129	0.005	199	0.005	67	**0.005**	**396**

Table L-38
SOx - New York Summer

YEAR	Baseline								With Proposed Tier 2 & Sulfur Standards							
	LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY		LDV		LDT1/2		LDT3/4		ALL LIGHT-DUTY	
	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS	EF	TONS
1990	0.078	2,411	0.101	1,065	0.093	325	**0.084**	**3,801**	0.078	2,411	0.101	1,065	0.093	325	**0.084**	**3,801**
1995	0.076	2,305	0.100	1,370	0.097	444	**0.085**	**4,119**	0.076	2,305	0.100	1,370	0.097	444	**0.085**	**4,119**
2000	0.035	983	0.046	811	0.048	281	**0.040**	**2,075**	0.035	983	0.046	811	0.048	281	**0.040**	**2,075**
2001	0.035	967	0.046	850	0.047	293	**0.040**	**2,110**	0.035	967	0.046	850	0.047	293	**0.040**	**2,110**
2002	0.035	951	0.046	891	0.047	307	**0.040**	**2,149**	0.035	951	0.046	891	0.047	307	**0.040**	**2,149**
2003	0.035	935	0.046	933	0.047	321	**0.040**	**2,189**	0.035	935	0.046	933	0.047	321	**0.040**	**2,189**
2004	0.035	918	0.046	974	0.047	333	**0.041**	**2,224**	0.007	190	0.009	193	0.010	74	**0.008**	**457**
2005	0.035	901	0.046	1,016	0.047	346	**0.041**	**2,263**	0.007	186	0.009	202	0.010	77	**0.008**	**465**
2006	0.035	883	0.046	1,061	0.047	361	**0.041**	**2,305**	0.007	181	0.009	210	0.011	81	**0.008**	**472**
2007	0.035	863	0.046	1,105	0.047	376	**0.041**	**2,345**	0.007	177	0.009	218	0.010	84	**0.008**	**478**
2008	0.035	844	0.046	1,151	0.047	392	**0.041**	**2,387**	0.007	172	0.009	226	0.010	88	**0.008**	**486**
2009	0.035	826	0.046	1,194	0.047	406	**0.042**	**2,427**	0.007	168	0.009	234	0.010	91	**0.008**	**493**
2010	0.035	812	0.046	1,234	0.047	420	**0.042**	**2,466**	0.007	165	0.009	242	0.010	94	**0.008**	**501**
2011	0.035	799	0.046	1,272	0.047	433	**0.042**	**2,504**	0.007	162	0.009	249	0.010	96	**0.008**	**508**
2012	0.035	790	0.046	1,308	0.047	445	**0.042**	**2,542**	0.007	160	0.009	256	0.010	99	**0.009**	**515**
2013	0.035	782	0.046	1,341	0.047	456	**0.042**	**2,578**	0.007	158	0.009	262	0.010	101	**0.009**	**522**
2014	0.035	776	0.046	1,372	0.047	466	**0.042**	**2,613**	0.007	157	0.009	268	0.010	104	**0.009**	**529**
2015	0.035	772	0.046	1,400	0.047	476	**0.042**	**2,648**	0.007	156	0.009	274	0.010	106	**0.009**	**536**
2016	0.035	769	0.046	1,427	0.047	485	**0.042**	**2,682**	0.007	156	0.009	279	0.010	108	**0.009**	**543**
2017	0.035	768	0.046	1,453	0.047	494	**0.042**	**2,716**	0.007	155	0.009	284	0.010	110	**0.009**	**550**
2018	0.035	769	0.046	1,477	0.047	502	**0.042**	**2,748**	0.007	155	0.009	289	0.010	112	**0.009**	**556**
2019	0.035	771	0.046	1,499	0.047	510	**0.042**	**2,780**	0.007	156	0.009	293	0.010	113	**0.009**	**563**
2020	0.035	774	0.046	1,520	0.047	517	**0.042**	**2,812**	0.007	157	0.009	298	0.010	115	**0.009**	**569**
2021	0.035	779	0.046	1,541	0.047	524	**0.043**	**2,843**	0.007	157	0.009	301	0.010	117	**0.009**	**575**
2022	0.035	784	0.046	1,560	0.047	531	**0.043**	**2,875**	0.007	158	0.009	305	0.010	118	**0.009**	**582**
2023	0.035	790	0.046	1,579	0.047	537	**0.043**	**2,906**	0.007	160	0.009	309	0.010	119	**0.009**	**588**
2024	0.035	796	0.046	1,597	0.047	543	**0.043**	**2,937**	0.007	161	0.009	312	0.010	121	**0.009**	**594**
2025	0.035	803	0.046	1,615	0.047	549	**0.043**	**2,967**	0.007	162	0.009	316	0.010	122	**0.009**	**600**
2026	0.035	810	0.046	1,632	0.047	555	**0.043**	**2,997**	0.007	164	0.009	319	0.010	123	**0.009**	**606**
2027	0.035	817	0.046	1,650	0.047	561	**0.043**	**3,028**	0.007	165	0.009	323	0.010	125	**0.009**	**613**
2028	0.035	824	0.046	1,667	0.047	567	**0.043**	**3,058**	0.007	167	0.009	326	0.010	126	**0.009**	**619**
2029	0.035	832	0.046	1,684	0.047	573	**0.043**	**3,088**	0.007	168	0.009	329	0.010	127	**0.009**	**625**
2030	0.035	840	0.046	1,700	0.047	578	**0.043**	**3,118**	0.007	170	0.009	333	0.010	129	**0.009**	**631**

APPENDIX M
Example Calculation of Per-Vehicle Lifetime Emissions

Table M-1

Example Calculation of Per-Vehicle Lifetime NOx Emissions
Tier 1 LDT3: No I/M, Conventional Fuel (330 ppm), SFTP

Age	Final Emission Rate (grams per mile)	Mileage	Survival Rate	Discount Factor	Emissions (Tons)
1	0.784	21,331	0.998	1.000	0.0184
2	0.931	19,865	0.995	1.070	0.0190
3	1.065	18,500	0.989	1.145	0.0188
4	1.188	17,228	0.980	1.225	0.0181
5	1.305	16,044	0.967	1.311	0.0170
6	1.412	14,942	0.949	1.403	0.0157
7	1.510	13,915	0.924	1.501	0.0143
8	1.600	12,959	0.894	1.606	0.0127
9	1.682	12,068	0.857	1.718	0.0112
10	1.762	11,239	0.816	1.838	0.0097
11	1.838	10,466	0.795	1.967	0.0086
12	1.908	9,747	0.734	2.105	0.0071
13	1.973	9,077	0.669	2.252	0.0059
14	2.034	8,453	0.604	2.410	0.0047
15	2.090	7,872	0.539	2.579	0.0038
16	2.141	7,331	0.476	2.759	0.0030
17	2.189	6,827	0.418	2.952	0.0023
18	2.233	6,358	0.364	3.159	0.0018
19	2.274	5,921	0.315	3.380	0.0014
20	2.312	5,514	0.271	3.617	0.0011
21	2.348	5,135	0.232	3.870	0.0008
22	2.380	4,782	0.198	4.141	0.0006
23	2.410	4,454	0.169	4.430	0.0005
24	2.438	4,148	0.143	4.741	0.0003
25 and older	2.464	3,863	0.648	5.072	0.0013
Discounted Lifetime Emissions =					**0.1979 tons**