

1. Report No. FHWA/TX-94/1375-4		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle DEVELOPMENT OF EMISSION ESTIMATES FOR THE CONFORMITY ANALYSIS OF THE JOHRTS FY-94 TIP				5. Report Date July 1994	
				6. Performing Organization Code	
7. Author(s) Jimmie D. Benson, George B. Dresser, and Charles E. Bell				8. Performing Organization Report No. Research Report 1375-4	
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. Study No. 0-1375	
12. Sponsoring Agency Name and Address Texas Department of Transportation Research and Technology Transfer Office P. O. Box 5080 Austin, Texas 78763-5080				13. Type of Report and Period Covered Interim April 1992- August 1994	
				14. Sponsoring Agency Code	
15. Supplementary Notes Research performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration. Research Study Title: Develop Air Quality Data for Federal Submission.					
16. Abstract  This report documents the mobile source emissions estimation methodology used for the conformity analysis of the Transportation Improvement program (TIP) and the Long Range Plan (LRP) for (Victoria County/JOHRTS/El Paso). Included in the report is a brief overview of the emission estimation methodology and the 24-hour traffic assignments used in the analyses; the methods used to estimate the seasonally adjusted time-of-day vehicle miles of travel and associated operating speeds; the estimation of the emission rates using the EPA's MOBILE5a program; and briefly outlines the method used to develop the emission estimates using the MOBILE5a emission rates and compares the emission estimates for the Build and No-Build options. An appendix presents the emission rates developed for the conformity analysis.					
17. Key Words Mobile Source Emissions, Air Quality Analyses, Travel Models, Conformity Analyses			18. Distribution Statement No Restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161		
19. Security Classif.(of this report) Unclassified		20. Security Classif.(of this page) Unclassified		21. No. of Pages 186	22. Price



**DEVELOPMENT OF EMISSION ESTIMATES FOR THE  
CONFORMITY ANALYSIS OF THE JOHRTS FY-94 TIP**

by

Jimmie D. Benson  
Research Engineer

George B. Dresser  
Research Scientist

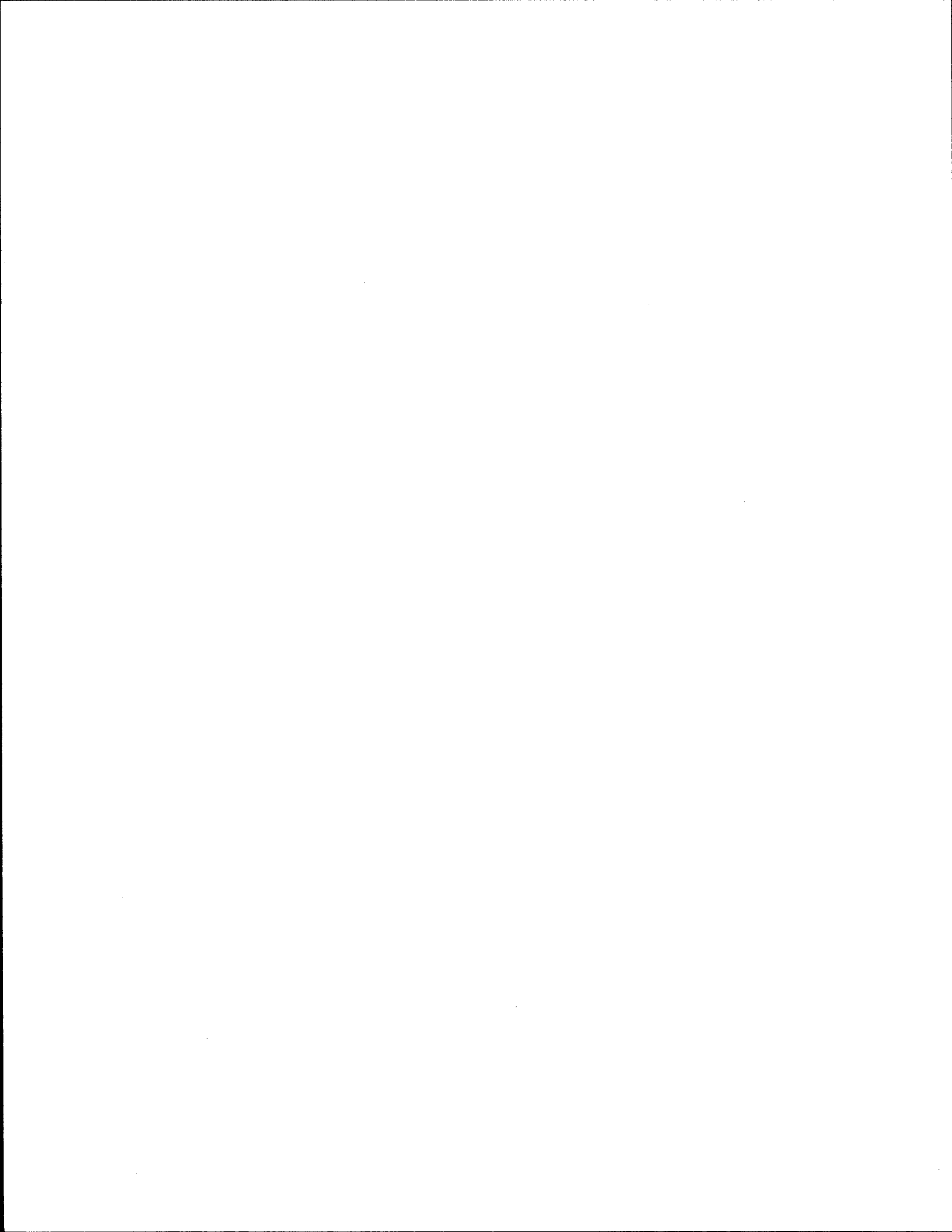
Charles E. Bell  
Systems Analyst

Research Report 1375-4  
Research Study Number 0-1375  
Research Study Title: Develop Air Quality Data for Federal Submission

Sponsored by  
Texas Department of Transportation  
In Cooperation with  
U.S. Department of Transportation  
Federal Highway Administration

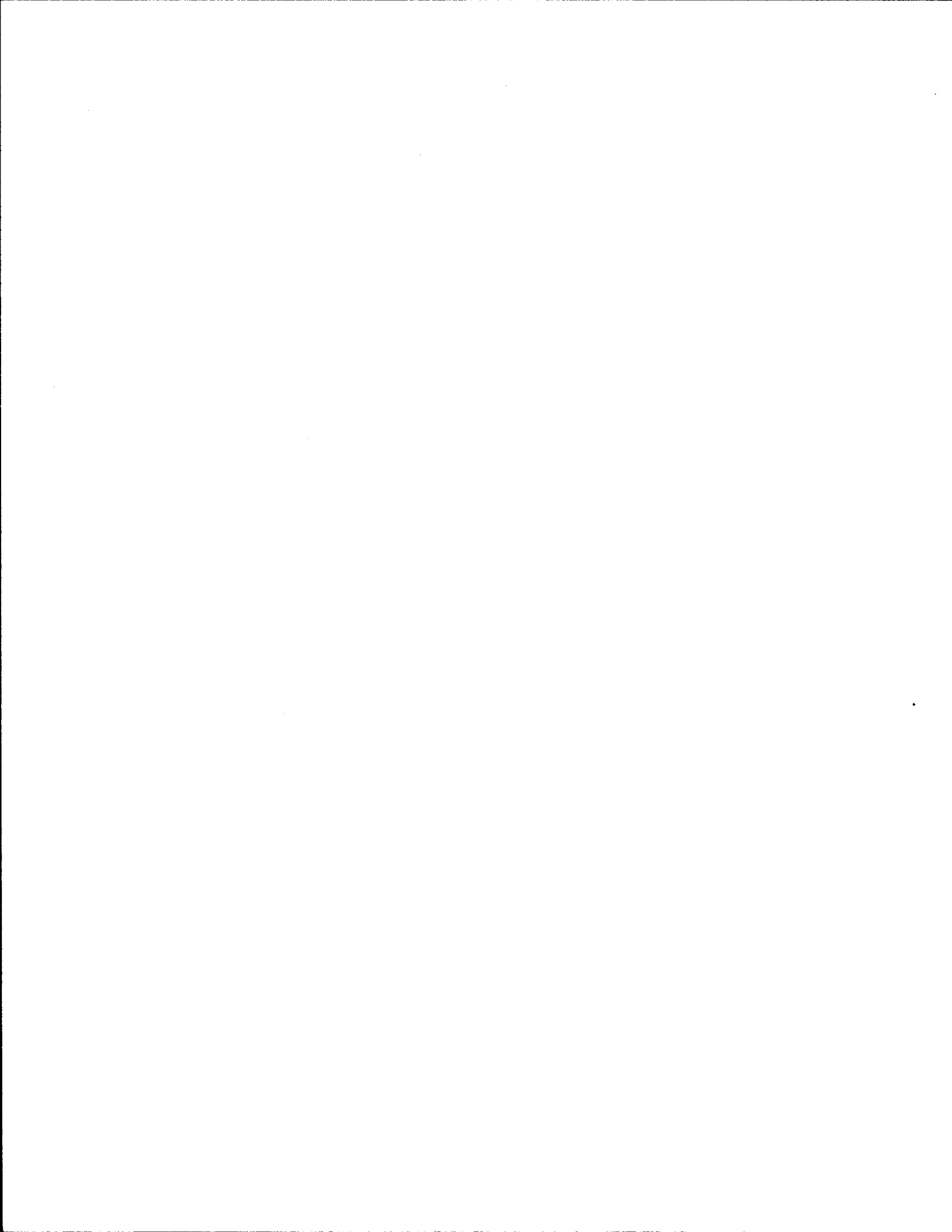
July 1994

TEXAS TRANSPORTATION INSTITUTE  
The Texas A&M University System  
College Station, Texas



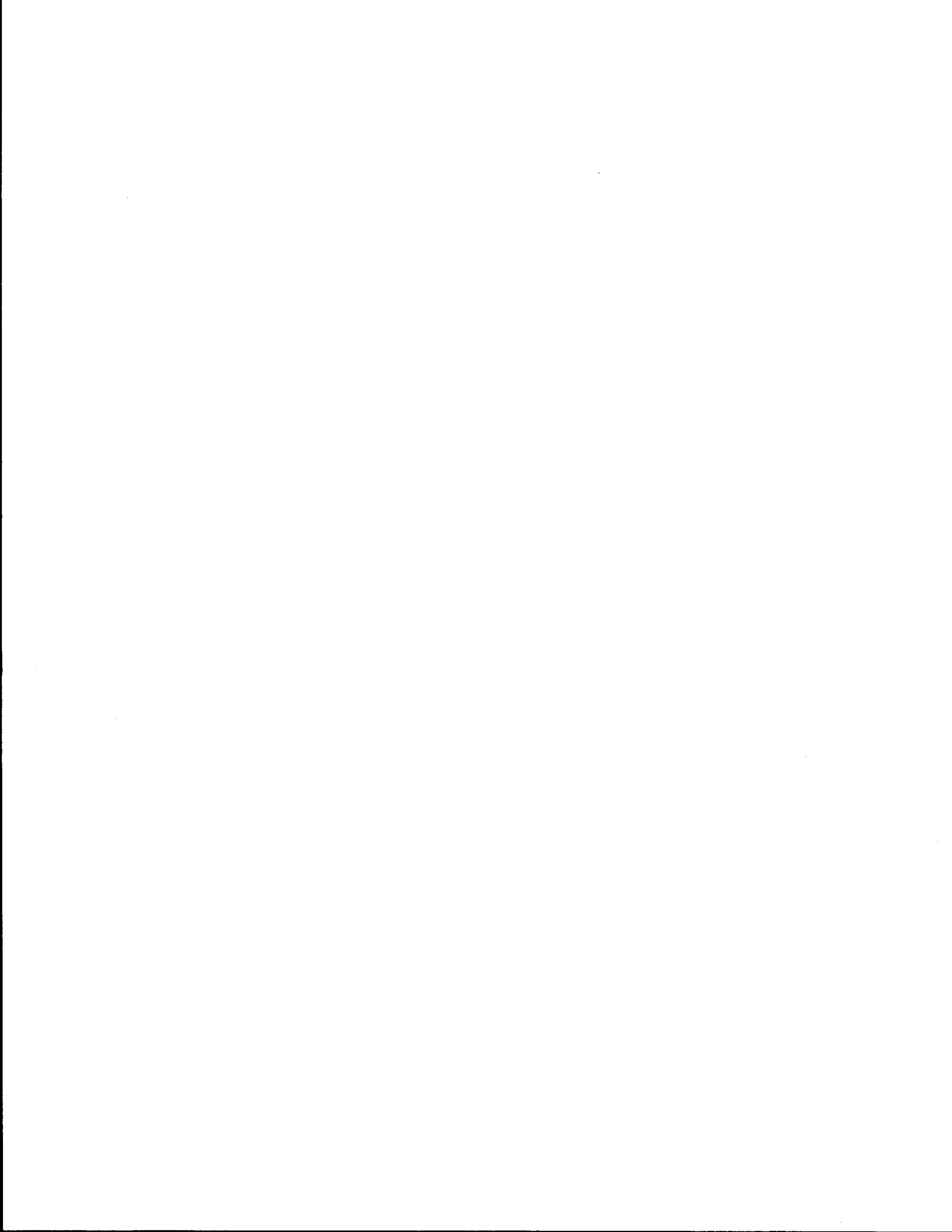
## **IMPLEMENTATION STATEMENT**

The purpose of this report is to document for the record the procedures used by the Texas Transportation Institute in support of the FY-94 conformity analysis for JOHRTS. The findings of the conformity analysis were previously submitted by the MPO and TxDOT to FHWA. The software used for these procedures is described in Research Report 1279-2, "User's Guide for the Texas Mobile Source Emission Estimation Software: PREPIN, POLFAC5A, COADJ, IMPSUM, and SUMALL." No further implementation of the materials in this report is needed.



## **DISCLAIMER**

The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation. Additionally, this report is not intended for construction, bidding, or permit purposes. George B. Dresser, Ph.D., is Principal Investigator for this project.





**TABLE OF CONTENTS**

I. Introduction . . . . . 1

II. Projection of Vehicle Registrations . . . . . 5

III. Estimation of Time-of-day VMT and Speeds . . . . . 11

IV. Estimation of Emission Rates Using MOBILE5a . . . . . 23

V. Emission Estimates . . . . . 47

Appendix A: MOBILE5a Emission Rates . . . . . A-1

## LIST OF TABLES

I-1.	24-Hour Traffic Assignments . . . . .	3
II-1.	Vehicle Estimates for JOHRTS . . . . .	9
III-1.	Portions of Travel By Time Periods (in percentages) . . . . .	15
III-2.	Morning Peak-Period Directional Split Estimates for JOHRTS . . . . .	16
III-3.	Off-Peak Directional Split Estimates for JOHRTS . . . . .	16
III-4.	Afternoon Peak-Period Directional Split Estimates for JOHRTS . . . . .	17
III-5.	Typical 24-Hour Capacities per Lane for the JOHRTS Network . . . . .	19
III-6.	Estimated Typical Hourly Capacities per Lane for JOHRTS Network . . . . .	19
III-7.	Average 24-Hour Speeds for the JOHRTS Network . . . . .	20
III-8.	Estimated Typical Freeflow Speeds for the JOHRTS Network . . . . .	20
III-9.	Volume-Delay Equation Parameters . . . . .	21
IV-1.	Temperature Ranges . . . . .	23
IV-2.	Observed Temperature Data Provided for 14 Days . . . . .	24
IV-3.	Estimated Time-of Day Average Temperatures for Conformity Analyses . . . . .	25
IV-4.	MOBILE5a Temperature Inputs Used for JOHRTS Conformity Applications . . . . .	25
IV-5.	1990 Hardin County MOBILE5a Set-up for Time Period 1 . . . . .	28
IV-6.	1990 Hardin County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	29
IV-7.	1990 Jefferson County MOBILE5a Set-up for Time Period 1 . . . . .	30
IV-8.	1990 Jefferson County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	31
IV-9.	1990 Orange County MOBILE5a Set-up for Time Period 1 . . . . .	32

IV-10.	1990 Orange County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	33
IV-11.	1996 Hardin County MOBILE5a Set-up for Time Period 1 . . . . .	34
IV-12.	1996 Hardin County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	35
IV-13.	1996 Jefferson County MOBILE5a Set-up for Time Period 1 . . . . .	36
IV-14.	1996 Jefferson County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	37
IV-15.	1996 Orange County MOBILE5a Set-up for Time Period 1 . . . . .	38
IV-16.	1996 Orange County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	39
IV-17.	1999 Hardin County MOBILE5a Set-up for Time Period 1 . . . . .	40
IV-18.	1999 Hardin County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	41
IV-19.	1999 Jefferson County MOBILE5a Set-up for Time Period 1 . . . . .	42
IV-20.	1999 Jefferson County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	43
IV-21.	1999 Orange County MOBILE5a Set-up for Time Period 1 . . . . .	44
IV-22.	1999 Orange County MOBILE5a Set-up for 24-Hour Diurnal Rates . . . . .	45
V-1.	Hardin County Number of Vehicles by Vehicle Type and Number of Vehicles Subject to Multiple Diurnals 1990, 1996, 1999 . . . . .	49
V-2.	Jefferson County Number of Vehicles by Vehicle Type and Number of Vehicles subject to Multiple Diurnals 1990, 1996, 1999 . . . . .	50
V-3.	Orange County Number of Vehicles by Vehicle Type and Number of Vehicles Subject to Multiple Diurnals 1990, 1996, 1999 . . . . .	51
V-4.	Summer 1996 24-Hour Emission Estimates for the JOHRTS FY-94 TIP . . . . .	52
V-5.	Summer 1999 24-Hour Emission estimates for the JOHRTS FY-94 TIP . . . . .	52
A-1.	Hardin 1990 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-3

A-2.	Hardin 1990 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-4
A-3.	Hardin 1990 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-5
A-4.	Hardin 1990 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-6
A-5.	Hardin 1990 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-7
A-6.	Hardin 1990 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-8
A-7.	Hardin 1990 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-9
A-8.	Hardin 1990 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-10
A-9.	Hardin 1990 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-11
A-10.	Hardin 1990 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-12
A-11.	Hardin 1990 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-13
A-12.	Hardin 1990 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-14
A-13.	Hardin 1996 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-15
A-14.	Hardin 1996 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-16
A-15.	Hardin 1996 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-17
A-16.	Hardin 1996 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-18
A-17.	Hardin 1996 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-19
A-18.	Hardin 1996 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-20
A-19.	Hardin 1996 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-21
A-20.	Hardin 1996 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-22
A-21.	Hardin 1996 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-23
A-22.	Hardin 1996 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-24
A-23.	Hardin 1996 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-25
A-24.	Hardin 1996 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-26

A-25.	Hardin 1999 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-27
A-26.	Hardin 1999 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-28
A-27.	Hardin 1999 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-29
A-28.	Hardin 1999 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-30
A-29.	Hardin 1999 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-31
A-30.	Hardin 1999 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-32
A-31.	Hardin 1999 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-33
A-32.	Hardin 1999 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-34
A-33.	Hardin 1999 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-35
A-34.	Hardin 1999 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-36
A-35.	Hardin 1999 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-37
A-36.	Hardin 1999 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-38
A-37.	Jefferson 1990 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-39
A-38.	Jefferson 1990 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-40
A-39.	Jefferson 1990 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-41
A-40.	Jefferson 1990 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-42
A-41.	Jefferson 1990 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-43
A-42.	Jefferson 1990 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-44
A-43.	Jefferson 1990 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-45

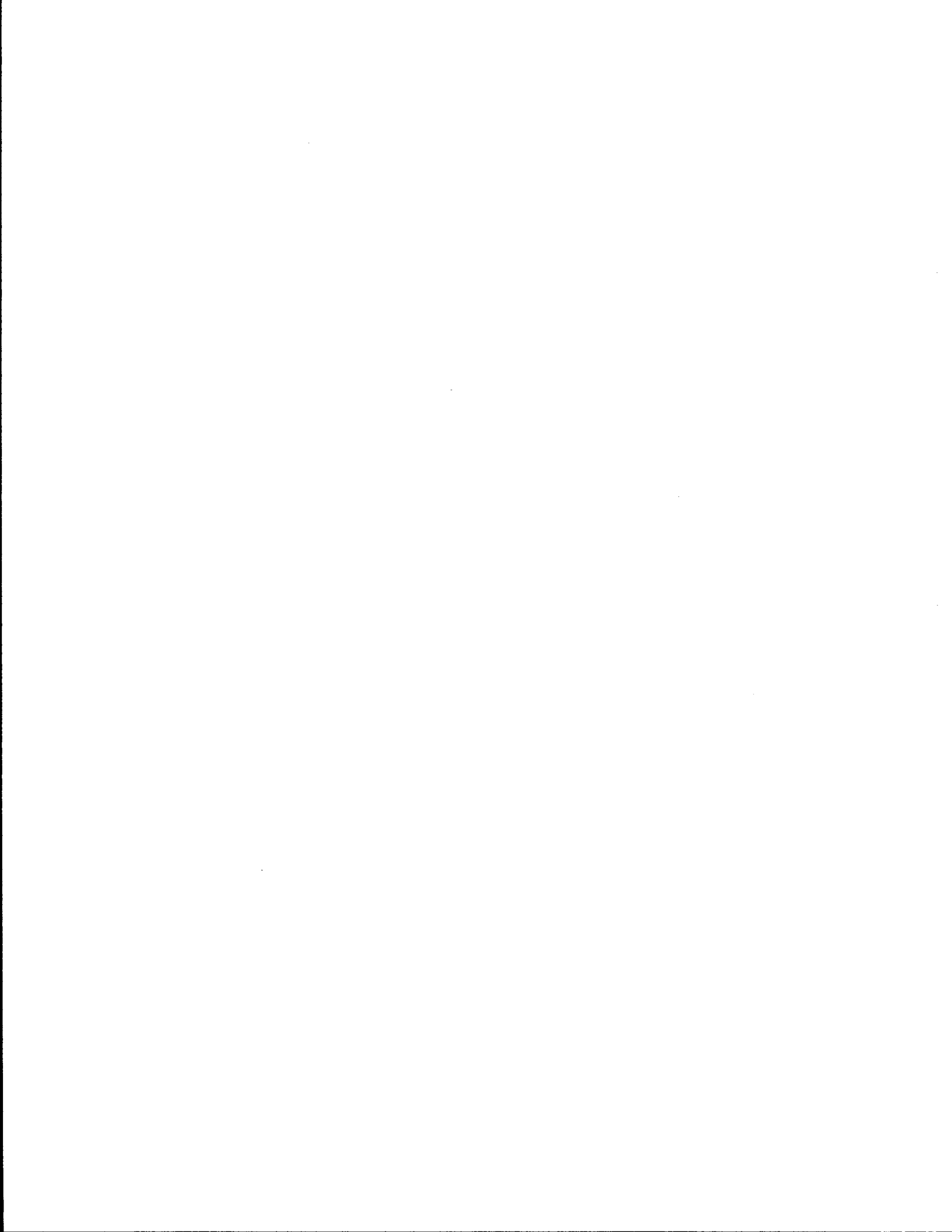
A-44.	Jefferson 1990 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-46
A-45.	Jefferson 1990 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-47
A-46.	Jefferson 1990 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-48
A-47.	Jefferson 1990 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-49
A-48.	Jefferson 1990 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-50
A-49.	Jefferson 1996 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-51
A-50.	Jefferson 1996 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-52
A-51.	Jefferson 1996 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-53
A-52.	Jefferson 1996 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-54
A-53.	Jefferson 1996 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-55
A-54.	Jefferson 1996 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-56
A-55.	Jefferson 1996 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-57
A-56.	Jefferson 1996 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-58
A-57.	Jefferson 1996 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-59
A-58.	Jefferson 1996 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-60

A-59.	Jefferson 1996 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-61
A-60.	Jefferson 1996 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-62
A-61.	Jefferson 1999 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-63
A-62.	Jefferson 1999 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-64
A-63.	Jefferson 1999 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-65
A-64.	Jefferson 1999 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-66
A-65.	Jefferson 1999 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-67
A-66.	Jefferson 1999 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-68
A-67.	Jefferson 1999 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-69
A-68.	Jefferson 1999 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-70
A-69.	Jefferson 1999 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-71
A-70.	Jefferson 1999 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-72
A-71.	Jefferson 1999 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-73
A-72.	Jefferson 1999 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-74
A-73.	Orange 1990 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-75
A-74.	Orange 1990 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-76

A-75.	Orange 1990 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-77
A-76.	Orange 1990 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-78
A-77.	Orange 1990 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-79
A-78.	Orange 1990 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-80
A-79.	Orange 1990 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-81
A-80.	Orange 1990 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-82
A-81.	Orange 1990 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-83
A-82.	Orange 1990 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-84
A-83.	Orange 1990 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-85
A-84.	Orange 1990 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-86
A-85.	Orange 1996 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-87
A-86.	Orange 1996 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-88
A-87.	Orange 1996 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-89
A-88.	Orange 1996 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-90
A-89.	Orange 1996 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-91
A-90.	Orange 1996 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-92
A-91.	Orange 1996 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-93
A-92.	Orange 1996 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-94
A-93.	Orange 1996 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-95
A-94.	Orange 1996 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-96
A-95.	Orange 1996 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-97
A-96.	Orange 1996 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-98
A-97.	Orange 1999 Time Period 1 VOC Emission Rates (grams/mile) . . . . .	A-99



A-98.	Orange 1999 Time Period 1 CO Emission Rates (grams/mile) . . . . .	A-100
A-99.	Orange 1999 Time Period 1 NOX Emission Rates (grams/mile) . . . . .	A-101
A-100.	Orange 1999 Time Period 2 VOC Emission Rates (grams/mile) . . . . .	A-102
A-101.	Orange 1999 Time Period 2 CO Emission Rates (grams/mile) . . . . .	A-103
A-102.	Orange 1999 Time Period 2 NOX Emission Rates (grams/mile) . . . . .	A-104
A-103.	Orange 1999 Time Period 3 VOC Emission Rates (grams/mile) . . . . .	A-105
A-104.	Orange 1999 Time Period 3 CO Emission Rates (grams/mile) . . . . .	A-106
A-105.	Orange 1999 Time Period 3 NOX Emission Rates (grams/mile) . . . . .	A-107
A-106.	Orange 1999 Time Period 4 VOC Emission Rates (grams/mile) . . . . .	A-108
A-107.	Orange 1999 Time Period 4 CO Emission Rates (grams/mile) . . . . .	A-109
A-108.	Orange 1999 Time Period 4 NOX Emission Rates (grams/mile) . . . . .	A-110
A-109.	1990 JOHRTS Diurnal Rates . . . . .	A-111
A-110.	1996 JOHRTS Diurnal Rates . . . . .	A-112
A-111.	1999 JOHRTS Diurnal Rates . . . . .	A-113



## SUMMARY

### Emission Estimation Methodology

For the conformity analyses, a series of 24-hour assignments were performed for the Beaumont-Port Arthur region for the 1990 base year and for the Build and No-Build Options for 1996 and 1999. Summer VMT, speeds, and mobile source emission estimates were developed for each of these assignments. The following briefly describes the methodology used in developing the estimates. The current networks for the region covers all of Jefferson and Orange Counties but only a portion of Hardin County. The emission estimates are developed by county. The emission estimation methodology provides complete coverage for Jefferson and Orange Counties. The partial results from Hardin County were discarded.

A series of programs (developed by the Texas Transportation Institute to facilitate the estimation of mobile source emissions) was used for the conformity analyses. The three programs used for computing the mobile source emissions for the Beaumont-Port Arthur analyses are:

- PREPIN** The PREPIN program was developed for use in urban areas (such as El Paso) which do not have time-of-day assignments and speeds available for air quality analyses. The program inputs a 24-hour assignment and applies the needed seasonal adjustment factors and time-of-day factors to the time-of-day travel. The Dallas-Fort Worth speed models are used to estimate the operational time-of-day speeds on the links. The VMT and speeds by link are subsequently input to the IMPSUM program for estimating emissions.
- POLFAC5A** The POLFAC5A program obtains emission rates using MOBILE5a.
- IMPSUM** The IMPSUM program applies the emission rates (obtained from POLFAC5A) and VMT mixes to the time-of-day VMT and speed estimates to estimate the emissions.

Using the PREPIN software, the Beaumont-Port Arthur 24-hour assignments were used to develop seasonally adjusted time-of-day AAWT VMT and speed estimates for four time-of-day periods:

Morning Peak Hour:	7:15 a.m. - 8:15 a.m.
Midday:	8:15 a.m. - 4:45 p.m.
Afternoon Peak Hour:	4:45 p.m. - 5:45 p.m.
Overnight:	5:45 p.m. - 7:15 a.m.

The volumes and VMT are seasonally adjusted to represent the summer season before the time-of-day volumes and speeds are estimated.

The POLFAC5A program was applied to develop the seasonal emission factors for each time-of-day period for each of the application years. The average summer event day temperatures for the subject time-of-day period were estimated and input to the POLFAC5A application of the MOBILE5a model. A separate 24-hour application of MOBILE5a was used to develop the diurnal emission rates.

Finally, IMPSUM was applied to estimate the emissions for each of the four time-of-day periods for each county. The 24-hour diurnal estimates for each county were computed using the 24-hour diurnal rates. The county emission estimates for each of the four time-of-day periods and the diurnal estimates were summed to develop the final emission estimates for each county.

## I. INTRODUCTION

This report documents the mobile source emissions estimation methodology used for the conformity analysis of the FY-94 Transportation Improvement Program for Jefferson Orange Hardin Regional Transportation Study. The remainder of this chapter provides a brief overview of the emission estimation methodology and the 24-hour traffic assignments used in the analyses. Chapter II describes the vehicle projections used in the analyses. Chapter III describes the methods used to estimate the seasonally adjusted time-of-day Vehicle Miles of Travel (VMT) and associated operating speeds. Chapter IV discusses the estimation of emission rates using the EPA's MOBILE5a program. Chapter V briefly outlines the method used to develop the emission estimates using the MOBILE5a emission rates and compares the emission estimates for the build and no-build options.

### Overview of Emission Estimation Methodology

For the conformity analyses, a series of 24-hour assignments was performed for the JOHRTS region for the 1990 base year and for the build and no-build options for 1996, 1996, and 1999. Summer mobile source emission estimates were developed for each of these assignments. These conformity analyses did not use TTI's IMPACT program for estimating mobile source emissions. Instead, a new series of programs (i.e., the POLFAC5A, PREPIN and IMPSUM programs developed by TTI) was used for these analyses. The methodology and software used in developing the estimates is described below.

A series of programs (developed by TTI to facilitate the application of EPA's MOBILE5a program in estimating mobile source emissions) was used for the conformity analyses. The three programs used for computing the mobile source emissions for the JOHRTS analyses are:

- PREPIN** The PREPIN program was developed for urban areas (such as JOHRTS) where time-of-day assignments and speeds are not available for air quality analyses. The program inputs a 24-hour assignment and applies the needed seasonal adjustment factors. The time-of-day factors are applied to the seasonally adjusted 24-hour assignment results to estimate the directional time-of-day travel. The Dallas-Fort Worth speed models are used to estimate the operational time-of-day speeds by direction on the links. Special intrazonal links are defined, and the VMT and speeds for intrazonal trips are estimated. These VMT and speeds by link are subsequently input to the IMPSUM program for the application of MOBILE5a emission factors.
- POLFAC5A** The POLFAC5A program is used to apply the EPA's MOBILE5a program to obtain the emission FACTORS (rates). The MOBILE5a emission factors are obtained for eight vehicle types and 63 speeds (i.e., 3 mph through 65 mph) for each vehicle type. Hence, there are 504 factors (i.e.,  $8 \times 63 = 504$ ) for each pollution type for each county. There are three pollution

types being computed: VOC, CO and NOX. Hence, for a given county there are 1,512 emission factors. These emission factors are output to an ASCII file for subsequent input to the IMPSUM program. The POLFAC5A program is applied for each time-of-day time period being used. These time-of-day emission factors are applied using the IMPSUM program to time-of-day VMT estimates by link.

**IMPSUM** The IMPSUM program applies the emission rates (obtained from POLFAC5A) and VMT mixes to the time-of-day VMT and speed estimates to estimate the emissions. The basic inputs to IMPSUM are:

1. Data specifying the number of counties in the region and their names.
2. Names of roadway types used in the study. These roadway types are used to summarize the emission results.
3. VMT mix by county and roadway type.
4. MOBILE5a emission factors developed using POLFAC5A by county.
5. Specification of the units for reporting emissions (grams, pounds, or tons).
6. Abbreviated assignment results by link input for the subject time period. The PREPIN program allows the user to estimate VMT and speed on each link by time period. For each link, the following information is input to IMPSUM: county number, roadway type number, VMT on link, operational speed estimate, and link distance.

Using these input data, the VMT for each link is stratified by the eight vehicle types and the MOBILE5a emission factors are applied to estimate the mobile source emissions for that link. The emissions for each county and emission type are reported by both roadway type and vehicle type (i.e., cross-classified by roadway type and vehicle type).

Using the PREPIN software, the JOHRTS 24-hour assignments were used to develop seasonally adjusted time-of-day AAWT VMT and speed estimates for four time-of-day periods:

- |                         |                       |
|-------------------------|-----------------------|
| 1. Morning Peak Hour:   | 7:15 a.m. - 8:15 a.m. |
| 2. Mid-day:             | 8:15 a.m. - 4:45 p.m. |
| 3. Afternoon Peak Hour: | 4:45 p.m. - 5:45 p.m. |
| 4. Overnight:           | 5:45 p.m. - 7:15 a.m. |

Separate time-of-day AAWT VMT and speed estimates were developed for the summer season.

The POLFAC5A program was applied to develop the seasonal emission factors for each time-of-day period for all application years. The average temperature for the subject season and subject time-of-day period were an input to the POLFAC5A application of the MOBILE5a model. A separate 24-hour application of MOBILE5a was used to develop the diurnal emission rates.

Finally, the IMPSUM program was applied to estimate the emissions for each of the four time-of-day periods. The 24-hour diurnal estimates were computed using the 24-hour diurnal rates. The emission estimates for each of the four time-of-day periods, and the diurnal estimates were summed to develop the final emission estimates.

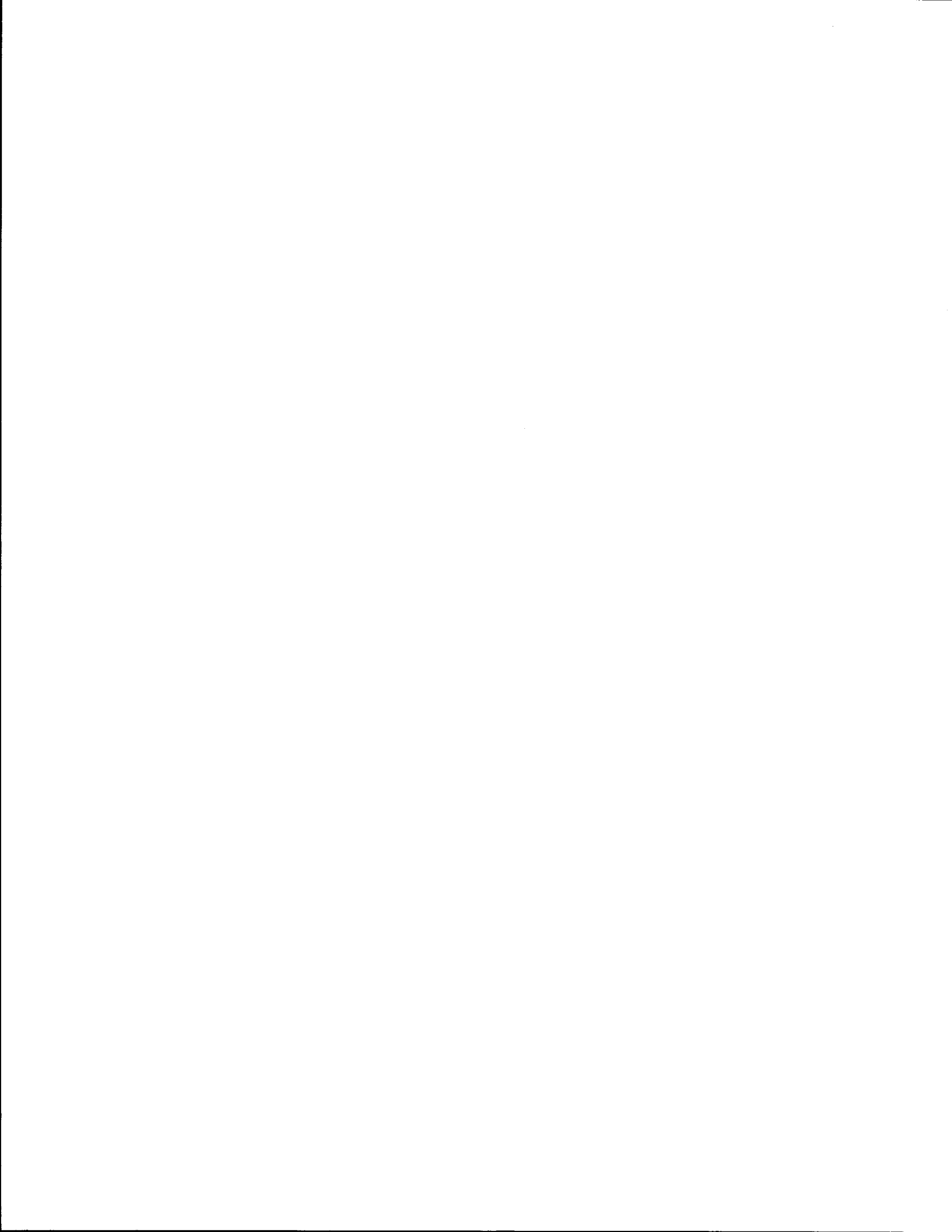
### 24-Hour Traffic Assignments

The 24-hour capacity restrained traffic assignments were developed by the Transportation Planning and Programming Division of TxDOT in a cooperative effort with the Beaumont/Port Arthur District 20 Office of TxDOT and the Southeast Region Planning Office. Table I-1 summarizes the 24-hour highway assignments used in these analyses.

**Table I-1**  
**24-Hour Traffic Assignments**

<b>Traffic Assignment</b>	<b>Trip Table Year</b>	<b>Network Year</b>
1. 1990 Base Year	1990	1990
2. 1996 Build Option	1996	1996
3. 1996 No-Build Option	1996	1993
4. 1999 Build Option	1999	1999
5. 1999 No-Build Option	1999	1993

These analyses used five highway networks (i.e., the 1990, 1993, 1995, 1996, and 1999 networks). The 1993 network was used to represent the no-build option for the conformity analyses.





## II. PROJECTION OF VEHICLE REGISTRATIONS

The projection of vehicle registrations for use in EPA's MOBILE model program was done using a modified version of the methodology discussed in EPA's "Procedures for Preparing Emissions Projections" (pp. 32-39). The methodology suggested by EPA uses average growth rates for projecting estimates of new vehicle registrations and survival rates for estimating the number of older vehicles that will be registered in future years. The methodology used in this report is similar in that estimates of the number of older vehicles registered in future years is based on the use of scrappage rates which are also the basis for estimating survival rates. The primary difference in the methodology used in this report and the method suggested by EPA is the method of estimating the number of new vehicle registrations for future years. The input data and the methodology are discussed in the following sections.

### Input Data

The input data consisted of the number of registered vehicles by age and type of vehicle (i.e., model year), survival or scrappage rates by age and type of vehicle, and population estimates for each county for 1990 through 2020. The registration data for each county came from (TxDOT), Motor Vehicle Registration Division. This historical information was used to develop estimates of new vehicle registrations (by county) and estimates of the percentage of registered vehicles by type of vehicle and model year.

The data used in this analysis were the 1989 through 1992 vehicle registrations by model year for each of the counties being analyzed. The registration data for each of these years were data as of September 1 for each year. The 1992 registered vehicles were used as the base year from which subsequent projections were made.

Local data on survival/scrappage rates were not available. Data from "Study of Vehicle Scrappage Rates," Oak Ridge National Laboratory, August 1990, were used for automobiles, light duty trucks, and heavy duty trucks. Scrappage rates were estimated for motorcycles using data from the "1991 Motorcycle Statistical Annual," Motorcycle Industry Council, Inc.

### Methodology

The first step was to estimate the total new vehicle registrations in 1992 for each county since the registration data available for 1992 were data as of September 1, 1992. An estimate of the average growth rate in new vehicle registrations between the years 1986 through 1991 was first developed. Since registration data were available for vehicles by type and model year only for 1989 through 1992, new vehicle registrations for 1986, 1987, and 1988 were estimated using scrappage rates applied to the vehicle registration data for 1989. For example, in Harris County there were 138,384 1988 model automobiles registered in 1989. Using the scrappage rate of 0.00441 for one-year-old vehicles, the number of 1988 automobiles registered in 1988 was estimated by dividing 138,384 by  $1 - 0.00441$ . The result was an estimate of 138,997 1988

automobiles registered in 1988. Using the same method with scrappage rates for two- and three-year-old vehicles, estimates of new vehicle registrations were developed for 1987 and 1986. These estimates were then used to develop average growth rates in new vehicle registrations for the five years prior to 1992. The average growth rate was then used to estimate the number of 1992 vehicles registered in 1992.

Based on the number of new vehicles registered as of September 1 each year and the number which were registered at the end of each year (from the next year's registration data), the percentage of new vehicles registered as of September 1 was computed for years 1989, 1990, and 1991. A second estimate of the number of 1992 vehicles that would be registered in 1992 was developed based on the average percentage of new vehicles registered as of September 1 applied to the number of 1992 vehicles registered as of September 1, 1992. The final estimate used for 1992 was the average of the two estimates. In estimating vehicle registrations, each type of vehicle was estimated individually.

The Comptroller of Public Accounts supplied vehicle registration data and population estimates for 1990, 1991, and 1992. Regression analyses were performed relating the total number of registered vehicles in a county and the percentage of vehicles by type of vehicle to the population in the county. Total registered vehicles was related directly to population while the percentage of vehicles in each class was related to the natural log of the population. Where 1989 data were available for registered vehicles, the 1989 population was estimated based on the 1990 through 1992 population estimates.

The 1989-1992 vehicle registration data were analyzed to develop estimates of the percentage change in vehicles between years which could be attributed to new vehicle registrations and the percentage which could be attributed to additions/deletions of older vehicles in the vehicle population. A regression analysis was performed on the percentage which could be attributed to new vehicles as a function of population change for each county. The resulting coefficients were applied to the projected population change in each county to estimate the percentage of vehicular growth (by type of vehicle) expected to be due to new vehicle registrations. In addition, a regression analysis was performed relating the growth in new vehicle registrations with the population change 1989 through 1992.

Beginning with the vehicles registered in 1992 by model year, the scrappage rates were applied to estimate the number of vehicles expected to be in operation (and therefore registered) in 1993. Specific rates were used for automobiles, motorcycles, light duty trucks, and heavy duty trucks. The result gave estimates of the number of 1968 through 1992 model year vehicles expected to be registered in each county in 1993.

Using the estimated population for each county and the coefficients obtained from the linear regressions, an estimate of the total vehicles expected to be registered in each county was developed. The percentage of vehicles by type was then estimated using the coefficients obtained from the linear regressions. These estimates were used to develop control totals of the estimated number of registered vehicles for each county. The absolute change in the total number of vehicles (by type) expected to be registered in each county was then estimated by summing the

number of 1968 through 1992 vehicles determined to still be in operation in 1993 and subtracting the total from the estimated number of vehicles expected to be registered in the county in 1993 (based on the estimated total registered vehicles by type). The result provided estimates of the number of new and older vehicles which would be registered in the county. The percentage of those vehicles which would be new vehicles was estimated using the regression coefficients computed earlier and applied to the projected population change from the prior year. Using the regression results which related the change in new vehicle registrations with the population change, a second estimate of the number of new vehicle registrations was computed. For automobiles (LDV), motorcycles (MC), and light duty gas trucks type one (LDGT1), the larger of the two estimates of new vehicle registrations was used. For light duty gas trucks type two (LDGT2), heavy duty gas trucks (HDGV), and heavy duty diesel trucks (HDDV), the two estimates were averaged. These seemed to produce the most realistic results in analyzing the final projections. The remaining older vehicles were distributed in the same proportion as the vehicles which had survived from the prior year. The final step was the conversion of the vehicles into percentages for input to EPA's MOBILE model.

Estimates for 1994 through 2007 were developed using the same methodology applied to each year in a sequential manner. The estimates were then converted to percentages by model year and placed in computer files for input to EPA's MOBILE model. Attachment E provides the final vehicle registration distribution projections for JOHRTS.

The total vehicle registration by county was projected by vehicle type for 1996 and 1999. The 1990 data were already available from TxDOT's Motor Vehicle Registration Division. These projections were calculated by each vehicle model year for the current year and the 19 previous years, with the last year including all of the vehicles in the older category. The older category included all vehicles 21 years and older. The totals of all vehicle model years by vehicle type were determined and put into three tables. The original vehicle registration data from TxDOT was aggregated into six vehicle groups LDV, MC, LDGT1, LDGT2, HDDV, and HDGV. These six groups were then disaggregated into the eight MOBILE4.1 vehicle groups using the MOBILE4.1 default values to separate LDV into LDGV and LDDV, LDT1 into LDGT1 and LDDT, and JOHRTS HDGV and HDDV vehicle registration data to separate HDV into HDGV and HDDV. The procedure used to group the classification counts are shown below:

LDV	100 passenger cars from TxDOT vehicle classification counts
LDGV	98 LDV (MOBILE4.1 default)
LDDV	2 LDV (MOBILE4.1 default)
LDT1	80 panel and pickup trucks from TxDOT vehicle classification counts
LDGT1	97 LDT1 (MOBILE4.1 default)
LDDT	3 LDT1 (MOBILE4.1 default)
LDGT2	20 panel and pickup trucks from TxDOT vehicle classification counts
	20 other 2-axle from TxDOT vehicle classification counts
HDV	80 other 2-axle, plus remaining truck classifications
HDGV	76.8 HDV (September 1, 1990 JOHRTS Vehicle Registration data)
HDDV	23.2 HDV (September 1, 1990 JOHRTS Vehicle Registration data)
MC	100 motorcycles and motor scooters from vehicle classification counts

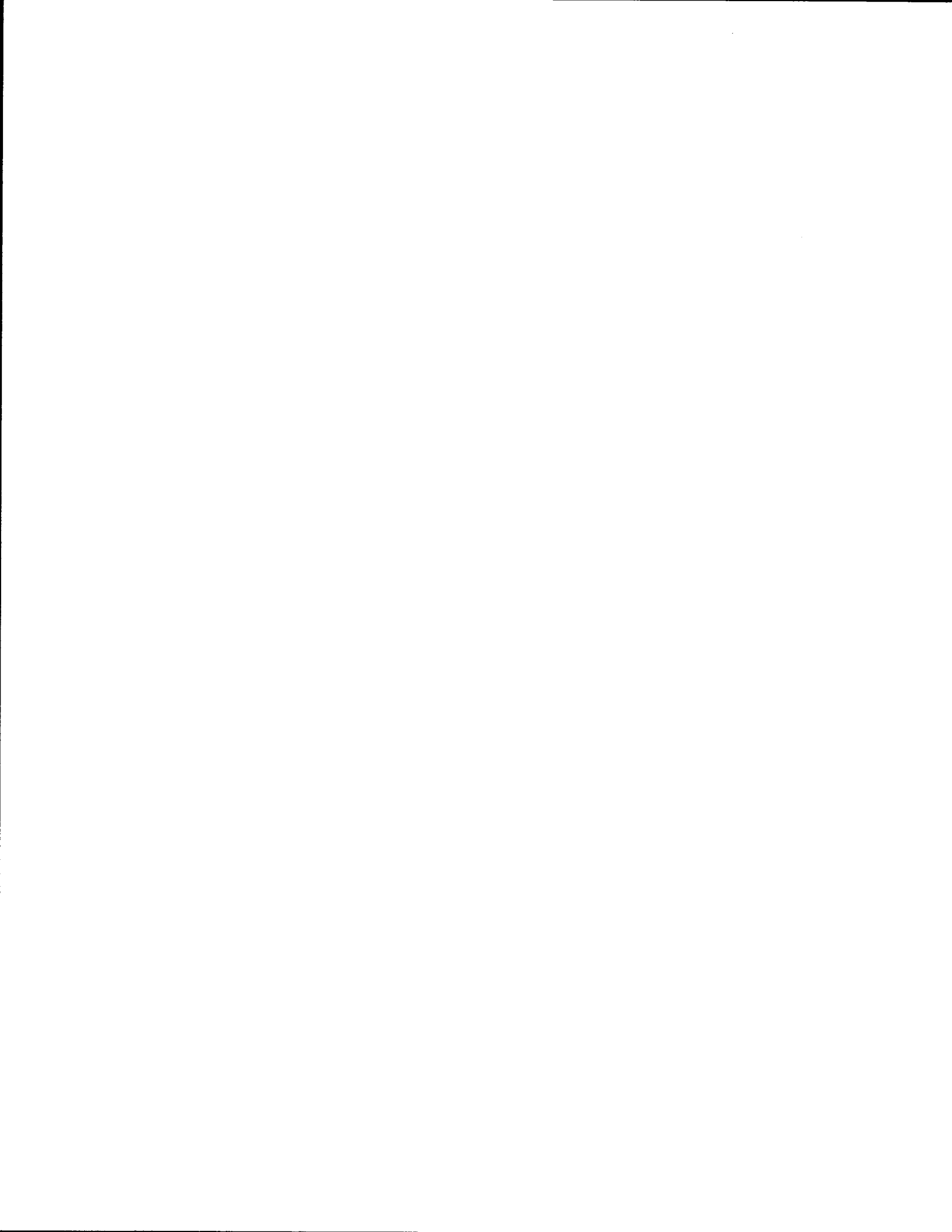
The distribution of panel and pickup trucks between LDT1 and LDGT2 and other 2-axle

trucks between LDGT2 and HDV is based on the professional judgment of TxDOT traffic data collection staff. TxDOT vehicle classification count procedures do not distinguish between gas and diesel trucks.

This distribution was followed for each vehicle type in order to determine the number of vehicles that are LDGT1, LDGV, LDDV, and LDDT. All of the other numbers will stay the same in the table. Table II-1 shows the total number of vehicles registered by the eight vehicle types for 1990, 1996, and 1999.

**Table II-1  
Vehicle Estimates for JOHRTS**

VEHICLE TYPE	1990			1996			1999		
	Hardin	Jefferson	Orange	Hardin	Jefferson	Orange	Hardin	Jefferson	Orange
LDGV	17,792	119,371	36,719	17,946	121,635	40,056	17,963	121,153	40,793
LDGT1	10,907	45,254	18,375	11,785	44,956	22,205	12,002	43,687	23,378
LDGT2	1,086	3,619	1,429	1,119	3,580	1,730	1,131	3,470	1,828
HDGV	399	2,062	542	341	2,108	603	327	2,098	615
LDDV	363	2,436	749	366	2,482	817	367	2,472	832
LDDT	337	1,400	568	364	1,390	687	371	1,351	723
HDDV	156	790	180	121	732	253	115	664	274
MC	588	2,657	990	277	2,892	801	239	3,046	752



### III. ESTIMATION OF TIME-OF-DAY VMT AND SPEEDS

The time-of-day VMT and speed estimates for JOHRTS were developed using the PREPIN program. The PREPIN program is one of a series developed by TTI to facilitate the application of EPA's MOBILE5a program, in estimating of mobile source emissions. The PREPIN program was developed for use in urban areas (such as JOHRTS) which do not have time-of-day assignments and speeds available for air quality analyses. The program inputs a 24-hour assignment and applies the needed seasonal adjustment factors. The time-of-day factors are applied to the seasonally adjusted 24-hour assignment results to estimate the directional time-of-day travel. The Dallas-Fort Worth speed models are used to estimate the operational time-of-day speeds by direction on the links. Special intrazonal links are defined, and the VMT and speeds for intrazonal trips are estimated. These VMT and speeds by link are subsequently input to the IMPSUM program for the application of MOBILE5a emission factors.

For the conformity analyses, a series of 24-hour assignments was performed for the JOHRTS region for the 1990 base year and for the build and no-build options for 1995, 1996, and 1999. For a given application year and season, four applications of PREPIN are run to estimate the directional VMT and speeds for each of four time periods comprising the 24-hour period:

Morning Peak Hour:	7:15 a.m. - 8:15 a.m.
Mid-day:	8:15 a.m. - 4:45 p.m.
Afternoon Peak Hour:	4:45 p.m. - 5:45 p.m.
Overnight:	5:45 p.m. - 7:15 a.m.

For a given application of the PREPIN program for the JOHRTS conformity analyses, the following parameters and data were input to PREPIN:

- County table of equals
- Area type table of equals
- Seasonal adjustment factor
- Time-of-day factor
- Directions split estimates
- Time-of-day capacity factors
- Free-flow speed factors
- Coefficients for the Dallas-Fort Worth speed estimation model
- Assignment trip table
- Zonal radii data
- Capacity restrained assignment results

The remainder of this chapter discusses these key input data used in the JOHRTS PREPIN applications to prepare the time-of-day VMT and speed estimates. The primary output of PREPIN is a data set for the subject time period containing two records for each link (i.e., one record specifying the estimated time-of-day VMT and speed in the peak, or principal, direction and the second record specifying the estimated VMT and speed in the opposite direction). This data set is subsequently input to the IMPSUM program which applies the MOBILE5a emission rates

(developed using the POLFAC5A program) to estimate the mobile source emissions for each link. Finally, the SUMALL program combines the time-of-day emission estimates and computes the 24-hour diurnal estimates to obtain the 24-hour emission estimates.

### **County Specifications**

The PREPIN program provides for processing an assignment comprised of up to eight counties. Various summaries are produced by county and for the entire region. For a given application, the counties are numbered sequentially starting with one. The county table of equals data input to PREPIN specifies the zone numbers contained in each county. In the case of JOHRTS, the region is comprised of two counties (Jefferson and Orange Counties) and a portion of a third (Hardin County). The zone-to-county table of equals was provided by TxDOT for the conformity applications.

Each link in the network is assigned an associated zone number. Using the link's associated zone number, the county within which the link is located is determined using this input data. The county number is included in the link record output data set produced by PREPIN. The specification of the county number in these data allow the IMPSUM program to accumulate and report the mobile source emission estimates by county.

### **Area Type Specifications**

The PREPIN program allows various factors to be specified by area type number and functional classification number. The JOHRTS regional models use 14 area types for trip generation. TxDOT Transportation Planning and programming Division agreed to aggregate these to six area types for the network. The six network area types and their corresponding 14 generation area types are:



Network Area Types	Corresponding Trip Generation Area Types
1. Central Business District (CBD)	1. Beaumont CBD
2. CBD Fringe	2. Beaumont CBD Fringe 14. Beaumont Inner-urban
3. Urban	3. Beaumont Urban 8. Urban 12. Port Arthur Urban
4. Suburban	4. Beaumont Suburban 9. Suburban 13. Port Arthur Suburban
5. Suburban Fringe	5. Beaumont Suburban Fringe 10. Suburban Fringe
6. Rural	6. Beaumont Rural 7. Rural 11. Rural

The JOHRTS network area type table of equals specifies the zones contained in each of the six area types. Using the link's associated zone number, the area type within which the link is located is determined.

### Seasonal Adjustment Factors

Because 24-hour travel on the highway system varies somewhat by season, the PREPIN program provides for the input and application of seasonal adjustment factors to account for the seasonal variations. The seasonal adjustment factors are applied to the 24-hour link volumes to estimate the seasonally adjusted 24-hour volumes and VMT. The following seasonal adjustment factors (estimated using data from the 1990 Annual Report Permanent Automatic Traffic Recorders, TxDot) were used in the JOHRTS conformity analyses:

<u>County</u>	<u>Summer Factor</u>
Jefferson	1.065
Orange	1.065
Hardin	1.084

The following describes the procedures used to estimate the seasonal adjustment factors:

### *Summer Seasonal Adjustment Factor Computations*

The travel models are assumed to simulate AWT for a typical school year (September through May) and weekday (Monday through Thursday). For purposes of estimating a typical O3 season (June through August) weekday (Monday through Friday) AWT, the Monday through Thursday AWT from the travel model was adjusted in two steps. The first step was to adjust Monday through Thursday travel to represent Monday through Friday travel and the ratio of Monday through Thursday AAWT to Monday through Friday AAWT for the September through May time period. The second step was to adjust the September through May, Monday through Friday AAWT to June through August, Monday through Friday AAWT. The two adjustment factors were then multiplied to provide the total adjustment factor. Data from the ATR stations were used to calculate the adjustment factors.

There are two permanently located automatic traffic recorders (ATRs) in Jefferson County, both on IH-10 in the Beaumont urban area. One ATR is located in the rural area of Hardin County.

The locations and adjustment factors are:

S086 FM-92, 7.0 miles north of US-96, Silsbee  
Monday - Thursday to Monday - Friday: 1.035  
September - May to June - August: 1.029  
Total adjustment: 1.065

S117 IH-10, East end Neches River Bridge, Beaumont  
Monday - Thursday to Monday - Friday: 1.032  
September - May to June - August: 1.050  
Total adjustment: 1.084

S205 IH-10, South of Calder Street overpass, Beaumont

(S205 was out of service in 1990, 1991 and 1992 due to construction.)

The adjustment from ATR S086 was applied to Hardin County, and the adjustment for ATR S117 was applied to both Jefferson and Orange Counties.

### **Time-of-Day Travel Factors**

The 1990 household travel survey data for three study areas (San Antonio, Amarillo, and Brownsville) were processed to develop the estimated portions of travel by time of day. Table III-1 summarizes the results obtained from the three studies and the averages used in the conformity analyses. These average percentages are applied to the seasonally adjusted volumes and VMT to estimate the volumes and VMT for each of the four time periods.

**Table III-1**  
**PORTIONS OF TRAVEL BY TIME PERIODS**  
(in percentages)

	SAN ANTONIO	AMARILLO	BROWNSVILLE	AVERAGE
7:15 am to 8:15 am	10.88	10.84	10.34	10.69
8:15 am to 4:45 pm	48.13	51.17	51.71	50.33
4:45 pm to 5:45 pm	10.34	10.78	9.41	10.18
5:45 pm to 7:15 am	30.66	27.21	28.54	28.80
TOTALS	100.0	100.0	100.0	100.0
Number of Vehicle Trips in the Sample	15,466	20,844	9,567	-

### Time-of-Day Directional Split Estimates

The 24-hour link assignment volumes are non-directional volumes (i.e., the sum of the volumes in the two directions on a link). The seasonal adjustment factor and time-of-day travel factor are applied to estimate the seasonally adjusted time-of-day volume on a link. The PREPIN program provides for the application of directional splits to estimate the portion of the travel expected to occur in each direction. These directional volume estimates are used to estimate the directional speeds. The PREPIN program outputs two link records for a link: (1) a link record containing the estimated VMT and (2) speed in the peak (or dominant) direction and a link record containing the estimated VMT and speed in the off-peak (or opposite) direction. This allows the IMPSUM program to apply the MOBILE5a emission factors directionally by speed.

Time-of-day directional splits area type and facility type were provided by TxDOT's Transportation Planning and Programming Division after collaboration with TxDOT District 20 Office and the Southeast Region Planning Office. Table III-2 summarizes the morning peak directional split used in the JOHRTS PREPIN applications. Table III-3 summarizes the directional splits used for the off-peak periods and Table III-4 summarizes the directional splits used for the afternoon peak period.

**Table III-2**  
**Morning-Peak Period Directional Split Estimates for JOHRTS**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	54.0	50.0	65.0	65.0	65.0	58.0	58.0	64.5	50.0	50.0
2 CBD Fringe	87.0	50.0	60.0	60.0	60.0	59.0	59.0	63.0	50.0	50.0
3 Urban	85.0	60.0	62.0	62.0	62.0	58.0	58.0	53.0	60.0	60.0
4 Suburban	72.0	61.0	65.0	65.0	65.0	64.0	64.0	64.5	61.0	61.0
5 Suburban Fringe	80.0	65.0	68.0	68.0	68.0	66.0	66.0	62.5	67.0	67.0
6 Rural	78.0	70.0	71.0	71.0	71.0	68.0	68.0	75.0	70.0	70.0

**Table III-3**  
**Off-Peak Directional Split Estimates for JOHRTS**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	54.0	51.0	55.0	55.0	55.0	55.0	55.0	54.5	51.0	51.0
2 CBD Fringe	54.0	51.0	54.0	54.0	54.0	55.0	55.0	53.0	51.0	51.0
3 Urban	55.0	53.0	50.0	50.0	50.0	52.0	52.0	52.0	53.0	53.0
4 Suburban	55.0	51.0	57.0	57.0	57.0	56.0	56.0	57.0	51.0	51.0
5 Suburban Fringe	53.0	51.0	56.0	56.0	56.0	57.0	57.0	54.0	51.0	51.0
6 Rural	52.0	53.0	55.0	55.0	55.0	58.0	58.0	54.0	53.0	53.0

**Table III-4**  
**Afternoon Peak-Period Directional Split Estimates for JOHRTS**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	55.0	54.0	62.0	62.0	62.0	52.0	52.0	57.5	54.0	54.0
2 CBD Fringe	72.0	54.0	59.0	59.0	59.0	53.0	53.0	64.5	54.0	54.0
3 Urban	72.0	56.0	57.0	57.0	57.0	54.0	54.0	68.0	56.0	56.0
4 Suburban	72.0	67.0	60.0	60.0	60.0	65.0	65.0	62.5	67.0	67.0
5 Suburban Fringe	71.0	66.0	63.0	63.0	63.0	64.0	64.0	67.0	66.0	66.0
6 Rural	71.0	65.0	66.0	66.0	66.0	63.0	63.0	70.0	65.0	65.0

## Time-of-Day Capacity Factors

The 24-hour capacity restraint assignments are performed using non-directional 24-hour capacities. The non-directional capacities are included in the assignment data set which are input to PREPIN. User-supplied time-of-day capacity factors are applied to the non-directional capacity (or service volume) for the subject time period. In computing the directional V/C ratio for estimating the directional speeds, PREPIN assumes the directional split for capacity to be 50-50.

Table III-5 summarizes the typical 24-hour capacities per lane used in the JOHRTS highway networks. Table III-6 summarizes the estimated hourly capacities per lane used in developing the capacity factors. These capacities were developed to be consistent with the hourly capacities used in the Dallas-Fort Worth region for the application of their speed models. The capacity factors for a given time period are computed as follows:

$$\text{Capacity Factor} = \frac{(\text{Hourly Capacity per Lane})(\text{Length of the Time Period})}{24\text{-hour Capacity per Lane}}$$

The length of the time period is specified in hours. Capacity factors (stratified by area type and functional classification) were computed for each of the four time periods.

## Freeflow Speed Factors

The application of the Dallas-Fort Worth speed models requires an estimate of the freeflow speed on the link. These freeflow speed estimates are computed using the 24-hour speeds input on the link data. The freeflow speed factors (stratified by area type and functional classification) are applied to the 24-hour nondirectional link speeds to estimate the freeflow speed. The freeflow speed is assumed to be the same in each direction.

Table III-7 summarizes the typical 24-hour speeds used in the 1990 JOHRTS highway network. Table III-8 summarizes the typical freeflow speed estimates used in estimating the freeflow speed factors. These freeflow speed estimates were developed to be consistent with those used in the 1990 JOHRTS emissions inventories. The freeflow speed factor for a given functional class and area type is computed by simply dividing the freeflow speed by the 24-hour speed. These user-estimated factors are input to the PREPIN program using SPDFAC records.

**Table III-5  
Typical 24-Hour Capacities per Lane for the JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	-	19,893.58	17,033.33	8,538.40	6,450.00	3,600.00	5,150.97	4,704.58	8,538.40	6,300.00
2 CBD Fringe	-	19,893.58	17,033.33	7,966.38	5,800.00	6,229.17	4,728.09	4,049.87	7,966.38	6,300.00
3 Urban	-	15,762.01	15,854.44	7,516.84	5,504.44	5,490.65	4,440.21	3,923.80	8,541.48	6,300.00
4 Suburban	-	17,636.57	4,250.00	7,105.01	5,484.15	4,329.89	3,385.55	2,833.07	6,235.72	5,700.00
5 Suburban Fringe	-	12,850.00	4,100.00	6,690.3	4,950.00	3,868.26	2,923.92	2,050.00	5,050.76	5,100.00
6 Rural	-	11,412.88	3,482.00	5,943.28	4,173.26	3,395.49	2,451.15	1,840.65	4,598.58	4,500.00

**Table III-6  
Estimated Typical Hourly Capacities per Lane for JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	-	1,800.00	550.00	550.00	500.00	550.0	500.00	425.0	550.0	1,100.0
2 CBD Fringe	-	1,850.00	600.00	600.00	550.00	600.0	550.00	450.0	600.0	1,200.0
3 Urban	-	1,875.00	650.00	650.00	600.00	625.0	575.00	475.0	625.0	1,250.0
4 Suburban	-	1,950.00	725.00	725.00	675.00	700.0	625.00	525.0	700.0	1,400.0
5 Suburban Fringe	-	1,950.00	725.00	725.00	675.00	700.0	625.00	525.0	700.0	1,400.0
6 Rural	-	2,000.00	800.00	800.00	725.00	750.0	675.00	550.0	750.0	1,500.0

**Table III-7**  
**Average 24-Hour Speeds for the JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	10.0	38.0	37.0	19.5	15.0	14.0	14.0	14.0	33.0	34.0
2 CBD Fringe	13.3	38.0	37.3	23.2	23.0	21.5	21.5	18.9	33.0	34.0
3 Urban	15.1	39.4	38.0	24.8	23.5	24.2	22.2	21.3	33.4	34.6
4 Suburban	20.1	43.8	45.9	29.5	28.6	29.0	24.4	23.0	36.5	37.3
5 Suburban Fringe	24.2	53.5	54.2	34.5	30.5	29.7	29.7	26.8	41.1	41.6
6 Rural	29.0	55.4	54.6	37.4	33.3	32.6	32.6	30.1	44.4	46.3

**Table III-8**  
**Estimated Typical Freeflow Speeds for the JOHRTS Network**

AREA TYPES	FUNCTIONAL CLASSIFICATIONS									
	0	1	2	3	4	5	6	7	8	9
	Cent. Conn.	IH 10 & Freeway	Multi-lane Highway	Principal Arterial Divided	Principal Arterial Undivided	Minor Arterial Divided	Minor Arterial Undivided	Collectors	Frontage Road	Ramps
1 CBD	10.00	55.00	17.29	17.29	17.29	15.48	15.48	15.38	17.29	36.15
2 CBD Fringe	13.30	55.00	27.67	27.67	27.67	23.12	23.12	22.42	27.67	41.34
3 Urban	15.10	57.00	29.31	29.31	29.31	24.45	24.45	23.38	29.31	43.16
4 Suburban	19.90	57.00	38.10	38.10	38.10	32.35	32.35	29.87	38.10	47.55
5 Suburban Fringe	23.90	57.00	38.10	38.10	38.10	32.35	32.35	29.87	38.10	47.55
6 Rural	29.10	68.00	60.00	60.00	60.00	55.00	55.00	50.00	60.00	64.00



## Speed Model Parameters

In the Dallas-Fort Worth speed model implemented in the PREPIN program, the directional delay (in minutes per mile) due to congestion is computed using a volume-delay equation. The following is the general form of the volume-delay equation used in the model:

$$Delay = Min [A e^{B(\frac{V}{C})}, M]$$

Where:

Delay	=	Congestion delay (in minutes/mile)
A & B	=	Volume-Delay Equation Coefficients (input via DELAY records into the PREPIN program)
M	=	Maximum minutes of delay per mile, read from the DELAY cards
V/C	=	Time-of-day directional V/C ratio

Two sets of coefficients and constraints were developed by the NCTCOG for the D-FW model: one for high-capacity facilities and one for low-capacity facilities. High-capacity facilities (usually freeways) are defined as those having a capacity exceeding 3,400 vehicles per hour (one way). The volume-delay equation parameters which were developed by the NCTCOG in late 1992 for use in the D-FW air quality analyses are presented in Table III-9.

**Table III-9  
Volume-Delay Equation Parameters**

Parameters	Parameter Values	
	High-capacity Facilities	Low-capacity Facilities
A	0.015	0.050
B	3.5	3.0
M	5.0	10.0

Because the functional classification codes used in the link data may vary from study area to study area, PREPIN requires that the user specify the desired delay equation parameters by county and functional class. For the JOHRTS conformity applications, the high-capacity facilities parameter values in Table III-9 were used for functional classifications 1 and 2 (i.e., Interstate

Highway 10 and Freeways and Multi-lane Highways). The low-capacity facilities parameter values in Table III-9 were used for all other functional classes. The speed models are not applied to centroid connectors. Because centroid connectors represent local streets which generally are relatively uncongested, it is assumed the 24-hour speed is representative of both the peak and off-peak speeds on these facilities.

Given the estimated directional delay (in minutes/mile) and the estimated freeflow speed, the directional congested speed is computed as follows:

$$\text{Congested speed} = \frac{60}{\frac{60}{\text{Freeflow speed}} + \text{Delay}}$$

These congested directional speed estimates for each link are included in the link records produced by PREPIN for subsequent input to the IMPSUM program to estimate the mobile emissions for the traffic moving at this estimated speed.

### Other Data Inputs

The remaining data inputs to the PREPIN program are:

- The 24-hour Assignment Data Set: This is the network data set produced by the Texas Assignment Package which contains the capacity restraint assignment results. The PREPIN program uses this data set to obtain the following information for each link: the link's III-node and B-node numbers, the link's functional classification, link distance, the input link data speed, and the final nondirectional capacity restrained assignment volume.
- The Assignment Trip Table: This is the packed 24-hour assignment trip table data set used to produce the subject assignment. The PREPIN program uses this data set to obtain the 24-hour intrazonal trips for each zone.
- The Zonal Radii Data: These data are the zonal radii estimates used as input to the trip distribution model applications for the JOHRTS area. These zonal radii estimates are used by PREPIN to estimate the average trip length of intrazonal trips.

These data sets were developed by TxDOT for use in the JOHRTS conformity analyses.

#### IV. ESTIMATION OF EMISSION RATES USING MOBILE5a

The MOBILE5a program was used to compute the mobile source emission rates (or factors) for the JOHRTS Conformity Analyses. The MOBILE5a program was used directly for the computation of 24-hour diurnal emission rates. The MOBILE5a program was applied using the POLFAC5A program to estimate the emission factors by speed for each of the four time-of-day time periods (i.e., AM Peak Hour, Midday, PM Peak Hour, and Overnight).

The POLFAC5A program is one of a series of programs developed by the Texas Transportation Institute to facilitate the computation of mobile source emissions. The POLFAC5A program is used to apply MOBILE5a to obtain emission factors. The emission factors are obtained for eight vehicle types and 63 speeds (i.e., 3 mph through 65 mph) for each vehicle type. Hence, there are 504 factors (i.e.,  $8 \times 63 = 504$ ) for each pollution type for each county. Three pollution types are computed: VOC, CO, and NOX. Hence, for each county there are 1,512 emission factors. These emission factors are output to an ASCII file for subsequent input to either the IMPSUM program or the COADJ program. For JOHRTS, the POLFAC5A program was applied for each of the four time-of-day time periods for a given year and season. The emission factors from POLFAC5A are applied using the IMPSUM program to estimate emissions.

#### Estimation of Temperatures by Time Period

TNRCC provided the 24-hour temperature ranges for the JOHRTS area as presented in Table IV-1.

**Table IV-1  
Temperature Ranges**

Season	Low	High	Ambient
Summer Ozone	70	93	85.6

TNRCC suggested that the hourly temperature data from Houston Intercontinental Airport for the 14 event days should be used in developing time-of-day time period temperature estimates for the JOHRTS area. These temperature data were also used for the emissions inventories for the Houston-Galveston region. The average temperature for each of the 24-hour periods was computed using these data; the average observed temperatures for each of the four time periods were computed and are summarized in Table IV-2. The high and low temperatures in the observed data (Table IV-2) are different from those specified in Table IV-1. To use these observed data to estimate the average temperatures for the four time periods for the temperature ranges in Table IV-1, the value of P in the following formula was computed for each time period:

Where:

$$T_i = T_{low} + P_i(T_{high} - T_{low})$$

- $T_i$  = Temperature for time period i
- $T_{low}$  = Low Temperature
- $T_{high}$  = High Temperature
- $P_i$  = P factor for time period i

The P factors for each time period are also summarized in Table IV-2.

The estimated temperatures for each time period were computed using the high and low temperatures provided by TNRCC (see Table IV-1) and the P factors developed using the observed data (see Table IV-2). The resulting estimated average temperatures for each of the four time periods are shown in Table IV-3.

Diurnal rates were computed using a separate application of MOBILE5a. Each application of MOBILE5a requires three temperature inputs: the low temperature, the high temperature, and the ambient temperature. To avoid computing diurnals for the four time periods, the same temperature was input for the low, the high, and the ambient temperatures. Table IV-4 lists the temperature inputs for each of the four time periods and the 24-hour diurnal applications for the JOHRTS Region.

**Table IV-2**  
**Observed Temperature Data for 14 Days**

	Average Observed Temp	P Factor
LOW Observed Avg. Temp	67.7	-
Time Period 1 (AM Peak)	73.6	0.2556
Time Period 2 (Mid-day)	86.9	0.8281
Time Period 3 (PM Peak)	88.4	0.8909
Time Period 4 (Overnight)	74.1	0.2748
HIGH Observed Avg. Temp.	90.9	-

**Table IV-3**  
**Estimated Time-of-Day Average Temperatures for Conformity Analyses**

	Estimated Temp	P Factor
LOW Observed Avg. Temp	70.0	-
Time Period 1 (AM Peak)	75.9	0.2556
Time Period 2 (Mid-day)	89.0	0.8281
Time Period 3 (PM Peak)	90.5	0.8909
Time Period 4 (Overnight)	76.3	0.2748
HIGH Observed Avg. Temp.	93.0	-

**Table IV-4**  
**MOBILE5a Temperature Inputs Used for JOHRTS Conformity Applications**

	MOBILE5a Temperature Inputs		
	Low	High	Ambient
Time Period 1 (AM Peak)	75.9	76.5	76.5
Time Period 2 (Mid-day)	89.0	92.7	92.7
Time Period 3 (PM Peak)	90.5	94.2	94.2
Time Period 4 (Overnight)	76.3	73.6	73.6
24-hour Diurnal Application	70.0	93.0	85.6

## **Application of the COADJ Utility Program for 1990 Emission Rates**

The special utility program COADJ which produces a new set of emission factors by combining the emission factors from three applications of the POLFAC5A program. The program reads the emission factors from three data sets (FT01F001, FT02F001, and FT03F001) produced by the three applications of POLFAC5A. In the 1990 JOHRTS applications of COADJ, the three data sets contained the following emission factors:

- FT01F001: Emission factors from the POLFAC5A application which specified no Anti-Tampering Program and no Inspection and Maintenance (I/M) Program.
- FT02F001: Emission factors from the POLFAC5A application which specified an Anti-Tampering Program for model years 1968 to 1979 and an Inspection and Maintenance Program.
- FT03F001: Emission factors from the POLFAC5A application which specified an Anti-Tampering Program for model years 1980 to present and no Inspection and Maintenance Program.

The corresponding emission factors from FT02F001 and FT03F001 are summed, and the corresponding emission factors from FT01F001 are subtracted from the sums. The resulting set of emission factors are output in a data set for input to the IMPSUM program.

The COADJ program was originally developed for use in conjunction with MOBILE4.1. MOBILE4.1 allowed only one I/M program. The COADJ program and the procedure described above was needed to specify two I/M programs. The 1990 MOBILE set-ups continued to use this approach for the applications using MOBILE5a. COADJ was not needed for the 1995, 1996, and 1999 applications using MOBILE5a.

### **MOBILE5a Set-ups**

Tables IV-5, IV-7, and IV-9 are the 1990 MOBILE5A set-ups for Time Period 1 for Hardin County, Jefferson County, and Orange County. These were used to develop the 1990 summer emission factors for Time Period 1 (i.e., the AM Peak Period) for each of the three counties. The three temperature inputs in each set-up are highlighted in the last two lines of the input data. The temperatures are the only changes made in the set-ups to develop the emission factors for Time Period 2 (Mid-day), Time Period 3 (PM Peak Period) and Time Period 4 (Overnight). The temperature inputs used for the other three time periods are listed Table IV-4.

Tables IV-6, IV-8, and IV-10 are the three 1990 MOBILE5A set-ups for each county used to develop the 1990 summer 24-hour diurnal emission rates. These three sets of rates are input to the SUMALL program for computing the 24-hour diurnals for each county.

Tables IV-11, IV-13, and IV-15 are the 1996 MOBILE5a set-ups for Time Period 1 for

Hardin County, Jefferson County and Orange County. These were used to develop the 1996 summer emission factors for Time Period 1 (the AM Peak Period) for each of the three counties. Again, the three temperature inputs in each set-up are highlighted in the last two lines of the input data. The temperatures are the only changes made in the set-ups to develop the emission factors for Time Period 2 (Mid-day), Time Period 3 (PM Peak Period) and Time Period 4 (Overnight). The temperature inputs used for the other three time periods are listed Table IV-4.

Tables IV-12, IV-14, and IV-16 are the three 1996 MOBILE5a set-ups for each county used to develop the 1996 summer 24-hour diurnal emission rates. These three sets of rates are input to the SUMALL program for computing the 24-hour diurnals for each county.

Tables IV-17, IV-19, and IV-21 are the 1999 MOBILE5a set-ups for time period 1 for Hardin County, Jefferson County, and Orange County. These were used to develop the 1999 summer emission factors for Time Period 1 (the AM Peak Period) for each of the three counties. Again, the three temperature inputs in each set-up are highlighted in the last two lines of the input data. The temperatures are the only changes made in the set-ups to develop the emission factors for Time Period 2 (Mid-day), Time Period 3 (PM Peak Period) and Time Period 4 (Overnight). The temperature inputs used for the other three time periods are listed Table IV-4.

Tables IV-18, IV-20, and IV-22 are the three 1999 MOBILE5a set-ups for each county used to develop the 1999 summer 24-hour diurnal emission rates. These three sets of rates are input to the SUMALL program for computing the 24-hour diurnals for each county.

**Table IV-5**  
**1990 Hardin County MOBILE5a Set-up**  
**for Time Period 1**

1	PROMPT		
1	Hardin County Ozone Season 1990		T1
1	TAMFLG - Default: Tampering Rates		
1	SPDFLG - User input: one speed for all vehicle types		
3	VMFLAG - User input: single VMT mix for all scenario		
3	MYMRFG - User input: Reg. Distributions		
1	NEWFLG - Default: Basic exhaust emission rates		
1	IMFLAG - no I/M		
1	ALHFLG - No additional correction factors		
1	ATPFLG - no atp		
5	RLFLAG - Zero-out refueling emissions		
2	LOCFLG - User input: one LAP record for all scenarios		
1	TEMFLG - MOBILE5.0 calculates exhaust temperatures		
4	OUTFMT - 80-column descriptive format		
4	PRTFLG - Print all three pollutant emission factors		
1	IDLFLG - No idle emissions calculated or printed		
3	NMHFLG - Print HC = volatile organic compounds (VOC)		
1	HCFLAG - Print total HC		
	.598.346.030.010.008.004.003.001 VMT mix: LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV		
	.052 .085 .079 .076 .075 .084 .081 .058 .057 .059 July,1990 .LDGV..MY AGES 1-1		
	.051 .058 .051 .038 .023 .012 .011 .010 .008 .006 Vehicle 11-		
	.008 .005 .005 .004 .004 Registrations 21-		
	.099 .099 .079 .061 .068 .066 .075 .046 .053 .052 .LDGT1.MY AGES 1-1		
	.038 .049 .046 .036 .025 .014 .014 .013 .011 .009 11-		
	.013 .009 .008 .007 .007 21-		
	.128 .092 .072 .030 .076 .065 .083 .058 .064 .028 .LDGT2.MY AGES 1-1		
	.036 .048 .047 .041 .040 .024 .015 .013 .005 .006 11-		
	.008 .005 .005 .004 .003 21-		
	.024 .029 .031 .051 .018 .046 .040 .026 .077 .070 .HDGV..MY AGES 1-1		
	.051 .079 .090 .042 .024 .053 .042 .044 .029 .013 11-		
	.037 .024 .024 .020 .018 21-		
	.052 .085 .079 .076 .075 .084 .081 .058 .057 .059 .LDDV..MY AGES 1-1		
	.051 .058 .051 .038 .023 .012 .011 .010 .008 .006 11-		
	.008 .005 .005 .004 .004 21-		
	.099 .099 .079 .061 .068 .066 .075 .046 .053 .052 .LDDT..MY AGES 1-1		
	.038 .049 .046 .036 .025 .014 .014 .013 .011 .009 11-		
	.013 .009 .008 .007 .007 21-		
	.025 .044 .025 .031 .057 .088 .069 .025 .038 .082 .HDDV..MY AGES 1-1		
	.075 .082 .119 .013 .038 .038 .044 .044 .031 .013 11-		
	.006 .006 .006 .000 .000 21-		
	.003 .026 .048 .046 .083 .091 .061 .073 .126 .081 .MC....MY AGES 1-1		
	.096 .266 .000 .000 .000 .000 .000 .000 .000 .000 11-		
	.000 .000 .000 .000 .000 21-		
	Hardin BY Run 75.9 75.9 8.0 8.0 90 LAP rec: SCNME,MNTM		
	1 90 XXXX 75.9 20.6 27.3 20.6 7 SCN rec: RGN,CY,SP		



**Table IV-6**  
**1990 Hardin County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Hardin County Ozone Season 1990	
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - User input: single VMT mix for all scenario	
3	MYMRFG - User input: Reg. Distributions	
1	NEWFLG - Default: Basic exhaust emission rates	
1	IMFLAG - no I/M	
1	ALHFLG - No additional correction factors	
1	ATPFLG - no atp	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5.0 calculates exhaust temperatures	
3	OUTFMT - 112-Descriptive format	
4	PRTFLG - Print HC, CO, and NOX emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print HC = Volatile organic compounds (VOC)	
3	HCFLAG - HC components	
.598.346.030.010.008.004.003.001 VMT mix: LDGV,LDGT1,LDGT2,HGCV,LDDV,LDDT,HDDV,MC		
.052	.085 .079 .076 .075 .084 .081 .058 .057 .059	July,1990 .LDGV..MY AGES 1-10
.051	.058 .051 .038 .023 .012 .011 .010 .008 .006	Vehicle 11-20
.008	.005 .005 .004 .004	Registrations 21-25
.099	.099 .079 .061 .068 .066 .075 .046 .053 .052	.LDGT1.MY AGES 1-10
.038	.049 .046 .036 .025 .014 .014 .013 .011 .009	11-20
.013	.009 .008 .007 .007	21-25
.128	.092 .072 .030 .076 .065 .083 .058 .064 .028	.LDGT2.MY AGES 1-10
.036	.048 .047 .041 .040 .024 .015 .013 .005 .006	11-20
.008	.005 .005 .004 .003	21-25
.024	.029 .031 .051 .018 .046 .040 .026 .077 .070	.HDGV..MY AGES 1-10
.051	.079 .090 .042 .024 .053 .042 .044 .029 .013	11-20
.037	.024 .024 .020 .018	21-25
.052	.085 .079 .076 .075 .084 .081 .058 .057 .059	.LDDV..MY AGES 1-10
.051	.058 .051 .038 .023 .012 .011 .010 .008 .006	11-20
.008	.005 .005 .004 .004	21-25
.099	.099 .079 .061 .068 .066 .075 .046 .053 .052	.LDDT..MY AGES 1-10
.038	.049 .046 .036 .025 .014 .014 .013 .011 .009	11-20
.013	.009 .008 .007 .007	21-25
.025	.044 .025 .031 .057 .088 .069 .025 .038 .082	.HDDV..MY AGES 1-10
.075	.082 .119 .013 .038 .038 .044 .044 .031 .013	11-20
.006	.006 .006 .000 .000	21-25
.003	.026 .048 .046 .083 .091 .061 .073 .126 .081	.MC....MY AGES 1-10
.096	.266 .000 .000 .000 .000 .000 .000 .000 .000	11-20
.000	.000 .000 .000 .000	21-25
Hardin BY Run 70.093. 8.0 8.0 90 LAP rec:		
1 90 19.6 85.6 20.6 27.3 20.6 7 SCN rec:		

**Table IV-7**  
**1990 Jefferson County MOBILE5a Set-up**  
**for Time Period 1**

1	PROMPT		
1	JEFFERSON COUNTY - Base Year Ozone Season 1990		T1
1	TAMFLG - Default: Tampering Rates		
1	SPDFLG - User input: one speed for all vehicle types		
3	VMFLAG - User input: single VMT mix for all scenario		
3	MYMRFG - User input: Reg. Distributions		
1	NEWFLG - Default: Basic exhaust emission rates		
1	IMFLAG - no I/M		
1	ALHFLG - No additional correction factors		
1	ATPFLG - no atp		
5	RLFLAG - Zero-out refueling emissions		
2	LOCFLG - User input: one LAP record for all scenarios		
1	TEMFLG - MOBILE5.0 calculates exhaust temperatures		
4	QUTFMT - 80-column descriptive format		
4	PRTFLG - Print all three pollutant emission factors		
1	IDLFLG - No idle emissions calculated or printed		
3	NMHFLG - Print HC = volatile organic compounds (VOC)		
1	HCFLAG - Print total HC		
	.584 .237 .065 .036 .008 .004 .063 .003 - LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC		
	.060 .081 .076 .074 .074 .077 .079 .054 .053 .057 July,1990 .LDGV..MY AGES		1-1
	.051 .058 .051 .042 .026 .015 .012 .011 .008 .007 Vehicle		11-
	.009 .006 .006 .005 .005 Registrations		21-
	.070 .097 .077 .064 .071 .071 .077 .048 .060 .055 .LDGT1.MY AGES		1-1
	.038 .048 .044 .039 .027 .014 .016 .014 .012 .010		11-
	.014 .009 .009 .007 .007		21-
	.059 .089 .080 .036 .072 .087 .095 .062 .060 .044 .LDGT2.MY AGES		1-1
	.037 .060 .044 .050 .039 .023 .017 .014 .006 .006		11-
	.006 .004 .004 .003 .003		21-
	.036 .055 .052 .025 .040 .047 .059 .042 .054 .069 .HDGV..MY AGES		1-1
	.058 .078 .071 .044 .030 .046 .043 .031 .023 .012		11-
	.026 .017 .016 .014 .014		21-
	.060 .081 .076 .074 .074 .077 .079 .054 .053 .057 .LDDV..MY AGES		1-1
	.051 .058 .051 .042 .026 .015 .012 .011 .008 .007		11-
	.009 .006 .006 .005 .005		21-
	.070 .097 .077 .064 .071 .071 .077 .048 .060 .055 .LDDT..MY AGES		1-1
	.038 .048 .044 .039 .027 .014 .016 .014 .012 .010		11-
	.014 .009 .009 .007 .007		21-
	.022 .028 .040 .023 .062 .050 .043 .030 .056 .122 .HDDV..MY AGES		1-1
	.118 .097 .067 .045 .028 .047 .028 .028 .013 .013		11-
	.011 .007 .007 .006 .007		21-
	.017 .041 .049 .055 .100 .088 .055 .078 .118 .085 .MC....MY AGES		1-1
	.080 .231 .000 .000 .000 .000 .000 .000 .000 .000		11-
	.000 .000 .000 .000 .000		21-
	Jefferson BY Run 75.9 75.9 08.0 08.0 90 LAP rec: SCNME,MNTMP,MXTMP,RVP1,R		
	1 90 XXXX 75.9 20.6 27.3 20.6 7 SCN rec: RGN,CY,SPD,AMBTMP,PCCN,P		

**Table IV-8**  
**1990 Jefferson County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	JEFFERSON COUNTY	- Base Year Ozone Season 1990
1	TAMFLG	- Default: Tampering Rates
1	SPDFLG	- User input: one speed for all vehicle types
3	VMFLAG	- User input: single VMT mix for all scenario
3	MYMRFG	- User input: Reg. Distributions
1	NEWFLG	- Default: Basic exhaust emission rates
1	IMFLAG	- no I/M
1	ALHFLG	- No additional correction factors
1	ATPFLG	- no atp
5	RLFLAG	- Zero-out refueling emissions
2	LOCFLG	- User input: one LAP record for all scenarios
1	TEMFLG	- MOBILE5.0 calculates exhaust temperatures
3	OUTFMT	- 112-Descriptive format
4	PRTFLG	- Print HC, CO, and NOX emission factors
1	IDLFLG	- No idle emissions calculated or printed
3	NMHFLG	- Print HC = Volatile organic compounds (VOC)
3	HCFLAG	- HC components
.584.237.065.036.008.004.063.003 - LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC		
.060	.081	.076 .074 .074 .077 .079 .054 .053 .057 July,1990 .LDGV..MY AGES 1-10
.051	.058	.051 .042 .026 .015 .012 .011 .008 .007 Vehicle 11-20
.009	.006	.006 .005 .005 Registrations 21-25
.070	.097	.077 .064 .071 .071 .077 .048 .060 .055 .LDGT1.MY AGES 1-10
.038	.048	.044 .039 .027 .014 .016 .014 .012 .010 11-20
.014	.009	.009 .007 .007 21-25
.059	.089	.080 .036 .072 .087 .095 .062 .060 .044 .LDGT2.MY AGES 1-10
.037	.060	.044 .050 .039 .023 .017 .014 .006 .006 11-20
.006	.004	.004 .003 .003 21-25
.036	.055	.052 .025 .040 .047 .059 .042 .054 .069 .HDGV..MY AGES 1-10
.058	.078	.071 .044 .030 .046 .043 .031 .023 .012 11-20
.026	.017	.016 .014 .014 21-25
.060	.081	.076 .074 .074 .077 .079 .054 .053 .057 .LDDV..MY AGES 1-10
.051	.058	.051 .042 .026 .015 .012 .011 .008 .007 11-20
.009	.006	.006 .005 .005 21-25
.070	.097	.077 .064 .071 .071 .077 .048 .060 .055 .LDDT..MY AGES 1-10
.038	.048	.044 .039 .027 .014 .016 .014 .012 .010 11-20
.014	.009	.009 .007 .007 21-25
.022	.028	.040 .023 .062 .050 .043 .030 .056 .122 .HDDV..MY AGES 1-10
.118	.097	.067 .045 .028 .047 .028 .028 .013 .013 11-20
.011	.007	.007 .006 .007 21-25
.017	.041	.049 .055 .100 .088 .055 .078 .118 .085 .MC....MY AGES 1-10
.080	.231	.000 .000 .000 .000 .000 .000 .000 .000 11-20
.000	.000	.000 .000 .000 21-25
Jefferson BY Run 70.093.08.0 08.0 90 LAP rec:		
1	90	19.6 85.6 20.6 27.3 20.6 7 SCN rec:

**Table IV-9**  
**1990 Orange County MOBILE5a Set-up**  
**for Time Period 1**

1	PROMPT		
1	Orange County Base Year 1990		T1
1	TAMFLG - Default: Tampering Rates		
1	SPDFLG - User input: one speed for all vehicle types		
3	VMFLAG - User input: single VMT mix for all scenario		
3	MYMRFG - User input: Reg. Distributions		
1	NEWFLG - Default: Basic exhaust emission rates		
1	IMFLAG - no I/M		
1	ALHFLG - No additional correction factors		
1	ATPFLG - no atp		
5	RLFLAG - Zero-out refueling emissions		
2	LOCFLG - User input: one LAP record for all scenarios		
1	TEMFLG - MOBILE5.0 calculates exhaust temperatures		
4	OUTFMT - 80-column descriptive format		
4	PRTFLG - Print all three pollutant emission factors		
1	IDLFLG - No idle emissions calculated or printed		
3	NMHFLG - Print HC = volatile organic compounds (VOC)		
1	HCFLAG - Print total HC		
.584.237.065.036.008.004.063.003 - LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC			
.028	.071	.079	.070 .075 .076 .082 .057 .059 .062 July,1990 .LDGV..MY AGES 1-1
.060	.063	.057	.046 .029 .016 .014 .011 .009 .006 Vehicle 11-
.009	.006	.006	.005 .005 Registrations 21-
.027	.081	.075	.059 .066 .070 .070 .051 .061 .063 .LDGT1.MY AGES 1-1
.045	.059	.056	.045 .033 .018 .018 .015 .015 .011 11-
.018	.012	.011	.010 .009 21-
.027	.091	.061	.033 .073 .080 .096 .059 .074 .045 .LDGT2.MY AGES 1-1
.034	.064	.052	.049 .063 .028 .018 .012 .012 .003 11-
.008	.005	.005	.004 .003 21-
.013	.042	.031	.016 .037 .048 .056 .040 .035 .071 .HDGV..MY AGES 1-1
.056	.058	.077	.053 .055 .053 .048 .026 .035 .021 11-
.039	.026	.024	.021 .019 21-
.028	.071	.079	.070 .075 .076 .082 .057 .059 .062 .LDDV..MY AGES 1-1
.060	.063	.057	.046 .029 .016 .014 .011 .009 .006 11-
.009	.006	.006	.005 .005 21-
.027	.081	.075	.059 .066 .070 .070 .051 .061 .063 .LDDT..MY AGES 1-1
.045	.059	.056	.045 .033 .018 .018 .015 .015 .011 11-
.018	.012	.011	.010 .009 21-
.005	.005	.021	.021 .027 .043 .059 .021 .032 .128 .HDDV..MY AGES 1-1
.133	.101	.128	.053 .053 .032 .037 .032 .011 .016 11-
.011	.011	.011	.005 .005 21-
.007	.032	.045	.061 .091 .083 .056 .062 .119 .109 .MC....MY AGES 1-1
.093	.244	.000	.000 .000 .000 .000 .000 .000 .000 11-
.000	.000	.000	.000 .000 21-
Orange BY Run 75.9 75.9 08.0 08.0 90 LAP rec: SCNME,MNTMP,MXTMP,RVP1,R			
1 90 XXXX 75.9 20.6 27.3 20.6 7 SCN rec: RGN,CY,SPD,AMBTMP,PCCN,P			

**Table IV-10**  
**1990 Orange County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Orange County Base Year 1990	
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - User input: single VMT mix for all scenario	
3	MYMRFG - User input: Reg. Distributions	
1	NEWFLG - Default: Basic exhaust emission rates	
1	IMFLAG - no I/M	
1	ALHFLG - No additional correction factors	
1	ATPFLG - no atp	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5.0 calculates exhaust temperatures	
3	OUTFMT - 112-Descriptive format	
4	PRTFLG - Print HC, CO, and NOX emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print HC = Volatile organic compounds (VOC)	
3	HCFLAG - HC components	
	.584.237.065.036.008.004.063.003 - LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC	
	.028 .071 .079 .070 .075 .076 .082 .057 .059 .062 July,1990 .LDGV..MY AGES 1-10	
	.060 .063 .057 .046 .029 .016 .014 .011 .009 .006 Vehicle 11-20	
	.009 .006 .006 .005 .005 Registrations 21-25	
	.027 .081 .075 .059 .066 .070 .070 .051 .061 .063 .LDGT1.MY AGES 1-10	
	.045 .059 .056 .045 .033 .018 .018 .015 .015 .011 11-20	
	.018 .012 .011 .010 .009 21-25	
	.027 .091 .061 .033 .073 .080 .096 .059 .074 .045 .LDGT2.MY AGES 1-10	
	.034 .064 .052 .049 .063 .028 .018 .012 .012 .003 11-20	
	.008 .005 .005 .004 .003 21-25	
	.013 .042 .031 .016 .037 .048 .056 .040 .035 .071 .HDGV..MY AGES 1-10	
	.056 .058 .077 .053 .055 .053 .048 .026 .035 .021 11-20	
	.039 .026 .024 .021 .019 21-25	
	.028 .071 .079 .070 .075 .076 .082 .057 .059 .062 .LDDV..MY AGES 1-10	
	.060 .063 .057 .046 .029 .016 .014 .011 .009 .006 11-20	
	.009 .006 .006 .005 .005 21-25	
	.027 .081 .075 .059 .066 .070 .070 .051 .061 .063 .LDDT..MY AGES 1-10	
	.045 .059 .056 .045 .033 .018 .018 .015 .015 .011 11-20	
	.018 .012 .011 .010 .009 21-25	
	.005 .005 .021 .021 .027 .043 .059 .021 .032 .128 .HDDV..MY AGES 1-10	
	.133 .101 .128 .053 .053 .032 .037 .032 .011 .016 11-20	
	.011 .011 .011 .005 .005 21-25	
	.007 .032 .045 .061 .091 .083 .056 .062 .119 .109 .MC....MY AGES 1-10	
	.093 .244 .000 .000 .000 .000 .000 .000 .000 .000 11-20	
	.000 .000 .000 .000 .000 21-25	
	Orange BY Run 70.093.08.0 08.0 90 LAP rec:	
	1 90 19.6 85.6 20.6 27.3 20.6 7 SCN rec:	

**Table IV-11  
1996 Hardin County MOBILE5a Set-up  
for Time Period 1**

1	PROMPT		
1	Hardin County Projected Control 1996 Inventory Tier I, Projected I/M	T1	
1	TAMFLG - Default: Tampering Rates		
1	SPDFLG - User input: one speed for all vehicle types		
3	VMFLAG - 1996 Projected VMT		
3	MYMFLG - 1996 Projected vehicle registrations		
1	NEWFLG - Default BERS		
2	IMFLAG - 1994 I/M		
1	ALHFLG - No additional correction factors		
5	ATPFLG - ATP & Pressure Test		
5	RLFLAG - Zero-out refueling emissions		
2	LOCFLG - User input: one LAP record for all scenarios		
1	TEMFLG - MOBILE5A calculates exhaust temperatures		
4	OUTFMT - 80 column descriptive		
4	PRTFLG - Print all three pollutants		
1	IDLFLG - No idle emissions calculated or printed		
3	NMHFLG - Print volatile organic compounds (VOC)		
1	HCFLAG - Print total HC		
	.604.348.030.010.002.002.003.001	VMT mix:	LDGV,LDGT1,LDGT2,HGTV,LDDV,L
	.061 .081 .082 .082 .081 .076 .074 .073 .063 .051	July,1996	.LDGV..MY AGES 1-1
	.048 .047 .040 .026 .022 .019 .015 .016 .014 .010	Vehicle	11-
	.005 .003 .002 .002 .006	Registrations	21-
	.053 .071 .074 .076 .076 .076 .067 .076 .060 .041		.LDGT1.MY AGES 1-1
	.044 .040 .043 .026 .028 .028 .018 .022 .021 .016		11-
	.011 .006 .006 .005 .016		21-
	.080 .107 .102 .098 .093 .065 .060 .049 .039 .019		.LDGT2.MY AGES 1-1
	.040 .035 .045 .021 .029 .013 .014 .016 .017 .016		11-
	.011 .007 .005 .005 .012		21-
	.035 .046 .047 .048 .049 .043 .040 .045 .035 .016		.HDGV..MY AGES 1-1
	.020 .047 .054 .023 .075 .054 .047 .060 .056 .020		11-
	.022 .024 .016 .020 .056		21-
	.061 .081 .082 .082 .081 .076 .074 .073 .063 .051		.LDDV..MY AGES 1-1
	.048 .047 .040 .026 .022 .019 .015 .016 .014 .010		11-
	.005 .003 .002 .002 .006		21-
	.053 .071 .074 .076 .076 .076 .067 .076 .060 .041		.LDDT..MY AGES 1-1
	.044 .040 .043 .026 .028 .028 .018 .022 .021 .016		11-
	.011 .006 .006 .005 .016		21-
	.024 .032 .035 .037 .035 .036 .026 .026 .017 .008		.HDDV..MY AGES 1-1
	.016 .106 .066 .035 .041 .047 .072 .045 .140 .019		11-
	.025 .025 .031 .025 .033		21-
	.005 .007 .021 .032 .032 .030 .027 .057 .021 .023		.MC....MY AGES 1-1
	.038 .707 .000 .000 .000 .000 .000 .000 .000 .000		11-
	.000 .000 .000 .000 .000		21-
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.		
	94 68 20 2222 12 095. 12211111		
	94 68 20 2222 12 095.		
	Hardin I/M	75.9 75.9 8.0 7.8 92	LAP rec: SCNME,MN
	1 96 xxxx	75.9 20.6 27.3 20.6 7	SCN rec: RGN,CY,

**Table IV-12  
1996 Hardin County MOBILE5a Set-up  
for 24-Hour Diurnals Rates**

1	PROMPT	
1	Hardin County Projected Control 1996 Inventory	Tier I, Projected I/M
1	TAMFLG	- Default: Tampering Rates
1	SPDFLG	- User input: one speed for all vehicle types
3	VMFLAG	- 1996 Projected VMT
3	MYMRFG	- 1996 Projected vehicle registrations
1	NEWFLG	- Default BERs
2	IMFLAG	- 1994 I/M
1	ALHFLG	- No additional correction factors
5	ATPFLG	- ATP & Pressure Test
5	RLFLAG	- Zero-out refueling emissions
2	LOCFLG	- User input: one LAP record for all scenarios
1	TEMFLG	- MOBILE5A calculates exhaust temperatures
3	OUTFMT	- 112-Descriptive format
4	PRTFLG	- Print HC, CO, and NOX emission factors
1	IDLFLG	- No idle emissions calculated or printed
3	NMHFLG	- Print HC = Volatile organic compounds (VOC)
3	HCFLAG	- HC components
	.604.348.030.010.002.002.003.001	VMT mix:
	LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC	
	.061 .081 .082 .082 .081 .076 .074 .073 .063 .051	July,1996 .LDGV..MY AGES 1-10
	.048 .047 .040 .026 .022 .019 .015 .016 .014 .010	Vehicle 11-20
	.005 .003 .002 .002 .006	Registrations 21-25
	.053 .071 .074 .076 .076 .076 .067 .076 .060 .041	.LDGT1..MY AGES 1-10
	.044 .040 .043 .026 .028 .028 .018 .022 .021 .016	11-20
	.011 .006 .006 .005 .016	21-25
	.080 .107 .102 .098 .093 .065 .060 .049 .039 .019	.LDGT2..MY AGES 1-10
	.040 .035 .045 .021 .029 .013 .014 .016 .017 .016	11-20
	.011 .007 .005 .005 .012	21-25
	.035 .046 .047 .048 .049 .043 .040 .045 .035 .016	.HDGV..MY AGES 1-10
	.020 .047 .054 .023 .075 .054 .047 .060 .056 .020	11-20
	.022 .024 .016 .020 .056	21-25
	.061 .081 .082 .082 .081 .076 .074 .073 .063 .051	.LDDV..MY AGES 1-10
	.048 .047 .040 .026 .022 .019 .015 .016 .014 .010	11-20
	.005 .003 .002 .002 .006	21-25
	.053 .071 .074 .076 .076 .076 .067 .076 .060 .041	.LDDT..MY AGES 1-10
	.044 .040 .043 .026 .028 .028 .018 .022 .021 .016	11-20
	.011 .006 .006 .005 .016	21-25
	.024 .032 .035 .037 .035 .036 .026 .026 .017 .008	.HDDV..MY AGES 1-10
	.016 .106 .066 .035 .041 .047 .072 .045 .140 .019	11-20
	.025 .025 .031 .025 .033	21-25
	.005 .007 .021 .032 .032 .030 .027 .057 .021 .023	.MC....MY AGES 1-10
	.038 .707 .000 .000 .000 .000 .000 .000 .000 .000	11-20
	.000 .000 .000 .000 .000	21-25
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.	
	94 68 20 2222 12 095. 12211111	
	94 68 20 2222 12 095.	
	Hardin I/M 70.093. 8.0 7.8 92	LAP rec:
	1 96 19.6 85.6 20.6 27.3 20.6 7	SCN rec:

**Table IV-13**  
**1996 Jefferson County MOBILE5a Set-up**  
**for Time Period 1**

1	PROMPT		
1	Jefferson County Control Strategy Projection Tier I, Projected I/M		T1
1	TAMFLG - Default: Tampering Rates		
1	SPDFLG - User input: one speed for all vehicle types		
3	VMFLAG - 1996 Projected VMT mix		
3	MYMRFG - 1996 Projected vehicle registration		
1	NEWFLG - Default BER		
2	IMFLAG - 1994 I/M		
1	ALHFLG - No additional correction factors		
5	ATPFLG - ATP & Pressure Test		
5	RLFLAG - Zero-out refueling emissions		
2	LOCFLG - User input: one LAP record for all scenarios		
1	TEMFLG - MOBILE5A calculates exhaust temperatures		
4	OUTFMT - 80 Column descriptive		
4	PRTFLG - Print all three pollutant emission factors		
1	IDLFLG - No idle emissions calculated or printed		
3	NMHFLG - Print volatile organic compounds (VOC)		
1	HCFLAG - Print total HC		
	.590.240.065.037.002.001.062.003	VMT Mix: LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HD	
	.048 .070 .069 .075 .080 .082 .075 .074 .066 .058	July,1996 .LDGV..MY AGES	1-1
	.052 .049 .044 .027 .023 .021 .017 .018 .015 .012	TTI Vehicle	11-
	.006 .004 .003 .003 .008	Registrations	21-
	.066 .084 .081 .078 .074 .061 .065 .052 .042	.LDGT1.MY AGES	1-1
	.043 .041 .042 .026 .029 .025 .017 .021 .019 .016		11-
	.011 .005 .006 .005 .015		21-
	.076 .097 .092 .088 .084 .064 .054 .058 .047 .021	.LDGT2.MY AGES	1-1
	.039 .045 .046 .028 .026 .019 .015 .024 .017 .019		11-
	.015 .008 .006 .005 .007		21-
	.053 .069 .067 .065 .064 .055 .051 .049 .046 .027	.HDGV..MY AGES	1-1
	.034 .042 .042 .027 .036 .039 .029 .038 .036 .026		11-
	.014 .023 .021 .018 .033		21-
	.048 .070 .069 .075 .080 .082 .075 .074 .066 .058	.LDDV..MY AGES	1-1
	.052 .049 .044 .027 .023 .021 .017 .018 .015 .012		11-
	.006 .004 .003 .003 .008		21-
	.066 .084 .081 .078 .074 .061 .065 .052 .042	.LDDT..MY AGES	1-1
	.043 .041 .042 .026 .029 .025 .017 .021 .019 .016		11-
	.011 .005 .006 .005 .015		21-
	.055 .067 .066 .063 .057 .072 .044 .025 .035 .031	.HDDV..MY AGES	1-1
	.040 .049 .032 .025 .034 .071 .056 .049 .033 .022		11-
	.013 .017 .011 .012 .022		21-
	.023 .032 .033 .032 .034 .022 .022 .039 .031 .026	.MC....MY AGES	1-1
	.052 .653 .000 .000 .000 .000 .000 .000 .000		11-
	.000 .000 .000 .000 .000		21-
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.		
	94 68 20 2222 12 095. 12211111		
	94 68 20 2222 12 095.		
	Jef I/M	75.9 75.9 08.0 07.8 92	LAP rec: SCNME,MNTMP,MXTMP,RVP1,R
	1 96 XXXX 75.9 20.6 27.3 20.6 7		SCN rec: RGN,CY,SPD,AMBTMP,PCCN,P



**Table IV-14**  
**1996 Jefferson County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Jefferson County Control Strategy Projection Tier I, Projected I/M	
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - 1996 Projected VMT mix	
3	MYMRFG - 1996 Projected vehicle registration	
1	NEWFLG - Default BER	
2	IMFLAG - 1994 I/M	
1	ALHFLG - No additional correction factors	
5	ATPFLG - ATP & Pressure Test	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5A calculates exhaust temperatures	
3	OUTFMT - 112-Descriptive format	
4	PRTFLG - Print HC, CO, and NOX emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print HC = Volatile organic compounds (VOC)	
3	HCFLAG - HC components	
	.590.240.065.037.002.001.062.003	VMT Mix: LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC
	.048 .070 .069 .075 .080 .082 .075 .074 .066 .058	July,1996 .LDGV..MY AGES 1-10
	.052 .049 .044 .027 .023 .021 .017 .018 .015 .012	TTI Vehicle 11-20
	.006 .004 .003 .003 .008	Registrations 21-25
	.066 .084 .081 .078 .074 .074 .061 .065 .052 .042	.LDGT1.MY AGES 1-10
	.043 .041 .042 .026 .029 .025 .017 .021 .019 .016	11-20
	.011 .005 .006 .005 .015	21-25
	.076 .097 .092 .088 .084 .064 .054 .058 .047 .021	.LDGT2.MY AGES 1-10
	.039 .045 .046 .028 .026 .019 .015 .024 .017 .019	11-20
	.015 .008 .006 .005 .007	21-25
	.053 .069 .067 .065 .064 .055 .051 .049 .046 .027	.HDGV..MY AGES 1-10
	.034 .042 .042 .027 .036 .039 .029 .038 .036 .026	11-20
	.014 .023 .021 .018 .033	21-25
	.048 .070 .069 .075 .080 .082 .075 .074 .066 .058	.LDDV..MY AGES 1-10
	.052 .049 .044 .027 .023 .021 .017 .018 .015 .012	11-20
	.006 .004 .003 .003 .008	21-25
	.066 .084 .081 .078 .074 .074 .061 .065 .052 .042	.LDDT..MY AGES 1-10
	.043 .041 .042 .026 .029 .025 .017 .021 .019 .016	11-20
	.011 .005 .006 .005 .015	21-25
	.055 .067 .066 .063 .057 .072 .044 .025 .035 .031	.HDDV..MY AGES 1-10
	.040 .049 .032 .025 .034 .071 .056 .049 .033 .022	11-20
	.013 .017 .011 .012 .022	21-25
	.023 .032 .033 .032 .034 .022 .022 .039 .031 .026	.MC....MY AGES 1-10
	.052 .653 .000 .000 .000 .000 .000 .000 .000 .000	11-20
	.000 .000 .000 .000 .000	21-25
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.	
	94 68 20 2222 12 095. 12211111	
	94 68 20 2222 12 095.	
	Jef I/M 70. 093. 08.0 07.8 92	LAP rec:
	1 96 19.6 85.6 20.6 27.3 20.6 7	SCN rec:



**Table IV-16**  
**1996 Orange County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Orange County Projected Control Strategy Tier I, Projected I/M	
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - 1996 Projected VMT Mix	
3	MYMRFG - 1996 Projected vehicle registrations	
1	NEWFLG - Default BERs	
2	IMFLAG - 1994 I/M Program	
1	ALHFLG - No additional correction factors	
5	ATPFLG - ATP & Pressure Test	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5A calculates exhaust temperatures	
3	OUTFMT - 112-Descriptive format	
4	PRTFLG - Print HC, CO, and NOX emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print HC = Volatile organic compounds (VOC)	
3	HCFLAG - HC components	
	.590.240.065.037.002.001.062.003	VMT Mix: LDGV,LDGT1,LDGT2,HGTV,LDDV,LDDT,HDDV,MC
	.067 .090 .087 .084 .080 .070 .065 .066 .062 .049	July,1996 .LDGV..MY AGES 1-10
	.048 .043 .042 .025 .022 .021 .017 .018 .014 .011	Forecasted 11-20
	.006 .003 .003 .002 .007	Registrations 21-25
	.071 .095 .089 .082 .077 .062 .056 .057 .048 .037	.LDGT1.MY AGES 1-10
	.040 .040 .037 .025 .030 .027 .018 .025 .023 .016	11-20
	.012 .006 .006 .005 .017	21-25
	.084 .112 .104 .096 .089 .055 .042 .057 .034 .018	.LDGT2.MY AGES 1-10
	.042 .044 .039 .026 .029 .017 .015 .023 .017 .015	11-20
	.018 .007 .006 .005 .007	21-25
	.040 .053 .051 .049 .047 .050 .033 .041 .031 .015	.HDGV..MY AGES 1-10
	.042 .049 .055 .026 .033 .049 .047 .044 .048 .038	11-20
	.032 .035 .028 .014 .049	21-25
	.067 .090 .087 .084 .080 .070 .065 .066 .062 .049	.LDDV..MY AGES 1-10
	.048 .043 .042 .025 .022 .021 .017 .018 .014 .011	11-20
	.006 .003 .003 .002 .007	21-25
	.071 .095 .089 .082 .077 .062 .056 .057 .048 .037	.LDDT..MY AGES 1-10
	.040 .040 .037 .025 .030 .027 .018 .025 .023 .016	11-20
	.012 .006 .006 .005 .017	21-25
	.034 .046 .041 .037 .035 .027 .057 .013 .017 .016	.HDDV..MY AGES 1-10
	.032 .080 .073 .025 .027 .120 .055 .071 .064 .028	11-20
	.035 .006 .012 .022 .027	21-25
	.024 .030 .031 .030 .032 .019 .026 .023 .025 .037	.MC....MY AGES 1-10
	.057 .666 .000 .000 .000 .000 .000 .000 .000 .000	11-20
	.000 .000 .000 .000 .000	21-25
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.	
	94 68 20 2222 12 095. 12211111	
	94 68 20 2222 12 095.	
	Orange I/M 70. 093. 08.0 07.8 92	LAP rec:
	1 96 19.6 85.6 20.6 27.3 20.6 7	SCN rec:



**Table IV-18**  
**1999 Hardin County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Hardin County Projected Control 1999 Inventory	Tier I, Projected I/M
1	TAMFLG	- Default: Tampering Rates
1	SPDFLG	- User input: one speed for all vehicle types
3	VMFLAG	- 1996 Projected VMT
3	MYMFRG	- 1999 Projected vehicle registrations
1	NEWFLG	- Default BERs
2	IMFLAG	- 1994 I/M
1	ALHFLG	- No additional correction factors
5	ATPFLG	- ATP & Pressure Test
5	RLFLAG	- Zero-out refueling emissions
2	LOCFLG	- User input: one LAP record for all scenarios
1	TEMFLG	- MOBILE5A calculates exhaust temperatures
3	OUTFMT	- 112-Descriptive format
4	PRTFLG	- Print HC, CO, and NOX emission factors
1	IDLFLG	- No idle emissions calculated or printed
3	NMHFLG	- Print HC = Volatile organic compounds (VOC)
3	HCFLAG	- HC components
	.604.348.030.010.002.002.003.001	VMT mix:
	LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC	
	.060 .080 .079 .079 .078 .077 .075 .072 .065 .060	LDGV 1999
	.055 .044 .033 .028 .026 .021 .013 .011 .009 .007	LDGV 1999
	.008 .007 .005 .003 .006	LDGV 1999
	.047 .064 .064 .065 .065 .067 .068 .067 .065 .055	LDGT1 1999
	.062 .047 .031 .033 .030 .031 .019 .020 .020 .013	LDGT1 1999
	.016 .015 .011 .008 .019	LDGT1 1999
	.073 .094 .090 .086 .085 .081 .076 .071 .049 .044	LDGT2 1999
	.035 .027 .013 .026 .023 .028 .013 .018 .008 .009	LDGT2 1999
	.010 .011 .010 .007 .016	LDGT2 1999
	.034 .047 .047 .049 .048 .048 .048 .049 .043 .038	HDGV 1999
	.041 .032 .014 .017 .039 .045 .018 .060 .043 .037	HDGV 1999
	.048 .044 .016 .018 .076	HDGV 1999
	.060 .080 .079 .079 .078 .077 .075 .072 .065 .060	LDDV 1999
	.055 .044 .033 .028 .026 .021 .013 .011 .009 .007	LDDV 1999
	.008 .007 .005 .003 .006	LDDV 1999
	.047 .064 .064 .065 .065 .067 .068 .067 .065 .055	LDDT 1999
	.062 .047 .031 .033 .030 .031 .019 .020 .020 .013	LDDT 1999
	.016 .015 .011 .008 .019	LDDT 1999
	.024 .033 .034 .036 .036 .038 .040 .037 .037 .027	HDDV 1999
	.026 .016 .008 .014 .095 .058 .030 .035 .040 .061	HDDV 1999
	.038 .118 .016 .021 .081	HDDV 1999
	.005 .008 .009 .010 .009 .025 .036 .030 .028 .024	MC 1999
	.056 .761 .000 .000 .000 .000 .000 .000 .000 .000	MC 1999
	.000 .000 .000 .000 .000	MC 1999
94	20 68 20 1. 1. 095	1 2 2222 2211 220. 1.20 999.
94	68 20 2222 12 095.	12211111
94	68 20 2222 12 095.	
	Hardin I/M	70.093. 8.0 7.8 92
1	99 19.6 85.6 20.6 27.3 20.6 7	
		LAP rec:
		SCN rec:

**Table IV-19**  
**1999 Jefferson County MOBILE5a Set-up**  
**for Time Period 1**

1	PROMPT	
1	Jefferson County 1999 Control Strategy Projection Tier I, Projected I/M	T1
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - 1996 Projected VMT mix	
3	MYMFRG - 1999 Projected vehicle registration	
1	NEWFLG - Default BER	
2	IMFLAG - 1994 I/M	
1	ALHFLG - No additional correction factors	
5	ATPFLG - ATP & Pressure Test	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5A calculates exhaust temperatures	
4	OUTFMT - 80 Column descriptive	
4	PRTFLG - Print all three pollutant emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print volatile organic compounds (VOC)	
1	HCFLAG - Print total HC	
	.590.240.065.037.002.001.062.003	VMT Mix: LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HD
	.048 .063 .063 .067 .072 .070 .075 .077 .076 .065	LDGV 1999
	.060 .050 .041 .034 .030 .026 .015 .013 .011 .009	LDGV 1999
	.009 .008 .006 .003 .009	LDGV 1999
	.061 .079 .079 .075 .072 .069 .065 .061 .059 .048	LDGT1 1999
	.050 .039 .030 .030 .028 .028 .017 .020 .017 .011	LDGT1 1999
	.014 .012 .011 .007 .017	LDGT1 1999
	.069 .087 .087 .083 .079 .075 .070 .066 .049 .041	LDGT2 1999
	.042 .033 .014 .026 .030 .030 .018 .017 .012 .010	LDGT2 1999
	.015 .011 .012 .010 .014	LDGT2 1999
	.052 .068 .067 .066 .064 .062 .059 .057 .048 .044	HDGV 1999
	.040 .037 .021 .026 .031 .031 .020 .026 .028 .020	HDGV 1999
	.027 .026 .018 .010 .055	HDGV 1999
	.048 .063 .063 .067 .072 .070 .075 .077 .076 .065	LDDV 1999
	.060 .050 .041 .034 .030 .026 .015 .013 .011 .009	LDDV 1999
	.009 .008 .006 .003 .009	LDDV 1999
	.061 .079 .079 .075 .072 .069 .065 .061 .059 .048	LDDT 1999
	.050 .039 .030 .030 .028 .028 .017 .020 .017 .011	LDDT 1999
	.014 .012 .011 .007 .017	LDDT 1999
	.061 .074 .073 .066 .060 .059 .056 .049 .061 .036	HDDV 1999
	.020 .027 .023 .029 .036 .023 .018 .024 .050 .039	HDDV 1999
	.034 .023 .015 .009 .035	HDDV 1999
	.020 .033 .031 .030 .029 .027 .025 .022 .014 .014	MC 1999
	.027 .728 .000 .000 .000 .000 .000 .000 .000 .000	MC 1999
	.000 .000 .000 .000 .000	MC 1999
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.	
	94 68 20 2222 12 095. 12211111	
	94 68 20 2222 12 095.	
	Jef I/M	75.9 75.9 08.0 07.8 92
	1 99 XXXX 75.9 20.6 27.3 20.6 7	LAP rec: SCNME,MNTMP,MXTMP,RVP1,R SCN rec: RGN,CY,SPD,AMBTMP,PCCN,P

**Table IV-20**  
**1999 Jefferson County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Jefferson County 1999 Control Strategy Projection Tier I, Projected I/M	
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - 1996 Projected VMT mix	
3	MYMFRG - 1999 Projected vehicle registration	
1	NEWFLG - Default BER	
2	IMFLAG - 1994 I/M	
1	ALHFLG - No additional correction factors	
5	ATPFLG - ATP & Pressure Test	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5A calculates exhaust temperatures	
3	OUTFMT - 112-Descriptive format	
4	PRTFLG - Print HC, CO, and NOX emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print HC = Volatile organic compounds (VOC)	
3	HCFLAG - HC components	
	.590.240.065.037.002.001.062.003	VMT Mix: LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC
	.048 .063 .063 .067 .072 .070 .075 .077 .076 .065	LDGV 1999
	.060 .050 .041 .034 .030 .026 .015 .013 .011 .009	LDGV 1999
	.009 .008 .006 .003 .009	LDGV 1999
	.061 .079 .079 .075 .072 .069 .065 .061 .059 .048	LDGT1 1999
	.050 .039 .030 .030 .028 .028 .017 .020 .017 .011	LDGT1 1999
	.014 .012 .011 .007 .017	LDGT1 1999
	.069 .087 .087 .083 .079 .075 .070 .066 .049 .041	LDGT2 1999
	.042 .033 .014 .026 .030 .030 .018 .017 .012 .010	LDGT2 1999
	.015 .011 .012 .010 .014	LDGT2 1999
	.052 .068 .067 .066 .064 .062 .059 .057 .048 .044	HDGV 1999
	.040 .037 .021 .026 .031 .031 .020 .026 .028 .020	HDGV 1999
	.027 .026 .018 .010 .055	HDGV 1999
	.048 .063 .063 .067 .072 .070 .075 .077 .076 .065	LDDV 1999
	.060 .050 .041 .034 .030 .026 .015 .013 .011 .009	LDDV 1999
	.009 .008 .006 .003 .009	LDDV 1999
	.061 .079 .079 .075 .072 .069 .065 .061 .059 .048	LDDT 1999
	.050 .039 .030 .030 .028 .028 .017 .020 .017 .011	LDDT 1999
	.014 .012 .011 .007 .017	LDDT 1999
	.061 .074 .073 .066 .060 .059 .056 .049 .061 .036	HDDV 1999
	.020 .027 .023 .029 .036 .023 .018 .024 .050 .039	HDDV 1999
	.034 .023 .015 .009 .035	HDDV 1999
	.020 .033 .031 .030 .029 .027 .025 .022 .014 .014	MC 1999
	.027 .728 .000 .000 .000 .000 .000 .000 .000 .000	MC 1999
	.000 .000 .000 .000 .000	MC 1999
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.	
	94 68 20 2222 12 095. 12211111	
	94 68 20 2222 12 095.	
	Jef I/M 70. 093. 08.0 07.8 92	LAP rec:
	1 99 19.6 85.6 20.6 27.3 20.6 7	SCN rec:





**Table IV-22**  
**1999 Orange County MOBILE5a Set-up**  
**for 24-Hour Diurnals Rates**

1	PROMPT	
1	Orange County 1999 Projected Control Strategy Tier I, Projected I/M	
1	TAMFLG - Default: Tampering Rates	
1	SPDFLG - User input: one speed for all vehicle types	
3	VMFLAG - 1996 Projected VMT Mix	
3	MYMFRG - 1999 Projected vehicle registrations	
1	NEWFLG - Default BERs	
2	IMFLAG - 1994 I/M Program	
1	ALHFLG - No additional correction factors	
5	ATPFLG - ATP & Pressure Test	
5	RLFLAG - Zero-out refueling emissions	
2	LOCFLG - User input: one LAP record for all scenarios	
1	TEMFLG - MOBILE5A calculates exhaust temperatures	
3	OUTFMT - 112-Descriptive format	
4	PRTFLG - Print HC, CO, and NOX emission factors	
1	IDLFLG - No idle emissions calculated or printed	
3	NMHFLG - Print HC = Volatile organic compounds (VOC)	
3	HCFLAG - HC components	
	.590.240.065.037.002.001.062.003	VMT Mix: LDGV,LDGT1,LDGT2,HDGV,LDDV,LDDT,HDDV,MC
	.068 .090 .087 .084 .082 .079 .074 .069 .057 .050	LDGV 1999
	.047 .041 .030 .028 .023 .022 .012 .011 .010 .008	LDGV 1999
	.008 .007 .005 .003 .007	LDGV 1999
	.068 .091 .085 .079 .078 .072 .066 .061 .048 .042	LDGT1 1999
	.041 .034 .026 .027 .027 .025 .016 .019 .018 .012	LDGT1 1999
	.016 .014 .010 .008 .017	LDGT1 1999
	.077 .102 .095 .088 .087 .080 .073 .066 .040 .030	LDGT2 1999
	.039 .023 .012 .027 .027 .024 .016 .017 .010 .009	LDGT2 1999
	.014 .010 .009 .011 .013	LDGT2 1999
	.044 .059 .056 .054 .053 .051 .048 .046 .047 .030	HDGV 1999
	.037 .027 .013 .035 .039 .044 .020 .025 .038 .036	HDGV 1999
	.034 .037 .029 .025 .074	HDGV 1999
	.068 .090 .087 .084 .082 .079 .074 .069 .057 .050	LDDV 1999
	.047 .041 .030 .028 .023 .022 .012 .011 .010 .008	LDDV 1999
	.008 .007 .005 .003 .007	LDDV 1999
	.068 .091 .085 .079 .078 .072 .066 .061 .048 .042	LDDT 1999
	.041 .034 .026 .027 .027 .025 .016 .019 .018 .012	LDDT 1999
	.016 .014 .010 .008 .017	LDDT 1999
	.043 .057 .052 .047 .047 .042 .037 .034 .026 .054	HDDV 1999
	.012 .015 .014 .026 .065 .059 .020 .022 .094 .043	HDDV 1999
	.055 .049 .022 .027 .038	HDDV 1999
	.021 .027 .027 .029 .027 .025 .023 .020 .012 .016	MC 1999
	.016 .756 .000 .000 .000 .000 .000 .000 .000 .000	MC 1999
	.000 .000 .000 .000 .000	MC 1999
	94 20 68 20 1. 1. 095 1 2 2222 2211 220. 1.20 999.	
	94 68 20 2222 12 095. 12211111	
	94 68 20 2222 12 095.	
	Orange I/M	70. 093. 08.0 07.8 92
	1 99 19.6 85.6 20.6 27.3 20.6 7	LAP rec: SCN rec:

## **Emission Rates**

The emission rates are presented in Appendix A. The 24-hour diurnal emission rates for a given application (i.e., a given year and season) are stratified only by vehicle type. The emission factors used in computing the emissions produced on individual links in the highway network for a given application are by the four time-of-day time periods, the eight vehicle types and by 63 speeds (i.e., 3 mph through 65 mph).

## V. EMISSION ESTIMATES

The emission estimates are computed using the emission rates discussed in the preceding chapter. The time-of-day emission estimates are developed using the time-of-day emission rates (discussed in Chapter IV) and the time-of-day VMT and speed estimates (discussed in Chapter III). The 24-hour emission estimates are prepared by computing the 24-hour diurnal estimates and combining the diurnal estimates with the results from each of the four time-of-day time periods. The following provides a more detailed discussion of the method used to estimate the time-of-day emissions and the method used to develop the 24-hour emission estimates. Also included is a brief summary of the Build versus No-Build results for the JOHRTS FY-94 TIP.

### Estimation of Time-of-Day Emissions

For a given year and season, the mobile source emissions for each of the four time-of-day time periods were computed using the IMPSUM program. The IMPSUM program is one of a series of programs developed by the Texas Transportation Institute to facilitate the computation of emissions. The IMPSUM program uses emission factors obtained from POLFAC5A (or COADJ), the user-estimated VMT mixes, and the VMT/speed estimates to compute the emissions by county. TTI Research Report 1279-2, "User's Guide for the Texas Mobile Source Emission Estimation Software: PREPIN, POLFAC5A, COADJ, IMPSUM, and SUMALL," provides a user's guide for this series of programs.

The basic inputs for the conformity applications of IMPSUM for JOHRTS were:

1. Data specifying the number of counties in the region and their names.
2. Names of the road types used in the study. These road types are used to summarize the emission results. The roadway types used in the conformity analyses are the functional classes used in the networks.
3. VMT mix by county used in the MOBILE5a set-ups.
4. Emission factors from POLFAC5A or COADJ by county.
5. Specification of the units for reporting emissions (grams, pounds or tons).
6. Link records providing the estimated VMT and speeds. For each link record, the following information must be provided: county number, road type number, VMT estimate, operational speed estimate, and center line miles. These data were prepared using the PREPIN program.

As stated previously, the emission rates produced using MOBILE5a are stratified by eight vehicle types. Hence, to apply the emission rates, VMT for a link record are disaggregated by the eight vehicle types applying the user-supplied VMT mixes. The software was designed to allow the user to input the VMT mix data by county and by roadway type within a county. The IMPSUM program uses these data to disaggregate the VMT for each link by the eight vehicle types based on the user-supplied estimate of the VMT mix for that link's county and roadway type.

The emission estimates are computed for each link by multiplying the appropriate emission factors corresponding to the link's roadway type and the link's estimated speed. For non-integer speed estimates, the emission factors are computed by interpolating between the emission factors for the integer speeds on either side of the subject speed. The interpolation is performed using the reciprocals of the corresponding speeds rather than the speeds themselves. The emission results are accumulated for each county by vehicle type and roadway type.

### **Estimation of 24-hour Emissions**

For JOHRTS applications, the PREPIN, POLFAC5A and IMPSUM programs were applied to estimate the mobile source emissions for each of the four time-of-day time periods for each scenario. The four time-of-day estimates must be combined with the diurnal estimates to obtain the 24-hour emission estimates. The SUMALL utility program was used to compute the 24-hour emission estimates for JOHRTS.

SUMALL is designed to sum the results from two or more IMPSUM applications (i.e., the time-of-day applications). SUMALL also provides the option of calculating the 24-hour diurnal emission estimates. The diurnal estimates are combined with the time-of-day estimates (which exclude diurnals) to obtain the 24-hour emission estimates. The 24-hour tabular summaries produced by the SUMALL program are essentially the same as those produced for the individual time-of-day time periods by IMPSUM program.

As previously noted, MOBILE5a is not structured to compute diurnal emissions for less than a 24-hour time period; therefore, a separate run of MOBILE5a was made to calculate the diurnal emissions for each application year and season. Diurnal emissions are produced by LDGV, LDGT1, LDGT, HDGV, and MC vehicle types. Diesel vehicle types do not produce diurnal emissions. Multiple diurnal emissions are produced by LDGV, LDGT1, LDGT2, and HDGV. According to Terry Newell, U.S. EPA Motor Vehicle Laboratory, 12.26 percent of LDGV, LDGT1, and LDGT2 vehicle types and 23.1 percent of HDGV vehicles undergo multiple diurnals. These percentages were applied to the total number of vehicles by vehicle type to calculate the number of vehicles of multiple diurnals as shown in Table V-1.

**Table V-1**  
**Hardin County Number of Vehicles by Vehicle Type and**  
**Number of Vehicles Subject to Multiple Diurnals 1990, 1996, 1999**

Vehicle Type	Total 1990	Multiple Diurnals 1990	Total 1996	Multiple Diurnals 1996	Total 1999	Multiple Diurnals 1999
LDGV	17,792	2,181	17,946	2,200	17,963	2,202
LDGT1	10,907	1,337	11,785	1,445	12,002	1,471
LDGT2	1,086	133	1,119	137	1,131	139
HDGV	399	92	341	42	327	76
LDDV	363	-	366	-	367	-
LDDT	337	-	364	-	371	-
HDDV	156	-	121	-	115	-
MC	588	-	277	-	239	-

Note: Diurnal emission rates (grams per gasoline vehicle) are calculated separately for the 24-hour period

- a. TEMFLG = 1
- b. HCFLAG = 3
- c. OUTFMT = 3 (print evaporative emission rates by component)
- d. Speed = 19.6

**Table V-2**  
**Jefferson County Number of Vehicles by Vehicle Type and**  
**Number of Vehicles Subject to Multiple Diurnals 1990, 1996, 1999**

Vehicle Type	Total 1990	Multiple Diurnals 1990	Total 1996	Multiple Diurnals 1996	Total 1999	Multiple Diurnals 1999
LDGV	119,371	14,635	121,635	14,912	121,153	14,853
LDGT1	45,254	5,548	44,956	5,512	43,687	5,356
LDGT2	3,619	444	3,580	439	3,470	425
HDGV	2,062	476	2,108	258	2,098	485
LDDV	2,436	-	2,482	-	2,472	-
LDDT	1,400	-	1,390	-	1,351	-
HDDV	790	-	732	-	664	-
MC	2,657	-	2,892	-	3,046	-

Note: Diurnal emission rates (grams per gasoline vehicle) are calculated separately for the 24-hour period

- e. TEMFLG = 1
- f. HCFLAG = 3
- g. OUTFMT = 3 (print evaporative emission rates by component)
- h. Speed = 19.6

**Table V-3**  
**Orange County Number of Vehicles by Vehicle Type and**  
**Number of Vehicles Subject to Multiple Diurnals 1990, 1996, 1999**

Vehicle Type	Total 1990	Multiple Diurnals 1990	Total 1996	Multiple Diurnals 1996	Total 1999	Multiple Diurnals 1999
LDGV	36,719	4,502	40,056	4,911	40,793	5,001
LDGT1	18,375	2,253	22,205	2,722	23,378	2,866
LDGT2	1,429	175	1,730	212	1,828	224
HDGV	542	125	603	139	615	142
LDDV	749	-	817	-	832	-
LDDT	568	-	687	-	723	-
HDDV	180	-	253	-	274	-
MC	990	-	801	-	752	-

Note: Diurnal emission rates (grams per gasoline vehicle) are calculated separately for the 24-hour period

- i. TEMFLG = 1
- j. HCFLAG = 3
- k. OUTFMT = 3 (print evaporative emission rates by component)
- l. Speed = 19.6

## Build versus No-Build Results for the FY-94 TIP

An important part of the conformity analysis of the JOHRTS FY-94 TIP is the comparison of the Build versus No-Build emission estimates. Table V-4 summarizes the 24-hour emission estimates for the Build and No-Build options for the summer of 1996. Table V-5 provides similar results for the summer of 1999. As may be observed in each of the tables, the VOC, CO, and NOX emission estimates for the Build options are consistently lower than the No-Build for the same year and season.

**Table V-4**  
**Summer 1996 24-Hour Emission Estimates for the**  
**JOHRTS FY-94 TIP**

<b>Emission Type</b>	<b>No-Build Option Emissions</b>	<b>Build Option Emissions</b>	<b>Difference in Emissions</b>	<b>Percentage Difference in Emissions</b>
<b>VOC (pounds)</b>	37,529	39,254	-1,725	-0.7317
<b>CO (pounds)</b>	355,996	353,034	-2,962	-0.8321
<b>NOX (pounds)</b>	71,588	71,387	-201	-0.2813

**Table V-5**  
**Summer 1999 24-Hour Emission Estimates for the**  
**JOHRTS FY-94 TIP**

<b>Emission Type</b>	<b>No-Build Option Emissions</b>	<b>Build Option Emissions</b>	<b>Difference in Emissions</b>	<b>Percentage Difference in Emissions</b>
<b>VOC (pounds)</b>	34,052	33,809	-243	-0.7124
<b>CO (pounds)</b>	307,520	304,261	-3,259	-1.0598
<b>NOX (pounds)</b>	65,059	64,769	-290	-0.4451



**APPENDIX A:  
MOBILE5a EMISSION RATES DEVELOPED FOR CONFORMITY ANALYSIS  
OF THE JOHRTS FY-94 TIP**

Tables A-1 through A-36 list the Hardin County emission rates used in the conformity analyses. Tables A-1 through A-12 are the 1990 Hardin County emission rates. Tables A-13 through A-24 are the 1996 Hardin County emission rates. Tables A-25 through A-36 are the 1999 Hardin County emission rates.

Tables A-37 through A-72 list the Jefferson County emission rates used in the conformity analyses. Tables A-37 through A-48 are the 1990 Jefferson County emission rates. Tables A-49 through A-60 are the 1996 Jefferson County emission rates. Tables A-61 through A-72 are the 1999 Jefferson County emission rates.

Tables A-73 through A-108 list the Orange County emission rates used in the conformity analyses. Tables A-73 through A-84 are the 1990 Orange County emission rates. Tables A-85 through A-96 are the 1996 Orange County emission rates. Tables A-97 through A-108 are the 1999 Orange County emission rates.

Tables A-109, A-110, and A-111 summarize the 1990, 1996, and 1999 24-hour diurnal emission rates used for the JOHRTS conformity analyses. The MOBILE5a set-ups used to compute these rates were presented in an earlier section.



**Table A-1**  
**Hardin 1990 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	14.90859	17.37527	24.00414	37.84650	1.52919	2.22831	7.40639	18.55196
4	10.91568	12.92218	17.76567	30.85129	1.45182	2.11557	7.03166	15.48880
5	8.63932	10.31876	14.08719	26.65350	1.37958	2.01030	6.68177	13.22555
6	7.17101	8.61124	11.66224	23.67114	1.31209	1.91195	6.35488	11.52090
7	6.14778	7.40943	9.95216	21.34723	1.24900	1.82001	6.04930	10.21443
8	5.46658	6.59760	8.79033	19.63887	1.18998	1.73402	5.76349	9.19717
9	4.93985	5.96726	7.89182	18.15450	1.13476	1.65355	5.49601	8.39354
10	4.51502	5.45831	7.17127	16.83339	1.08305	1.57820	5.24556	7.75011
11	4.16464	5.03842	6.58165	15.65167	1.03461	1.50761	5.01093	7.22846
12	3.87021	4.68545	6.09051	14.59052	0.98920	1.44144	4.79101	6.80044
13	3.61876	4.38375	5.67485	13.63461	0.94662	1.37939	4.58478	6.44519
14	3.40098	4.12196	5.31794	12.77122	0.90667	1.32118	4.39129	6.14693
15	3.21000	3.89166	5.00739	11.98957	0.86917	1.26653	4.20966	5.89364
16	3.04064	3.68652	4.73385	11.28049	0.83395	1.21522	4.03910	5.67605
17	2.88896	3.50166	4.49016	10.63603	0.80087	1.16701	3.87886	5.48692
18	2.75187	3.33333	4.27078	10.04928	0.76977	1.12170	3.72826	5.32055
19	2.62697	3.17859	4.07139	9.51422	0.74054	1.07910	3.58666	5.17247
20	2.51547	3.06233	3.91703	9.02778	0.71304	1.03903	3.45348	5.03911
21	2.41875	2.95546	3.77207	8.58641	0.68717	1.00133	3.32817	4.91766
22	2.33014	2.85681	3.63897	8.18266	0.66282	0.96584	3.21023	4.80589
23	2.24854	2.76521	3.51601	7.81288	0.63989	0.93244	3.09920	4.70207
24	2.17307	2.67978	3.40181	7.47383	0.61830	0.90098	2.99464	4.60482
25	2.10297	2.59977	3.29530	7.16262	0.59797	0.87135	2.89615	4.51314
26	2.03765	2.52465	3.19560	6.87668	0.57881	0.84343	2.80337	4.42624
27	1.97659	2.45395	3.10203	6.61370	0.56076	0.81713	2.71595	4.34357
28	1.91938	2.38734	3.01402	6.37164	0.54375	0.79235	2.63357	4.26474
29	1.86565	2.32454	2.93116	6.14864	0.52773	0.76899	2.55595	4.18951
30	1.81510	2.26532	2.85308	5.94307	0.51262	0.74698	2.48279	4.11773
31	1.76748	2.20950	2.77949	5.75342	0.49839	0.72624	2.41385	4.04934
32	1.72256	2.15692	2.71016	5.57837	0.48497	0.70670	2.34889	3.98434
33	1.68014	2.10745	2.64488	5.41671	0.47234	0.68828	2.28769	3.92280
34	1.64005	2.06097	2.58347	5.26737	0.46044	0.67094	2.23005	3.86473
35	1.60214	2.01735	2.52578	5.12936	0.44923	0.65461	2.17577	3.81025
36	1.56627	1.97651	2.47165	5.00180	0.43868	0.63924	2.12468	3.75944
37	1.53232	1.93830	2.42092	4.88391	0.42876	0.62478	2.07662	3.71232
38	1.50016	1.90264	2.37348	4.77495	0.41943	0.61119	2.03144	3.66896
39	1.46969	1.86940	2.32915	4.67429	0.41066	0.59841	1.98898	3.62938
40	1.44080	1.83847	2.28781	4.58134	0.40244	0.58642	1.94913	3.59355
41	1.41340	1.80972	2.24930	4.49557	0.39472	0.57518	1.91176	3.56147
42	1.38739	1.78302	2.21344	4.41650	0.38749	0.56465	1.87675	3.53301
43	1.36268	1.75822	2.18006	4.34369	0.38073	0.55480	1.84401	3.50797
44	1.33917	1.73516	2.14897	4.27676	0.37442	0.54560	1.81344	3.48623
45	1.31676	1.71366	2.11997	4.21536	0.36854	0.53702	1.78494	3.46750
46	1.29536	1.69352	2.09281	4.15918	0.36306	0.52905	1.75843	3.45143
47	1.27486	1.67452	2.06725	4.10792	0.35799	0.52165	1.73385	3.43759
48	1.25532	1.65641	2.04291	4.06086	0.35329	0.51481	1.71111	3.42543
49	1.25215	1.65302	2.03787	4.01416	0.34897	0.50851	1.69016	3.42543
50	1.24917	1.64981	2.03313	3.97217	0.34500	0.50272	1.67093	3.42543
51	1.24636	1.64679	2.02866	3.93468	0.34137	0.49744	1.65338	3.42543
52	1.24370	1.64394	2.02444	3.90149	0.33809	0.49265	1.63745	3.42543
53	1.24119	1.64124	2.02046	3.87244	0.33512	0.48834	1.62311	3.42543
54	1.23881	1.63868	2.01669	3.84739	0.33248	0.48448	1.61030	3.42543
55	1.23655	1.63626	2.01312	3.82623	0.33015	0.48108	1.59900	3.42543
56	1.30092	1.73174	2.13505	3.80885	0.32812	0.47813	1.58918	3.57160
57	1.36539	1.82734	2.25715	3.79518	0.32639	0.47561	1.58082	3.71777
58	1.42996	1.92304	2.37942	3.78515	0.32496	0.47352	1.57388	3.86394
59	1.49462	2.01885	2.50183	3.77873	0.32382	0.47186	1.56835	4.01011
60	1.55938	2.11475	2.62439	3.77590	0.32296	0.47062	1.56421	4.15628
61	1.62421	2.21074	2.74708	3.77664	0.32239	0.46979	1.56146	4.30245
62	1.68912	2.30681	2.86989	3.78098	0.32211	0.46938	1.56009	4.44862
63	1.75411	2.40296	2.99282	3.78895	0.32211	0.46938	1.56009	4.59479
64	1.81916	2.49918	3.11586	3.80059	0.32240	0.46979	1.56146	4.74095
65	1.88428	2.59547	3.23900	3.81598	0.32296	0.47062	1.56421	4.88712

**Table A-2**  
**Hardin 1990 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	145.74103	177.15433	245.61557	439.23608	5.14202	6.09395	44.47429	157.47183
4	110.91827	135.43912	188.40424	401.31128	4.73896	5.61627	40.98807	125.58249
5	89.48662	109.22523	151.50722	367.46851	4.37544	5.18545	37.84399	102.53587
6	74.98898	91.31331	125.91214	337.22070	4.04717	4.79641	35.00467	85.51166
7	64.56108	78.38731	107.28775	310.14453	3.75034	4.44464	32.43738	72.68262
8	56.72569	68.68454	93.25159	285.87061	3.48162	4.12616	30.11313	62.83640
9	50.64056	61.17638	82.37680	264.07666	3.23804	3.83749	28.00635	55.15096
10	45.78969	55.22163	73.75664	244.48177	3.01698	3.57551	26.09444	49.05716
11	41.83922	50.40018	66.78915	226.83929	2.81614	3.33749	24.35730	44.15379
12	38.56393	46.42575	61.06070	210.93330	2.63346	3.12098	22.77724	40.15279
13	35.80629	43.09694	56.27867	196.57471	2.46711	2.92384	21.33849	36.84402
14	33.45319	40.26814	52.23135	183.59666	2.31548	2.74414	20.02702	34.07191
15	31.42125	37.83185	48.76210	171.85347	2.17713	2.58017	18.83040	31.71977
16	29.64789	35.70712	45.75340	161.21533	2.05077	2.43043	17.73753	29.69901
17	28.08521	33.83218	43.11566	151.56918	1.93527	2.29354	16.73854	27.94174
18	26.69608	32.15936	40.77950	142.81384	1.82960	2.16831	15.82458	26.39546
19	25.45142	30.65157	38.69104	134.86053	1.73285	2.05365	14.98776	25.01932
20	24.36499	29.61581	37.19612	127.63083	1.64421	1.94859	14.22107	23.78149
21	23.40852	28.62794	35.81667	121.05463	1.56294	1.85228	13.51816	22.65695
22	22.53429	27.71132	34.55228	115.07010	1.48839	1.76393	12.87341	21.62628
23	21.73105	26.85538	33.38591	109.62233	1.41998	1.68286	12.28175	20.67418
24	20.98973	26.05215	32.30402	104.66255	1.35719	1.60844	11.73862	19.78888
25	20.30289	25.29584	31.29601	100.14723	1.29953	1.54011	11.23995	18.96132
26	19.66443	24.58205	30.35350	96.03780	1.24660	1.47737	10.78207	18.18449
27	19.06940	23.90775	29.47006	92.29984	1.19799	1.41977	10.36168	17.45314
28	18.51363	23.27069	28.64055	88.90251	1.15338	1.36690	9.97582	16.76334
29	17.99367	22.66931	27.86101	85.81912	1.11245	1.31840	9.62183	16.11221
30	17.50662	22.10246	27.12828	83.02495	1.07493	1.27393	9.29730	15.49769
31	17.05000	21.56937	26.43983	80.49866	1.04057	1.23320	9.00008	14.91807
32	16.62167	21.06921	25.79359	78.22118	1.00914	1.19596	8.72824	14.37219
33	16.21973	20.60139	25.18788	76.17557	0.98044	1.16195	8.48004	13.85945
34	15.84253	20.16530	24.62105	74.34682	0.95430	1.13096	8.25388	13.37879
35	15.48857	19.76024	24.09177	72.72174	0.93054	1.10281	8.04839	12.92986
36	15.15646	19.38539	23.59871	71.28885	0.90903	1.07731	7.86233	12.51169
37	14.84497	19.03999	23.14061	70.03813	0.88963	1.05432	7.69456	12.12402
38	14.55291	18.72314	22.71616	68.96100	0.87223	1.03370	7.54408	11.76569
39	14.27916	18.43381	22.32391	68.04980	0.85673	1.01533	7.41002	11.43595
40	14.02266	18.17079	21.96252	67.29866	0.84304	0.99911	7.29160	11.13383
41	13.78237	17.93291	21.63048	66.70235	0.83108	0.98493	7.18815	10.85816
42	13.55724	17.71860	21.32594	66.25691	0.82078	0.97273	7.09906	10.60733
43	13.34626	17.52625	21.04724	65.95947	0.81208	0.96242	7.02386	10.37993
44	13.14833	17.35391	20.79224	65.80792	0.80494	0.95396	6.96212	10.17383
45	12.96237	17.19930	20.55884	65.80138	0.79932	0.94730	6.91348	9.98708
46	12.78711	17.05957	20.34431	65.93967	0.79518	0.94239	6.87769	9.81717
47	12.62126	16.93152	20.14569	66.22380	0.79251	0.93922	6.85455	9.66108
48	12.46338	16.81136	19.95979	66.65570	0.79128	0.93777	6.84393	9.51576
49	12.46338	16.81136	19.95979	67.23813	0.79150	0.93802	6.84579	9.51576
50	12.46338	16.81136	19.95979	67.97502	0.79315	0.93998	6.86011	9.51576
51	12.46338	16.81136	19.95979	68.87132	0.79626	0.94367	6.88698	9.51576
52	12.46338	16.81136	19.95979	69.93321	0.80083	0.94909	6.92656	9.51576
53	12.46338	16.81136	19.95979	71.16772	0.80690	0.95628	6.97905	9.51576
54	12.46338	16.81136	19.95979	72.58374	0.81450	0.96528	7.04475	9.51576
55	12.46338	16.81136	19.95979	74.19078	0.82366	0.97615	7.12403	9.51576
56	14.84709	20.45139	24.43336	76.00053	0.83445	0.98893	7.21732	11.80695
57	17.23076	24.09143	28.90692	78.02580	0.84692	1.00370	7.32515	14.09814
58	19.61444	27.73148	33.38052	80.28152	0.86114	1.02056	7.44813	16.38931
59	21.99814	31.37152	37.85411	82.78444	0.87719	1.03958	7.58698	18.68047
60	24.38185	35.01155	42.32768	85.55333	0.89517	1.06089	7.74249	20.97166
61	26.76556	38.65161	46.80127	88.60959	0.91518	1.08461	7.91559	23.26285
62	29.14925	42.29166	51.27484	91.97717	0.93735	1.11087	8.10729	25.55403
63	31.53296	45.93172	55.74843	95.68298	0.96180	1.13985	8.31875	27.84521
64	33.91667	49.57175	60.22200	99.75740	0.98868	1.17171	8.55130	30.13641
65	36.30037	53.21182	64.69559	104.23392	1.01817	1.20666	8.80635	32.42760

**Table A-3**  
**Hardin 1990 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	2.40237	2.62704	2.94149	5.46686	2.80697	3.30252	37.36388	0.89777
4	2.24052	2.44049	2.76625	5.52343	2.68875	3.16342	35.79022	0.85871
5	2.13887	2.32599	2.66100	5.58000	2.57917	3.03449	34.33154	0.82629
6	2.06799	2.24862	2.59154	5.63657	2.47756	2.91496	32.97911	0.80001
7	2.01521	2.19329	2.54313	5.69315	2.38335	2.80410	31.72499	0.77937
8	1.97415	2.15236	2.50831	5.74972	2.29597	2.70130	30.56190	0.76391
9	1.94122	2.12150	2.48287	5.80629	2.21494	2.60597	29.48332	0.75316
10	1.91425	2.09807	2.46424	5.86286	2.13981	2.51757	28.48320	0.74669
11	1.89182	2.08031	2.45075	5.91943	2.07016	2.43563	27.55611	0.74409
12	1.87297	2.06701	2.44122	5.97600	2.00563	2.35970	26.69708	0.74493
13	1.85700	2.05727	2.43482	6.03258	1.94586	2.28939	25.90158	0.74885
14	1.84341	2.05045	2.43093	6.08915	1.89057	2.22433	25.16550	0.75548
15	1.83182	2.04601	2.42905	6.14572	1.83945	2.16419	24.48509	0.76446
16	1.82191	2.04353	2.42882	6.20229	1.79226	2.10866	23.85692	0.77546
17	1.81345	2.04268	2.42992	6.25886	1.74876	2.05748	23.27789	0.78818
18	1.80625	2.04317	2.43211	6.31543	1.70874	2.01040	22.74522	0.80232
19	1.80013	2.04475	2.43515	6.37200	1.67201	1.96719	22.25627	0.81760
20	1.79775	2.05550	2.44741	6.42858	1.63839	1.92764	21.80881	0.83376
21	1.80413	2.08028	2.47411	6.48515	1.60773	1.89156	21.40073	0.85056
22	1.81028	2.10366	2.49919	6.54171	1.57989	1.85880	21.03011	0.86778
23	1.81624	2.12575	2.52278	6.59829	1.55474	1.82921	20.69528	0.88521
24	1.82205	2.14666	2.54504	6.65486	1.53216	1.80264	20.39468	0.90267
25	1.82773	2.16645	2.56606	6.71143	1.51205	1.77899	20.12704	0.91998
26	1.83331	2.18520	2.58593	6.76800	1.49433	1.75813	19.89114	0.93699
27	1.83881	2.20296	2.60474	6.82458	1.47891	1.74000	19.68594	0.95358
28	1.84425	2.21978	2.62256	6.88115	1.46573	1.72449	19.51053	0.96961
29	1.84963	2.23570	2.63946	6.93772	1.45474	1.71156	19.36420	0.98500
30	1.85498	2.25077	2.65550	6.99429	1.44588	1.70113	19.24622	0.99967
31	1.86031	2.26503	2.67074	7.05086	1.43911	1.69317	19.15616	1.01354
32	1.86565	2.27851	2.68525	7.10743	1.43441	1.68764	19.09363	1.02659
33	1.87100	2.29127	2.69909	7.16400	1.43176	1.68453	19.05833	1.03877
34	1.87639	2.30336	2.71232	7.22057	1.43115	1.68380	19.05014	1.05009
35	1.88183	2.31481	2.72502	7.27715	1.43256	1.68547	19.06902	1.06055
36	1.88736	2.32570	2.73724	7.33372	1.43602	1.68954	19.11504	1.07018
37	1.89300	2.33608	2.74906	7.39029	1.44153	1.69602	19.18839	1.07902
38	1.89878	2.34601	2.76057	7.44686	1.44912	1.70495	19.28938	1.08714
39	1.90473	2.35556	2.77184	7.50343	1.45882	1.71636	19.41846	1.09461
40	1.91087	2.36481	2.78295	7.56000	1.47067	1.73030	19.57620	1.10154
41	1.91726	2.37385	2.79401	7.61657	1.48472	1.74683	19.76324	1.10805
42	1.92392	2.38275	2.80510	7.67315	1.50104	1.76603	19.98044	1.11426
43	1.93090	2.39162	2.81633	7.72972	1.51969	1.78798	20.22874	1.12033
44	1.93825	2.40055	2.82781	7.78629	1.54076	1.81277	20.50922	1.12642
45	1.94602	2.40965	2.83965	7.84286	1.56434	1.84051	20.82312	1.13274
46	1.95426	2.41905	2.85197	7.89943	1.59054	1.87134	21.17189	1.13948
47	1.96302	2.42885	2.86490	7.95600	1.61948	1.90539	21.55708	1.14687
48	1.97236	2.43918	2.87856	8.01258	1.65129	1.94281	21.98047	1.15514
49	2.06069	2.54054	3.00461	8.06915	1.68611	1.98378	22.44406	1.19276
50	2.14902	2.64191	3.13067	8.12572	1.72412	2.02850	22.94992	1.23037
51	2.23735	2.74327	3.25673	8.18229	1.76548	2.07716	23.50055	1.26798
52	2.32568	2.84463	3.38278	8.23887	1.81041	2.13003	24.09862	1.30560
53	2.41401	2.94600	3.50884	8.29543	1.85913	2.18734	24.74699	1.34321
54	2.50234	3.04736	3.63489	8.35200	1.91186	2.24938	25.44890	1.38083
55	2.59067	3.14872	3.76095	8.40858	1.96888	2.31647	26.20801	1.41844
56	2.67900	3.25009	3.88700	8.46515	2.03049	2.38895	27.02798	1.45605
57	2.76732	3.35145	4.01306	8.52172	2.09700	2.46720	27.91333	1.49367
58	2.85565	3.45281	4.13911	8.57829	2.16876	2.55164	28.86856	1.53128
59	2.94398	3.55417	4.26517	8.63486	2.24617	2.64271	29.89897	1.56890
60	3.03231	3.65554	4.39122	8.69143	2.32964	2.74092	31.01013	1.60651
61	3.12064	3.75690	4.51728	8.74801	2.41966	2.84683	32.20828	1.64412
62	3.20897	3.85826	4.64333	8.80458	2.51672	2.96102	33.50027	1.68174
63	3.29730	3.95963	4.76939	8.86115	2.62139	3.08418	34.89366	1.71935
64	3.38563	4.06099	4.89545	8.91772	2.73430	3.21702	36.39656	1.75697
65	3.47396	4.16235	5.02150	8.97429	2.85613	3.36035	38.01816	1.79458

**Table A-4  
Hardin 1990 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	19.51309	21.58076	29.08441	51.66478	1.52919	2.22831	7.40639	20.05998
4	13.97726	15.68283	20.88237	40.19897	1.45182	2.11557	7.03166	17.01465
5	10.91414	12.35097	16.26653	33.83449	1.37958	2.01030	6.68177	14.76473
6	8.97930	10.21567	13.31704	29.60550	1.31209	1.91195	6.35488	13.07017
7	7.65140	8.73738	11.28129	26.47844	1.24900	1.82001	6.04930	11.77150
8	6.81894	7.78004	9.97217	24.38753	1.18998	1.73402	5.76349	10.76034
9	6.17665	7.04272	8.96793	22.60764	1.13476	1.65355	5.49601	9.96156
10	5.65508	6.44950	8.16363	21.03632	1.08305	1.57820	5.24556	9.32203
11	5.22169	5.96194	7.50621	19.63936	1.03461	1.50761	5.01093	8.80356
12	4.85452	5.55375	6.95924	18.39063	0.98920	1.44144	4.79101	8.37815
13	4.53824	5.20634	6.49695	17.26958	0.94662	1.37939	4.58478	8.02508
14	4.26180	4.90623	6.10065	16.25954	0.90667	1.32118	4.39129	7.72865
15	4.01710	4.64345	5.75652	15.34686	0.86917	1.26653	4.20966	7.47692
16	3.79801	4.41047	5.45412	14.51992	0.83395	1.21522	4.03910	7.26068
17	3.59985	4.20152	5.18546	13.76891	0.80087	1.16701	3.87886	7.07271
18	3.41900	4.01216	4.94436	13.08539	0.76977	1.12170	3.72826	6.90737
19	3.25259	3.83891	4.72600	12.46209	0.74054	1.07910	3.58666	6.76021
20	3.10924	3.70600	4.55565	11.89756	0.71304	1.03903	3.45348	6.62767
21	2.99390	3.57924	4.39161	11.38870	0.68717	1.00133	3.32817	6.50697
22	2.88807	3.46217	4.24113	10.92327	0.66282	0.96584	3.21023	6.39590
23	2.79048	3.35344	4.10227	10.49702	0.63989	0.93244	3.09920	6.29271
24	2.70008	3.25197	3.97349	10.10613	0.61830	0.90098	2.99464	6.19607
25	2.61600	3.15693	3.85354	9.74724	0.59797	0.87135	2.89615	6.10496
26	2.53752	3.06767	3.74141	9.41734	0.57881	0.84343	2.80337	6.01859
27	2.46407	2.98365	3.63631	9.11379	0.56076	0.81713	2.71595	5.93644
28	2.39513	2.90448	3.53759	8.83419	0.54375	0.79235	2.63357	5.85809
29	2.33029	2.82983	3.44472	8.57641	0.52773	0.76899	2.55595	5.78332
30	2.26919	2.75943	3.35728	8.33857	0.51262	0.74698	2.48279	5.71198
31	2.21153	2.69308	3.27491	8.11893	0.49839	0.72624	2.41385	5.64401
32	2.15703	2.63059	3.19733	7.91597	0.48497	0.70670	2.34889	5.57941
33	2.10548	2.57180	3.12426	7.72831	0.47234	0.68828	2.28769	5.51824
34	2.05667	2.51656	3.05550	7.55471	0.46044	0.67094	2.23005	5.46053
35	2.01041	2.46475	2.99085	7.39404	0.44923	0.65461	2.17577	5.40639
36	1.96654	2.41621	2.93011	7.24532	0.43868	0.63924	2.12468	5.35588
37	1.92491	2.37083	2.87311	7.10760	0.42876	0.62478	2.07662	5.30904
38	1.88538	2.32847	2.81969	6.98009	0.41943	0.61119	2.03144	5.26594
39	1.84783	2.28899	2.76967	6.86204	0.41066	0.59841	1.98898	5.22660
40	1.81212	2.25225	2.72289	6.75277	0.40244	0.58642	1.94913	5.19099
41	1.77815	2.21810	2.67916	6.65170	0.39472	0.57518	1.91176	5.15910
42	1.74580	2.18637	2.63831	6.55825	0.38749	0.56465	1.87675	5.13080
43	1.71495	2.15690	2.60014	6.47195	0.38073	0.55480	1.84401	5.10590
44	1.68552	2.12949	2.56446	6.39234	0.37442	0.54560	1.81344	5.08429
45	1.65736	2.10393	2.53103	6.31903	0.36854	0.53702	1.78494	5.06566
46	1.63037	2.07997	2.49961	6.25166	0.36306	0.52905	1.75843	5.04968
47	1.60443	2.05735	2.46995	6.18990	0.35799	0.52165	1.73385	5.03591
48	1.57969	2.03568	2.44148	6.13253	0.35329	0.51481	1.71111	5.02382
49	1.57396	2.02950	2.43219	6.07236	0.34897	0.50851	1.69016	5.02382
50	1.56856	2.02368	2.42344	6.01787	0.34500	0.50272	1.67093	5.02382
51	1.56347	2.01819	2.41519	5.96880	0.34137	0.49744	1.65338	5.02382
52	1.55867	2.01301	2.40742	5.92489	0.33809	0.49265	1.63745	5.02382
53	1.55413	2.00812	2.40007	5.88594	0.33512	0.48834	1.62311	5.02382
54	1.54983	2.00349	2.39312	5.85176	0.33248	0.48448	1.61030	5.02382
55	1.54577	1.99911	2.38655	5.82219	0.33015	0.48108	1.59900	5.02382
56	1.61540	2.10411	2.51240	5.79709	0.32812	0.47813	1.58918	5.16903
57	1.68523	2.20933	2.63857	5.77637	0.32639	0.47561	1.58082	5.31425
58	1.75524	2.31475	2.76503	5.75992	0.32496	0.47352	1.57388	5.45946
59	1.82543	2.42036	2.89178	5.74769	0.32382	0.47186	1.56835	5.60468
60	1.89578	2.52614	3.01879	5.73964	0.32296	0.47062	1.56421	5.74989
61	1.96627	2.63208	3.14605	5.73573	0.32239	0.46979	1.56146	5.89511
62	2.03691	2.73816	3.27353	5.73599	0.32211	0.46938	1.56009	6.04032
63	2.10768	2.84440	3.40123	5.74042	0.32211	0.46938	1.56009	6.18554
64	2.17857	2.95076	3.52913	5.74906	0.32240	0.46979	1.56146	6.33075
65	2.24957	3.05725	3.65721	5.76199	0.32296	0.47062	1.56421	6.47596

**Table A-5  
Hardin 1990 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	176.45409	213.53018	287.48047	571.32544	5.14202	6.09395	44.47429	187.79500
4	134.14311	163.43571	220.39857	521.99585	4.73896	5.61627	40.98807	149.76573
5	108.08170	131.81000	177.11781	477.97510	4.37544	5.18545	37.84399	122.28648
6	90.44806	110.15913	147.09448	438.63110	4.04717	4.79641	35.00467	101.99068
7	77.76581	94.53064	125.25226	403.41260	3.75034	4.44464	32.43738	86.69791
8	68.23941	82.80748	108.79584	371.83789	3.48162	4.12616	30.11313	74.96165
9	60.84402	73.74742	96.05000	343.49023	3.23804	3.83749	28.00635	65.80142
10	54.95122	66.57327	85.94998	318.00244	3.01698	3.57551	26.09444	58.53845
11	50.15437	60.77425	77.78880	295.05420	2.81614	3.33749	24.35730	52.69437
12	46.17888	56.00177	71.08063	274.36523	2.63346	3.12098	22.77724	47.92563
13	42.83282	52.01015	65.48189	255.68893	2.46711	2.92384	21.33849	43.88172
14	39.97820	48.62164	60.74399	238.80856	2.31548	2.74414	20.02702	40.67719
15	37.51344	45.70494	56.68314	223.53398	2.17713	2.58017	18.83040	37.87300
16	35.36214	43.16115	53.16147	209.69672	2.05077	2.43043	17.73753	35.46352
17	33.46600	40.91481	50.07372	197.14969	1.93527	2.29354	16.73854	33.36777
18	31.77974	38.90785	47.33862	185.76141	1.82960	2.16831	15.82458	31.52328
19	30.26796	37.09511	44.89304	175.41640	1.73285	2.05365	14.98776	29.88135
20	28.94540	35.83293	43.14404	166.01253	1.64421	1.94859	14.22107	28.40405
21	27.78160	34.62219	41.52109	157.45863	1.56294	1.85228	13.51816	27.06158
22	26.71675	33.49419	40.03307	149.67448	1.48839	1.76393	12.87341	25.83090
23	25.73729	32.43645	38.65976	142.58842	1.41998	1.68286	12.28175	24.69373
24	24.83229	31.43977	37.38553	136.13713	1.35719	1.60844	11.73862	23.63603
25	23.99290	30.49757	36.19791	130.26395	1.29953	1.54011	11.23995	22.64717
26	23.21184	29.60529	35.08708	124.91869	1.24660	1.47737	10.78207	21.71873
27	22.48325	28.75974	34.04572	120.05663	1.19799	1.41977	10.36168	20.84456
28	21.80222	27.95895	33.06769	115.63776	1.15338	1.36690	9.97582	20.01991
29	21.16472	27.20157	32.14853	111.62697	1.11245	1.31840	9.62183	19.24147
30	20.56732	26.48677	31.28452	107.99257	1.07493	1.27393	9.29730	18.50676
31	20.00717	25.81419	30.47278	104.70657	1.04057	1.23320	9.00008	17.81380
32	19.48178	25.18326	29.71089	101.74422	1.00914	1.19596	8.72824	17.16122
33	18.98888	24.59361	28.99696	99.08339	0.98044	1.16195	8.48004	16.54831
34	18.52655	24.04482	28.32903	96.70473	0.95430	1.13096	8.25388	15.97380
35	18.09308	23.53630	27.70560	94.59096	0.93054	1.10281	8.04839	15.43732
36	17.68678	23.06725	27.12506	92.72716	0.90903	1.07731	7.86233	14.93768
37	17.30614	22.63684	26.58601	91.10031	0.88963	1.05432	7.69456	14.47459
38	16.94980	22.24403	26.08681	89.69922	0.87223	1.03370	7.54408	14.04665
39	16.61635	21.88757	25.62581	88.51404	0.85673	1.01533	7.41002	13.65298
40	16.30450	21.56601	25.20140	87.53702	0.84304	0.99911	7.29160	13.29238
41	16.01297	21.27774	24.81177	86.76141	0.83108	0.98493	7.18815	12.96346
42	15.74046	21.02080	24.45474	86.18198	0.82078	0.97273	7.09906	12.66430
43	15.48565	20.79294	24.12830	85.79507	0.81208	0.96242	7.02386	12.39316
44	15.24720	20.59155	23.82990	85.59795	0.80494	0.95396	6.96212	12.14750
45	15.02365	20.41350	23.55701	85.58948	0.79932	0.94730	6.91348	11.92495
46	14.81338	20.25475	23.30640	85.76932	0.79518	0.94239	6.87769	11.72251
47	14.61466	20.11084	23.07446	86.13892	0.79251	0.93922	6.85455	11.53651
48	14.42556	19.97635	22.85745	86.70070	0.79128	0.93777	6.84393	11.36330
49	14.42556	19.97635	22.85745	87.45833	0.79150	0.93802	6.84579	11.36330
50	14.42556	19.97635	22.85745	88.41676	0.79315	0.93998	6.86011	11.36330
51	14.42556	19.97635	22.85745	89.58260	0.79626	0.94367	6.88698	11.36330
52	14.42556	19.97635	22.85745	90.96382	0.80083	0.94909	6.92656	11.36330
53	14.42556	19.97635	22.85745	92.56963	0.80690	0.95628	6.97905	11.36330
54	14.42556	19.97635	22.85745	94.41141	0.81450	0.96528	7.04475	11.36330
55	14.42556	19.97635	22.85745	96.50177	0.82366	0.97615	7.12403	11.36330
56	17.27562	24.38512	28.03671	98.85573	0.83445	0.98893	7.21732	14.09941
57	20.12570	28.79390	33.21600	101.49013	0.84692	1.00370	7.32515	16.83551
58	22.97580	33.20273	38.39532	104.42413	0.86114	1.02056	7.44813	19.57159
59	25.82588	37.61153	43.57462	107.67975	0.87719	1.03958	7.58698	22.30771
60	28.67599	42.02032	48.75391	111.28133	0.89517	1.06089	7.74249	25.04382
61	31.52611	46.42914	53.93320	115.25670	0.91518	1.08461	7.91559	27.77994
62	34.37617	50.83795	59.11249	119.63690	0.93735	1.11087	8.10729	30.51602
63	37.22629	55.24677	64.29178	124.45721	0.96180	1.13985	8.31875	33.25215
64	40.07642	59.65555	69.47107	129.75687	0.98868	1.17171	8.55130	35.98827
65	42.92648	64.06438	74.65038	135.57959	1.01817	1.20666	8.80635	38.72435

**Table A-6  
Hardin 1990 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	2.27936	2.51345	2.74103	4.95855	2.80697	3.30252	37.36388	0.81424
4	2.11888	2.33090	2.56930	5.00986	2.68875	3.16342	35.79022	0.77881
5	2.01904	2.21922	2.46614	5.06118	2.57917	3.03449	34.33154	0.74941
6	1.95008	2.14396	2.39795	5.11249	2.47756	2.91496	32.97911	0.72557
7	1.89920	2.09024	2.35024	5.16380	2.38335	2.80410	31.72499	0.70686
8	1.85996	2.05054	2.31570	5.21511	2.29597	2.70130	30.56190	0.69283
9	1.82874	2.02060	2.29022	5.26642	2.21494	2.60597	29.48332	0.68309
10	1.80335	1.99783	2.27128	5.31773	2.13981	2.51757	28.48320	0.67722
11	1.78238	1.98051	2.25726	5.36905	2.07016	2.43563	27.55611	0.67486
12	1.76485	1.96745	2.24701	5.42036	2.00563	2.35970	26.69708	0.67562
13	1.75008	1.95780	2.23975	5.47167	1.94586	2.28939	25.90158	0.67918
14	1.73758	1.95091	2.23486	5.52298	1.89057	2.22433	25.16550	0.68519
15	1.72695	1.94628	2.23189	5.57429	1.83945	2.16419	24.48509	0.69333
16	1.71791	1.94352	2.23048	5.62560	1.79226	2.10866	23.85692	0.70331
17	1.71021	1.94228	2.23034	5.67692	1.74876	2.05748	23.27789	0.71485
18	1.70366	1.94231	2.23122	5.72823	1.70874	2.01040	22.74522	0.72767
19	1.69811	1.94338	2.23293	5.77954	1.67201	1.96719	22.25627	0.74153
20	1.69624	1.95317	2.24341	5.83085	1.63839	1.92764	21.80881	0.75619
21	1.70316	1.97684	2.26816	5.88216	1.60773	1.89156	21.40073	0.77143
22	1.70975	1.99911	2.29132	5.93347	1.57989	1.85880	21.03011	0.78704
23	1.71606	2.02011	2.31307	5.98478	1.55474	1.82921	20.69528	0.80285
24	1.72214	2.03995	2.33353	6.03609	1.53216	1.80264	20.39468	0.81869
25	1.72802	2.05870	2.35280	6.08740	1.51205	1.77899	20.12704	0.83439
26	1.73372	2.07643	2.37098	6.13871	1.49433	1.75813	19.89114	0.84982
27	1.73927	2.09319	2.38816	6.19003	1.47891	1.74000	19.68594	0.86486
28	1.74468	2.10904	2.40440	6.24134	1.46573	1.72449	19.51053	0.87940
29	1.74997	2.12402	2.41977	6.29265	1.45474	1.71156	19.36420	0.89336
30	1.75517	2.13817	2.43433	6.34396	1.44588	1.70113	19.24622	0.90666
31	1.76028	2.15154	2.44814	6.39528	1.43911	1.69317	19.15616	0.91924
32	1.76533	2.16416	2.46127	6.44659	1.43441	1.68764	19.09363	0.93107
33	1.77033	2.17609	2.47376	6.49790	1.43176	1.68453	19.05833	0.94213
34	1.77531	2.18736	2.48568	6.54921	1.43115	1.68380	19.05014	0.95239
35	1.78027	2.19803	2.49709	6.60052	1.43256	1.68547	19.06902	0.96188
36	1.78525	2.20814	2.50805	6.65183	1.43602	1.68954	19.11504	0.97061
37	1.79028	2.21776	2.51862	6.70314	1.44153	1.69602	19.18839	0.97863
38	1.79536	2.22693	2.52887	6.75445	1.44912	1.70495	19.28938	0.98599
39	1.80054	2.23573	2.53887	6.80576	1.45882	1.71636	19.41846	0.99277
40	1.80584	2.24423	2.54870	6.85708	1.47067	1.73030	19.57620	0.99906
41	1.81129	2.25249	2.55844	6.90839	1.48472	1.74683	19.76324	1.00496
42	1.81694	2.26060	2.56817	6.95970	1.50104	1.76603	19.98044	1.01059
43	1.82281	2.26865	2.57797	7.01101	1.51969	1.78798	20.22874	1.01609
44	1.82894	2.27672	2.58794	7.06233	1.54076	1.81277	20.50922	1.02162
45	1.83539	2.28491	2.59818	7.11364	1.56434	1.84051	20.82312	1.02735
46	1.84220	2.29333	2.60878	7.16495	1.59054	1.87134	21.17189	1.03346
47	1.84941	2.30208	2.61985	7.21626	1.61948	1.90539	21.55708	1.04016
48	1.85707	2.31129	2.63152	7.26757	1.65129	1.94281	21.98047	1.04767
49	1.93980	2.40718	2.74642	7.31888	1.68611	1.98378	22.44406	1.08178
50	2.02252	2.50308	2.86134	7.37019	1.72412	2.02850	22.94992	1.11590
51	2.10525	2.59897	2.97625	7.42150	1.76548	2.07716	23.50055	1.15001
52	2.18797	2.69487	3.09116	7.47282	1.81041	2.13003	24.09862	1.18412
53	2.27070	2.79076	3.20607	7.52413	1.85913	2.18734	24.74699	1.21824
54	2.35343	2.88666	3.32098	7.57543	1.91186	2.24938	25.44890	1.25235
55	2.43615	2.98256	3.43589	7.62675	1.96888	2.31647	26.20801	1.28647
56	2.51887	3.07845	3.55080	7.67806	2.03049	2.38895	27.02798	1.32058
57	2.60160	3.17435	3.66571	7.72937	2.09700	2.46720	27.91333	1.35470
58	2.68433	3.27024	3.78062	7.78068	2.16876	2.55164	28.86856	1.38881
59	2.76705	3.36614	3.89553	7.83200	2.24617	2.64271	29.89897	1.42293
60	2.84978	3.46204	4.01044	7.88331	2.32964	2.74092	31.01013	1.45704
61	2.93250	3.55793	4.12535	7.93462	2.41966	2.84683	32.20828	1.49116
62	3.01523	3.65383	4.24026	7.98593	2.51672	2.96102	33.50027	1.52527
63	3.09795	3.74972	4.35517	8.03724	2.62139	3.08418	34.89366	1.55938
64	3.18068	3.84562	4.47008	8.08855	2.73430	3.21702	36.39656	1.59350
65	3.26340	3.94152	4.58499	8.13987	2.85613	3.36035	38.01816	1.62761



**Table A-7  
Hardin 1990 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	20.44455	22.38568	30.13692	54.33154	1.52919	2.22831	7.40639	20.24544
4	14.58185	16.18890	21.50983	41.87866	1.45182	2.11557	7.03166	17.20061
5	11.35427	12.71039	16.69286	35.04448	1.37958	2.01030	6.68177	14.95105
6	9.32299	10.49096	13.63173	30.55141	1.31209	1.91195	6.35488	13.25679
7	7.93270	8.95934	11.52720	27.25856	1.24900	1.82001	6.04930	11.95834
8	7.07114	7.97638	10.18867	25.09526	1.18998	1.73402	5.76349	10.94737
9	6.40654	7.22054	9.16354	23.26117	1.13476	1.65355	5.49601	10.14873
10	5.86600	6.61274	8.34270	21.64470	1.08305	1.57820	5.24556	9.50933
11	5.41607	6.11348	7.67188	20.20929	1.03461	1.50761	5.01093	8.99095
12	5.03417	5.69573	7.11388	18.92738	0.98920	1.44144	4.79101	8.56563
13	4.70455	5.34042	6.64239	17.77731	0.94662	1.37939	4.58478	8.21262
14	4.41588	5.03370	6.23832	16.74174	0.90667	1.32118	4.39129	7.91625
15	4.15981	4.76532	5.88757	15.80621	0.86917	1.26653	4.20966	7.66457
16	3.93007	4.52756	5.57947	14.95881	0.83395	1.21522	4.03910	7.44837
17	3.72183	4.31449	5.30588	14.18930	0.80087	1.16701	3.87886	7.26045
18	3.53138	4.12155	5.06050	13.48898	0.76977	1.12170	3.72826	7.09514
19	3.35577	3.94517	4.83839	12.85035	0.74054	1.07910	3.58666	6.94801
20	3.20563	3.80932	4.66471	12.27246	0.71304	1.03903	3.45348	6.81549
21	3.08690	3.67897	4.49679	11.75239	0.68717	1.00133	3.32817	6.69482
22	2.97794	3.55859	4.34276	11.27677	0.66282	0.96584	3.21023	6.58377
23	2.87743	3.44677	4.20065	10.84116	0.63989	0.93244	3.09920	6.48061
24	2.78429	3.34241	4.06887	10.44168	0.61830	0.90098	2.99464	6.38398
25	2.69765	3.24467	3.94615	10.07488	0.59797	0.87135	2.89615	6.29289
26	2.61677	3.15285	3.83145	9.73770	0.57881	0.84343	2.80337	6.20654
27	2.54103	3.06644	3.72396	9.42740	0.56076	0.81713	2.71595	6.12440
28	2.46993	2.98501	3.62300	9.14154	0.54375	0.79235	2.63357	6.04607
29	2.40304	2.90821	3.52804	8.87796	0.52773	0.76899	2.55595	5.97132
30	2.34000	2.83580	3.43863	8.63470	0.51262	0.74698	2.48279	5.89998
31	2.28047	2.76753	3.35441	8.41003	0.49839	0.72624	2.41385	5.83203
32	2.22420	2.70323	3.27508	8.20237	0.48497	0.70670	2.34889	5.76744
33	2.17095	2.64273	3.20036	8.01031	0.47234	0.68828	2.28769	5.70629
34	2.12051	2.58588	3.13004	7.83259	0.46044	0.67094	2.23005	5.64859
35	2.07268	2.53254	3.06389	7.66807	0.44923	0.65461	2.17577	5.59446
36	2.02731	2.48257	3.00174	7.51571	0.43868	0.63924	2.12468	5.54395
37	1.98423	2.43583	2.94339	7.37459	0.42876	0.62478	2.07662	5.49713
38	1.94331	2.39219	2.88867	7.24388	0.41943	0.61119	2.03144	5.45404
39	1.90440	2.35150	2.83742	7.12280	0.41066	0.59841	1.98898	5.41470
40	1.86740	2.31362	2.78945	7.01069	0.40244	0.58642	1.94913	5.37909
41	1.83217	2.27840	2.74459	6.90692	0.39472	0.57518	1.91176	5.34721
42	1.79860	2.24566	2.70265	6.81093	0.38749	0.56465	1.87675	5.31891
43	1.76657	2.21523	2.66342	6.72223	0.38073	0.55480	1.84401	5.29402
44	1.73598	2.18692	2.62673	6.64035	0.37442	0.54560	1.81344	5.27241
45	1.70671	2.16049	2.59232	6.56489	0.36854	0.53702	1.78494	5.25379
46	1.67864	2.13572	2.55997	6.49548	0.36306	0.52905	1.75843	5.23781
47	1.65163	2.11231	2.52939	6.43179	0.35799	0.52165	1.73385	5.22404
48	1.62588	2.08987	2.50002	6.37249	0.35329	0.51481	1.71111	5.21195
49	1.61957	2.08307	2.48977	6.30963	0.34897	0.50851	1.69016	5.21195
50	1.61364	2.07666	2.48012	6.25265	0.34500	0.50272	1.67093	5.21195
51	1.60804	2.07063	2.47103	6.20123	0.34137	0.49744	1.65338	5.21195
52	1.60276	2.06493	2.46246	6.15515	0.33809	0.49265	1.63745	5.21195
53	1.59777	2.05955	2.45436	6.11417	0.33512	0.48834	1.62311	5.21195
54	1.59305	2.05446	2.44670	6.07809	0.33248	0.48448	1.61030	5.21195
55	1.58858	2.04964	2.43946	6.04675	0.33015	0.48108	1.59900	5.21195
56	1.65880	2.15583	2.56568	6.02002	0.32812	0.47813	1.58918	5.35713
57	1.72924	2.26226	2.69225	5.99777	0.32639	0.47561	1.58082	5.50231
58	1.79989	2.36890	2.81916	5.97991	0.32496	0.47352	1.57388	5.64749
59	1.87072	2.47575	2.94637	5.96637	0.32382	0.47186	1.56835	5.79267
60	1.94172	2.58278	3.07387	5.95711	0.32296	0.47062	1.56421	5.93785
61	2.01289	2.69000	3.20165	5.95210	0.32239	0.46979	1.56146	6.08303
62	2.08422	2.79738	3.32967	5.95133	0.32211	0.46938	1.56009	6.22821
63	2.15569	2.90492	3.45794	5.95483	0.32211	0.46938	1.56009	6.37339
64	2.22730	3.01260	3.58641	5.96264	0.32240	0.46979	1.56146	6.51856
65	2.29903	3.12043	3.71511	5.97481	0.32296	0.47062	1.56421	6.66374

**Table A-8  
Hardin 1990 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	181.32524	219.41765	294.04346	588.38965	5.14202	6.09395	44.47429	192.12370
4	137.82550	167.95953	225.40460	537.58618	4.73896	5.61627	40.98807	153.21799
5	111.03067	135.45732	181.12370	492.25073	4.37544	5.18545	37.84399	125.10577
6	92.90082	113.20230	150.40891	451.73169	4.04717	4.79641	35.00467	104.34279
7	79.86203	97.13741	128.06483	415.46069	3.75034	4.44464	32.43738	88.69820
8	70.06824	85.08803	111.23096	382.94409	3.48162	4.12616	30.11313	76.69197
9	62.46558	75.77727	98.19308	353.74902	3.23804	3.83749	28.00635	67.32108
10	56.40794	68.40591	87.86180	327.50024	3.01698	3.57551	26.09444	59.89110
11	51.47708	62.44865	79.51384	303.86694	2.81614	3.33749	24.35730	53.91263
12	47.39072	57.54681	72.65210	282.55957	2.63346	3.12098	22.77724	49.03421
13	43.95143	53.44762	66.92522	263.32568	2.46711	2.92384	21.33849	44.99962
14	41.01732	49.96825	62.07878	245.94087	2.31548	2.74414	20.02702	41.61908
15	38.48393	46.97345	57.92490	230.21034	2.17713	2.58017	18.83040	38.75031
16	36.27271	44.36153	54.32242	215.95975	2.05077	2.43043	17.73753	36.28528
17	34.32368	42.05482	51.16379	203.03796	1.93527	2.29354	16.73854	34.14125
18	32.59029	39.99353	48.36584	191.30963	1.82960	2.16831	15.82458	32.25421
19	31.03613	38.13130	45.86404	180.65558	1.73285	2.05365	14.98776	30.57434
20	29.67624	36.83313	44.07614	170.97087	1.64421	1.94859	14.22107	29.06287
21	28.47952	35.58714	42.41608	162.16151	1.56294	1.85228	13.51816	27.68936
22	27.38441	34.42578	40.89394	154.14482	1.48839	1.76393	12.87341	26.43015
23	26.37700	33.33620	39.48918	146.84718	1.41998	1.68286	12.28175	25.26660
24	25.44608	32.30902	38.18570	140.20319	1.35719	1.60844	11.73862	24.18436
25	24.58252	31.33754	36.97081	134.15459	1.29953	1.54011	11.23995	23.17252
26	23.77887	30.41714	35.83450	128.64970	1.24660	1.47737	10.78207	22.22427
27	23.02916	29.54468	34.76920	123.64241	1.19799	1.41977	10.36168	21.32796
28	22.32831	28.71814	33.76871	119.09146	1.15338	1.36690	9.97582	20.48410
29	21.67223	27.93623	32.82843	114.96097	1.11245	1.31840	9.62183	19.68753
30	21.05740	27.19821	31.94460	111.21803	1.07493	1.27393	9.29730	18.93571
31	20.48088	26.50372	31.11420	107.83383	1.04057	1.23320	9.00008	18.22661
32	19.94014	25.85225	30.33487	104.78300	1.00914	1.19596	8.72824	17.55884
33	19.43286	25.24347	29.60458	102.04277	0.98044	1.16195	8.48004	16.93167
34	18.95709	24.67699	28.92134	99.59302	0.95430	1.13096	8.25388	16.34380
35	18.51103	24.15221	28.28366	97.41614	0.93054	1.10281	8.04839	15.79485
36	18.09299	23.66832	27.68987	95.49669	0.90903	1.07731	7.86233	15.28359
37	17.70140	23.22452	27.13849	93.82124	0.88963	1.05432	7.69456	14.80976
38	17.33487	22.81975	26.62793	92.37830	0.87223	1.03370	7.54408	14.37190
39	16.99194	22.45267	26.15643	91.15773	0.85673	1.01533	7.41002	13.96911
40	16.67130	22.12186	25.72238	90.15147	0.84304	0.99911	7.29160	13.60017
41	16.37163	21.82561	25.32388	89.35269	0.83108	0.98493	7.18815	13.26366
42	16.09155	21.56184	24.95876	88.75600	0.82078	0.97273	7.09906	12.95759
43	15.82977	21.32834	24.62492	88.35754	0.81208	0.96242	7.02386	12.68020
44	15.58483	21.12225	24.31978	88.15454	0.80494	0.95396	6.96212	12.42889
45	15.35526	20.94040	24.04071	88.14580	0.79932	0.94730	6.91348	12.20124
46	15.13938	20.77853	23.78442	88.33102	0.79518	0.94239	6.87769	11.99415
47	14.93538	20.63199	23.54724	88.71162	0.79251	0.93922	6.85455	11.80388
48	14.74128	20.49512	23.32532	89.29021	0.79128	0.93777	6.84393	11.62668
49	14.74128	20.49512	23.32532	90.07045	0.79150	0.93802	6.84579	11.62668
50	14.74128	20.49512	23.32532	91.05753	0.79315	0.93998	6.86011	11.62668
51	14.74128	20.49512	23.32532	92.25818	0.79626	0.94367	6.88698	11.62668
52	14.74128	20.49512	23.32532	93.68069	0.80083	0.94909	6.92656	11.62668
53	14.74128	20.49512	23.32532	95.33444	0.80690	0.95628	6.97905	11.62668
54	14.74128	20.49512	23.32532	97.23125	0.81450	0.96528	7.04475	11.62668
55	14.74128	20.49512	23.32532	99.38405	0.82366	0.97615	7.12403	11.62668
56	17.66609	25.02916	28.61752	101.80832	0.83445	0.98893	7.21732	14.42621
57	20.59097	29.56322	33.90977	104.52132	0.84692	1.00370	7.32515	17.22574
58	23.51582	34.09729	39.20201	107.54297	0.86114	1.02056	7.44813	20.02525
59	26.44067	38.63138	44.49428	110.89584	0.87719	1.03958	7.58698	22.82478
60	29.36557	43.16544	49.78650	114.60500	0.89517	1.06089	7.74249	25.62430
61	32.29045	47.69952	55.07875	118.69913	0.91518	1.08461	7.91559	28.42386
62	35.21529	52.23357	60.37100	123.21019	0.93735	1.11087	8.10729	31.22337
63	38.14017	56.76765	65.66327	128.17439	0.96180	1.13985	8.31875	34.02292
64	41.06505	61.30173	70.95547	133.63232	0.98868	1.17171	8.55130	36.82245
65	43.98990	65.83580	76.24773	139.62898	1.01817	1.20666	8.80635	39.62201

**Table A-9**  
**Hardin 1990 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.26814	2.50290	2.72227	4.90895	2.80697	3.30252	37.36388	0.80577
4	2.10776	2.32069	2.55083	4.95975	2.68875	3.16342	35.79022	0.77071
5	2.00807	2.20927	2.44786	5.01055	2.57917	3.03449	34.33154	0.74161
6	1.93928	2.13419	2.37977	5.06135	2.47756	2.91496	32.97911	0.71802
7	1.88857	2.08062	2.33212	5.11214	2.38335	2.80410	31.72499	0.69950
8	1.84949	2.04102	2.29759	5.16294	2.29597	2.70130	30.56190	0.68563
9	1.81842	2.01116	2.27209	5.21374	2.21494	2.60597	29.48332	0.67598
10	1.79318	1.98845	2.25312	5.26454	2.13981	2.51757	28.48320	0.67018
11	1.77233	1.97116	2.23903	5.31534	2.07016	2.43563	27.55611	0.66783
12	1.75493	1.95812	2.22871	5.36614	2.00563	2.35970	26.69708	0.66859
13	1.74027	1.94846	2.22136	5.41693	1.94586	2.28939	25.90158	0.67211
14	1.72786	1.94156	2.21637	5.46774	1.89057	2.22433	25.16550	0.67806
15	1.71732	1.93691	2.21330	5.51853	1.83945	2.16419	24.48509	0.68612
16	1.70835	1.93411	2.21177	5.56933	1.79226	2.10866	23.85692	0.69600
17	1.70072	1.93283	2.21150	5.62013	1.74876	2.05748	23.27789	0.70741
18	1.69423	1.93281	2.21225	5.67093	1.70874	2.01040	22.74522	0.72010
19	1.68872	1.93381	2.21383	5.72172	1.67201	1.96719	22.25627	0.73381
20	1.68691	1.94351	2.22414	5.77252	1.63839	1.92764	21.80881	0.74832
21	1.69387	1.96707	2.24870	5.82332	1.60773	1.89156	21.40073	0.76340
22	1.70050	1.98923	2.27169	5.87411	1.57989	1.85880	21.03011	0.77885
23	1.70684	2.01013	2.29326	5.92492	1.55474	1.82921	20.69528	0.79450
24	1.71295	2.02986	2.31354	5.97571	1.53216	1.80264	20.39468	0.81017
25	1.71884	2.04851	2.33265	6.02651	1.51205	1.77899	20.12704	0.82570
26	1.72455	2.06613	2.35067	6.07731	1.49433	1.75813	19.89114	0.84097
27	1.73010	2.08280	2.36769	6.12811	1.47891	1.74000	19.68594	0.85586
28	1.73551	2.09855	2.38378	6.17891	1.46573	1.72449	19.51053	0.87025
29	1.74079	2.11344	2.39900	6.22971	1.45474	1.71156	19.36420	0.88406
30	1.74597	2.12750	2.41342	6.28050	1.44588	1.70113	19.24622	0.89722
31	1.75106	2.14078	2.42710	6.33130	1.43911	1.69317	19.15616	0.90968
32	1.75608	2.15332	2.44010	6.38210	1.43441	1.68764	19.09363	0.92139
33	1.76105	2.16517	2.45246	6.43290	1.43176	1.68453	19.05833	0.93232
34	1.76599	2.17636	2.46426	6.48370	1.43115	1.68380	19.05014	0.94248
35	1.77091	2.18695	2.47554	6.53450	1.43256	1.68547	19.06902	0.95187
36	1.77584	2.19699	2.48638	6.58529	1.43602	1.68954	19.11504	0.96051
37	1.78080	2.20653	2.49683	6.63609	1.44153	1.69602	19.18839	0.96845
38	1.78582	2.21563	2.50696	6.68689	1.44912	1.70495	19.28938	0.97573
39	1.79093	2.22436	2.51684	6.73769	1.45882	1.71636	19.41846	0.98244
40	1.79615	2.23278	2.52655	6.78849	1.47067	1.73030	19.57620	0.98866
41	1.80151	2.24097	2.53617	6.83928	1.48472	1.74683	19.76324	0.99450
42	1.80706	2.24901	2.54576	6.89008	1.50104	1.76603	19.98044	1.00007
43	1.81283	2.25697	2.55543	6.94088	1.51969	1.78798	20.22874	1.00552
44	1.81885	2.26496	2.56526	6.99168	1.54076	1.81277	20.50922	1.01099
45	1.82518	2.27307	2.57534	7.04248	1.56434	1.84051	20.82312	1.01666
46	1.83185	2.28139	2.58578	7.09328	1.59054	1.87134	21.17189	1.02271
47	1.83891	2.29005	2.59668	7.14407	1.61948	1.90539	21.55708	1.02934
48	1.84642	2.29914	2.60815	7.19487	1.65129	1.94281	21.98047	1.03677
49	1.92863	2.39452	2.72201	7.24567	1.68611	1.98378	22.44406	1.07053
50	2.01084	2.48990	2.83587	7.29647	1.72412	2.02850	22.94992	1.10429
51	2.09305	2.58528	2.94972	7.34727	1.76548	2.07716	23.50055	1.13805
52	2.17526	2.68066	3.06358	7.39807	1.81041	2.13003	24.09862	1.17180
53	2.25747	2.77604	3.17743	7.44886	1.85913	2.18734	24.74699	1.20556
54	2.33968	2.87142	3.29129	7.49966	1.91186	2.24938	25.44890	1.23932
55	2.42189	2.96680	3.40515	7.55046	1.96888	2.31647	26.20801	1.27308
56	2.50410	3.06218	3.51900	7.60125	2.03049	2.38895	27.02798	1.30684
57	2.58630	3.15756	3.63286	7.65206	2.09700	2.46720	27.91333	1.34060
58	2.66851	3.25294	3.74672	7.70285	2.16876	2.55164	28.86856	1.37436
59	2.75072	3.34833	3.86057	7.75365	2.24617	2.64271	29.89897	1.40812
60	2.83293	3.44371	3.97443	7.80445	2.32964	2.74092	31.01013	1.44188
61	2.91514	3.53909	4.08829	7.85525	2.41966	2.84683	32.20828	1.47564
62	2.99735	3.63447	4.20214	7.90605	2.51672	2.96102	33.50027	1.50940
63	3.07956	3.72985	4.31600	7.95685	2.62139	3.08418	34.89366	1.54316
64	3.16177	3.82523	4.42986	8.00764	2.73430	3.21702	36.39656	1.57692
65	3.24398	3.92061	4.54371	8.05845	2.85613	3.36035	38.01816	1.61068

**Table A-10**  
**Hardin 1990 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	14.98360	17.46333	24.09396	38.09615	1.52919	2.22831	7.40639	18.59326
4	10.96805	12.98481	17.82552	31.04221	1.45182	2.11557	7.03166	15.53101
5	8.67977	10.36763	14.13210	26.81459	1.37958	2.01030	6.68177	13.26845
6	7.20422	8.65157	11.69846	23.81409	1.31209	1.91195	6.35488	11.56431
7	6.17617	7.44399	9.98279	21.47775	1.24900	1.82001	6.04930	10.25824
8	5.49232	6.62885	8.81820	19.76251	1.18998	1.73402	5.76349	9.24129
9	4.96356	5.99596	7.91761	18.27249	1.13476	1.65355	5.49601	8.43791
10	4.53707	5.48492	7.19534	16.94652	1.08305	1.57820	5.24556	7.79468
11	4.18531	5.06326	6.60425	15.76054	1.03461	1.50761	5.01093	7.27319
12	3.88968	4.70877	6.11184	14.69561	0.98920	1.44144	4.79101	6.84531
13	3.63719	4.40574	5.69505	13.73635	0.94662	1.37939	4.58478	6.49016
14	3.41848	4.14276	5.33712	12.86995	0.90667	1.32118	4.39129	6.19199
15	3.22667	3.91138	5.02566	12.08560	0.86917	1.26653	4.20966	5.93878
16	3.05656	3.70525	4.75128	11.37409	0.83395	1.21522	4.03910	5.72127
17	2.90418	3.51948	4.50682	10.72742	0.80087	1.16701	3.87886	5.53220
18	2.76646	3.35030	4.28671	10.13866	0.76977	1.12170	3.72826	5.36588
19	2.64095	3.19475	4.08665	9.60177	0.74054	1.07910	3.58666	5.21784
20	2.52897	3.07790	3.93181	9.11369	0.71304	1.03903	3.45348	5.08452
21	2.43190	2.97063	3.78654	8.67086	0.68717	1.00133	3.32817	4.96311
22	2.34296	2.87160	3.65314	8.26576	0.66282	0.96584	3.21023	4.85138
23	2.26107	2.77965	3.52991	7.89476	0.63989	0.93244	3.09920	4.74758
24	2.18531	2.69388	3.41547	7.55458	0.61830	0.90098	2.99464	4.65037
25	2.11495	2.61356	3.30873	7.24233	0.59797	0.87135	2.89615	4.55872
26	2.04938	2.53814	3.20882	6.95543	0.57881	0.84343	2.80337	4.47185
27	1.98810	2.46716	3.11505	6.69158	0.56076	0.81713	2.71595	4.38920
28	1.93066	2.40028	3.02686	6.44870	0.54375	0.79235	2.63357	4.31039
29	1.87673	2.33722	2.94383	6.22496	0.52773	0.76899	2.55595	4.23519
30	1.82598	2.27776	2.86559	6.01869	0.51262	0.74698	2.48279	4.16342
31	1.77817	2.22171	2.79184	5.82840	0.49839	0.72624	2.41385	4.09506
32	1.73307	2.16892	2.72237	5.65275	0.48497	0.70670	2.34889	4.03008
33	1.69048	2.11925	2.65695	5.49054	0.47234	0.68828	2.28769	3.96856
34	1.65024	2.07257	2.59541	5.34069	0.46044	0.67094	2.23005	3.91051
35	1.61217	2.02878	2.53759	5.20220	0.44923	0.65461	2.17577	3.85605
36	1.57616	1.98777	2.48334	5.07420	0.43868	0.63924	2.12468	3.80525
37	1.54206	1.94940	2.43250	4.95589	0.42876	0.62478	2.07662	3.75814
38	1.50977	1.91360	2.38495	4.84656	0.41943	0.61119	2.03144	3.71479
39	1.47917	1.88022	2.34052	4.74553	0.41066	0.59841	1.98898	3.67523
40	1.45016	1.84916	2.29908	4.65225	0.40244	0.58642	1.94913	3.63941
41	1.42264	1.82029	2.26047	4.56617	0.39472	0.57518	1.91176	3.60734
42	1.39652	1.79348	2.22452	4.48681	0.38749	0.56465	1.87675	3.57888
43	1.37169	1.76857	2.19104	4.41373	0.38073	0.55480	1.84401	3.55385
44	1.34808	1.74542	2.15987	4.34655	0.37442	0.54560	1.81344	3.53212
45	1.32557	1.72383	2.13078	4.28492	0.36854	0.53702	1.78494	3.51340
46	1.30407	1.70361	2.10354	4.22852	0.36306	0.52905	1.75843	3.49733
47	1.28347	1.68452	2.07790	4.17706	0.35799	0.52165	1.73385	3.48349
48	1.26384	1.66634	2.05348	4.12981	0.35329	0.51481	1.71111	3.47134
49	1.26064	1.66290	2.04839	4.08289	0.34897	0.50851	1.69016	3.47134
50	1.25763	1.65966	2.04359	4.04070	0.34500	0.50272	1.67093	3.47134
51	1.25478	1.65661	2.03907	4.00302	0.34137	0.49744	1.65338	3.47134
52	1.25210	1.65372	2.03481	3.96966	0.33809	0.49265	1.63745	3.47134
53	1.24955	1.65100	2.03078	3.94046	0.33512	0.48834	1.62311	3.47134
54	1.24715	1.64841	2.02697	3.91527	0.33248	0.48448	1.61030	3.47134
55	1.24487	1.64596	2.02336	3.89398	0.33015	0.48108	1.59900	3.47134
56	1.30938	1.74170	2.14541	3.87649	0.32812	0.47813	1.58918	3.61746
57	1.37400	1.83755	2.26763	3.86272	0.32639	0.47561	1.58082	3.76358
58	1.43872	1.93351	2.39002	3.85261	0.32496	0.47352	1.57388	3.90971
59	1.50354	2.02958	2.51256	3.84612	0.32382	0.47186	1.56835	4.05583
60	1.56845	2.12574	2.63525	3.84322	0.32296	0.47062	1.56421	4.20195
61	1.63344	2.22199	2.75806	3.84392	0.32239	0.46979	1.56146	4.34807
62	1.69851	2.31832	2.88101	3.84822	0.32211	0.46938	1.56009	4.49420
63	1.76365	2.41473	3.00406	3.85616	0.32211	0.46938	1.56009	4.64032
64	1.82886	2.51122	3.12723	3.86780	0.32240	0.46979	1.56146	4.78644
65	1.89413	2.60777	3.25050	3.88319	0.32296	0.47062	1.56421	4.93256

**Table A-11  
Hardin 1990 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	146.40529	177.92918	246.53230	442.77661	5.14202	6.09395	44.47429	158.16982
4	111.42072	136.03586	189.10548	404.54565	4.73896	5.61627	40.98807	126.13918
5	89.88889	109.70670	152.06856	370.42993	4.37544	5.18545	37.84399	102.99052
6	75.32335	91.71506	126.37628	339.93872	4.04717	4.79641	35.00467	85.89105
7	64.84660	78.73140	107.68126	312.64404	3.75034	4.44464	32.43738	73.00537
8	56.97461	68.98553	93.59200	288.17456	3.48162	4.12616	30.11313	63.11566
9	50.86111	61.44426	82.67616	266.20483	3.23804	3.83749	28.00635	55.39630
10	45.98767	55.46355	74.02359	246.45201	3.01698	3.57551	26.09444	49.27560
11	42.01891	50.62125	67.02998	228.66750	2.81614	3.33749	24.35730	44.35063
12	38.72845	46.62982	61.28009	212.63330	2.63346	3.12098	22.77724	40.33199
13	35.95808	43.28690	56.48022	198.15900	2.46711	2.92384	21.33849	39.00861
14	33.59413	40.44620	52.41785	185.07632	2.31548	2.74414	20.02702	34.22427
15	31.55284	37.99969	48.93567	173.23854	2.17713	2.58017	18.83040	31.86172
16	29.77130	35.86604	45.91582	162.51462	2.05077	2.43043	17.73753	29.83203
17	28.20142	33.98322	43.26825	152.79076	1.93527	2.29354	16.73854	28.06694
18	26.80586	32.30330	40.92340	143.96483	1.82960	2.16831	15.82458	26.51379
19	25.55544	30.78900	38.82715	135.94743	1.73285	2.05365	14.98776	25.13152
20	24.46391	29.74840	37.32660	128.65945	1.64421	1.94859	14.22107	23.88818
21	23.50294	28.75575	35.94174	122.03029	1.56294	1.85228	13.51816	22.75861
22	22.62459	27.83458	34.67241	115.99748	1.48839	1.76393	12.87341	21.72333
23	21.81755	26.97432	33.50145	110.50583	1.41998	1.68286	12.28175	20.76698
24	21.07268	26.16695	32.41528	105.50607	1.35719	1.60844	11.73862	19.87766
25	20.38254	25.40662	31.40327	100.95439	1.29953	1.54011	11.23995	19.04639
26	19.74098	24.68900	30.45702	96.81178	1.24660	1.47737	10.78207	18.26605
27	19.14307	24.01102	29.57005	93.04372	1.19799	1.41977	10.36168	17.53142
28	18.58458	23.37044	28.73723	89.61906	1.15338	1.36690	9.97582	16.83849
29	18.06207	22.76572	27.95457	86.51074	1.11245	1.31840	9.62183	16.18442
30	17.57265	22.19568	27.21892	83.69409	1.07493	1.27393	9.29730	15.56711
31	17.11378	21.65958	26.52771	81.14740	1.04057	1.23320	9.00008	14.98488
32	16.68333	21.15662	25.87889	78.85158	1.00914	1.19596	8.72824	14.43653
33	16.27943	20.68619	25.27077	76.78946	0.98044	1.16195	8.48004	13.92148
34	15.90038	20.24767	24.70168	74.94601	0.95430	1.13096	8.25388	13.43864
35	15.54471	19.84038	24.17029	73.30783	0.93054	1.10281	8.04839	12.98770
36	15.21100	19.46350	23.67529	71.86339	0.90903	1.07731	7.86233	12.56764
37	14.89801	19.11630	23.21539	70.60258	0.88963	1.05432	7.69456	12.17823
38	14.60456	18.79782	22.78929	69.51677	0.87223	1.03370	7.54408	11.81829
39	14.32952	18.50703	22.39552	68.59827	0.85673	1.01533	7.41002	11.48708
40	14.07182	18.24277	22.03273	67.84103	0.84304	0.99911	7.29160	11.18361
41	13.83043	18.00380	21.69943	67.23991	0.83108	0.98493	7.18815	10.90671
42	13.60428	17.78857	21.39374	66.79094	0.82078	0.97273	7.09906	10.65478
43	13.39234	17.59547	21.11400	66.49107	0.81208	0.96242	7.02386	10.42636
44	13.19355	17.42250	20.85806	66.33830	0.80494	0.95396	6.96212	10.21936
45	13.00677	17.26741	20.62379	66.33170	0.79932	0.94730	6.91348	10.03178
46	12.83076	17.12729	20.40849	66.47108	0.79518	0.94239	6.87769	9.86113
47	12.66421	16.99890	20.20914	66.75755	0.79251	0.93922	6.85455	9.70435
48	12.50566	16.87843	20.02258	67.19289	0.79128	0.93777	6.84393	9.55839
49	12.50566	16.87843	20.02258	67.78004	0.79150	0.93802	6.84579	9.55839
50	12.50566	16.87843	20.02258	68.52286	0.79315	0.93998	6.86011	9.55839
51	12.50566	16.87843	20.02258	69.42639	0.79626	0.94367	6.88698	9.55839
52	12.50566	16.87843	20.02258	70.49687	0.80083	0.94909	6.92656	9.55839
53	12.50566	16.87843	20.02258	71.74132	0.80690	0.95628	6.97905	9.55839
54	12.50566	16.87843	20.02258	73.16870	0.81450	0.96528	7.04475	9.55839
55	12.50566	16.87843	20.02258	74.78874	0.82366	0.97615	7.12403	9.55839
56	14.89942	20.53479	24.51151	76.61307	0.83445	0.98893	7.21732	11.85984
57	17.29314	24.19115	29.00040	78.65466	0.84692	1.00370	7.32515	14.16130
58	19.68689	27.84752	33.48935	80.92856	0.86114	1.02056	7.44813	16.46274
59	22.08064	31.50389	37.97829	83.45164	0.87719	1.03958	7.58698	18.76419
60	24.47441	35.16023	42.46722	86.24286	0.89517	1.06089	7.74249	21.06563
61	26.86819	38.81662	46.95615	89.32376	0.91518	1.08461	7.91559	23.36708
62	29.26192	42.47299	51.44508	92.71844	0.93735	1.11087	8.10729	25.66850
63	31.65569	46.12936	55.93402	96.45415	0.96180	1.13985	8.31875	27.96997
64	34.04947	49.78572	60.42293	100.56139	0.98868	1.17171	8.55130	30.27144
65	36.44322	53.44212	64.91185	105.07397	1.01817	1.20666	8.80635	32.57286

**Table A-12**  
**Hardin 1990 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC
3	2.39804	2.62299	2.93437	5.44889	2.80697	3.30252	37.36388	0.89503
4	2.23624	2.43659	2.75927	5.50527	2.68875	3.16342	35.79022	0.85608
5	2.13466	2.32220	2.65411	5.56166	2.57917	3.03449	34.33154	0.82376
6	2.06385	2.24491	2.58470	5.61804	2.47756	2.91496	32.97911	0.79756
7	2.01114	2.18963	2.53632	5.67443	2.38335	2.80410	31.72499	0.77699
8	1.97014	2.14875	2.50151	5.73081	2.29597	2.70130	30.56190	0.76157
9	1.93727	2.11793	2.47607	5.78720	2.21494	2.60597	29.48332	0.75086
10	1.91036	2.09453	2.45744	5.84359	2.13981	2.51757	28.48320	0.74441
11	1.88798	2.07678	2.44393	5.89997	2.07016	2.43563	27.55611	0.74181
12	1.86917	2.06349	2.43438	5.95636	2.00563	2.35970	26.69708	0.74265
13	1.85325	2.05376	2.42795	6.01274	1.94586	2.28939	25.90158	0.74656
14	1.83970	2.04694	2.42403	6.06913	1.89057	2.22433	25.16550	0.75317
15	1.82814	2.04249	2.42212	6.12551	1.83945	2.16419	24.48509	0.76212
16	1.81826	2.04000	2.42185	6.18190	1.79226	2.10866	23.85692	0.77309
17	1.80983	2.03914	2.42291	6.23828	1.74876	2.05748	23.27789	0.78577
18	1.80266	2.03962	2.42505	6.29467	1.70874	2.01040	22.74522	0.79987
19	1.79656	2.04119	2.42805	6.35105	1.67201	1.96719	22.25627	0.81510
20	1.79419	2.05190	2.44024	6.40744	1.63839	1.92764	21.80881	0.83121
21	1.80059	2.07664	2.46688	6.46382	1.60773	1.89156	21.40073	0.84796
22	1.80676	2.09998	2.49188	6.52021	1.57989	1.85880	21.03011	0.86513
23	1.81274	2.12204	2.51542	6.57659	1.55474	1.82921	20.69528	0.88251
24	1.81856	2.14290	2.53761	6.63298	1.53216	1.80264	20.39468	0.89991
25	1.82425	2.16266	2.55856	6.68937	1.51205	1.77899	20.12704	0.91717
26	1.82984	2.18138	2.57838	6.74575	1.49433	1.75813	19.89114	0.93413
27	1.83534	2.19910	2.59713	6.80214	1.47891	1.74000	19.68594	0.95066
28	1.84077	2.21589	2.61489	6.85852	1.46573	1.72449	19.51053	0.96665
29	1.84615	2.23178	2.63174	6.91491	1.45474	1.71156	19.36420	0.98199
30	1.85150	2.24682	2.64773	6.97129	1.44588	1.70113	19.24622	0.99661
31	1.85683	2.26104	2.66292	7.02768	1.43911	1.69317	19.15616	1.01044
32	1.86215	2.27450	2.67738	7.08406	1.43441	1.68764	19.09363	1.02345
33	1.86749	2.28723	2.69117	7.14045	1.43176	1.68453	19.05833	1.03560
34	1.87286	2.29928	2.70436	7.19683	1.43115	1.68380	19.05014	1.04688
35	1.87829	2.31071	2.71700	7.25322	1.43256	1.68547	19.06902	1.05731
36	1.88381	2.32157	2.72918	7.30961	1.43602	1.68954	19.11504	1.06691
37	1.88942	2.33192	2.74096	7.36599	1.44153	1.69602	19.18839	1.07572
38	1.89518	2.34182	2.75242	7.42238	1.44912	1.70495	19.28938	1.08381
39	1.90110	2.35135	2.76365	7.47876	1.45882	1.71636	19.41846	1.09127
40	1.90721	2.36058	2.77472	7.53515	1.47067	1.73030	19.57620	1.09818
41	1.91356	2.36959	2.78573	7.59153	1.48472	1.74683	19.76324	1.10466
42	1.92019	2.37846	2.79677	7.64792	1.50104	1.76603	19.98044	1.11085
43	1.92714	2.38730	2.80795	7.70430	1.51969	1.78798	20.22874	1.11690
44	1.93444	2.39620	2.81938	7.76069	1.54076	1.81277	20.50922	1.12298
45	1.94217	2.40527	2.83116	7.81707	1.56434	1.84051	20.82312	1.12928
46	1.95035	2.41463	2.84342	7.87346	1.59054	1.87134	21.17189	1.13600
47	1.95906	2.42440	2.85629	7.92984	1.61948	1.90539	21.55708	1.14336
48	1.96835	2.43470	2.86988	7.98623	1.65129	1.94281	21.98047	1.15161
49	2.05648	2.53586	2.99554	8.04261	1.68611	1.98378	22.44406	1.18911
50	2.14461	2.63703	3.12120	8.09901	1.72412	2.02850	22.94992	1.22661
51	2.23274	2.73820	3.24687	8.15539	1.76548	2.07716	23.50055	1.26411
52	2.32087	2.83937	3.37253	8.21178	1.81041	2.13003	24.09862	1.30161
53	2.40900	2.94054	3.49820	8.26816	1.85913	2.18734	24.74699	1.33910
54	2.49713	3.04171	3.62386	8.32454	1.91186	2.24938	25.44890	1.37660
55	2.58527	3.14288	3.74952	8.38093	1.96888	2.31647	26.20801	1.41410
56	2.67340	3.24405	3.87519	8.43731	2.03049	2.38895	27.02798	1.45160
57	2.76153	3.34521	4.00085	8.49370	2.09700	2.46720	27.91333	1.48910
58	2.84966	3.44638	4.12651	8.55009	2.16876	2.55164	28.86856	1.52660
59	2.93779	3.54755	4.25217	8.60647	2.24617	2.64271	29.89897	1.56410
60	3.02592	3.64872	4.37784	8.66286	2.32964	2.74092	31.01013	1.60160
61	3.11405	3.74989	4.50350	8.71925	2.41966	2.84683	32.20828	1.63910
62	3.20219	3.85106	4.62916	8.77563	2.51672	2.96102	33.50027	1.67660
63	3.29032	3.95223	4.75483	8.83202	2.62139	3.08418	34.89366	1.71410
64	3.37845	4.05340	4.88049	8.88840	2.73430	3.21702	36.39656	1.75159
65	3.46658	4.15457	5.00615	8.94479	2.85613	3.36035	38.01816	1.78909

**Table A-13**  
**Hardin 1996 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	8.05721	10.25725	11.69481	20.12856	1.62326	2.32586	6.52089	16.16701
4	5.93801	7.63410	8.68050	16.45981	1.54113	2.20818	6.19097	13.62833
5	4.74345	6.12609	6.93283	14.24211	1.46445	2.09830	5.88291	11.74806
6	3.97917	5.14836	5.79328	12.66014	1.39280	1.99565	5.59510	10.32884
7	3.44919	4.46462	4.99413	11.42493	1.32583	1.89968	5.32606	9.23908
8	3.10838	4.01177	4.46174	10.52149	1.26319	1.80993	5.07441	8.38916
9	2.84421	3.65863	4.04762	9.73546	1.20456	1.72593	4.83892	7.71674
10	2.62903	3.37057	3.71152	9.03440	1.14967	1.64728	4.61841	7.17768
11	2.44952	3.12999	3.43254	8.40603	1.09825	1.57360	4.41183	6.74014
12	2.29676	2.92503	3.19647	7.84060	1.05005	1.50454	4.21821	6.38080
13	2.16457	2.74740	2.99333	7.33018	1.00485	1.43977	4.03663	6.08227
14	2.04852	2.59114	2.81592	6.86814	0.96244	1.37901	3.86627	5.83146
15	1.94536	2.45185	2.65892	6.44887	0.92264	1.32198	3.70636	5.61833
16	1.85266	2.32623	2.51833	6.06761	0.88525	1.26841	3.55619	5.43514
17	1.76855	2.21176	2.39109	5.72018	0.85014	1.21809	3.41511	5.27585
18	1.69157	2.10649	2.27483	5.40299	0.81713	1.17080	3.28252	5.13568
19	1.62059	2.00888	2.16769	5.11288	0.78609	1.12633	3.15785	5.01089
20	1.55280	1.92884	2.07891	4.85136	0.75690	1.08451	3.04059	4.89849
21	1.49406	1.86002	2.00253	4.61809	0.72944	1.04516	2.93026	4.79613
22	1.44028	1.79690	1.93260	4.40455	0.70359	1.00812	2.82642	4.70193
23	1.39080	1.73873	1.86823	4.20882	0.67925	0.97326	2.72866	4.61444
24	1.34508	1.68487	1.80870	4.02921	0.65634	0.94042	2.63660	4.53251
25	1.30268	1.63483	1.75342	3.86420	0.63475	0.90949	2.54989	4.45528
26	1.26320	1.58818	1.70191	3.71245	0.61442	0.88036	2.46820	4.38210
27	1.22634	1.54458	1.65376	3.57275	0.59526	0.85290	2.39124	4.31250
28	1.19182	1.50372	1.60865	3.44402	0.57720	0.82703	2.31871	4.24615
29	1.15939	1.46538	1.56629	3.32530	0.56019	0.80266	2.25036	4.18286
30	1.12887	1.42934	1.52646	3.21571	0.54416	0.77968	2.18595	4.12248
31	1.10007	1.39542	1.48895	3.11449	0.52905	0.75803	2.12525	4.06500
32	1.07283	1.36346	1.45359	3.02093	0.51481	0.73763	2.06806	4.01037
33	1.04703	1.33333	1.42024	2.93439	0.50140	0.71841	2.01418	3.95869
34	1.02254	1.30490	1.38877	2.85432	0.48876	0.70031	1.96342	3.90995
35	0.99925	1.27807	1.35905	2.78019	0.47687	0.68327	1.91564	3.86426
36	0.97708	1.25273	1.33099	2.71155	0.46567	0.66722	1.87066	3.82167
37	0.95593	1.22880	1.30449	2.64798	0.45514	0.65213	1.82834	3.78222
38	0.93573	1.20617	1.27946	2.58911	0.44523	0.63794	1.78856	3.74596
39	0.91641	1.18478	1.25581	2.53458	0.43593	0.62461	1.75118	3.71292
40	0.89791	1.16455	1.23346	2.48411	0.42719	0.61209	1.71609	3.68306
41	0.88017	1.14539	1.21234	2.43740	0.41900	0.60036	1.68319	3.65638
42	0.86313	1.12724	1.19236	2.39420	0.41133	0.58937	1.65237	3.63277
43	0.84675	1.11003	1.17345	2.35430	0.40415	0.57908	1.62354	3.61206
44	0.83098	1.09368	1.15553	2.31748	0.39745	0.56948	1.59662	3.59416
45	0.81578	1.07811	1.13851	2.28356	0.39121	0.56053	1.57153	3.57881
46	0.80110	1.06325	1.12231	2.25239	0.38540	0.55221	1.54820	3.56571
47	0.78691	1.04902	1.10685	2.22379	0.38001	0.54449	1.52655	3.55448
48	0.77342	1.03543	1.09210	2.19758	0.37503	0.53735	1.50653	3.54466
49	0.77164	1.03348	1.08977	2.17312	0.37043	0.53077	1.48808	3.54466
50	0.76995	1.03165	1.08757	2.15114	0.36622	0.52473	1.47116	3.54466
51	0.76836	1.02992	1.08549	2.13151	0.36237	0.51922	1.45570	3.54466
52	0.76685	1.02828	1.08352	2.11413	0.35888	0.51422	1.44168	3.54466
53	0.76543	1.02673	1.08166	2.09893	0.35574	0.50971	1.42905	3.54466
54	0.76407	1.02526	1.07990	2.08583	0.35293	0.50569	1.41778	3.54466
55	0.76279	1.02386	1.07823	2.07477	0.35046	0.50214	1.40783	3.54466
56	0.78962	1.06657	1.12749	2.06569	0.34830	0.49906	1.39918	3.66978
57	0.81651	1.10934	1.17682	2.05855	0.34647	0.49643	1.39182	3.79490
58	0.84345	1.15217	1.22623	2.05333	0.34495	0.49425	1.38571	3.92001
59	0.87045	1.19506	1.27571	2.05000	0.34374	0.49252	1.38084	4.04513
60	0.89750	1.23801	1.32525	2.04856	0.34283	0.49122	1.37720	4.17025
61	0.92459	1.28100	1.37485	2.04900	0.34223	0.49035	1.37477	4.29537
62	0.95173	1.32404	1.42451	2.05132	0.34193	0.48992	1.37356	4.42048
63	0.97890	1.36712	1.47423	2.05555	0.34193	0.48992	1.37357	4.54560
64	1.00611	1.41025	1.52399	2.06171	0.34223	0.49035	1.37478	4.67072
65	1.03336	1.45341	1.57379	2.06984	0.34283	0.49122	1.37720	4.79584

**Table A-14**  
**Hardin 1996 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	72.80611	98.15402	111.50658	223.53714	5.33607	6.16977	42.50887	158.65070
4	56.05428	75.59500	85.93047	204.23633	4.91779	5.68614	39.17668	126.52739
5	45.93980	61.78999	69.95039	187.01291	4.54056	5.24997	36.17154	103.34198
6	39.17361	52.49300	59.05055	171.61917	4.19990	4.85608	33.45772	86.23302
7	34.33365	45.82811	51.18011	157.83936	3.89187	4.49993	31.00386	73.35046
8	30.70326	40.83237	45.26031	145.48569	3.61300	4.17750	28.78236	63.46895
9	27.88168	36.95921	40.66629	134.39427	3.36023	3.88523	26.76866	55.75899
10	25.62717	33.87511	37.01065	124.42181	3.13083	3.61999	24.94122	49.64697
11	23.78519	31.36513	34.04070	115.44315	2.92241	3.37901	23.28087	44.72903
12	22.25255	29.28462	31.58493	107.34824	2.73284	3.15981	21.77066	40.71536
13	20.95749	27.53270	29.52312	100.04088	2.56021	2.96021	20.39549	37.39471
14	19.84880	26.03696	27.76860	93.43604	2.40286	2.77828	19.14198	34.61090
15	18.88881	24.74405	26.25763	87.45973	2.25929	2.61227	17.99823	32.24667
16	18.04929	23.61411	24.94234	82.04573	2.12816	2.46066	16.95367	30.21318
17	17.30869	22.61650	23.78616	77.13661	2.00830	2.32207	15.99883	28.44229
18	16.65022	21.72765	22.76073	72.68086	1.89864	2.19528	15.12526	26.88156
19	16.06067	20.92899	21.84395	68.63327	1.79824	2.07919	14.32541	25.49001
20	15.41761	20.21797	21.03923	64.95393	1.70625	1.97283	13.59261	24.23584
21	14.72215	19.39163	20.16014	61.60718	1.62192	1.87532	12.92076	23.09419
22	14.08915	18.63524	19.35870	58.56151	1.54456	1.78588	12.30450	22.04573
23	13.51040	17.93932	18.62427	55.78906	1.47357	1.70380	11.73899	21.07532
24	12.97912	17.29633	17.94815	53.26486	1.40840	1.62845	11.21986	20.17133
25	12.48959	16.70003	17.32324	50.96696	1.34857	1.55927	10.74323	19.32503
26	12.03706	16.14539	16.74365	48.87560	1.29364	1.49575	10.30558	18.52950
27	11.61748	15.62823	16.20454	46.97322	1.24320	1.43744	9.90377	17.77977
28	11.22739	15.14510	15.70184	45.24429	1.19690	1.38391	9.53496	17.07202
29	10.86385	14.69313	15.23215	43.67508	1.15443	1.33480	9.19662	16.40364
30	10.52431	14.26985	14.79259	42.25308	1.11550	1.28978	8.88643	15.77273
31	10.20656	13.87318	14.38072	40.96738	1.07984	1.24855	8.60234	15.17771
32	9.90864	13.50129	13.99442	39.80830	1.04722	1.21084	8.34251	14.61752
33	9.62887	13.15255	13.63186	38.76727	1.01744	1.17640	8.10528	14.09170
34	9.36575	12.82553	13.29140	37.83656	0.99031	1.14503	7.88912	13.59919
35	9.11793	12.51890	12.97160	37.00954	0.96566	1.11652	7.69271	13.13978
36	8.88422	12.23143	12.67115	36.28032	0.94333	1.09071	7.51488	12.71241
37	8.66356	11.96203	12.38889	35.64378	0.92320	1.06744	7.35452	12.31691
38	8.45497	11.70962	12.12369	35.09563	0.90515	1.04656	7.21068	11.95203
39	8.25758	11.47320	11.87453	34.63188	0.88906	1.02797	7.08256	11.61698
40	8.07058	11.25181	11.64042	34.24962	0.87485	1.01154	6.96937	11.31069
41	7.89327	11.04453	11.42047	33.94614	0.86244	0.99719	6.87048	11.03193
42	7.72494	10.85040	11.21369	33.71947	0.85175	0.98483	6.78534	10.77895
43	7.56498	10.66852	11.01924	33.56810	0.84273	0.97440	6.71346	10.55018
44	7.41281	10.49791	10.83619	33.49095	0.83532	0.96583	6.65444	10.34333
45	7.26786	10.33757	10.66366	33.48764	0.82949	0.95908	6.60796	10.15626
46	7.12959	10.18636	10.50066	33.55798	0.82519	0.95412	6.57375	9.98625
47	6.99748	10.04309	10.34618	33.70264	0.82242	0.95091	6.55163	9.82998
48	6.87103	9.90644	10.19920	33.92241	0.82114	0.94944	6.54148	9.68414
49	6.87103	9.90644	10.19920	34.21881	0.82136	0.94969	6.54326	9.68414
50	6.87103	9.90644	10.19920	34.59384	0.82308	0.95168	6.55694	9.68414
51	6.87103	9.90644	10.19920	35.04999	0.82631	0.95541	6.58263	9.68414
52	6.87103	9.90644	10.19920	35.59041	0.83106	0.96090	6.62046	9.68414
53	6.87103	9.90644	10.19920	36.21867	0.83735	0.96818	6.67063	9.68414
54	6.87103	9.90644	10.19920	36.93929	0.84524	0.97729	6.73343	9.68414
55	6.87103	9.90644	10.19920	37.75716	0.85475	0.98829	6.80920	9.68414
56	7.80952	11.52378	11.95984	38.67821	0.86594	1.00123	6.89837	12.01636
57	8.74802	13.14112	13.72048	39.70891	0.87888	1.01619	7.00143	14.34859
58	9.68652	14.75847	15.48113	40.85690	0.89363	1.03325	7.11898	16.68079
59	10.62502	16.37579	17.24174	42.13065	0.91029	1.05251	7.25169	19.01299
60	11.56352	17.99312	19.00237	43.53979	0.92895	1.07409	7.40033	21.34520
61	12.50203	19.61044	20.76300	45.09517	0.94972	1.09810	7.56578	23.67741
62	13.44052	21.22778	22.52362	46.80902	0.97272	1.12469	7.74901	26.00961
63	14.37902	22.84515	24.28429	48.69501	0.99809	1.15403	7.95113	28.34184
64	15.31752	24.46246	26.04492	50.76855	1.02599	1.18629	8.17340	30.67406
65	16.25600	26.07980	27.80556	53.04675	1.05659	1.22167	8.41718	33.00629



**Table A-15**  
**Hardin 1996 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	2.10535	2.47736	2.51901	4.60325	2.72303	3.15332	29.79782	0.91266
4	1.93288	2.27564	2.32409	4.65088	2.60834	3.02051	28.54282	0.87295
5	1.82851	2.15392	2.20732	4.69852	2.50203	2.89740	27.37952	0.83999
6	1.75830	2.07252	2.12980	4.74615	2.40347	2.78326	26.30098	0.81327
7	1.70771	2.01440	2.07483	4.79379	2.31207	2.67742	25.30077	0.79230
8	1.66945	1.97100	2.03404	4.84142	2.22731	2.57926	24.37323	0.77658
9	1.63947	1.93756	2.00277	4.88906	2.14870	2.48824	23.51303	0.76565
10	1.61533	1.91120	1.97821	4.93669	2.07581	2.40383	22.71545	0.75908
11	1.59548	1.89005	1.95857	4.98433	2.00825	2.32559	21.97609	0.75643
12	1.57888	1.87288	1.94263	5.03196	1.94564	2.25309	21.29102	0.75729
13	1.56480	1.85881	1.92956	5.07960	1.88767	2.18596	20.65662	0.76127
14	1.55273	1.84720	1.91875	5.12723	1.83403	2.12384	20.06960	0.76800
15	1.54227	1.83757	1.90975	5.17487	1.78444	2.06641	19.52695	0.77713
16	1.53314	1.82957	1.90221	5.22250	1.73866	2.01340	19.02600	0.78832
17	1.52512	1.82290	1.89587	5.27014	1.69646	1.96453	18.56421	0.80125
18	1.51804	1.81734	1.89053	5.31777	1.65764	1.91957	18.13940	0.81563
19	1.51175	1.81270	1.88601	5.36540	1.62200	1.87831	17.74950	0.83116
20	1.51279	1.81133	1.88422	5.41304	1.58939	1.84055	17.39264	0.84759
21	1.52139	1.82337	1.89627	5.46067	1.55965	1.80611	17.06718	0.86467
22	1.52927	1.83456	1.90741	5.50831	1.53264	1.77483	16.77161	0.88217
23	1.53652	1.84500	1.91775	5.55594	1.50824	1.74657	16.50458	0.89989
24	1.54323	1.85476	1.92738	5.60358	1.48633	1.72120	16.26488	0.91764
25	1.54946	1.86390	1.93638	5.65121	1.46683	1.69861	16.05142	0.93524
26	1.55527	1.87248	1.94479	5.69885	1.44964	1.67871	15.86331	0.95253
27	1.56072	1.88054	1.95269	5.74648	1.43468	1.66139	15.69965	0.96939
28	1.56584	1.88813	1.96011	5.79412	1.42190	1.64659	15.55976	0.98569
29	1.57067	1.89526	1.96709	5.84175	1.41123	1.63423	15.44304	1.00134
30	1.57524	1.90199	1.97369	5.88939	1.40264	1.62428	15.34897	1.01624
31	1.57959	1.90833	1.97993	5.93702	1.39607	1.61668	15.27715	1.03035
32	1.58373	1.91431	1.98584	5.98465	1.39151	1.61140	15.22729	1.04361
33	1.58769	1.91995	1.99145	6.03229	1.38894	1.60842	15.19914	1.05600
34	1.59149	1.92529	1.99680	6.07992	1.38834	1.60773	15.19260	1.06751
35	1.59515	1.93034	2.00191	6.12756	1.38972	1.60932	15.20766	1.07814
36	1.59870	1.93513	2.00681	6.17519	1.39307	1.61321	15.24434	1.08793
37	1.60213	1.93969	2.01153	6.22283	1.39842	1.61940	15.30285	1.09692
38	1.60548	1.94404	2.01610	6.27046	1.40578	1.62792	15.38339	1.10517
39	1.60875	1.94821	2.02053	6.31810	1.41519	1.63882	15.48633	1.11277
40	1.61196	1.95223	2.02487	6.36574	1.42668	1.65213	15.61214	1.11981
41	1.61512	1.95612	2.02913	6.41337	1.44032	1.66791	15.76131	1.12642
42	1.61825	1.95992	2.03335	6.46101	1.45615	1.68624	15.93452	1.13274
43	1.62137	1.96365	2.03757	6.50864	1.47424	1.70720	16.13254	1.13891
44	1.62448	1.96735	2.04180	6.55628	1.49468	1.73087	16.35620	1.14511
45	1.62759	1.97107	2.04608	6.60391	1.51756	1.75736	16.60655	1.15153
46	1.63074	1.97482	2.05044	6.65155	1.54298	1.78680	16.88469	1.15838
47	1.63391	1.97866	2.05492	6.69918	1.57105	1.81930	17.19188	1.16589
48	1.63715	1.98261	2.05956	6.74681	1.60190	1.85503	17.52953	1.17430
49	1.69723	2.06181	2.14386	6.79445	1.63569	1.89416	17.89922	1.21254
50	1.75731	2.14100	2.22816	6.84208	1.67256	1.93685	18.30266	1.25078
51	1.81740	2.22019	2.31246	6.88972	1.71269	1.98332	18.74179	1.28901
52	1.87749	2.29939	2.39676	6.93735	1.75627	2.03380	19.21877	1.32725
53	1.93757	2.37858	2.48106	6.98499	1.80353	2.08852	19.73582	1.36549
54	1.99766	2.45777	2.56537	7.03262	1.85468	2.14776	20.29561	1.40373
55	2.05774	2.53697	2.64967	7.08026	1.91000	2.21182	20.90097	1.44196
56	2.11783	2.61616	2.73397	7.12789	1.96976	2.28102	21.55492	1.48020
57	2.17791	2.69535	2.81827	7.17553	2.03428	2.35574	22.26099	1.51844
58	2.23800	2.77455	2.90257	7.22316	2.10390	2.43636	23.02280	1.55668
59	2.29808	2.85374	2.98688	7.27080	2.17899	2.52332	23.84454	1.59492
60	2.35817	2.93293	3.07118	7.31843	2.25997	2.61709	24.73071	1.63315
61	2.41826	3.01213	3.15548	7.36607	2.34730	2.71821	25.68623	1.67139
62	2.47834	3.09132	3.23978	7.41370	2.44145	2.82725	26.71658	1.70963
63	2.53843	3.17051	3.32409	7.46134	2.54300	2.94484	27.82777	1.74786
64	2.59851	3.24971	3.40839	7.50897	2.65253	3.07168	29.02640	1.78611
65	2.65860	3.32890	3.49269	7.55661	2.77071	3.20854	30.31961	1.82434

**Table A-16**  
**Hardin 1996 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	10.29846	12.08200	13.66907	27.69838	1.62326	2.32586	6.52089	18.08282
4	7.40987	8.78209	9.86267	21.66429	1.54113	2.20818	6.19097	15.57079
5	5.82681	6.94554	7.74264	18.28775	1.46445	2.09830	5.88291	13.71023
6	4.83399	5.78110	6.39771	16.03239	1.39280	1.99565	5.59510	12.30589
7	4.15574	4.98004	5.47282	14.35959	1.32583	1.89968	5.32606	11.22756
8	3.75076	4.47290	4.88839	13.24686	1.26319	1.80993	5.07441	10.38655
9	3.43682	4.08111	4.43801	12.29744	1.20456	1.72593	4.83892	9.72119
10	3.17806	3.76296	4.07360	11.45651	1.14967	1.64728	4.61841	9.18778
11	2.95945	3.49853	3.77208	10.70638	1.09825	1.57360	4.41183	8.75484
12	2.77097	3.27440	3.51781	10.03361	1.05005	1.50454	4.21821	8.39925
13	2.60566	3.08118	3.29980	9.42755	1.00485	1.43977	4.03663	8.10386
14	2.45851	2.91213	3.11015	8.87958	0.96244	1.37901	3.86627	7.85568
15	2.32589	2.76226	2.94301	8.38254	0.92264	1.32198	3.70636	7.64478
16	2.20504	2.62785	2.79399	7.93041	0.88525	1.26841	3.55619	7.46352
17	2.09385	2.50602	2.65972	7.51808	0.85014	1.21809	3.41511	7.30589
18	1.99070	2.39457	2.53761	7.14114	0.81713	1.17080	3.28252	7.16719
19	1.89431	2.29177	2.42560	6.79579	0.78609	1.12633	3.15785	7.04371
20	1.80841	2.20618	2.33178	6.48739	0.75690	1.08451	3.04059	6.93249
21	1.74214	2.12941	2.24800	6.21736	0.72944	1.04516	2.93026	6.83121
22	1.68130	2.05892	2.17130	5.97015	0.70359	1.00812	2.82642	6.73799
23	1.62516	1.99389	2.10069	5.74350	0.67925	0.97326	2.72866	6.65142
24	1.57315	1.93363	2.03540	5.53541	0.65634	0.94042	2.63660	6.57035
25	1.52476	1.87757	1.97477	5.34414	0.63475	0.90949	2.54989	6.49393
26	1.47959	1.82526	1.91828	5.16810	0.61442	0.88036	2.46820	6.42152
27	1.43727	1.77631	1.86547	5.00589	0.59526	0.85290	2.39124	6.35264
28	1.39752	1.73041	1.81599	4.85627	0.57720	0.82703	2.31871	6.28700
29	1.36007	1.68729	1.76953	4.71811	0.56019	0.80266	2.25036	6.22437
30	1.32470	1.64672	1.72582	4.59042	0.54416	0.77968	2.18595	6.16462
31	1.29122	1.60851	1.68464	4.47231	0.52905	0.75803	2.12525	6.10774
32	1.25946	1.57248	1.64581	4.36296	0.51481	0.73763	2.06806	6.05369
33	1.22927	1.53850	1.60916	4.26165	0.50140	0.71841	2.01418	6.00255
34	1.20052	1.50643	1.57454	4.16772	0.48876	0.70031	1.96342	5.95432
35	1.17309	1.47614	1.54183	4.08060	0.47687	0.68327	1.91564	5.90911
36	1.14689	1.44752	1.51090	3.99974	0.46567	0.66722	1.87066	5.86697
37	1.12181	1.42048	1.48165	3.92469	0.45514	0.65213	1.82834	5.82793
38	1.09778	1.39492	1.45397	3.85499	0.44523	0.63794	1.78856	5.79205
39	1.07471	1.37075	1.42779	3.79026	0.43593	0.62461	1.75118	5.75935
40	1.05254	1.34787	1.40300	3.73015	0.42719	0.61209	1.71609	5.72980
41	1.03121	1.32621	1.37952	3.67434	0.41900	0.60036	1.68319	5.70341
42	1.01065	1.30569	1.35726	3.62255	0.41133	0.58937	1.65237	5.68004
43	0.99081	1.28622	1.33614	3.57451	0.40415	0.57908	1.62354	5.65955
44	0.97164	1.26772	1.31609	3.52999	0.39745	0.56948	1.59662	5.64185
45	0.95310	1.25011	1.29701	3.48878	0.39121	0.56053	1.57153	5.62665
46	0.93513	1.23328	1.27881	3.45069	0.38540	0.55221	1.54820	5.61369
47	0.91770	1.21716	1.26140	3.41555	0.38001	0.54449	1.52655	5.60258
48	0.90117	1.20171	1.24472	3.38301	0.37503	0.53735	1.50653	5.59286
49	0.89804	1.19828	1.24054	3.35156	0.37043	0.53077	1.48808	5.59286
50	0.89509	1.19505	1.23660	3.32310	0.36622	0.52473	1.47116	5.59286
51	0.89231	1.19200	1.23288	3.29747	0.36237	0.51922	1.45570	5.59286
52	0.88968	1.18911	1.22937	3.27455	0.35888	0.51422	1.44168	5.59286
53	0.88719	1.18639	1.22605	3.25423	0.35574	0.50971	1.42905	5.59286
54	0.88483	1.18380	1.22290	3.23641	0.35293	0.50569	1.41778	5.59286
55	0.88260	1.18135	1.21992	3.22101	0.35046	0.50214	1.40783	5.59286
56	0.90976	1.22619	1.26960	3.20796	0.34830	0.49906	1.39918	5.71667
57	0.93703	1.27114	1.31942	3.19720	0.34647	0.49643	1.39182	5.84047
58	0.96440	1.31620	1.36937	3.18870	0.34495	0.49425	1.38571	5.96428
59	0.99186	1.36137	1.41944	3.18240	0.34374	0.49252	1.38084	6.08808
60	1.01941	1.40662	1.46963	3.17830	0.34283	0.49122	1.37720	6.21189
61	1.04704	1.45197	1.51993	3.17638	0.34223	0.49035	1.37477	6.33569
62	1.07474	1.49740	1.57034	3.17665	0.34193	0.48992	1.37356	6.45950
63	1.10251	1.54291	1.62084	3.17911	0.34193	0.48992	1.37357	6.58330
64	1.13036	1.58849	1.67142	3.18379	0.34223	0.49035	1.37478	6.70711
65	1.15826	1.63414	1.72210	3.19073	0.34283	0.49122	1.37720	6.83091

**Table A-17**  
**Hardin 1996 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	78.20267	108.24463	121.68393	285.88379	5.33607	6.16977	42.50887	192.74257
4	60.12891	83.35625	93.70766	261.20044	4.91779	5.68614	39.17668	153.71643
5	49.19977	68.04825	76.17531	239.17358	4.54056	5.24997	36.17154	125.54875
6	41.88284	57.71368	64.19864	219.48633	4.19990	4.85608	33.45772	104.76335
7	36.64740	50.29933	55.54568	201.86310	3.89187	4.49993	31.00386	89.11252
8	32.72049	44.74359	49.03731	186.06384	3.61300	4.17750	28.78236	77.10760
9	29.66914	40.44048	43.98828	171.87885	3.36023	3.88523	26.76866	67.74086
10	27.23187	37.01863	39.97275	159.12495	3.13083	3.61999	24.94122	60.31546
11	25.24139	34.23799	36.71251	147.64198	2.92241	3.37901	23.28087	54.34073
12	23.58582	31.93654	34.01849	137.28928	2.73284	3.15981	21.77066	49.46458
13	22.18739	30.00114	31.75806	127.94377	2.56021	2.96021	20.39549	45.43037
14	20.99055	28.35048	29.83563	119.49678	2.40286	2.77828	19.14198	42.04832
15	19.95447	26.92459	28.18080	111.85359	2.25929	2.61227	17.99823	39.17606
16	19.04849	25.67867	26.74075	104.92957	2.12816	2.46066	16.95367	36.70560
17	18.24924	24.57825	25.47514	98.65118	2.00830	2.32207	15.99883	34.55417
18	17.53854	23.59689	24.35274	92.95268	1.89864	2.19528	15.12526	32.65802
19	16.90201	22.71381	23.34914	87.77612	1.79824	2.07919	14.32541	30.96744
20	16.21745	21.94044	22.48293	83.07056	1.70625	1.97283	13.59261	29.44379
21	15.48568	21.05244	21.54468	78.79033	1.62192	1.87532	12.92076	28.05681
22	14.81930	20.23756	20.68887	74.89519	1.54456	1.78588	12.30450	26.78304
23	14.20971	19.48582	19.90417	71.34947	1.47357	1.70380	11.73899	25.60411
24	13.64981	18.78926	19.18132	68.12123	1.40840	1.62845	11.21986	24.50589
25	13.13363	18.14153	18.51279	65.18243	1.34857	1.55927	10.74323	23.47772
26	12.65620	17.53745	17.89230	62.50772	1.29364	1.49575	10.30558	22.51123
27	12.21332	16.97289	17.31482	60.07478	1.24320	1.43744	9.90377	21.60040
28	11.80140	16.44443	16.77606	57.86360	1.19690	1.38391	9.53496	20.74055
29	11.41737	15.94926	16.27246	55.85674	1.15443	1.33480	9.19662	19.92854
30	11.05862	15.48502	15.80102	54.03810	1.11550	1.28978	8.88643	19.16203
31	10.72283	15.04974	15.35922	52.39381	1.07984	1.24855	8.60234	18.43916
32	10.40801	14.64164	14.94484	50.91147	1.04722	1.21084	8.34251	17.75861
33	10.11240	14.25917	14.55599	49.58003	1.01744	1.17640	8.10528	17.11980
34	9.83445	13.90096	14.19098	48.38979	0.99031	1.14503	7.88912	16.52145
35	9.57277	13.56570	13.84832	47.33206	0.96566	1.11652	7.69271	15.96335
36	9.32613	13.25217	13.52663	46.39946	0.94333	1.09071	7.51488	15.44414
37	9.09339	12.95925	13.22470	45.58540	0.92320	1.06744	7.35452	14.96365
38	8.87357	12.68584	12.94135	44.88432	0.90515	1.04656	7.21068	14.52037
39	8.66573	12.43088	12.67547	44.29126	0.88906	1.02797	7.08256	14.11332
40	8.46904	12.19332	12.42606	43.80237	0.87485	1.01154	6.96937	13.74121
41	8.28273	11.97215	12.19211	43.41425	0.86244	0.99719	6.87048	13.40255
42	8.10607	11.76628	11.97257	43.12433	0.85175	0.98483	6.78534	13.09520
43	7.93840	11.57463	11.76652	42.93074	0.84273	0.97440	6.71346	12.81727
44	7.77907	11.39606	11.57291	42.83212	0.83532	0.96583	6.65444	12.56597
45	7.62747	11.22930	11.39078	42.82787	0.82949	0.95908	6.60796	12.33870
46	7.48300	11.07291	11.21900	42.91782	0.82519	0.95412	6.57375	12.13216
47	7.34507	10.92534	11.05642	43.10280	0.82242	0.95091	6.55163	11.94231
48	7.21308	10.78482	10.90186	43.38388	0.82114	0.94944	6.54148	11.76513
49	7.21308	10.78482	10.90186	43.76297	0.82136	0.94969	6.54326	11.76513
50	7.21308	10.78482	10.90186	44.24260	0.82308	0.95168	6.55694	11.76513
51	7.21308	10.78482	10.90186	44.82597	0.82631	0.95541	6.58263	11.76513
52	7.21308	10.78482	10.90186	45.51712	0.83106	0.96090	6.62046	11.76513
53	7.21308	10.78482	10.90186	46.32062	0.83735	0.96818	6.67063	11.76513
54	7.21308	10.78482	10.90186	47.24223	0.84524	0.97729	6.73343	11.76513
55	7.21308	10.78482	10.90186	48.28824	0.85475	0.98829	6.80920	11.76513
56	8.23295	12.61550	12.83368	49.46614	0.86594	1.00123	6.89837	14.59851
57	9.25282	14.44617	14.76551	50.78433	0.87888	1.01619	7.00143	17.43187
58	10.27269	16.27684	16.69731	52.25250	0.89363	1.03325	7.11898	20.26524
59	11.29256	18.10748	18.62910	53.88153	0.91029	1.05251	7.25169	23.09862
60	12.31243	19.93816	20.56091	55.68375	0.92895	1.07409	7.40033	25.93199
61	13.33231	21.76883	22.49274	57.67293	0.94972	1.09810	7.56578	28.76535
62	14.35217	23.59949	24.42455	59.86478	0.97272	1.12469	7.74901	31.59871
63	15.37203	25.43018	26.35638	62.27678	0.99809	1.15403	7.95113	34.43216
64	16.39189	27.26083	28.28821	64.92867	1.02599	1.18629	8.17340	37.26553
65	17.41176	29.09151	30.22002	67.84230	1.05659	1.22167	8.41718	40.09889

**Table A-18**  
**Hardin 1996 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.10509	2.46541	2.48620	4.39001	2.72303	3.15332	29.79782	0.82775
4	1.93079	2.26294	2.29030	4.43544	2.60834	3.02051	28.54282	0.79173
5	1.82552	2.14090	2.17295	4.48086	2.50203	2.89740	27.37952	0.76184
6	1.75486	2.05936	2.09499	4.52629	2.40347	2.78326	26.30098	0.73761
7	1.70406	2.00116	2.03965	4.57172	2.31207	2.67742	25.30077	0.71858
8	1.66573	1.95771	1.99852	4.61715	2.22731	2.57926	24.37323	0.70432
9	1.63575	1.92422	1.96692	4.66258	2.14870	2.48824	23.51303	0.69442
10	1.61167	1.89778	1.94202	4.70800	2.07581	2.40383	22.71545	0.68845
11	1.59189	1.87655	1.92203	4.75343	2.00825	2.32559	21.97609	0.68605
12	1.57538	1.85927	1.90573	4.79886	1.94564	2.25309	21.29102	0.68683
13	1.56140	1.84507	1.89229	4.84429	1.88767	2.18596	20.65662	0.69044
14	1.54942	1.83331	1.88110	4.88972	1.83403	2.12384	20.06960	0.69655
15	1.53905	1.82351	1.87170	4.93515	1.78444	2.06641	19.52695	0.70483
16	1.53001	1.81532	1.86376	4.98057	1.73866	2.01340	19.02600	0.71498
17	1.52207	1.80844	1.85702	5.02600	1.69646	1.96453	18.56421	0.72671
18	1.51505	1.80267	1.85127	5.07143	1.65764	1.91957	18.13940	0.73974
19	1.50882	1.79780	1.84634	5.11686	1.62200	1.87831	17.74950	0.75383
20	1.51001	1.79606	1.84400	5.16228	1.58939	1.84055	17.39264	0.76873
21	1.51885	1.80778	1.85558	5.20771	1.55965	1.80611	17.06718	0.78422
22	1.52693	1.81867	1.86626	5.25314	1.53264	1.77483	16.77161	0.80010
23	1.53437	1.82880	1.87615	5.29857	1.50824	1.74657	16.50458	0.81617
24	1.54123	1.83825	1.88534	5.34400	1.48633	1.72120	16.26488	0.83226
25	1.54759	1.84710	1.89390	5.38942	1.46683	1.69861	16.05142	0.84822
26	1.55351	1.85539	1.90190	5.43485	1.44964	1.67871	15.86331	0.86391
27	1.55905	1.86316	1.90939	5.48028	1.43468	1.66139	15.69965	0.87920
28	1.56424	1.87047	1.91642	5.52571	1.42190	1.64659	15.55976	0.89398
29	1.56912	1.87733	1.92303	5.57114	1.41123	1.63423	15.44304	0.90817
30	1.57372	1.88379	1.92925	5.61656	1.40264	1.62428	15.34897	0.92169
31	1.57808	1.88987	1.93513	5.66199	1.39607	1.61668	15.27715	0.93449
32	1.58222	1.89560	1.94069	5.70742	1.39151	1.61140	15.22729	0.94652
33	1.58617	1.90100	1.94596	5.75285	1.38894	1.60842	15.19914	0.95775
34	1.58993	1.90610	1.95098	5.79828	1.38834	1.60773	15.19260	0.96819
35	1.59354	1.91092	1.95576	5.84371	1.38972	1.60932	15.20766	0.97783
36	1.59702	1.91549	1.96034	5.88913	1.39307	1.61321	15.24434	0.98671
37	1.60036	1.91982	1.96473	5.93456	1.39842	1.61940	15.30285	0.99486
38	1.60360	1.92394	1.96896	5.97999	1.40578	1.62792	15.38339	1.00234
39	1.60675	1.92789	1.97307	6.02542	1.41519	1.63882	15.48633	1.00924
40	1.60982	1.93168	1.97707	6.07084	1.42668	1.65213	15.61214	1.01563
41	1.61283	1.93534	1.98098	6.11627	1.44032	1.66791	15.76131	1.02162
42	1.61578	1.93889	1.98484	6.16170	1.45615	1.68624	15.93452	1.02735
43	1.61869	1.94238	1.98867	6.20713	1.47424	1.70720	16.13254	1.03294
44	1.62158	1.94582	1.99249	6.25256	1.49468	1.73087	16.35620	1.03857
45	1.62445	1.94925	1.99634	6.29799	1.51756	1.75736	16.60655	1.04439
46	1.62733	1.95271	2.00024	6.34342	1.54298	1.78680	16.88469	1.05060
47	1.63021	1.95622	2.00422	6.38884	1.57105	1.81930	17.19188	1.05741
48	1.63312	1.95983	2.00832	6.43427	1.60190	1.85503	17.52953	1.06504
49	1.69273	2.03798	2.09017	6.47970	1.63569	1.89416	17.89922	1.09972
50	1.75234	2.11614	2.17203	6.52513	1.67256	1.93685	18.30266	1.13440
51	1.81194	2.19429	2.25389	6.57055	1.71269	1.98332	18.74179	1.16908
52	1.87156	2.27245	2.33576	6.61599	1.75627	2.03380	19.21877	1.20376
53	1.93116	2.35060	2.41762	6.66141	1.80353	2.08852	19.73582	1.23844
54	1.99078	2.42876	2.49947	6.70684	1.85468	2.14776	20.29561	1.27312
55	2.05039	2.50692	2.58134	6.75227	1.91000	2.21182	20.90097	1.30780
56	2.10999	2.58507	2.66320	6.79770	1.96976	2.28102	21.55492	1.34248
57	2.16960	2.66323	2.74506	6.84313	2.03428	2.35574	22.26099	1.37716
58	2.22921	2.74138	2.82692	6.88855	2.10390	2.43636	23.02280	1.41184
59	2.28882	2.81954	2.90878	6.93398	2.17899	2.52332	23.84454	1.44652
60	2.34843	2.89769	2.99064	6.97941	2.25997	2.61709	24.73071	1.48121
61	2.40804	2.97585	3.07250	7.02484	2.34730	2.71821	25.68623	1.51589
62	2.46765	3.05400	3.15436	7.07026	2.44145	2.82725	26.71658	1.55056
63	2.52726	3.13216	3.23622	7.11569	2.54300	2.94484	27.82777	1.58525
64	2.58687	3.21031	3.31808	7.16112	2.65253	3.07168	29.02640	1.61992
65	2.64648	3.28847	3.39994	7.20655	2.77071	3.20854	30.31961	1.65461

**Table A-19**  
**Hardin 1996 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	10.80434	12.47154	14.11566	29.24205	1.62326	2.32586	6.52089	18.31435
4	7.73682	9.01752	10.12373	22.65457	1.54113	2.20818	6.19097	15.80409
5	6.06396	7.10750	7.91690	19.01167	1.46445	2.09830	5.88291	13.94484
6	5.01860	5.90201	6.52432	16.60498	1.39280	1.99565	5.59510	12.54149
7	4.30641	5.07553	5.57039	14.83618	1.32583	1.89968	5.32606	11.46392
8	3.88705	4.55769	4.97454	13.68108	1.26319	1.80993	5.07441	10.62350
9	3.56192	4.15847	4.51633	12.69946	1.20456	1.72593	4.83892	9.95860
10	3.29325	3.83456	4.14583	11.83126	1.14967	1.64728	4.61841	9.42558
11	3.06568	3.56561	3.83949	11.05760	1.09825	1.57360	4.41183	8.99293
12	2.86895	3.33789	3.58135	10.36420	1.05005	1.50454	4.21821	8.63760
13	2.69592	3.14178	3.36022	9.73983	1.00485	1.43977	4.03663	8.34242
14	2.54150	2.97039	3.16801	9.17543	0.96244	1.37901	3.86627	8.09441
15	2.40192	2.81862	2.99877	8.66351	0.92264	1.32198	3.70636	7.88366
16	2.27439	2.68266	2.84802	8.19781	0.88525	1.26841	3.55619	7.70252
17	2.15676	2.55958	2.71234	7.77302	0.85014	1.21809	3.41511	7.54501
18	2.04736	2.44711	2.58908	7.38457	0.81713	1.17080	3.28252	7.40641
19	1.94487	2.34348	2.47613	7.02853	0.78609	1.12633	3.15785	7.28302
20	1.85473	2.25684	2.38118	6.71128	0.75690	1.08451	3.04059	7.17187
21	1.78688	2.17836	2.29566	6.43473	0.72944	1.04516	2.93026	7.07066
22	1.72455	2.10630	2.21735	6.18154	0.70359	1.00812	2.82642	6.97751
23	1.66703	2.03979	2.14525	5.94940	0.67925	0.97326	2.72866	6.89100
24	1.61370	1.97813	2.07858	5.73626	0.65634	0.94042	2.63660	6.80998
25	1.56406	1.92077	2.01665	5.54031	0.63475	0.90949	2.54989	6.73362
26	1.51770	1.86722	1.95894	5.35993	0.61442	0.88036	2.46820	6.66126
27	1.47425	1.81710	1.90499	5.19371	0.59526	0.85290	2.39124	6.59243
28	1.43341	1.77009	1.85444	5.04035	0.57720	0.82703	2.31871	6.52683
29	1.39491	1.72591	1.80695	4.89871	0.56019	0.80266	2.25036	6.46424
30	1.35853	1.68433	1.76227	4.76776	0.54416	0.77968	2.18595	6.40454
31	1.32407	1.64516	1.72017	4.64660	0.52905	0.75803	2.12525	6.34770
32	1.29137	1.60822	1.68045	4.53439	0.51481	0.73763	2.06806	6.29369
33	1.26027	1.57336	1.64296	4.43040	0.50140	0.71841	2.01418	6.24258
34	1.23063	1.54045	1.60753	4.33395	0.48876	0.70031	1.96342	6.19439
35	1.20234	1.50935	1.57403	4.24444	0.47687	0.68327	1.91564	6.14921
36	1.17530	1.47997	1.54236	4.16134	0.46567	0.66722	1.87066	6.10710
37	1.14940	1.45219	1.51238	4.08416	0.45514	0.65213	1.82834	6.06809
38	1.12457	1.42592	1.48401	4.01245	0.44523	0.63794	1.78856	6.03224
39	1.10072	1.40106	1.45714	3.94582	0.43593	0.62461	1.75118	5.99956
40	1.07778	1.37753	1.43170	3.88390	0.42719	0.61209	1.71609	5.97003
41	1.05570	1.35524	1.40758	3.82638	0.41900	0.60036	1.68319	5.94365
42	1.03440	1.33411	1.38471	3.77296	0.41133	0.58937	1.65237	5.92031
43	1.01384	1.31406	1.36300	3.72337	0.40415	0.57908	1.62354	5.89933
44	0.99397	1.29499	1.34235	3.67737	0.39745	0.56948	1.59662	5.88213
45	0.97472	1.27682	1.32270	3.63476	0.39121	0.56053	1.57153	5.86695
46	0.95607	1.25947	1.30394	3.59532	0.38540	0.55221	1.54820	5.85400
47	0.93796	1.24282	1.28599	3.55890	0.38001	0.54449	1.52655	5.84289
48	0.92078	1.22687	1.26879	3.52510	0.37503	0.53735	1.50653	5.83318
49	0.91734	1.22309	1.26417	3.49218	0.37043	0.53077	1.48808	5.83318
50	0.91410	1.21953	1.25982	3.46235	0.36622	0.52473	1.47116	5.83318
51	0.91104	1.21617	1.25571	3.43543	0.36237	0.51922	1.45570	5.83318
52	0.90815	1.21300	1.25184	3.41133	0.35888	0.51422	1.44168	5.83318
53	0.90541	1.21000	1.24818	3.38989	0.35574	0.50971	1.42905	5.83318
54	0.90282	1.20715	1.24471	3.37104	0.35293	0.50569	1.41778	5.83318
55	0.90037	1.20446	1.24143	3.35468	0.35046	0.50214	1.40783	5.83318
56	0.92750	1.24952	1.29108	3.34073	0.34830	0.49906	1.39918	5.95690
57	0.95474	1.29470	1.34089	3.32915	0.34647	0.49643	1.39182	6.08062
58	0.98210	1.34001	1.39084	3.31987	0.34495	0.49425	1.38571	6.20434
59	1.00955	1.38543	1.44094	3.31287	0.34374	0.49252	1.38084	6.32806
60	1.03711	1.43095	1.49116	3.30813	0.34283	0.49122	1.37720	6.45177
61	1.06475	1.47657	1.54150	3.30561	0.34223	0.49035	1.37477	6.57549
62	1.09247	1.52228	1.59196	3.30534	0.34193	0.48992	1.37356	6.69921
63	1.12028	1.56808	1.64252	3.30731	0.34193	0.48992	1.37357	6.82293
64	1.14815	1.61396	1.69319	3.31155	0.34223	0.49035	1.37478	6.94665
65	1.17610	1.65992	1.74394	3.31809	0.34283	0.49122	1.37720	7.07037

**Table A-20**  
**Hardin 1996 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	79.04005	109.83247	123.25761	293.98486	5.33607	6.16977	42.50887	197.52565
4	60.76083	84.57607	94.90863	268.60107	4.91779	5.68614	39.17668	157.53102
5	49.70535	69.03149	77.13646	245.95052	4.54056	5.24997	36.17154	128.66441
6	42.30313	58.53392	64.99374	225.70564	4.19990	4.85608	33.45772	107.36316
7	37.00645	51.00191	56.22026	207.58305	3.89187	4.49993	31.00386	91.32393
8	33.03363	45.35828	49.62122	191.33607	3.61300	4.17750	28.78236	79.02109
9	29.94670	40.98764	44.50200	176.74916	3.36023	3.88523	26.76866	69.42191
10	27.48114	37.51276	40.43092	163.63382	3.13083	3.61999	24.94122	61.81223
11	25.46764	34.68956	37.12581	151.82553	2.92241	3.37901	23.28087	55.68925
12	23.79300	32.35335	34.39493	141.17949	2.73284	3.15981	21.77066	50.69209
13	22.37856	30.38907	32.10374	131.56918	2.56021	2.96021	20.39549	46.55780
14	21.16805	28.71399	30.15527	122.88284	2.40286	2.77828	19.14198	43.09177
15	20.12016	27.26714	28.47810	115.02303	2.25929	2.61227	17.99823	40.14821
16	19.20387	26.00291	27.01869	107.90280	2.12816	2.46066	16.95367	37.61647
17	18.39551	24.88628	25.73610	101.44655	2.00830	2.32207	15.99883	35.42170
18	17.67670	23.89034	24.59862	95.58655	1.89864	2.19528	15.12526	33.46848
19	17.03288	22.99394	23.58154	90.26332	1.79824	2.07919	14.32541	31.73592
20	16.34190	22.21086	22.70598	85.42441	1.70625	1.97283	13.59261	30.17445
21	15.60448	21.31331	21.75874	81.02289	1.62192	1.87532	12.92076	28.75308
22	14.93293	20.48935	20.89470	77.01741	1.54456	1.78588	12.30450	27.44766
23	14.31856	19.72894	20.10239	73.37120	1.47357	1.70380	11.73899	26.23947
24	13.75422	19.02409	19.37247	70.05154	1.40840	1.62845	11.21986	25.11400
25	13.23391	18.36838	18.69734	67.02940	1.34857	1.55927	10.74323	24.06032
26	12.75263	17.75664	18.07069	64.27892	1.29364	1.49575	10.30558	23.06989
27	12.30614	17.18474	17.48743	61.77707	1.24320	1.43744	9.90377	22.13643
28	11.89084	16.64925	16.94322	59.50323	1.19690	1.38391	9.53496	21.25523
29	11.50365	16.14740	16.43452	57.43945	1.15443	1.33480	9.19662	20.42310
30	11.14191	15.67682	15.95830	55.56929	1.11550	1.28978	8.88643	19.63756
31	10.80334	15.23556	15.51199	53.87843	1.07984	1.24855	8.60234	18.89674
32	10.48591	14.82186	15.09338	52.35408	1.04722	1.21084	8.34251	18.19930
33	10.18785	14.43417	14.70057	50.98495	1.01744	1.17640	8.10528	17.54465
34	9.90760	14.07113	14.33187	49.76096	0.99031	1.14503	7.88912	16.93146
35	9.64378	13.73144	13.98575	48.67329	0.96566	1.11652	7.69271	16.35948
36	9.39513	13.41387	13.66086	47.71420	0.94333	1.09071	7.51488	15.82740
37	9.16052	13.11731	13.35595	46.87712	0.92320	1.06744	7.35452	15.33498
38	8.93896	12.84065	13.06985	46.15614	0.90515	1.04656	7.21068	14.88070
39	8.72950	12.58280	12.80144	45.54634	0.88906	1.02797	7.08256	14.46355
40	8.53131	12.34274	12.54970	45.04353	0.87485	1.01154	6.96937	14.08221
41	8.34361	12.11940	12.31360	44.64444	0.86244	0.99719	6.87048	13.73514
42	8.16565	11.91170	12.09210	44.34633	0.85175	0.98483	6.78534	13.42017
43	7.99677	11.71853	11.88426	44.14722	0.84273	0.97440	6.71346	13.13535
44	7.83633	11.53871	11.68902	44.04576	0.83532	0.96583	6.65444	12.87781
45	7.68370	11.37094	11.50540	44.04140	0.82949	0.95908	6.60796	12.64490
46	7.53826	11.21374	11.33225	44.13396	0.82519	0.95412	6.57375	12.43323
47	7.39941	11.06548	11.16840	44.32416	0.82242	0.95091	6.55163	12.23866
48	7.26655	10.92434	11.01265	44.61319	0.82114	0.94944	6.54148	12.05709
49	7.26655	10.92434	11.01265	45.00304	0.82136	0.94969	6.54326	12.05709
50	7.26655	10.92434	11.01265	45.49625	0.82308	0.95168	6.55694	12.05709
51	7.26655	10.92434	11.01265	46.09616	0.82631	0.95541	6.58263	12.05709
52	7.26655	10.92434	11.01265	46.80688	0.83106	0.96090	6.62046	12.05709
53	7.26655	10.92434	11.01265	47.63316	0.83735	0.96818	6.67063	12.05709
54	7.26655	10.92434	11.01265	48.58092	0.84524	0.97729	6.73343	12.05709
55	7.26655	10.92434	11.01265	49.65652	0.85475	0.98829	6.80920	12.05709
56	8.29912	12.78877	12.97130	50.86783	0.86594	1.00123	6.89837	14.96079
57	9.33168	14.65321	14.92994	52.22334	0.87888	1.01619	7.00143	17.86447
58	10.36425	16.51762	16.88855	53.73309	0.89363	1.03325	7.11898	20.76814
59	11.39681	18.38203	18.84718	55.40833	0.91029	1.05251	7.25169	23.67186
60	12.42938	20.24646	20.80582	57.26157	0.92895	1.07409	7.40033	26.57552
61	13.46195	22.11089	22.76445	59.30714	0.94972	1.09810	7.56578	29.47922
62	14.49451	23.97530	24.72307	61.56110	0.97272	1.12469	7.74901	32.38287
63	15.52707	25.83975	26.68175	64.04146	0.99809	1.15403	7.95113	35.28662
64	16.55962	27.70416	28.64038	66.76845	1.02599	1.18629	8.17340	38.19029
65	17.59216	29.56860	30.59903	69.76466	1.05659	1.22167	8.41718	41.09398

**Table A-21**  
**Hardin 1996 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	2.10545	2.46465	2.48344	4.36996	2.72303	3.15332	29.79782	0.81913
4	1.93095	2.26208	2.28742	4.41519	2.60834	3.02051	28.54282	0.78349
5	1.82557	2.13999	2.16998	4.46041	2.50203	2.89740	27.37952	0.75391
6	1.75486	2.05841	2.09197	4.50563	2.40347	2.78326	26.30098	0.72993
7	1.70403	2.00020	2.03659	4.55085	2.31207	2.67742	25.30077	0.71110
8	1.66568	1.95673	1.99541	4.59607	2.22731	2.57926	24.37323	0.69700
9	1.63570	1.92323	1.96377	4.64129	2.14870	2.48824	23.51303	0.68719
10	1.61161	1.89678	1.93884	4.68651	2.07581	2.40383	22.71545	0.68129
11	1.59184	1.87554	1.91881	4.73173	2.00825	2.32559	21.97609	0.67891
12	1.57533	1.85825	1.90247	4.77695	1.94564	2.25309	21.29102	0.67968
13	1.56136	1.84403	1.88899	4.82217	1.88767	2.18596	20.65662	0.68326
14	1.54938	1.83225	1.87776	4.86739	1.83403	2.12384	20.06960	0.68930
15	1.53902	1.82243	1.86833	4.91261	1.78444	2.06641	19.52695	0.69750
16	1.52999	1.81421	1.86035	4.95784	1.73866	2.01340	19.02600	0.70754
17	1.52205	1.80732	1.85356	5.00306	1.69646	1.96453	18.56421	0.71914
18	1.51504	1.80151	1.84777	5.04828	1.65764	1.91957	18.13940	0.73204
19	1.50881	1.79662	1.84280	5.09350	1.62200	1.87831	17.74950	0.74598
20	1.51002	1.79484	1.84041	5.13872	1.58939	1.84055	17.39264	0.76073
21	1.51888	1.80654	1.85194	5.18394	1.55965	1.80611	17.06718	0.77606
22	1.52698	1.81739	1.86258	5.22916	1.53264	1.77483	16.77161	0.79177
23	1.53443	1.82749	1.87243	5.27438	1.50824	1.74657	16.50458	0.80768
24	1.54131	1.83692	1.88157	5.31960	1.48633	1.72120	16.26488	0.82360
25	1.54768	1.84574	1.89009	5.36482	1.46683	1.69861	16.05142	0.83940
26	1.55362	1.85400	1.89806	5.41004	1.44964	1.67871	15.86331	0.85492
27	1.55916	1.86174	1.90551	5.45526	1.43468	1.66139	15.69965	0.87005
28	1.56436	1.86902	1.91250	5.50048	1.42190	1.64659	15.55976	0.88468
29	1.56925	1.87586	1.91907	5.54570	1.41123	1.63423	15.44304	0.89872
30	1.57385	1.88229	1.92526	5.59092	1.40264	1.62428	15.34897	0.91210
31	1.57822	1.88835	1.93111	5.63615	1.39607	1.61668	15.27715	0.92477
32	1.58236	1.89406	1.93663	5.68137	1.39151	1.61140	15.22729	0.93667
33	1.58630	1.89943	1.94188	5.72659	1.38894	1.60842	15.19914	0.94779
34	1.59006	1.90451	1.94686	5.77181	1.38834	1.60773	15.19260	0.95811
35	1.59367	1.90930	1.95161	5.81703	1.38972	1.60932	15.20766	0.96766
36	1.59713	1.91385	1.95615	5.86225	1.39307	1.61321	15.24434	0.97644
37	1.60047	1.91816	1.96052	5.90747	1.39842	1.61940	15.30285	0.98451
38	1.60371	1.92226	1.96472	5.95269	1.40578	1.62792	15.38339	0.99192
39	1.60684	1.92619	1.96879	5.99791	1.41519	1.63882	15.48633	0.99874
40	1.60990	1.92995	1.97276	6.04313	1.42668	1.65213	15.61214	1.00506
41	1.61289	1.93359	1.97664	6.08835	1.44032	1.66791	15.76131	1.01099
42	1.61583	1.93712	1.98047	6.13357	1.45615	1.68624	15.93452	1.01666
43	1.61872	1.94059	1.98426	6.17879	1.47424	1.70720	16.13254	1.02219
44	1.62159	1.94400	1.98804	6.22402	1.49468	1.73087	16.35620	1.02776
45	1.62444	1.94741	1.99185	6.26923	1.51756	1.75736	16.60655	1.03352
46	1.62728	1.95084	1.99571	6.31446	1.54298	1.78680	16.88469	1.03967
47	1.63014	1.95432	1.99964	6.35968	1.57105	1.81930	17.19188	1.04641
48	1.63302	1.95789	2.00368	6.40490	1.60190	1.85503	17.52953	1.05396
49	1.63599	2.03596	2.08532	6.45012	1.63569	1.89416	17.89922	1.08828
50	1.75217	2.11403	2.16696	6.49534	1.67256	1.93685	18.30266	1.12260
51	1.81175	2.19209	2.24860	6.54056	1.71269	1.98332	18.74179	1.15692
52	1.87132	2.27016	2.33024	6.58578	1.75627	2.03380	19.21877	1.19124
53	1.93090	2.34823	2.41187	6.63100	1.80353	2.08852	19.73582	1.22556
54	1.99047	2.42629	2.49351	6.67622	1.85468	2.14776	20.29561	1.25988
55	2.05005	2.50436	2.57515	6.72144	1.91000	2.21182	20.90097	1.29420
56	2.10962	2.58243	2.65679	6.76666	1.96976	2.28102	21.55492	1.32852
57	2.16920	2.66049	2.73843	6.81189	2.03428	2.35574	22.26099	1.36283
58	2.22878	2.73856	2.82006	6.85711	2.10390	2.43636	23.02280	1.39715
59	2.28835	2.81663	2.90170	6.90233	2.17899	2.52332	23.84454	1.43147
60	2.34793	2.89470	2.98334	6.94755	2.25997	2.61709	24.73071	1.46579
61	2.40750	2.97276	3.06497	6.99277	2.34730	2.71821	25.68623	1.50011
62	2.46708	3.05083	3.14662	7.03799	2.44145	2.82725	26.71658	1.53443
63	2.52665	3.12890	3.22825	7.08321	2.54300	2.94484	27.82777	1.56875
64	2.58623	3.20696	3.30989	7.12843	2.65253	3.07168	29.02640	1.60307
65	2.64580	3.28503	3.39153	7.17365	2.77071	3.20854	30.31961	1.63739

**Table A-22**  
**Hardin 1996 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	8.08948	10.29907	11.73526	20.26434	1.62326	2.32586	6.52089	16.22037
4	5.96005	7.66336	8.70761	16.56477	1.54113	2.20818	6.19097	13.68281
5	4.76023	6.14870	6.95320	14.33120	1.46445	2.09830	5.88291	11.80335
6	3.99280	5.16690	5.80969	12.73949	1.39280	1.99565	5.59510	10.38475
7	3.46076	4.48044	5.00796	11.49758	1.32583	1.89968	5.32606	9.29547
8	3.11903	4.02622	4.47441	10.59039	1.26319	1.80993	5.07441	8.44592
9	2.85415	3.67200	4.05938	9.80129	1.20456	1.72593	4.83892	7.77379
10	2.63836	3.38301	3.72248	9.09756	1.14967	1.64728	4.61841	7.23497
11	2.45831	3.14161	3.44279	8.46684	1.09825	1.57360	4.41183	6.79763
12	2.30507	2.93592	3.20608	7.89931	1.05005	1.50454	4.21821	6.43843
13	2.17244	2.75762	3.00235	7.38701	1.00485	1.43977	4.03663	6.14005
14	2.05597	2.60074	2.82438	6.92328	0.96244	1.37901	3.86627	5.88934
15	1.95243	2.46086	2.66686	6.50248	0.92264	1.32198	3.70636	5.67630
16	1.85937	2.33469	2.52577	6.11981	0.88525	1.26841	3.55619	5.49320
17	1.77491	2.21970	2.39806	5.77111	0.85014	1.21809	3.41511	5.33397
18	1.69760	2.11393	2.28134	5.45275	0.81713	1.17080	3.28252	5.19386
19	1.62630	2.01583	2.17375	5.16158	0.78609	1.12633	3.15785	5.06913
20	1.55827	1.93546	2.08468	4.89911	0.75690	1.08451	3.04059	4.95678
21	1.49941	1.86648	2.00818	4.66504	0.72944	1.04516	2.93026	4.85446
22	1.44551	1.80322	1.93813	4.45076	0.70359	1.00812	2.82642	4.76031
23	1.39591	1.74491	1.87365	4.25436	0.67925	0.97326	2.72866	4.67285
24	1.35009	1.69092	1.81402	4.07413	0.65634	0.94042	2.63660	4.59096
25	1.30759	1.64076	1.75866	3.90856	0.63475	0.90949	2.54989	4.51376
26	1.26802	1.59400	1.70706	3.75628	0.61442	0.88036	2.46820	4.44061
27	1.23106	1.55029	1.65883	3.61609	0.59526	0.85290	2.39124	4.37104
28	1.19645	1.50933	1.61364	3.48691	0.57720	0.82703	2.31871	4.30472
29	1.16394	1.47089	1.57121	3.36777	0.56019	0.80266	2.25036	4.24146
30	1.13333	1.43475	1.53130	3.25780	0.54416	0.77968	2.18595	4.18111
31	1.10445	1.40074	1.49372	3.15622	0.52905	0.75803	2.12525	4.12365
32	1.07714	1.36869	1.45830	3.06232	0.51481	0.73763	2.06806	4.06905
33	1.05126	1.33848	1.42489	2.97547	0.50140	0.71841	2.01418	4.01739
34	1.02670	1.30998	1.39336	2.89510	0.48876	0.70031	1.96342	3.96867
35	1.00334	1.28307	1.36359	2.82070	0.47687	0.68327	1.91564	3.92300
36	0.98110	1.25766	1.33547	2.75181	0.46567	0.66722	1.87066	3.88043
37	0.95988	1.23365	1.30892	2.68801	0.45514	0.65213	1.82834	3.84100
38	0.93962	1.21097	1.28383	2.62891	0.44523	0.63794	1.78856	3.80476
39	0.92024	1.18952	1.26013	2.57418	0.43593	0.62461	1.75118	3.77173
40	0.90167	1.16922	1.23774	2.52350	0.42719	0.61209	1.71609	3.74188
41	0.88387	1.15001	1.21656	2.47661	0.41900	0.60036	1.68319	3.71521
42	0.86677	1.13181	1.19654	2.43324	0.41133	0.58937	1.65237	3.69161
43	0.85033	1.11454	1.17758	2.39318	0.40415	0.57908	1.62354	3.67091
44	0.83450	1.09814	1.15961	2.35621	0.39745	0.56948	1.59662	3.65302
45	0.81924	1.08253	1.14255	2.32215	0.39121	0.56053	1.57153	3.63767
46	0.80451	1.06762	1.12631	2.29084	0.38540	0.55221	1.54820	3.62458
47	0.79026	1.05335	1.11081	2.26212	0.38001	0.54449	1.52655	3.61335
48	0.77672	1.03971	1.09602	2.23579	0.37503	0.53735	1.50653	3.60354
49	0.77492	1.03775	1.09366	2.21122	0.37043	0.53077	1.48808	3.60354
50	0.77321	1.03589	1.09143	2.18912	0.36622	0.52473	1.47116	3.60354
51	0.77160	1.03414	1.08933	2.16940	0.36237	0.51922	1.45570	3.60354
52	0.77008	1.03249	1.08734	2.15193	0.35888	0.51422	1.44168	3.60354
53	0.76864	1.03092	1.08546	2.13665	0.35574	0.50971	1.42905	3.60354
54	0.76727	1.02943	1.08368	2.12348	0.35293	0.50569	1.41778	3.60354
55	0.76597	1.02802	1.08199	2.11235	0.35046	0.50214	1.40783	3.60354
56	0.79282	1.07079	1.13127	2.10321	0.34830	0.49906	1.39918	3.72860
57	0.81973	1.11362	1.18063	2.09602	0.34647	0.49643	1.39182	3.85367
58	0.84669	1.15652	1.23006	2.09076	0.34495	0.49425	1.38571	3.97873
59	0.87371	1.19948	1.27956	2.08739	0.34374	0.49252	1.38084	4.10379
60	0.90077	1.24249	1.32913	2.08592	0.34283	0.49122	1.37720	4.22886
61	0.92789	1.28555	1.37876	2.08633	0.34223	0.49035	1.37477	4.35392
62	0.95504	1.32865	1.42844	2.08863	0.34193	0.48992	1.37356	4.47898
63	0.98224	1.37180	1.47818	2.09285	0.34193	0.48992	1.37357	4.60404
64	1.00947	1.41500	1.52797	2.09901	0.34223	0.49035	1.37478	4.72911
65	1.03674	1.45823	1.57780	2.10714	0.34283	0.49122	1.37720	4.85417



**Table A-23**  
**Hardin 1996 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	72.92470	98.37347	111.72911	225.20663	5.33607	6.16977	42.50887	159.45908
4	56.14389	75.76393	86.10057	205.76169	4.91779	5.68614	39.17668	127.17210
5	46.01151	61.92624	70.08652	188.40962	4.54056	5.24997	36.17154	103.86855
6	39.23320	52.60664	59.16310	172.90092	4.19990	4.85608	33.45772	86.67242
7	34.38452	45.92542	51.27553	159.01817	3.89187	4.49993	31.00386	73.72423
8	30.74762	40.91747	45.34286	146.57225	3.61300	4.17750	28.78236	63.79237
9	27.92097	37.03493	40.73889	135.39799	3.36023	3.88523	26.76866	56.04309
10	25.66245	33.94347	37.07539	125.35106	3.13083	3.61999	24.94122	49.89996
11	23.81720	31.42758	34.09911	116.30533	2.92241	3.37901	23.28087	44.95699
12	22.28185	29.34227	31.63814	108.14996	2.73284	3.15981	21.77066	40.92288
13	20.98453	27.58635	29.57201	100.78804	2.56021	2.96021	20.39549	37.58528
14	19.87389	26.08723	27.81384	94.13387	2.40286	2.77828	19.14198	34.78726
15	18.91223	24.79143	26.29973	88.11293	2.25929	2.61227	17.99823	32.41095
16	18.07126	23.65895	24.98174	82.65852	2.12816	2.46066	16.95367	30.36711
17	17.32936	22.65913	23.82317	77.71271	2.00830	2.32207	15.99883	28.58725
18	16.66975	21.76826	22.79562	73.22368	1.89864	2.19528	15.12526	27.01852
19	16.07916	20.96777	21.87695	69.14586	1.79824	2.07919	14.32541	25.61987
20	15.43519	20.25539	21.07088	65.43903	1.70625	1.97283	13.59261	24.35931
21	14.73893	19.42770	20.19049	62.06728	1.62192	1.87532	12.92076	23.21188
22	14.10520	18.67003	19.38785	58.99887	1.54456	1.78588	12.30450	22.15804
23	13.52578	17.97290	18.65230	56.20572	1.47357	1.70380	11.73899	21.18271
24	12.99386	17.32874	17.97516	53.66269	1.40840	1.62845	11.21986	20.27414
25	12.50375	16.73132	17.34930	51.34761	1.34857	1.55927	10.74323	19.42352
26	12.05067	16.17558	16.76878	49.24060	1.29364	1.49575	10.30558	18.62393
27	11.63057	15.65741	16.22884	47.32405	1.24320	1.43744	9.90377	17.87039
28	11.24001	15.17329	15.72533	45.58220	1.19690	1.38391	9.53496	17.15901
29	10.87602	14.72037	15.25489	44.00125	1.15443	1.33480	9.19662	16.48723
30	10.53606	14.29620	14.81462	42.56865	1.11550	1.28978	8.88643	15.85310
31	10.21790	13.89869	14.40209	41.27335	1.07984	1.24855	8.60234	15.25505
32	9.91962	13.52602	14.01516	40.10562	1.04722	1.21084	8.34251	14.69200
33	9.63950	13.17654	13.65201	39.05679	1.01744	1.17640	8.10528	14.16351
34	9.37605	12.84884	13.31101	38.11917	0.99031	1.14503	7.88912	13.66848
35	9.12792	12.54158	12.99071	37.28593	0.96566	1.11652	7.69271	13.20674
36	8.89393	12.25355	12.68979	36.55130	0.94333	1.09071	7.51488	12.77719
37	8.67300	11.98363	12.40710	35.90999	0.92320	1.06744	7.35452	12.37967
38	8.46416	11.73076	12.14150	35.35774	0.90515	1.04656	7.21068	12.01294
39	8.26654	11.49394	11.89196	34.89055	0.88906	1.02797	7.08256	11.67618
40	8.07934	11.27220	11.65753	34.50542	0.87485	1.01154	6.96937	11.36833
41	7.90182	11.06461	11.43726	34.19968	0.86244	0.99719	6.87048	11.08815
42	7.73331	10.87023	11.23021	33.97130	0.85175	0.98483	6.78534	10.83387
43	7.57319	10.68813	11.03551	33.81877	0.84273	0.97440	6.71346	10.60394
44	7.42086	10.51735	10.85223	33.74110	0.83532	0.96583	6.65444	10.39603
45	7.27576	10.35687	10.67949	33.73775	0.82949	0.95908	6.60796	10.20801
46	7.13736	10.20555	10.51631	33.80861	0.82519	0.95412	6.57375	10.03713
47	7.00512	10.06219	10.36165	33.95435	0.82242	0.95091	6.55163	9.88006
48	6.87855	9.92545	10.21451	34.17574	0.82114	0.94944	6.54148	9.73349
49	6.87855	9.92545	10.21451	34.47441	0.82136	0.94969	6.54326	9.73349
50	6.87855	9.92545	10.21451	34.85220	0.82308	0.95168	6.55694	9.73349
51	6.87855	9.92545	10.21451	35.31177	0.82631	0.95541	6.58263	9.73349
52	6.87855	9.92545	10.21451	35.85623	0.83106	0.96090	6.62046	9.73349
53	6.87855	9.92545	10.21451	36.48917	0.83735	0.96818	6.67063	9.73349
54	6.87855	9.92545	10.21451	37.21518	0.84524	0.97729	6.73343	9.73349
55	6.87855	9.92545	10.21451	38.03915	0.85475	0.98829	6.80920	9.73349
56	7.81883	11.54741	11.97889	38.96707	0.86594	1.00123	6.89837	12.07759
57	8.75912	13.16937	13.74327	40.00546	0.87888	1.01619	7.00143	14.42170
58	9.69941	14.79134	15.50765	41.16203	0.89363	1.03325	7.11898	16.76579
59	10.63970	16.41328	17.27200	42.44531	0.91029	1.05251	7.25169	19.10989
60	11.57999	18.03523	19.03636	43.86497	0.92895	1.07409	7.40033	21.45396
61	12.52028	19.65718	20.80074	45.43198	0.94972	1.09810	7.56578	23.79810
62	13.46056	21.27914	22.56508	47.15862	0.97272	1.12469	7.74901	26.14214
63	14.40085	22.90114	24.32948	49.05872	0.99809	1.15403	7.95113	28.48627
64	15.34113	24.52306	26.09386	51.14771	1.02599	1.18629	8.17340	30.83038
65	16.28140	26.14502	27.85823	53.44293	1.05659	1.22167	8.41718	33.17447

**Table A-24**  
**Hardin 1996 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	2.10552	2.47707	2.51797	4.59460	2.72303	3.15332	29.79782	0.90987
4	1.93297	2.27531	2.32301	4.64215	2.60834	3.02051	28.54282	0.87028
5	1.82856	2.15357	2.20622	4.68969	2.50203	2.89740	27.37952	0.83742
6	1.75833	2.07216	2.12868	4.73724	2.40347	2.78326	26.30098	0.81079
7	1.70773	2.01404	2.07370	4.78478	2.31207	2.67742	25.30077	0.78987
8	1.66946	1.97064	2.03289	4.83233	2.22731	2.57926	24.37323	0.77420
9	1.63948	1.93720	2.00161	4.87987	2.14870	2.48824	23.51303	0.76331
10	1.61534	1.91083	1.97704	4.92742	2.07581	2.40383	22.71545	0.75676
11	1.59549	1.88968	1.95738	4.97497	2.00825	2.32559	21.97609	0.75411
12	1.57889	1.87251	1.94143	5.02251	1.94564	2.25309	21.29102	0.75497
13	1.56481	1.85843	1.92835	5.07006	1.88767	2.18596	20.65662	0.75894
14	1.55274	1.84681	1.91753	5.11760	1.83403	2.12384	20.06960	0.76566
15	1.54229	1.83718	1.90851	5.16515	1.78444	2.06641	19.52695	0.77476
16	1.53316	1.82917	1.90096	5.21269	1.73866	2.01340	19.02600	0.78591
17	1.52515	1.82249	1.89461	5.26024	1.69646	1.96453	18.56421	0.79880
18	1.51806	1.81692	1.88925	5.30778	1.65764	1.91957	18.13940	0.81313
19	1.51177	1.81228	1.88471	5.35533	1.62200	1.87831	17.74950	0.82862
20	1.51282	1.81090	1.88290	5.40287	1.58939	1.84055	17.39264	0.84500
21	1.52143	1.82292	1.89493	5.45042	1.55965	1.80611	17.06718	0.86203
22	1.52932	1.83410	1.90606	5.49796	1.53264	1.77483	16.77161	0.87948
23	1.53658	1.84453	1.91639	5.54551	1.50824	1.74657	16.50458	0.89714
24	1.54329	1.85427	1.92600	5.59305	1.48633	1.72120	16.26488	0.91483
25	1.54953	1.86341	1.93498	5.64060	1.46683	1.69861	16.05142	0.93238
26	1.55535	1.87198	1.94338	5.68814	1.44964	1.67871	15.86331	0.94962
27	1.56079	1.88003	1.95126	5.73569	1.43468	1.66139	15.69965	0.96643
28	1.56592	1.88760	1.95867	5.78323	1.42190	1.64659	15.55976	0.98268
29	1.57075	1.89473	1.96564	5.83078	1.41123	1.63423	15.44304	0.99828
30	1.57532	1.90145	1.97222	5.87832	1.40264	1.62428	15.34897	1.01314
31	1.57967	1.90778	1.97845	5.92587	1.39607	1.61668	15.27715	1.02720
32	1.58381	1.91375	1.98435	5.97341	1.39151	1.61140	15.22729	1.04042
33	1.58777	1.91938	1.98995	6.02096	1.38894	1.60842	15.19914	1.05277
34	1.59158	1.92471	1.99529	6.06850	1.38834	1.60773	15.19260	1.06424
35	1.59524	1.92976	2.00038	6.11605	1.38972	1.60932	15.20766	1.07484
36	1.59878	1.93454	2.00527	6.16360	1.39307	1.61321	15.24434	1.08460
37	1.60221	1.93909	2.00998	6.21114	1.39842	1.61940	15.30285	1.09356
38	1.60555	1.94343	2.01453	6.25869	1.40578	1.62792	15.38339	1.10179
39	1.60882	1.94760	2.01896	6.30623	1.41519	1.63882	15.48633	1.10937
40	1.61202	1.95160	2.02328	6.35378	1.42668	1.65213	15.61214	1.11639
41	1.61518	1.95549	2.02753	6.40132	1.44032	1.66791	15.76131	1.12298
42	1.61831	1.95928	2.03174	6.44887	1.45615	1.68624	15.93452	1.12927
43	1.62142	1.96300	2.03594	6.49641	1.47424	1.70720	16.13254	1.13542
44	1.62452	1.96670	2.04016	6.54396	1.49468	1.73087	16.35620	1.14160
45	1.62763	1.97040	2.04442	6.59150	1.51756	1.75736	16.60655	1.14801
46	1.63076	1.97414	2.04877	6.63905	1.54298	1.78680	16.88469	1.15484
47	1.63393	1.97797	2.05324	6.68660	1.57105	1.81930	17.19188	1.16232
48	1.63715	1.98191	2.05785	6.73414	1.60190	1.85503	17.52953	1.17071
49	1.69722	2.06107	2.14207	6.78169	1.63569	1.89416	17.89922	1.20883
50	1.75729	2.14023	2.22629	6.82924	1.67256	1.93685	18.30266	1.24695
51	1.81736	2.21939	2.31051	6.87678	1.71269	1.98332	18.74179	1.28507
52	1.87744	2.29855	2.39473	6.92432	1.75627	2.03380	19.21877	1.32319
53	1.93751	2.37771	2.47895	6.97187	1.80353	2.08852	19.73582	1.36131
54	1.99758	2.45687	2.56316	7.01941	1.85468	2.14776	20.29561	1.39943
55	2.05766	2.53603	2.64738	7.06696	1.91000	2.21182	20.90097	1.43755
56	2.11773	2.61519	2.73160	7.11450	1.96976	2.28102	21.55492	1.47568
57	2.17780	2.69435	2.81582	7.16205	2.03428	2.35574	22.26099	1.51380
58	2.23788	2.77351	2.90004	7.20959	2.10390	2.43636	23.02280	1.55192
59	2.29795	2.85267	2.98426	7.25714	2.17899	2.52332	23.84454	1.59004
60	2.35802	2.93183	3.06848	7.30468	2.25997	2.61709	24.73071	1.62816
61	2.41809	3.01099	3.15270	7.35223	2.34730	2.71821	25.68623	1.66628
62	2.47817	3.09015	3.23692	7.39977	2.44145	2.82725	26.71658	1.70440
63	2.53824	3.16931	3.32114	7.44732	2.54300	2.94484	27.82777	1.74252
64	2.59831	3.24847	3.40536	7.49487	2.65253	3.07168	29.02640	1.78064
65	2.65839	3.32763	3.48958	7.54241	2.77071	3.20854	30.31961	1.81877

**Table A-25**  
**Hardin 1999 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	7.10588	9.56023	10.07361	15.75034	1.40899	2.05684	5.94344	16.26155
4	5.22597	7.07620	7.44291	12.88734	1.33770	1.95278	5.64274	13.73062
5	4.17835	5.66912	5.94139	11.15328	1.27114	1.85561	5.36196	11.85608
6	3.51344	4.76591	4.97278	9.91503	1.20895	1.76483	5.09964	10.44119
7	3.05501	4.13848	4.29819	8.94773	1.15082	1.67996	4.85442	9.35476
8	2.76354	3.72665	3.85274	8.24136	1.09645	1.60059	4.62506	8.50743
9	2.53813	3.40637	3.50692	7.62657	1.04556	1.52631	4.41041	7.83706
10	2.35468	3.14552	3.22629	7.07792	0.99792	1.45676	4.20943	7.29965
11	2.20177	2.92795	2.99325	6.58587	0.95328	1.39160	4.02115	6.86345
12	2.07174	2.74284	2.79593	6.14284	0.91145	1.33053	3.84467	6.50519
13	1.95933	2.58265	2.62601	5.74266	0.87221	1.27325	3.67917	6.20758
14	1.86073	2.44198	2.47753	5.38019	0.83540	1.21952	3.52390	5.95753
15	1.77318	2.31683	2.34611	5.05107	0.80085	1.16908	3.37815	5.74505
16	1.69460	2.20423	2.22843	4.75155	0.76840	1.12171	3.24128	5.56243
17	1.62339	2.10189	2.12197	4.47842	0.73792	1.07721	3.11269	5.40361
18	1.55831	2.00804	2.02479	4.22887	0.70927	1.03539	2.99184	5.26388
19	1.49839	1.92129	1.93533	4.00044	0.68233	0.99606	2.87821	5.13947
20	1.43646	1.84435	1.85511	3.79500	0.65699	0.95908	2.77133	5.02741
21	1.38007	1.77675	1.78489	3.61267	0.63315	0.92428	2.67077	4.92536
22	1.32851	1.71489	1.72072	3.44572	0.61072	0.89152	2.57613	4.83145
23	1.28114	1.65800	1.66177	3.29267	0.58959	0.86069	2.48703	4.74422
24	1.23744	1.60546	1.60739	3.15219	0.56970	0.83165	2.40312	4.66254
25	1.19697	1.55677	1.55703	3.02309	0.55096	0.80430	2.32409	4.58555
26	1.15935	1.51149	1.51023	2.90434	0.53331	0.77853	2.24964	4.51259
27	1.12428	1.46927	1.46661	2.79498	0.51668	0.75426	2.17948	4.44320
28	1.09149	1.42980	1.42585	2.69418	0.50101	0.73138	2.11338	4.37706
29	1.06074	1.39283	1.38767	2.60119	0.48624	0.70982	2.05108	4.31396
30	1.03184	1.35813	1.35184	2.51532	0.47233	0.68950	1.99238	4.25377
31	1.00461	1.32552	1.31816	2.43598	0.45921	0.67036	1.93705	4.19646
32	0.97889	1.29483	1.28646	2.36261	0.44685	0.65232	1.88493	4.14200
33	0.95456	1.26591	1.25659	2.29472	0.43521	0.63532	1.83581	4.09047
34	0.93150	1.23864	1.22841	2.23187	0.42424	0.61931	1.78956	4.04189
35	0.90959	1.21289	1.20180	2.17367	0.41392	0.60424	1.74600	3.99634
36	0.88875	1.18855	1.17666	2.11974	0.40420	0.59005	1.70501	3.95388
37	0.86890	1.16554	1.15288	2.06977	0.39506	0.57671	1.66644	3.91455
38	0.84995	1.14376	1.13038	2.02345	0.38646	0.56416	1.63018	3.87840
39	0.83185	1.12313	1.10906	1.98054	0.37838	0.55237	1.59611	3.84546
40	0.81452	1.10358	1.08886	1.94078	0.37080	0.54130	1.56413	3.81568
41	0.79791	1.08502	1.06970	1.90395	0.36369	0.53092	1.53414	3.78909
42	0.78198	1.06740	1.05150	1.86987	0.35703	0.52120	1.50605	3.76555
43	0.76667	1.05063	1.03420	1.83836	0.35081	0.51211	1.47977	3.74491
44	0.75194	1.03467	1.01774	1.80925	0.34499	0.50361	1.45524	3.72706
45	0.73775	1.01943	1.00204	1.78241	0.33957	0.49570	1.43237	3.71175
46	0.72406	1.00487	0.98705	1.75770	0.33453	0.48834	1.41110	3.69870
47	0.71083	0.99090	0.97268	1.73501	0.32985	0.48151	1.39137	3.68750
48	0.69823	0.97751	0.95893	1.71422	0.32552	0.47520	1.37312	3.67771
49	0.69650	0.97551	0.95679	1.69516	0.32154	0.46938	1.35631	3.67771
50	0.69488	0.97363	0.95478	1.67801	0.31788	0.46404	1.34088	3.67771
51	0.69334	0.97185	0.95288	1.66271	0.31454	0.45917	1.32680	3.67771
52	0.69188	0.97017	0.95109	1.64917	0.31151	0.45474	1.31402	3.67771
53	0.69051	0.96857	0.94939	1.63732	0.30878	0.45076	1.30250	3.67771
54	0.68920	0.96707	0.94778	1.62711	0.30634	0.44720	1.29223	3.67771
55	0.68796	0.96564	0.94625	1.61848	0.30420	0.44406	1.28316	3.67771
56	0.70919	0.99990	0.98212	1.61141	0.30233	0.44134	1.27528	3.80244
57	0.73048	1.03424	1.01805	1.60585	0.30074	0.43901	1.26857	3.92718
58	0.75182	1.06864	1.05406	1.60178	0.29941	0.43709	1.26300	4.05192
59	0.77321	1.10309	1.09013	1.59920	0.29836	0.43555	1.25856	4.17665
60	0.79465	1.13760	1.12625	1.59808	0.29758	0.43440	1.25524	4.30139
61	0.81614	1.17217	1.16243	1.59843	0.29705	0.43364	1.25303	4.42612
62	0.83766	1.20678	1.19867	1.60025	0.29679	0.43326	1.25193	4.55086
63	0.85923	1.24144	1.23495	1.60356	0.29679	0.43326	1.25193	4.67560
64	0.88083	1.27614	1.27128	1.60837	0.29705	0.43364	1.25304	4.80033
65	0.90246	1.31088	1.30765	1.61473	0.29758	0.43440	1.25524	4.92507

**Table A-26**  
**Hardin 1999 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	62.39859	85.81073	91.82053	167.33778	4.95234	5.74691	40.62360	162.43896
4	48.45386	66.53874	71.19151	152.88936	4.56414	5.29643	37.43922	129.54860
5	40.06923	54.84875	58.47459	139.99608	4.21404	4.89015	34.56735	105.80960
6	34.47379	47.01491	49.87016	128.47246	3.89787	4.52326	31.97386	88.29211
7	30.47598	41.41173	43.68439	118.15703	3.61200	4.19152	29.62886	75.10197
8	27.47826	37.21397	39.04041	108.90919	3.35319	3.89118	27.50589	64.98450
9	25.14787	33.95744	35.43716	100.60626	3.11859	3.61895	25.58150	57.09044
10	23.28484	31.36095	32.56729	93.14096	2.90569	3.37189	23.83513	50.83246
11	21.76158	29.24425	30.23195	86.41963	2.71226	3.14742	22.24838	45.79707
12	20.49309	27.48653	28.29701	80.35986	2.53631	2.94324	20.80515	41.68759
13	19.42036	26.00375	26.66884	74.88965	2.37610	2.75733	19.49097	38.09060
14	18.50131	24.73569	25.28029	69.94531	2.23006	2.58786	18.29306	35.43735
15	17.70499	23.63812	24.08191	65.47151	2.09682	2.43324	17.20003	33.01666
16	17.00824	22.67783	23.03674	61.41866	1.97512	2.29202	16.20180	30.93460
17	16.39330	21.82950	22.11647	57.74371	1.86388	2.16293	15.28930	29.12148
18	15.84642	21.07338	21.29919	54.40820	1.76211	2.04482	14.45447	27.52342
19	15.35670	20.39412	20.56778	51.37820	1.66893	1.93669	13.69009	26.09863
20	14.73586	19.68634	19.80995	48.62387	1.58355	1.83762	12.98979	24.81454
21	13.99611	18.80945	18.90765	46.11848	1.50528	1.74679	12.34773	23.64561
22	13.32307	18.00847	18.08560	43.83858	1.43349	1.66348	11.75880	22.57211
23	12.70803	17.27336	17.33304	41.76314	1.36761	1.58703	11.21837	21.57855
24	12.14373	16.59586	16.64116	39.87355	1.30713	1.51685	10.72227	20.65298
25	11.62410	15.96923	16.00264	38.15334	1.25160	1.45241	10.26677	19.78647
26	11.14404	15.38784	15.41140	36.58777	1.20061	1.39324	9.84854	18.97194
27	10.69917	14.84700	14.86234	35.16368	1.15380	1.33892	9.46454	18.20433
28	10.28581	14.34280	14.35114	33.86942	1.11084	1.28906	9.11209	17.47966
29	9.90075	13.87190	13.87418	32.69470	1.07142	1.24332	8.78875	16.79532
30	9.54122	13.43143	13.42831	31.63019	1.03528	1.20138	8.49232	16.14935
31	9.20482	13.01894	13.01086	30.66776	1.00218	1.16298	8.22084	15.54012
32	8.88946	12.63225	12.61946	29.80011	0.97192	1.12785	7.97253	14.96656
33	8.59327	12.26944	12.25209	29.02075	0.94428	1.09578	7.74582	14.42819
34	8.31462	11.92882	11.90692	28.32411	0.91909	1.06656	7.53924	13.92391
35	8.05206	11.60886	11.58234	27.70497	0.89621	1.04000	7.35155	13.45354
36	7.80429	11.30814	11.27689	27.15909	0.87549	1.01596	7.18160	13.01596
37	7.57016	11.02540	10.98927	26.68259	0.85681	0.99428	7.02834	12.61101
38	7.34862	10.75946	10.71828	26.27220	0.84006	0.97484	6.89089	12.23743
39	7.13873	10.50922	10.46278	25.92511	0.82513	0.95751	6.76845	11.89437
40	6.93964	10.27367	10.22178	25.63892	0.81194	0.94221	6.66028	11.58077
41	6.75058	10.05183	9.99429	25.41176	0.80042	0.92884	6.56578	11.29535
42	6.57082	9.84276	9.77939	25.24203	0.79050	0.91733	6.48441	11.03633
43	6.39973	9.64555	9.57621	25.12875	0.78213	0.90761	6.41572	10.80210
44	6.23670	9.45932	9.38387	25.07100	0.77525	0.89964	6.35932	10.59031
45	6.08116	9.28312	9.20158	25.06848	0.76984	0.89335	6.31490	10.39877
46	5.93258	9.11598	9.02844	25.12119	0.76585	0.88873	6.28220	10.22470
47	5.79045	8.95688	8.86361	25.22942	0.76327	0.88574	6.26107	10.06470
48	5.65429	8.80474	8.70621	25.39397	0.76209	0.88437	6.25137	9.91538
49	5.65429	8.80474	8.70621	25.61589	0.76230	0.88460	6.25307	9.91538
50	5.65429	8.80474	8.70621	25.89661	0.76389	0.88645	6.26614	9.91538
51	5.65429	8.80474	8.70621	26.23807	0.76689	0.88993	6.29069	9.91538
52	5.65429	8.80474	8.70621	26.64262	0.77129	0.89504	6.32684	9.91538
53	5.65429	8.80474	8.70621	27.11296	0.77714	0.90182	6.37479	9.91538
54	5.65429	8.80474	8.70621	27.65236	0.78445	0.91031	6.43480	9.91538
55	5.65429	8.80474	8.70621	28.26463	0.79328	0.92056	6.50721	9.91538
56	6.31754	10.03620	9.96546	28.95410	0.80367	0.93261	6.59243	12.30329
57	6.98079	11.26766	11.22472	29.72566	0.81568	0.94655	6.69092	14.69121
58	7.64405	12.49912	12.48398	30.58505	0.82937	0.96244	6.80326	17.07906
59	8.30731	13.73058	13.74324	31.53857	0.84483	0.98038	6.93008	19.46696
60	8.97056	14.96204	15.00249	32.59344	0.86215	1.00047	7.07212	21.85486
61	9.63382	16.19348	16.26173	33.75781	0.88142	1.02284	7.23024	24.24278
62	10.29707	17.42493	17.52097	35.04077	0.90277	1.04761	7.40534	26.63066
63	10.96033	18.65637	18.78021	36.45258	0.92632	1.07494	7.59850	29.01859
64	11.62359	19.88783	20.03946	38.00481	0.95221	1.10499	7.81091	31.40649
65	12.28684	21.11929	21.29872	39.71027	0.98061	1.13794	8.04388	33.79442

**Table A-27**  
**Hardin 1999 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	1.95447	2.44346	2.45808	4.19773	2.36287	2.78329	25.31313	0.91266
4	1.79006	2.23963	2.25841	4.24117	2.26335	2.66606	24.24698	0.87295
5	1.69102	2.11691	2.13884	4.28461	2.17110	2.55740	23.25877	0.83999
6	1.62471	2.03494	2.05940	4.32805	2.08558	2.45666	22.34256	0.81327
7	1.57715	1.97639	2.00296	4.37149	2.00627	2.36323	21.49290	0.79230
8	1.54134	1.93259	1.96094	4.41492	1.93271	2.27660	20.70497	0.77658
9	1.51339	1.89870	1.92857	4.45836	1.86450	2.19625	19.97424	0.76565
10	1.49096	1.87181	1.90298	4.50180	1.80126	2.12175	19.29671	0.75908
11	1.47257	1.85007	1.88234	4.54524	1.74263	2.05269	18.66861	0.75643
12	1.45722	1.83221	1.86542	4.58868	1.68830	1.98870	18.08665	0.75729
13	1.44421	1.81738	1.85136	4.63212	1.63800	1.92944	17.54773	0.76127
14	1.43306	1.80493	1.83956	4.67556	1.59145	1.87461	17.04904	0.76800
15	1.42340	1.79440	1.82956	4.71899	1.54842	1.82393	16.58807	0.77713
16	1.41496	1.78543	1.82101	4.76243	1.50870	1.77713	16.16252	0.78832
17	1.40753	1.77775	1.81367	4.80587	1.47208	1.73400	15.77026	0.80125
18	1.40095	1.77114	1.80732	4.84931	1.43839	1.69432	15.40937	0.81563
19	1.39507	1.76543	1.80179	4.89275	1.40747	1.65790	15.07813	0.83116
20	1.39688	1.76092	1.79666	4.93619	1.37918	1.62457	14.77499	0.84759
21	1.40521	1.76949	1.80497	4.97962	1.35337	1.59417	14.49851	0.86467
22	1.41281	1.77743	1.81263	5.02306	1.32993	1.56656	14.24742	0.88217
23	1.41978	1.78481	1.81972	5.06650	1.30875	1.54162	14.02058	0.89989
24	1.42619	1.79169	1.82631	5.10993	1.28975	1.51923	13.81695	0.91764
25	1.43212	1.79811	1.83245	5.15338	1.27282	1.49929	13.63562	0.93524
26	1.43762	1.80413	1.83818	5.19681	1.25790	1.48172	13.47581	0.95253
27	1.44274	1.80977	1.84355	5.24025	1.24493	1.46643	13.33679	0.96939
28	1.44752	1.81506	1.84858	5.28369	1.23383	1.45337	13.21795	0.98569
29	1.45199	1.82004	1.85331	5.32713	1.22458	1.44246	13.11880	1.00134
30	1.45620	1.82472	1.85776	5.37057	1.21712	1.43368	13.03888	1.01624
31	1.46017	1.82912	1.86196	5.41401	1.21142	1.42697	12.97787	1.03035
32	1.46392	1.83327	1.86593	5.45745	1.20747	1.42231	12.93551	1.04361
33	1.46747	1.83719	1.86969	5.50089	1.20524	1.41968	12.91160	1.05600
34	1.47084	1.84089	1.87326	5.54432	1.20472	1.41907	12.90604	1.06750
35	1.47406	1.84439	1.87667	5.58776	1.20591	1.42048	12.91883	1.07814
36	1.47713	1.84770	1.87992	5.63120	1.20882	1.42390	12.95000	1.08793
37	1.48008	1.85085	1.88304	5.67463	1.21346	1.42937	12.99970	1.09692
38	1.48291	1.85386	1.88604	5.71808	1.21985	1.43689	13.06813	1.10517
39	1.48563	1.85673	1.88895	5.76151	1.22801	1.44651	13.15557	1.11277
40	1.48827	1.85950	1.89179	5.80495	1.23799	1.45826	13.26244	1.11981
41	1.49082	1.86217	1.89456	5.84839	1.24982	1.47219	13.38916	1.12642
42	1.49331	1.86476	1.89728	5.89183	1.26355	1.48837	13.53631	1.13274
43	1.49573	1.86730	1.89999	5.93527	1.27925	1.50687	13.70453	1.13890
44	1.49811	1.86981	1.90269	5.97871	1.29699	1.52776	13.89453	1.14510
45	1.50044	1.87231	1.90541	6.02214	1.31684	1.55114	14.10721	1.15153
46	1.50274	1.87482	1.90816	6.06559	1.33890	1.57712	14.34349	1.15838
47	1.50502	1.87737	1.91097	6.10902	1.36326	1.60581	14.60445	1.16588
48	1.50729	1.87998	1.91385	6.15246	1.39003	1.63735	14.89128	1.17430
49	1.55760	1.95354	1.98948	6.19590	1.41934	1.67189	15.20534	1.21254
50	1.60792	2.02711	2.06510	6.23934	1.45134	1.70957	15.54806	1.25077
51	1.65823	2.10068	2.14073	6.28278	1.48616	1.75059	15.92110	1.28901
52	1.70855	2.17424	2.21636	6.32622	1.52398	1.79514	16.32628	1.32725
53	1.75887	2.24781	2.29198	6.36965	1.56498	1.84344	16.76553	1.36549
54	1.80919	2.32138	2.36761	6.41309	1.60937	1.89572	17.24106	1.40372
55	1.85950	2.39495	2.44324	6.45653	1.65738	1.95227	17.75531	1.44196
56	1.90982	2.46851	2.51886	6.49997	1.70923	2.01335	18.31084	1.48020
57	1.96013	2.54208	2.59449	6.54341	1.76522	2.07930	18.91063	1.51844
58	2.01045	2.61564	2.67012	6.58685	1.82563	2.15046	19.55777	1.55668
59	2.06077	2.68921	2.74575	6.63028	1.89079	2.22721	20.25583	1.59491
60	2.11108	2.76278	2.82137	6.67372	1.96106	2.30998	21.00864	1.63315
61	2.16140	2.83635	2.89700	6.71716	2.03683	2.39924	21.82033	1.67139
62	2.21172	2.90991	2.97263	6.76060	2.11854	2.49548	22.69563	1.70963
63	2.26203	2.98348	3.04825	6.80404	2.20665	2.59927	23.63956	1.74787
64	2.31235	3.05705	3.12388	6.84748	2.30169	2.71123	24.65778	1.78610
65	2.36267	3.13061	3.19951	6.89092	2.40424	2.83203	25.75636	1.82434

**Table A-28**  
**Hardin 1999 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	9.04609	11.31236	11.78030	21.50563	1.40899	2.05684	5.94344	18.33871
4	6.47262	8.15059	8.44717	16.82268	1.33770	1.95278	5.64274	15.83414
5	5.08033	6.41945	6.61793	14.19904	1.27114	1.85561	5.36196	13.97910
6	4.21540	5.33464	5.46989	12.44587	1.20895	1.76483	5.09964	12.57892
7	3.62871	4.59452	4.68623	11.14557	1.15082	1.67996	4.85442	11.50380
8	3.28401	4.13347	4.19744	10.28369	1.09645	1.60059	4.62506	10.66528
9	3.01774	3.77847	3.82167	9.54808	1.04556	1.52631	4.41041	10.00189
10	2.79858	3.49049	3.51763	8.89597	0.99792	1.45676	4.20943	9.47006
11	2.61368	3.25136	3.26594	8.31375	0.95328	1.39160	4.02115	9.03840
12	2.45449	3.04885	3.05352	7.79109	0.91145	1.33053	3.84467	8.68387
13	2.31506	2.87445	2.87126	7.31979	0.87221	1.27325	3.67917	8.38936
14	2.19114	2.72205	2.71260	6.89321	0.83540	1.21952	3.52390	8.14191
15	2.07962	2.58716	2.57273	6.50585	0.80085	1.16908	3.37815	7.93164
16	1.97816	2.46640	2.44799	6.15308	0.76840	1.12171	3.24128	7.75091
17	1.88496	2.35719	2.33565	5.83096	0.73792	1.07721	3.11269	7.59375
18	1.79866	2.25754	2.23355	5.53609	0.70927	1.03539	2.99184	7.45547
19	1.71813	2.16586	2.13999	5.26556	0.68233	0.99606	2.87821	7.33235
20	1.64149	2.08367	2.05539	5.02501	0.65699	0.95908	2.77133	7.22146
21	1.57890	2.00902	1.97909	4.81634	0.63315	0.92428	2.67077	7.12048
22	1.52152	1.94064	1.90933	4.62523	0.61072	0.89152	2.57613	7.02754
23	1.46867	1.87770	1.84525	4.44997	0.58959	0.86069	2.48703	6.94122
24	1.41979	1.81951	1.78613	4.28900	0.56970	0.83165	2.40312	6.86039
25	1.37440	1.76552	1.73137	4.14098	0.55096	0.80430	2.32409	6.78420
26	1.33210	1.71527	1.68047	4.00470	0.53331	0.77853	2.24964	6.71200
27	1.29256	1.66837	1.63302	3.87907	0.51668	0.75426	2.17948	6.64333
28	1.25548	1.62448	1.58867	3.76313	0.50101	0.73138	2.11338	6.57788
29	1.22061	1.58333	1.54711	3.65603	0.48624	0.70982	2.05108	6.51543
30	1.18774	1.54469	1.50811	3.55699	0.47233	0.68950	1.99238	6.45587
31	1.15667	1.50834	1.47142	3.46533	0.45921	0.67036	1.93705	6.39916
32	1.12725	1.47411	1.43687	3.38041	0.44685	0.65232	1.88493	6.34527
33	1.09934	1.44184	1.40429	3.30170	0.43521	0.63532	1.83581	6.29427
34	1.07279	1.41138	1.37354	3.22866	0.42424	0.61931	1.78956	6.24619
35	1.04750	1.38262	1.34447	3.16087	0.41392	0.60424	1.74600	6.20112
36	1.02338	1.35544	1.31698	3.09791	0.40420	0.59005	1.70501	6.15910
37	1.00032	1.32972	1.29094	3.03941	0.39506	0.57671	1.66644	6.12018
38	0.97824	1.30538	1.26628	2.98503	0.38646	0.56416	1.63018	6.08440
39	0.95708	1.28233	1.24289	2.93449	0.37838	0.55237	1.59611	6.05180
40	0.93677	1.26047	1.22068	2.88751	0.37080	0.54130	1.56413	6.02234
41	0.91724	1.23972	1.19959	2.84384	0.36369	0.53092	1.53414	5.99602
42	0.89843	1.22002	1.17953	2.80326	0.35703	0.52120	1.50605	5.97273
43	0.88031	1.20128	1.16043	2.76558	0.35081	0.51211	1.47977	5.95230
44	0.86282	1.18343	1.14223	2.73060	0.34499	0.50361	1.45524	5.93464
45	0.84591	1.16640	1.12484	2.69818	0.33957	0.49570	1.43237	5.91949
46	0.82955	1.15011	1.10821	2.66816	0.33453	0.48834	1.41110	5.90657
47	0.81369	1.13447	1.09226	2.64041	0.32985	0.48151	1.39137	5.89549
48	0.79860	1.11945	1.07692	2.61472	0.32552	0.47520	1.37312	5.88580
49	0.79558	1.11590	1.07310	2.59048	0.32154	0.46938	1.35631	5.88580
50	0.79272	1.11255	1.06951	2.56854	0.31788	0.46404	1.34088	5.88580
51	0.79003	1.10940	1.06612	2.54878	0.31454	0.45917	1.32680	5.88580
52	0.78748	1.10642	1.06292	2.53111	0.31151	0.45474	1.31402	5.88580
53	0.78507	1.10360	1.05989	2.51544	0.30878	0.45076	1.30250	5.88580
54	0.78280	1.10093	1.05703	2.50169	0.30634	0.44720	1.29223	5.88580
55	0.78064	1.09840	1.05432	2.48982	0.30420	0.44406	1.28316	5.88580
56	0.80162	1.13379	1.08998	2.47975	0.30233	0.44134	1.27528	6.00924
57	0.82271	1.16931	1.12577	2.47145	0.30074	0.43901	1.26857	6.13268
58	0.84389	1.20493	1.16168	2.46488	0.29941	0.43709	1.26300	6.25612
59	0.86517	1.24066	1.19771	2.46002	0.29836	0.43555	1.25856	6.37956
60	0.88652	1.27649	1.23384	2.45685	0.29758	0.43440	1.25524	6.50299
61	0.90796	1.31241	1.27008	2.45536	0.29705	0.43364	1.25303	6.62643
62	0.92947	1.34842	1.30641	2.45556	0.29679	0.43326	1.25193	6.74987
63	0.95105	1.38451	1.34282	2.45745	0.29679	0.43326	1.25193	6.87331
64	0.97270	1.42068	1.37932	2.46104	0.29705	0.43364	1.25304	6.99675
65	0.99440	1.45691	1.41589	2.46637	0.29758	0.43440	1.25524	7.12019

**Table A-29**  
**Hardin 1999 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	64.81783	92.07356	98.32103	209.58728	4.95234	5.74691	40.62360	197.24521
4	50.28314	71.36060	76.17094	191.49092	4.56414	5.29643	37.43922	157.30737
5	41.53510	58.74309	62.46225	175.34232	4.21404	4.89015	34.56735	128.48172
6	35.69432	50.27078	53.16718	160.90926	3.89787	4.52326	31.97386	107.21074
7	31.52071	44.20778	46.47884	147.98935	3.61200	4.19152	29.62886	91.19427
8	28.39148	39.66743	41.45680	136.40666	3.35319	3.89118	27.50589	78.90887
9	25.95944	36.14861	37.56157	126.00739	3.11859	3.61895	25.58150	69.32336
10	24.01573	33.34665	34.46107	116.65726	2.90569	3.37189	23.83513	61.72446
11	22.42706	31.06566	31.94002	108.23891	2.71226	3.14742	22.24838	55.61018
12	21.10451	29.17409	29.85292	100.64917	2.53631	2.94324	20.80515	50.62010
13	19.98639	27.58031	28.09813	93.79781	2.37610	2.75733	19.49097	46.49167
14	19.02863	26.21854	26.60266	87.60515	2.23006	2.58786	18.29306	43.03059
15	18.19887	25.04047	25.31281	82.00182	2.09682	2.43324	17.20003	40.09126
16	17.47287	24.00978	24.18837	76.92567	1.97512	2.29202	16.20180	37.56305
17	16.83202	23.09879	23.19864	72.32289	1.86388	2.16293	15.28930	35.36142
18	16.26198	22.28601	22.31976	68.14520	1.76211	2.04482	14.45447	33.42094
19	15.75135	21.55466	21.53320	64.35020	1.66893	1.93669	13.69009	31.69087
20	15.11190	20.80788	20.73514	60.90047	1.58355	1.83762	12.98979	30.13162
21	14.35570	19.89214	19.79436	57.76254	1.50528	1.74679	12.34773	28.71220
22	13.66742	19.05392	18.93692	54.90697	1.43349	1.66348	11.75880	27.40872
23	13.03818	18.28293	18.15157	52.30751	1.36761	1.58703	11.21837	26.20221
24	12.46060	17.57074	17.42917	49.94086	1.30713	1.51685	10.72227	25.07835
25	11.92849	16.91052	16.76210	47.78632	1.25160	1.45241	10.26677	24.02615
26	11.43669	16.29669	16.14407	45.82547	1.20061	1.39324	9.84854	23.03711
27	10.98078	15.72457	15.56986	44.04184	1.15380	1.33892	9.46454	22.10497
28	10.55700	15.19033	15.03498	42.42078	1.11084	1.28906	9.11209	21.22505
29	10.16213	14.69071	14.53572	40.94946	1.07142	1.24332	8.78875	20.39410
30	9.79338	14.22297	14.06889	39.61623	1.03528	1.20138	8.49232	19.60968
31	9.44833	13.78474	13.63173	38.41078	1.00218	1.16298	8.22084	18.86990
32	9.12484	13.37393	13.22187	37.32405	0.97192	1.12785	7.97253	18.17345
33	8.82106	12.98869	12.83722	36.34795	0.94428	1.09578	7.74582	17.51973
34	8.53533	12.62739	12.47591	35.47539	0.91909	1.06656	7.53924	16.90739
35	8.26618	12.28851	12.13632	34.69995	0.89621	1.04000	7.35155	16.33624
36	8.01230	11.97065	11.81696	34.01622	0.87549	1.01596	7.18160	15.80493
37	7.77252	11.67255	11.51648	33.41943	0.85681	0.99428	7.02834	15.31321
38	7.54576	11.39302	11.23365	32.90544	0.84006	0.97484	6.89089	14.85958
39	7.33108	11.13091	10.96731	32.47069	0.82513	0.95751	6.76845	14.44301
40	7.12761	10.88516	10.71639	32.11224	0.81194	0.94221	6.66028	14.06222
41	6.93453	10.65472	10.47989	31.82774	0.80042	0.92884	6.56578	13.71564
42	6.75112	10.43855	10.25680	31.61517	0.79050	0.91733	6.48441	13.40111
43	6.57671	10.23565	10.04622	31.47327	0.78213	0.90761	6.41572	13.11670
44	6.41066	10.04497	9.84721	31.40092	0.77525	0.89964	6.35932	12.85952
45	6.25236	9.86540	9.65887	31.39780	0.76984	0.89335	6.31490	12.62695
46	6.10125	9.69572	9.48025	31.46381	0.76585	0.88873	6.28220	12.41558
47	5.95677	9.53467	9.31037	31.59937	0.76327	0.88574	6.26107	12.22129
48	5.81837	9.38080	9.14828	31.80547	0.76209	0.88437	6.25137	12.03998
49	5.81837	9.38080	9.14828	32.08340	0.76230	0.88460	6.25307	12.03998
50	5.81837	9.38080	9.14828	32.43500	0.76389	0.88645	6.26614	12.03998
51	5.81837	9.38080	9.14828	32.86267	0.76689	0.88993	6.29069	12.03998
52	5.81837	9.38080	9.14828	33.36938	0.77129	0.89504	6.32684	12.03998
53	5.81837	9.38080	9.14828	33.95845	0.77714	0.90182	6.37479	12.03998
54	5.81837	9.38080	9.14828	34.63405	0.78445	0.91031	6.43480	12.03998
55	5.81837	9.38080	9.14828	35.40091	0.79328	0.92056	6.50721	12.03998
56	6.52050	10.75214	10.51576	36.26443	0.80367	0.93261	6.59243	14.93955
57	7.22263	12.12348	11.88326	37.23082	0.81568	0.94655	6.69092	17.83910
58	7.92476	13.49483	13.25075	38.30717	0.82937	0.96244	6.80326	20.73866
59	8.62689	14.86617	14.61825	39.50145	0.84483	0.98038	6.93008	23.63821
60	9.32903	16.23749	15.98573	40.82266	0.86215	1.00047	7.07212	26.53775
61	10.03116	17.60881	17.35320	42.28099	0.88142	1.02284	7.23024	29.43738
62	10.73329	18.98015	18.72067	43.88789	0.90277	1.04761	7.40534	32.33690
63	11.43542	20.35149	20.08817	45.65614	0.92632	1.07494	7.59850	35.23650
64	12.13755	21.72282	21.45563	47.60028	0.95221	1.10499	7.81091	38.13609
65	12.83968	23.09416	22.82312	49.73633	0.98061	1.13794	8.04388	41.03566

**Table A-30**  
**Hardin 1999 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC
3	1.97094	2.45219	2.45453	4.06945	2.36287	2.78329	25.31313	0.82775
4	1.80433	2.24667	2.25291	4.11156	2.26335	2.66606	24.24698	0.79173
5	1.70406	2.12302	2.13214	4.15367	2.17110	2.55740	23.25877	0.76184
6	1.63700	2.04047	2.05186	4.19578	2.08558	2.45666	22.34256	0.73761
7	1.58896	1.98153	1.99478	4.23790	2.00627	2.36323	21.49290	0.71858
8	1.55282	1.93745	1.95223	4.28000	1.93271	2.27660	20.70497	0.70432
9	1.52464	1.90334	1.91940	4.32211	1.86450	2.19625	19.97424	0.69442
10	1.50206	1.87627	1.89339	4.36423	1.80126	2.12175	19.29671	0.68845
11	1.48355	1.85436	1.87235	4.40634	1.74263	2.05269	18.66861	0.68605
12	1.46812	1.83634	1.85505	4.44845	1.68830	1.98870	18.08665	0.68683
13	1.45505	1.82135	1.84063	4.49056	1.63800	1.92944	17.54773	0.69044
14	1.44386	1.80875	1.82847	4.53267	1.59145	1.87461	17.04904	0.69655
15	1.43417	1.79807	1.81813	4.57478	1.54842	1.82393	16.58807	0.70483
16	1.42570	1.78894	1.80924	4.61689	1.50870	1.77713	16.16252	0.71498
17	1.41825	1.78111	1.80156	4.65900	1.47208	1.73400	15.77026	0.72671
18	1.41164	1.77434	1.79488	4.70111	1.43839	1.69432	15.40937	0.73974
19	1.40575	1.76847	1.78903	4.74322	1.40747	1.65790	15.07813	0.75383
20	1.40765	1.76369	1.78348	4.78534	1.37918	1.62457	14.77499	0.76873
21	1.41616	1.77211	1.79149	4.82744	1.35337	1.59417	14.49851	0.78422
22	1.42392	1.77989	1.79886	4.86955	1.32993	1.56656	14.24742	0.80010
23	1.43103	1.78711	1.80567	4.91167	1.30875	1.54162	14.02058	0.81617
24	1.43757	1.79383	1.81199	4.95378	1.28975	1.51923	13.81695	0.83226
25	1.44361	1.80010	1.81785	4.99589	1.27282	1.49929	13.63562	0.84822
26	1.44921	1.80597	1.82333	5.03800	1.25790	1.48172	13.47581	0.86391
27	1.45441	1.81146	1.82844	5.08011	1.24493	1.46643	13.33679	0.87920
28	1.45926	1.81660	1.83323	5.12222	1.23383	1.45337	13.21795	0.89398
29	1.46381	1.82143	1.83772	5.16433	1.22458	1.44246	13.11880	0.90817
30	1.46807	1.82597	1.84194	5.20644	1.21712	1.43368	13.03888	0.92169
31	1.47207	1.83024	1.84592	5.24856	1.21142	1.42697	12.97787	0.93449
32	1.47585	1.83426	1.84967	5.29067	1.20747	1.42231	12.93551	0.94652
33	1.47943	1.83804	1.85322	5.33278	1.20524	1.41968	12.91160	0.95775
34	1.48282	1.84161	1.85659	5.37489	1.20472	1.41907	12.90604	0.96819
35	1.48604	1.84498	1.85979	5.41700	1.20591	1.42048	12.91883	0.97783
36	1.48911	1.84818	1.86285	5.45911	1.20882	1.42390	12.95000	0.98671
37	1.49204	1.85120	1.86577	5.50122	1.21346	1.42937	12.99970	0.99486
38	1.49484	1.85408	1.86858	5.54333	1.21985	1.43689	13.06813	1.00234
39	1.49754	1.85683	1.87129	5.58544	1.22801	1.44651	13.15557	1.00924
40	1.50013	1.85947	1.87392	5.62755	1.23799	1.45826	13.26244	1.01563
41	1.50264	1.86201	1.87648	5.66966	1.24982	1.47219	13.38916	1.02162
42	1.50506	1.86447	1.87899	5.71177	1.26355	1.48837	13.53631	1.02735
43	1.50741	1.86687	1.88146	5.75389	1.27925	1.50687	13.70453	1.03294
44	1.50971	1.86923	1.88392	5.79600	1.29699	1.52776	13.89453	1.03857
45	1.51195	1.87158	1.88638	5.83811	1.31684	1.55114	14.10721	1.04439
46	1.51415	1.87392	1.88885	5.88022	1.33890	1.57712	14.34349	1.05060
47	1.51632	1.87628	1.89135	5.92233	1.36326	1.60581	14.60445	1.05741
48	1.51846	1.87869	1.89391	5.96444	1.39003	1.63735	14.89128	1.06504
49	1.56897	1.95212	1.96850	6.00655	1.41934	1.67189	15.20534	1.09972
50	1.61948	2.02554	2.04309	6.04867	1.45134	1.70957	15.54806	1.13440
51	1.66999	2.09897	2.11768	6.09077	1.48616	1.75059	15.92110	1.16908
52	1.72050	2.17239	2.19227	6.13289	1.52398	1.79514	16.32628	1.20376
53	1.77101	2.24582	2.26686	6.17500	1.56498	1.84344	16.76553	1.23844
54	1.82152	2.31924	2.34145	6.21711	1.60937	1.89572	17.24106	1.27312
55	1.87204	2.39267	2.41605	6.25922	1.65738	1.95227	17.75531	1.30780
56	1.92254	2.46609	2.49064	6.30133	1.70923	2.01335	18.31084	1.34248
57	1.97305	2.53952	2.56523	6.34344	1.76522	2.07930	18.91063	1.37716
58	2.02357	2.61294	2.63982	6.38555	1.82563	2.15046	19.55777	1.41185
59	2.07408	2.68637	2.71441	6.42766	1.89079	2.22721	20.25583	1.44652
60	2.12459	2.75980	2.78900	6.46977	1.96106	2.30998	21.00864	1.48120
61	2.17510	2.83322	2.86359	6.51188	2.03683	2.39924	21.82033	1.51589
62	2.22561	2.90664	2.93818	6.55399	2.11854	2.49548	22.69563	1.55056
63	2.27612	2.98007	3.01277	6.59611	2.20665	2.59927	23.63956	1.58525
64	2.32663	3.05350	3.08736	6.63822	2.30169	2.71123	24.65778	1.61992
65	2.37714	3.12692	3.16195	6.68033	2.40424	2.83203	25.75636	1.65461



**Table A-31  
Hardin 1999 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	9.49308	11.69840	12.17378	22.70331	1.40899	2.05684	5.94344	18.58907
4	6.75618	8.37963	8.67456	17.59242	1.33770	1.95278	5.64274	16.08623
5	5.28297	6.57439	6.76801	14.76245	1.27114	1.85561	5.36196	14.23249
6	4.37123	5.44856	5.57773	12.89187	1.20895	1.76483	5.09964	12.83329
7	3.75461	4.68325	4.76847	11.51708	1.15082	1.67996	4.85442	11.75891
8	3.39761	4.21199	4.26987	10.62250	1.09645	1.60059	4.62506	10.92097
9	3.12186	3.84993	3.88740	9.86202	1.04556	1.52631	4.41041	10.25804
10	2.89434	3.55647	3.57814	9.18878	0.99792	1.45676	4.20943	9.72658
11	2.70192	3.31300	3.32230	8.58826	0.95328	1.39160	4.02115	9.29522
12	2.53583	3.10701	3.10655	8.04948	0.91145	1.33053	3.84467	8.94094
13	2.38998	2.92979	2.92159	7.56382	0.87221	1.27325	3.67917	8.64663
14	2.26002	2.77509	2.76071	7.12430	0.83540	1.21952	3.52390	8.39935
15	2.14275	2.63830	2.61899	6.72517	0.80085	1.16908	3.37815	8.18922
16	2.03578	2.51598	2.49275	6.36161	0.76840	1.12171	3.24128	8.00862
17	1.93728	2.40548	2.37916	6.02953	0.73792	1.07721	3.11269	7.85157
18	1.84584	2.30476	2.27602	5.72543	0.70927	1.03539	2.99184	7.71338
19	1.76031	2.21220	2.18161	5.44627	0.68233	0.99606	2.87821	7.59036
20	1.68017	2.12894	2.09602	5.19870	0.65699	0.95908	2.77133	7.47954
21	1.61622	2.05273	2.01824	4.98508	0.63315	0.92428	2.67077	7.37862
22	1.55758	1.98289	1.94713	4.78945	0.61072	0.89152	2.57613	7.28576
23	1.50354	1.91860	1.88180	4.61001	0.58959	0.86069	2.48703	7.19950
24	1.45354	1.85915	1.82151	4.44520	0.56970	0.83165	2.40312	7.11872
25	1.40709	1.80398	1.76566	4.29362	0.55096	0.80430	2.32409	7.04258
26	1.36378	1.75261	1.71374	4.15404	0.53331	0.77853	2.24964	6.97043
27	1.32327	1.70465	1.66533	4.02534	0.51668	0.75426	2.17948	6.90182
28	1.28527	1.65976	1.62007	3.90655	0.50101	0.73138	2.11338	6.83640
29	1.24951	1.61766	1.57766	3.79678	0.48624	0.70982	2.05108	6.77400
30	1.21579	1.57811	1.53784	3.69524	0.47233	0.68950	1.99238	6.71448
31	1.18390	1.54091	1.50038	3.60123	0.45921	0.67036	1.93705	6.65781
32	1.15369	1.50586	1.46510	3.51411	0.44685	0.65232	1.88493	6.60395
33	1.12501	1.47280	1.43182	3.43332	0.43521	0.63532	1.83581	6.55300
34	1.09772	1.44160	1.40038	3.35834	0.42424	0.61931	1.78956	6.50495
35	1.07171	1.41212	1.37067	3.28870	0.41392	0.60424	1.74600	6.45990
36	1.04688	1.38426	1.34255	3.22399	0.40420	0.59005	1.70501	6.41791
37	1.02313	1.35788	1.31591	3.16384	0.39506	0.57671	1.66644	6.37902
38	1.00039	1.33291	1.29067	3.10790	0.38646	0.56416	1.63018	6.34327
39	0.97858	1.30925	1.26672	3.05587	0.37838	0.55237	1.59611	6.31069
40	0.95763	1.28681	1.24397	3.00747	0.37080	0.54130	1.56413	6.28125
41	0.93747	1.26551	1.22235	2.96245	0.36369	0.53092	1.53414	6.25495
42	0.91806	1.24527	1.20178	2.92059	0.35703	0.52120	1.50605	6.23167
43	0.89933	1.22601	1.18218	2.88167	0.35081	0.51211	1.47977	6.21126
44	0.88125	1.20766	1.16349	2.84553	0.34499	0.50361	1.45524	6.19361
45	0.86377	1.19014	1.14564	2.81198	0.33957	0.49570	1.43237	6.17848
46	0.84684	1.17337	1.12854	2.78089	0.33453	0.48834	1.41110	6.16556
47	0.83042	1.15728	1.11214	2.75212	0.32985	0.48151	1.39137	6.15449
48	0.81480	1.14181	1.09636	2.72543	0.32552	0.47520	1.37312	6.14481
49	0.81146	1.13789	1.09215	2.70007	0.32154	0.46938	1.35631	6.14481
50	0.80832	1.13421	1.08819	2.67708	0.31788	0.46404	1.34088	6.14481
51	0.80536	1.13073	1.08445	2.65635	0.31454	0.45917	1.32680	6.14481
52	0.80256	1.12744	1.08091	2.63777	0.31151	0.45474	1.31402	6.14481
53	0.79991	1.12434	1.07758	2.62126	0.30878	0.45076	1.30250	6.14481
54	0.79740	1.12140	1.07442	2.60673	0.30634	0.44720	1.29223	6.14481
55	0.79503	1.11861	1.07143	2.59412	0.30420	0.44406	1.28316	6.14481
56	0.81590	1.15408	1.10697	2.58337	0.30233	0.44134	1.27528	6.26816
57	0.83688	1.18967	1.14267	2.57444	0.30074	0.43901	1.26857	6.39151
58	0.85797	1.22539	1.17850	2.56729	0.29941	0.43709	1.26300	6.51487
59	0.87916	1.26123	1.21445	2.56189	0.29836	0.43555	1.25856	6.63822
60	0.90044	1.29717	1.25052	2.55822	0.29758	0.43440	1.25524	6.76157
61	0.92181	1.33322	1.28670	2.55627	0.29705	0.43364	1.25303	6.88493
62	0.94326	1.36936	1.32299	2.55605	0.29679	0.43326	1.25193	7.00828
63	0.96478	1.40560	1.35937	2.55756	0.29679	0.43326	1.25193	7.13163
64	0.98638	1.44191	1.39584	2.56081	0.29705	0.43364	1.25304	7.25498
65	1.00804	1.47831	1.43239	2.56584	0.29758	0.43440	1.25524	7.37834

**Table A-32**  
**Hardin 1999 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	65.19751	93.07541	99.29895	215.17258	4.95234	5.74691	40.62360	202.13110
4	50.57024	72.13126	76.91841	196.59398	4.56414	5.29643	37.43922	161.20396
5	41.76517	59.36526	63.06056	180.01501	4.21404	4.89015	34.56735	131.66429
6	35.88593	50.79086	53.66200	165.19734	3.89787	4.52326	31.97386	109.86638
7	31.68472	44.65434	46.89844	151.93315	3.61200	4.19152	29.62886	93.45322
8	28.53488	40.05922	41.81987	140.04172	3.35319	3.89118	27.50589	80.86351
9	26.08690	36.49844	37.88094	129.36537	3.11859	3.61895	25.58150	71.04050
10	24.13054	33.66359	34.74588	119.76605	2.90569	3.37189	23.83513	63.25342
11	22.53160	31.35628	32.19696	111.12335	2.71226	3.14742	22.24838	56.98766
12	21.20056	29.44325	30.08699	103.33134	2.53631	2.94324	20.80515	51.87401
13	20.07532	27.83165	28.31316	96.29741	2.37610	2.75733	19.49097	47.64331
14	19.11148	26.45483	26.80157	89.93976	2.23006	2.58786	18.29306	44.09650
15	18.27647	25.26384	25.49792	84.18706	2.09682	2.43324	17.20003	41.08429
16	17.54587	24.22185	24.36154	78.97566	1.97512	2.29202	16.20180	38.49355
17	16.90097	23.30080	23.36131	74.25022	1.86388	2.16293	15.28930	36.23732
18	16.32729	22.47893	22.47313	69.96118	1.76211	2.04482	14.45447	34.24883
19	15.81338	21.73924	21.67824	66.06503	1.66893	1.93669	13.69009	32.47588
20	15.17101	20.98627	20.87425	62.52341	1.58355	1.83762	12.98979	30.87799
21	14.41223	20.06439	19.92780	59.30185	1.50528	1.74679	12.34773	29.42343
22	13.72157	19.22031	19.06514	56.37016	1.43349	1.66348	11.75880	28.08763
23	13.09010	18.44366	18.27498	53.70142	1.36761	1.58703	11.21837	26.85127
24	12.51044	17.72600	17.54810	51.27176	1.30713	1.51685	10.72227	25.69955
25	11.97638	17.06052	16.87685	49.05977	1.25160	1.45241	10.26677	24.62129
26	11.48274	16.44156	16.25490	47.04666	1.20061	1.39324	9.84854	23.60776
27	11.02510	15.86452	15.67699	45.21553	1.15380	1.33892	9.46454	22.65254
28	10.59969	15.32556	15.13864	43.55127	1.11084	1.28906	9.11209	21.75081
29	10.20329	14.82144	14.63612	42.04074	1.07142	1.24332	8.78875	20.89928
30	9.83310	14.34941	14.16622	40.67195	1.03528	1.20138	8.49232	20.09541
31	9.48669	13.90715	13.72619	39.43439	1.00218	1.16298	8.22084	19.33733
32	9.16193	13.49255	13.31363	38.31871	0.97192	1.12785	7.97253	18.62361
33	8.85696	13.10379	12.92645	37.31664	0.94428	1.09578	7.74582	17.95369
34	8.57012	12.73924	12.56279	36.42079	0.91909	1.06656	7.53924	17.32619
35	8.29994	12.39738	12.22100	35.62466	0.89621	1.04000	7.35155	16.74089
36	8.04511	12.07683	11.89960	34.92273	0.87549	1.01596	7.18160	16.19641
37	7.80443	11.77632	11.59723	34.31003	0.85681	0.99428	7.02834	15.69253
38	7.57687	11.49465	11.31267	33.78232	0.84006	0.97484	6.89089	15.22766
39	7.36144	11.23066	11.04472	33.33598	0.82513	0.95751	6.76845	14.80078
40	7.15727	10.98330	10.79234	32.96802	0.81194	0.94221	6.66028	14.41054
41	6.96357	10.75149	10.55451	32.67593	0.80042	0.92884	6.56578	14.05538
42	6.77958	10.53421	10.33020	32.45767	0.79050	0.91733	6.48441	13.73307
43	6.60465	10.33039	10.11852	32.31195	0.78213	0.90761	6.41572	13.44161
44	6.43812	10.13900	9.91850	32.23773	0.77525	0.89964	6.35932	13.17806
45	6.27939	9.95888	9.72925	32.23453	0.76984	0.89335	6.31490	12.93972
46	6.12788	9.78879	9.54980	32.30226	0.76585	0.88873	6.28220	12.72312
47	5.98302	9.62741	9.37916	32.44150	0.76327	0.88574	6.26107	12.52402
48	5.84428	9.47325	9.21635	32.65303	0.76209	0.88437	6.25137	12.33821
49	5.84428	9.47325	9.21635	32.93837	0.76230	0.88460	6.25307	12.33821
50	5.84428	9.47325	9.21635	33.29936	0.76389	0.88645	6.26614	12.33821
51	5.84428	9.47325	9.21635	33.73843	0.76689	0.88993	6.29069	12.33821
52	5.84428	9.47325	9.21635	34.25862	0.77129	0.89504	6.32684	12.33821
53	5.84428	9.47325	9.21635	34.86342	0.77714	0.90182	6.37479	12.33821
54	5.84428	9.47325	9.21635	35.55702	0.78445	0.91031	6.43480	12.33821
55	5.84428	9.47325	9.21635	36.34430	0.79328	0.92056	6.50721	12.33821
56	6.55253	10.86697	10.60038	37.23088	0.80367	0.93261	6.59243	15.30961
57	7.26079	12.26068	11.98441	38.22299	0.81568	0.94655	6.69092	18.28101
58	7.96905	13.65440	13.36845	39.32799	0.82937	0.96244	6.80326	21.25232
59	8.67731	15.04813	14.75249	40.55415	0.84483	0.98038	6.93008	24.22374
60	9.38556	16.44182	16.13651	41.91058	0.86215	1.00047	7.07212	27.19513
61	10.09382	17.83551	17.52052	43.40776	0.88142	1.02284	7.23024	30.16655
62	10.80208	19.22922	18.90454	45.05746	0.90277	1.04761	7.40534	33.13789
63	11.51034	20.62294	20.28857	46.87288	0.92632	1.07494	7.59850	36.10934
64	12.21860	22.01665	21.67259	48.86880	0.95221	1.10499	7.81091	39.08073
65	12.92685	23.41037	23.05663	51.06177	0.98061	1.13794	8.04388	42.05212

**Table A-33**  
**Hardin 1999 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	1.97285	2.45343	2.45460	4.05802	2.36287	2.78329	25.31313	0.81913
4	1.80601	2.24771	2.25276	4.10001	2.26335	2.66606	24.24698	0.78349
5	1.70560	2.12395	2.13185	4.14201	2.17110	2.55740	23.25877	0.75391
6	1.63846	2.04132	2.05148	4.18400	2.08558	2.45666	22.34256	0.72993
7	1.59036	1.98234	1.99433	4.22599	2.00627	2.36323	21.49290	0.71110
8	1.55419	1.93822	1.95172	4.26799	1.93271	2.27660	20.70497	0.69700
9	1.52598	1.90408	1.91884	4.30998	1.86450	2.19625	19.97424	0.68719
10	1.50338	1.87699	1.89278	4.35197	1.80126	2.12175	19.29671	0.68129
11	1.48486	1.85506	1.87170	4.39396	1.74263	2.05269	18.66861	0.67891
12	1.46941	1.83702	1.85436	4.43596	1.68830	1.98870	18.08665	0.67968
13	1.45634	1.82202	1.83990	4.47795	1.63800	1.92944	17.54773	0.68326
14	1.44514	1.80940	1.82771	4.51994	1.59145	1.87461	17.04904	0.68930
15	1.43545	1.79869	1.81732	4.56193	1.54842	1.82393	16.58807	0.69750
16	1.42697	1.78955	1.80840	4.60393	1.50870	1.77713	16.16252	0.70754
17	1.41952	1.78170	1.80069	4.64592	1.47208	1.73400	15.77026	0.71914
18	1.41291	1.77492	1.79397	4.68791	1.43839	1.69432	15.40937	0.73204
19	1.40701	1.76903	1.78809	4.72990	1.40747	1.65790	15.07813	0.74598
20	1.40892	1.76422	1.78250	4.77190	1.37918	1.62457	14.77499	0.76073
21	1.41745	1.77262	1.79048	4.81389	1.35337	1.59417	14.49851	0.77606
22	1.42523	1.78039	1.79783	4.85588	1.32993	1.56656	14.24742	0.79177
23	1.43235	1.78759	1.80461	4.89787	1.30875	1.54162	14.02058	0.80768
24	1.43891	1.79430	1.81090	4.93987	1.28975	1.51923	13.81695	0.82360
25	1.44495	1.80056	1.81674	4.98186	1.27282	1.49929	13.63562	0.83940
26	1.45056	1.80641	1.82219	5.02385	1.25790	1.48172	13.47581	0.85492
27	1.45577	1.81188	1.82728	5.06585	1.24493	1.46643	13.33679	0.87005
28	1.46063	1.81701	1.83205	5.10783	1.23383	1.45337	13.21795	0.88468
29	1.46518	1.82183	1.83651	5.14983	1.22458	1.44246	13.11880	0.89872
30	1.46945	1.82635	1.84071	5.19182	1.21712	1.43368	13.03888	0.91210
31	1.47346	1.83061	1.84467	5.23382	1.21142	1.42697	12.97787	0.92477
32	1.47724	1.83461	1.84840	5.27581	1.20747	1.42231	12.93551	0.93667
33	1.48082	1.83838	1.85194	5.31780	1.20524	1.41968	12.91160	0.94779
34	1.48421	1.84194	1.85529	5.35979	1.20472	1.41907	12.90604	0.95811
35	1.48743	1.84530	1.85847	5.40179	1.20591	1.42048	12.91883	0.96766
36	1.49050	1.84848	1.86151	5.44378	1.20882	1.42390	12.95000	0.97644
37	1.49343	1.85150	1.86441	5.48577	1.21346	1.42937	12.99970	0.98451
38	1.49624	1.85436	1.86720	5.52777	1.21985	1.43689	13.06813	0.99192
39	1.49893	1.85710	1.86989	5.56976	1.22801	1.44651	13.15557	0.99874
40	1.50152	1.85973	1.87250	5.61175	1.23799	1.45826	13.26244	1.00506
41	1.50402	1.86225	1.87504	5.65374	1.24982	1.47219	13.38916	1.01099
42	1.50644	1.86470	1.87753	5.69574	1.26355	1.48837	13.53631	1.01666
43	1.50879	1.86709	1.87998	5.73773	1.27925	1.50687	13.70453	1.02219
44	1.51108	1.86944	1.88242	5.77972	1.29699	1.52776	13.89453	1.02776
45	1.51331	1.87177	1.88485	5.82171	1.31684	1.55114	14.10721	1.03352
46	1.51550	1.87409	1.88729	5.86371	1.33890	1.57712	14.34349	1.03967
47	1.51766	1.87644	1.88977	5.90570	1.36326	1.60581	14.60445	1.04641
48	1.51978	1.87883	1.89230	5.94770	1.39003	1.63735	14.89128	1.05396
49	1.57032	1.95226	1.96680	5.98969	1.41934	1.67189	15.20534	1.08828
50	1.62086	2.02568	2.04131	6.03168	1.45134	1.70957	15.54806	1.12260
51	1.67140	2.09910	2.11581	6.07367	1.48616	1.75059	15.92110	1.15692
52	1.72194	2.17252	2.19031	6.11567	1.52398	1.79514	16.32628	1.19124
53	1.77248	2.24595	2.26481	6.15766	1.56498	1.84344	16.76553	1.22556
54	1.82302	2.31937	2.33932	6.19965	1.60937	1.89572	17.24106	1.25988
55	1.87355	2.39279	2.41382	6.24164	1.65738	1.95227	17.75531	1.29419
56	1.92409	2.46622	2.48833	6.28363	1.70923	2.01335	18.31084	1.32852
57	1.97463	2.53964	2.56283	6.32563	1.76522	2.07930	18.91063	1.36283
58	2.02517	2.61306	2.63733	6.36762	1.82563	2.15046	19.55777	1.39715
59	2.07571	2.68649	2.71184	6.40961	1.89079	2.22721	20.25583	1.43147
60	2.12625	2.75991	2.78634	6.45160	1.96106	2.30998	21.00864	1.46579
61	2.17679	2.83333	2.86084	6.49360	2.03683	2.39924	21.82033	1.50011
62	2.22732	2.90675	2.93535	6.53559	2.11854	2.49548	22.69563	1.53443
63	2.27786	2.98018	3.00985	6.57759	2.20665	2.59927	23.63956	1.56875
64	2.32840	3.05360	3.08435	6.61958	2.30169	2.71123	24.65778	1.60307
65	2.37894	3.12702	3.15886	6.66157	2.40424	2.83203	25.75636	1.63739

**Table A-34  
Hardin 1999 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	7.13247	9.59676	10.10656	15.85109	1.40899	2.05684	5.94344	16.31956
4	5.24368	7.10117	7.46458	12.96459	1.33770	1.95278	5.64274	13.78974
5	4.19160	5.68810	5.95744	11.21854	1.27114	1.85561	5.36196	11.91602
6	3.52407	4.78130	4.98556	9.97299	1.20895	1.76483	5.09964	10.50174
7	3.06393	4.15150	4.30886	9.00072	1.15082	1.67996	4.85442	9.41579
8	2.77176	3.73854	3.86250	8.29168	1.09645	1.60059	4.62506	8.56882
9	2.54580	3.41738	3.51597	7.67471	1.04556	1.52631	4.41041	7.89875
10	2.36189	3.15576	3.23472	7.12417	0.99792	1.45676	4.20943	7.36157
11	2.20856	2.93752	3.00113	6.63045	0.95328	1.39160	4.02115	6.92556
12	2.07816	2.75181	2.80331	6.18593	0.91145	1.33053	3.84467	6.56746
13	1.96540	2.59107	2.63292	5.78443	0.87221	1.27325	3.67917	6.26998
14	1.86649	2.44988	2.48401	5.42075	0.83540	1.21952	3.52390	6.02003
15	1.77864	2.32426	2.35217	5.09053	0.80085	1.16908	3.37815	5.80765
16	1.69977	2.21121	2.23410	4.79002	0.76840	1.12171	3.24128	5.62510
17	1.62829	2.10844	2.12727	4.51598	0.73792	1.07721	3.11269	5.46636
18	1.56295	2.01418	2.02972	4.26559	0.70927	1.03539	2.99184	5.32668
19	1.50278	1.92703	1.93992	4.03638	0.68233	0.99606	2.87821	5.20233
20	1.44066	1.84981	1.85946	3.83027	0.65699	0.95908	2.77133	5.09032
21	1.38418	1.78208	1.78915	3.64739	0.63315	0.92428	2.67077	4.98831
22	1.33253	1.72010	1.72488	3.47993	0.61072	0.89152	2.57613	4.89445
23	1.28507	1.66310	1.66585	3.32641	0.58959	0.86069	2.48703	4.80726
24	1.24129	1.61046	1.61140	3.18550	0.56970	0.83165	2.40312	4.72561
25	1.20074	1.56167	1.56097	3.05601	0.55096	0.80430	2.32409	4.64865
26	1.16305	1.51630	1.51410	2.93689	0.53331	0.77853	2.24964	4.57573
27	1.12791	1.47398	1.47042	2.82719	0.51668	0.75426	2.17948	4.50637
28	1.09505	1.43443	1.42959	2.72608	0.50101	0.73138	2.11338	4.44025
29	1.06424	1.39738	1.39135	2.63279	0.48624	0.70982	2.05108	4.37718
30	1.03527	1.36260	1.35547	2.54665	0.47233	0.68950	1.99238	4.31701
31	1.00797	1.32992	1.32174	2.46705	0.45921	0.67036	1.93705	4.25973
32	0.98220	1.29916	1.28999	2.39345	0.44685	0.65232	1.88493	4.20530
33	0.95781	1.27017	1.26007	2.32534	0.43521	0.63532	1.83581	4.15379
34	0.93469	1.24283	1.23184	2.26229	0.42424	0.61931	1.78956	4.10522
35	0.91273	1.21702	1.20519	2.20388	0.41392	0.60424	1.74600	4.05970
36	0.89184	1.19263	1.18001	2.14977	0.40420	0.59005	1.70501	4.01725
37	0.87193	1.16956	1.15618	2.09963	0.39506	0.57671	1.66644	3.97794
38	0.85293	1.14773	1.13364	2.05316	0.38646	0.56416	1.63018	3.94181
39	0.83478	1.12705	1.11228	2.01009	0.37838	0.55237	1.59611	3.90888
40	0.81740	1.10745	1.09204	1.97019	0.37080	0.54130	1.56413	3.87912
41	0.80075	1.08884	1.07284	1.93323	0.36369	0.53092	1.53414	3.85254
42	0.78476	1.07117	1.05461	1.89902	0.35703	0.52120	1.50605	3.82901
43	0.76941	1.05437	1.03727	1.86739	0.35081	0.51211	1.47977	3.80837
44	0.75463	1.03836	1.02077	1.83817	0.34499	0.50361	1.45524	3.79054
45	0.74039	1.02309	1.00504	1.81123	0.33957	0.49570	1.43237	3.77524
46	0.72666	1.00848	0.99001	1.78642	0.33453	0.48834	1.41110	3.76218
47	0.71339	0.99448	0.97562	1.76364	0.32985	0.48151	1.39137	3.75099
48	0.70075	0.98105	0.96183	1.74275	0.32552	0.47520	1.37312	3.74121
49	0.69900	0.97903	0.95967	1.72360	0.32154	0.46938	1.35631	3.74121
50	0.69736	0.97713	0.95764	1.70638	0.31788	0.46404	1.34088	3.74121
51	0.69580	0.97533	0.95572	1.69101	0.31454	0.45917	1.32680	3.74121
52	0.69433	0.97363	0.95391	1.67740	0.31151	0.45474	1.31402	3.74121
53	0.69294	0.97202	0.95219	1.66549	0.30878	0.45076	1.30250	3.74121
54	0.69162	0.97050	0.95056	1.65523	0.30634	0.44720	1.29223	3.74121
55	0.69037	0.96905	0.94902	1.64655	0.30420	0.44406	1.28316	3.74121
56	0.71160	1.00336	0.98489	1.63944	0.30233	0.44134	1.27528	3.86589
57	0.73289	1.03773	1.02083	1.63384	0.30074	0.43901	1.26857	3.99057
58	0.75424	1.07217	1.05684	1.62974	0.29941	0.43709	1.26300	4.11525
59	0.77564	1.10667	1.09292	1.62713	0.29836	0.43555	1.25856	4.23993
60	0.79708	1.14122	1.12906	1.62598	0.29758	0.43440	1.25524	4.36461
61	0.81857	1.17583	1.16525	1.62631	0.29705	0.43364	1.25303	4.48930
62	0.84010	1.21049	1.20149	1.62812	0.29679	0.43326	1.25193	4.61398
63	0.86167	1.24519	1.23778	1.63141	0.29679	0.43326	1.25193	4.73866
64	0.88328	1.27993	1.27412	1.63623	0.29705	0.43364	1.25304	4.86334
65	0.90493	1.31471	1.31050	1.64258	0.29758	0.43440	1.25524	4.98802

**Table A-35  
Hardin 1999 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	62.45099	85.94423	91.96902	168.46506	4.95234	5.74691	40.62360	163.26372
4	48.49348	66.64156	71.30545	153.91931	4.56414	5.29643	37.43922	130.20636
5	40.10098	54.93179	58.56587	140.93915	4.21404	4.89015	34.56735	106.34685
6	34.50023	47.08435	49.94563	129.33789	3.89787	4.52326	31.97386	88.74037
7	30.49861	41.47137	43.74834	118.95297	3.61200	4.19152	29.62886	75.48331
8	27.49803	37.26631	39.09569	109.64285	3.35319	3.89118	27.50589	65.31439
9	25.16547	34.00418	35.48575	101.28400	3.11859	3.61895	25.58150	57.38026
10	23.30067	31.40331	32.61058	93.76840	2.90569	3.37189	23.83513	51.09056
11	21.77600	29.28311	30.27100	87.00179	2.71226	3.14742	22.24838	46.02962
12	20.50635	27.52254	28.33258	80.90121	2.53631	2.94324	20.80515	41.89925
13	19.43263	26.03740	26.70152	75.39413	2.37610	2.75733	19.49097	38.48206
14	18.51274	24.76733	25.31053	70.41649	2.23006	2.58786	18.29306	35.61728
15	17.71570	23.66806	24.11006	65.91257	2.09682	2.43324	17.20003	33.18431
16	17.01831	22.70627	23.06310	61.83240	1.97512	2.29202	16.20180	31.09169
17	16.40280	21.85660	22.14124	58.13271	1.86388	2.16293	15.28930	29.26932
18	15.85542	21.09929	21.32256	54.77470	1.76211	2.04482	14.45447	27.66316
19	15.36525	20.41891	20.58987	51.72430	1.66893	1.93669	13.69009	26.23114
20	14.74401	19.71030	19.83113	48.95143	1.58355	1.83762	12.98979	24.94051
21	14.00390	18.83258	18.92795	46.42918	1.50528	1.74679	12.34773	23.76566
22	13.33053	18.03081	18.10507	44.13390	1.43349	1.66348	11.75880	22.68672
23	12.71518	17.29492	17.35175	42.04448	1.36761	1.58703	11.21837	21.68810
24	12.15060	16.61668	16.65916	40.14217	1.30713	1.51685	10.72227	20.75784
25	11.63070	15.98933	16.01997	38.41034	1.25160	1.45241	10.26677	19.88693
26	11.15038	15.40725	15.42812	36.83424	1.20061	1.39324	9.84854	19.06827
27	10.70528	14.86575	14.87848	35.40056	1.15380	1.33892	9.46454	18.29674
28	10.29169	14.36090	14.36673	34.09758	1.11084	1.28906	9.11209	17.56841
29	9.90641	13.88939	13.88925	32.91493	1.07142	1.24332	8.78875	16.88062
30	9.54668	13.44833	13.44289	31.84328	1.03528	1.20138	8.49232	16.23134
31	9.21010	13.03529	13.02498	30.87434	1.00218	1.16298	8.22084	15.61903
32	8.89456	12.64808	12.63316	30.00085	0.97192	1.12785	7.97253	15.04254
33	8.59820	12.28479	12.26539	29.21625	0.94428	1.09578	7.74582	14.50144
34	8.31940	11.94374	11.91984	28.51491	0.91909	1.06656	7.53924	13.99461
35	8.05670	11.62337	11.59491	27.89162	0.89621	1.04000	7.35155	13.52185
36	7.80880	11.32228	11.28914	27.34204	0.87549	1.01596	7.18160	13.08205
37	7.57454	11.03921	11.00123	26.86232	0.85681	0.99428	7.02834	12.67504
38	7.35289	10.77298	10.72996	26.44919	0.84006	0.97484	6.89089	12.29956
39	7.14290	10.52249	10.47421	26.09975	0.82513	0.95751	6.76845	11.95477
40	6.94372	10.28672	10.23298	25.81163	0.81194	0.94221	6.66028	11.63957
41	6.75456	10.06469	10.00528	25.58296	0.80042	0.92884	6.56578	11.35271
42	6.57473	9.85547	9.79019	25.41208	0.79050	0.91733	6.48441	11.09236
43	6.40357	9.65814	9.58684	25.29802	0.78213	0.90761	6.41572	10.85695
44	6.24047	9.47181	9.39436	25.23988	0.77525	0.89964	6.35932	10.64408
45	6.08487	9.29555	9.21192	25.23735	0.76984	0.89335	6.31490	10.45157
46	5.93623	9.12835	9.03866	25.29041	0.76585	0.88873	6.28220	10.27662
47	5.79405	8.96922	8.87371	25.39938	0.76327	0.88574	6.26107	10.11580
48	5.65784	8.81704	8.71621	25.56503	0.76209	0.88437	6.25137	9.96572
49	5.65784	8.81704	8.71621	25.78845	0.76230	0.88460	6.25307	9.96572
50	5.65784	8.81704	8.71621	26.07104	0.76389	0.88645	6.26614	9.96572
51	5.65784	8.81704	8.71621	26.41483	0.76689	0.88993	6.29069	9.96572
52	5.65784	8.81704	8.71621	26.82211	0.77129	0.89504	6.32684	9.96572
53	5.65784	8.81704	8.71621	27.29559	0.77714	0.90182	6.37479	9.96572
54	5.65784	8.81704	8.71621	27.83864	0.78445	0.91031	6.43480	9.96572
55	5.65784	8.81704	8.71621	28.45503	0.79328	0.92056	6.50721	9.96572
56	6.32194	10.05148	9.97792	29.14914	0.80367	0.93261	6.59243	12.36576
57	6.98603	11.28593	11.23964	29.92590	0.81568	0.94655	6.69092	14.76580
58	7.65014	12.52037	12.50135	30.79108	0.82937	0.96244	6.80326	17.16580
59	8.31423	13.75482	13.76307	31.75102	0.84483	0.98038	6.93008	19.56581
60	8.97833	14.98927	15.02478	32.81302	0.86215	1.00047	7.07212	21.96584
61	9.64243	16.22371	16.28648	33.98520	0.88142	1.02284	7.23024	24.36586
62	10.30653	17.45813	17.54817	35.27684	0.90277	1.04761	7.40534	26.76588
63	10.97063	18.69257	18.80988	36.69814	0.92632	1.07494	7.59850	29.16591
64	11.63472	19.92700	20.07158	38.26080	0.95221	1.10499	7.81091	31.56598
65	12.29882	21.16145	21.33328	39.97778	0.98061	1.13794	8.04388	33.96597

**Table A-36**  
**Hardin 1999 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	1.95526	2.44395	2.45814	4.19175	2.36287	2.78329	25.31313	0.90987
4	1.79075	2.24005	2.25839	4.23512	2.26335	2.66606	24.24698	0.87028
5	1.69165	2.11729	2.13877	4.27850	2.17110	2.55740	23.25877	0.83742
6	1.62531	2.03529	2.05929	4.32188	2.08558	2.45666	22.34256	0.81079
7	1.57773	1.97672	2.00283	4.36525	2.00627	2.36323	21.49290	0.78987
8	1.54191	1.93290	1.96079	4.40863	1.93271	2.27660	20.70497	0.77420
9	1.51394	1.89900	1.92840	4.45201	1.86450	2.19625	19.97424	0.76331
10	1.49151	1.87211	1.90279	4.49538	1.80126	2.12175	19.29671	0.75676
11	1.47311	1.85036	1.88213	4.53876	1.74263	2.05269	18.66861	0.75411
12	1.45775	1.83250	1.86520	4.58214	1.68830	1.98870	18.08665	0.75497
13	1.44474	1.81765	1.85112	4.62551	1.63800	1.92944	17.54773	0.75894
14	1.43359	1.80520	1.83931	4.66889	1.59145	1.87461	17.04904	0.76566
15	1.42393	1.79466	1.82930	4.71226	1.54842	1.82393	16.58807	0.77476
16	1.41549	1.78569	1.82074	4.75564	1.50870	1.77713	16.16252	0.78591
17	1.40806	1.77801	1.81339	4.79902	1.47208	1.73400	15.77026	0.79880
18	1.40147	1.77139	1.80702	4.84239	1.43839	1.69432	15.40937	0.81313
19	1.39560	1.76568	1.80148	4.88577	1.40747	1.65790	15.07813	0.82862
20	1.39741	1.76115	1.79634	4.92915	1.37918	1.62457	14.77499	0.84500
21	1.40575	1.76972	1.80463	4.97252	1.35337	1.59417	14.49851	0.86203
22	1.41335	1.77765	1.81228	5.01590	1.32993	1.56656	14.24742	0.87948
23	1.42033	1.78503	1.81937	5.05928	1.30875	1.54162	14.02058	0.89714
24	1.42674	1.79190	1.82595	5.10265	1.28975	1.51923	13.81695	0.91483
25	1.43268	1.79832	1.83208	5.14603	1.27282	1.49929	13.63562	0.93238
26	1.43818	1.80433	1.83780	5.18941	1.25790	1.48172	13.47581	0.94962
27	1.44330	1.80996	1.84316	5.23278	1.24493	1.46643	13.33679	0.96643
28	1.44808	1.81525	1.84818	5.27616	1.23383	1.45337	13.21795	0.98268
29	1.45256	1.82022	1.85290	5.31954	1.22458	1.44246	13.11880	0.99828
30	1.45678	1.82490	1.85734	5.36291	1.21712	1.43368	13.03888	1.01314
31	1.46074	1.82930	1.86153	5.40629	1.21142	1.42697	12.97787	1.02720
32	1.46449	1.83344	1.86549	5.44967	1.20747	1.42231	12.93551	1.04042
33	1.46805	1.83736	1.86925	5.49304	1.20524	1.41968	12.91160	1.05277
34	1.47142	1.84105	1.87281	5.53642	1.20472	1.41907	12.90604	1.06424
35	1.47464	1.84455	1.87621	5.57980	1.20591	1.42048	12.91883	1.07484
36	1.47771	1.84786	1.87945	5.62317	1.20882	1.42390	12.95000	1.08460
37	1.48066	1.85100	1.88257	5.66654	1.21346	1.42937	12.99970	1.09356
38	1.48348	1.85400	1.88557	5.70992	1.21985	1.43689	13.06813	1.10179
39	1.48621	1.85687	1.88847	5.75330	1.22801	1.44651	13.15557	1.10936
40	1.48884	1.85963	1.89130	5.79668	1.23799	1.45826	13.26244	1.11639
41	1.49140	1.86230	1.89406	5.84005	1.24982	1.47219	13.38916	1.12298
42	1.49388	1.86489	1.89678	5.88343	1.26355	1.48837	13.53631	1.12927
43	1.49630	1.86743	1.89948	5.92680	1.27925	1.50687	13.70453	1.13542
44	1.49867	1.86993	1.90217	5.97018	1.29699	1.52776	13.89453	1.14160
45	1.50101	1.87242	1.90488	6.01356	1.31684	1.55114	14.10721	1.14801
46	1.50330	1.87493	1.90762	6.05694	1.33890	1.57712	14.34349	1.15484
47	1.50558	1.87747	1.91041	6.10031	1.36326	1.60581	14.60445	1.16232
48	1.50784	1.88007	1.91329	6.14369	1.39003	1.63735	14.89128	1.17071
49	1.55817	1.95363	1.98888	6.18707	1.41934	1.67189	15.20534	1.20883
50	1.60850	2.02720	2.06448	6.23045	1.45134	1.70957	15.54806	1.24695
51	1.65882	2.10077	2.14007	6.27382	1.48616	1.75059	15.92110	1.28507
52	1.70915	2.17433	2.21567	6.31720	1.52398	1.79514	16.32628	1.32319
53	1.75948	2.24790	2.29126	6.36057	1.56498	1.84344	16.76553	1.36131
54	1.80981	2.32147	2.36686	6.40395	1.60937	1.89572	17.24106	1.39943
55	1.86014	2.39503	2.44246	6.44733	1.65738	1.95227	17.75531	1.43755
56	1.91046	2.46860	2.51805	6.49070	1.70923	2.01335	18.31084	1.47568
57	1.96079	2.54217	2.59365	6.53408	1.76522	2.07930	18.91063	1.51380
58	2.01112	2.61573	2.66924	6.57745	1.82563	2.15046	19.55777	1.55192
59	2.06145	2.68930	2.74484	6.62083	1.89079	2.22721	20.25583	1.59004
60	2.11178	2.76287	2.82043	6.66421	1.96106	2.30998	21.00864	1.62816
61	2.16211	2.83643	2.89603	6.70759	2.03683	2.39924	21.82033	1.66628
62	2.21243	2.91000	2.97162	6.75096	2.11854	2.49548	22.69563	1.70440
63	2.26276	2.98357	3.04722	6.79434	2.20665	2.59927	23.63956	1.74252
64	2.31309	3.05713	3.12281	6.83772	2.30169	2.71123	24.65778	1.78064
65	2.36342	3.13070	3.19841	6.88109	2.40424	2.83203	25.75636	1.81876

**Table A-37**  
**Jefferson 1990 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	15.46643	17.72293	24.47704	33.38910	1.54197	2.21364	7.34907	17.55176
4	11.33738	13.18582	18.10191	27.08528	1.46395	2.10164	6.97724	14.66103
5	8.97741	10.53119	14.34945	23.33171	1.39111	1.99706	6.63006	12.52467
6	7.45247	8.78917	11.87871	20.68217	1.32305	1.89936	6.30570	10.91524
7	6.38857	7.56272	10.13758	18.62776	1.25943	1.80803	6.00248	9.68152
8	5.67839	6.73362	8.95413	17.13173	1.19993	1.72261	5.71888	8.72075
9	5.12922	6.08998	8.03908	15.83397	1.14424	1.64266	5.45347	7.96163
10	4.68655	5.57050	7.30534	14.67943	1.09210	1.56781	5.20496	7.35376
11	4.32173	5.14212	6.70488	13.64698	1.04325	1.49768	4.97215	6.86088
12	4.01542	4.78221	6.20467	12.71998	0.99747	1.43195	4.75393	6.45643
13	3.75406	4.47473	5.78126	11.88495	0.95453	1.37031	4.54930	6.12071
14	3.52790	4.20807	5.41767	11.13068	0.91424	1.31248	4.35730	5.83883
15	3.32974	3.97362	5.10127	10.44773	0.87643	1.25819	4.17708	5.59944
16	3.15416	3.76487	4.82258	9.82806	0.84092	1.20722	4.00784	5.39377
17	2.99701	3.57685	4.57432	9.26470	0.80756	1.15933	3.84884	5.21500
18	2.85507	3.40571	4.35087	8.75162	0.77621	1.11431	3.69941	5.05773
19	2.72579	3.24844	4.14782	8.28357	0.74673	1.07199	3.55891	4.91776
20	2.61034	3.13009	3.99188	7.85864	0.71900	1.03219	3.42675	4.79169
21	2.50982	3.02109	3.84426	7.47412	0.69291	0.99473	3.30241	4.67688
22	2.41769	2.92045	3.70874	7.12235	0.66835	0.95948	3.18538	4.57122
23	2.33282	2.82699	3.58359	6.80015	0.64524	0.92630	3.07521	4.47308
24	2.25427	2.73978	3.46739	6.50468	0.62347	0.89505	2.97146	4.38116
25	2.18129	2.65810	3.35907	6.23343	0.60296	0.86561	2.87374	4.29449
26	2.11325	2.58139	3.25771	5.98417	0.58365	0.83788	2.78167	4.21235
27	2.04962	2.50918	3.16262	5.75489	0.56545	0.81175	2.69493	4.13422
28	1.98997	2.44114	3.07324	5.54381	0.54830	0.78713	2.61319	4.05970
29	1.93394	2.37697	2.98911	5.34930	0.53214	0.76393	2.53617	3.98860
30	1.88121	2.31645	2.90987	5.16995	0.51690	0.74206	2.46357	3.92076
31	1.83153	2.25941	2.83520	5.00445	0.50255	0.72146	2.39517	3.85613
32	1.78468	2.20568	2.76487	4.85165	0.48903	0.70204	2.33071	3.79470
33	1.74044	2.15514	2.69866	4.71050	0.47629	0.68375	2.26998	3.73654
34	1.69865	2.10765	2.63639	4.58005	0.46429	0.66652	2.21279	3.68168
35	1.65915	2.06310	2.57788	4.45946	0.45298	0.65030	2.15893	3.63021
36	1.62181	2.02139	2.52297	4.34796	0.44235	0.63503	2.10824	3.58220
37	1.58649	1.98239	2.47151	4.24487	0.43234	0.62067	2.06055	3.53768
38	1.55307	1.94600	2.42336	4.14954	0.42294	0.60716	2.01571	3.49673
39	1.52145	1.91211	2.37835	4.06143	0.41410	0.59447	1.97359	3.45935
40	1.49151	1.88058	2.33635	3.98002	0.40580	0.58256	1.93404	3.42552
41	1.46315	1.85130	2.29719	3.90486	0.39802	0.57139	1.89696	3.39524
42	1.43628	1.82412	2.26069	3.83552	0.39073	0.56093	1.86222	3.36837
43	1.41079	1.79889	2.22668	3.77163	0.38391	0.55114	1.82974	3.34475
44	1.38658	1.77546	2.19498	3.71286	0.37755	0.54201	1.79940	3.32425
45	1.36354	1.75363	2.16536	3.65889	0.37162	0.53349	1.77112	3.30659
46	1.34157	1.73321	2.13760	3.60945	0.36610	0.52557	1.74482	3.29145
47	1.32054	1.71394	2.11144	3.56430	0.36098	0.51822	1.72043	3.27841
48	1.30051	1.69558	2.08651	3.52281	0.35624	0.51142	1.69786	3.26697
49	1.29726	1.69212	2.08141	3.48177	0.35188	0.50516	1.67707	3.26697
50	1.29419	1.68885	2.07662	3.44485	0.34788	0.49941	1.65800	3.26697
51	1.29130	1.68577	2.07210	3.41185	0.34423	0.49417	1.64058	3.26697
52	1.28857	1.68286	2.06783	3.38261	0.34091	0.48941	1.62478	3.26697
53	1.28598	1.68010	2.06380	3.35699	0.33792	0.48512	1.61054	3.26697
54	1.28353	1.67750	2.05999	3.33486	0.33526	0.48129	1.59784	3.26697
55	1.28121	1.67503	2.05638	3.31612	0.33291	0.47792	1.58663	3.26697
56	1.34867	1.77305	2.18144	3.30067	0.33086	0.47498	1.57688	3.40536
57	1.41623	1.87119	2.30669	3.28847	0.32912	0.47248	1.56858	3.54376
58	1.48389	1.96944	2.43209	3.27944	0.32767	0.47041	1.56169	3.68215
59	1.55166	2.06779	2.55765	3.27355	0.32652	0.46875	1.55621	3.82055
60	1.61951	2.16624	2.68335	3.27078	0.32566	0.46752	1.55210	3.95894
61	1.68745	2.26478	2.80918	3.27114	0.32509	0.46669	1.54937	4.09733
62	1.75546	2.36341	2.93514	3.27462	0.32480	0.46628	1.54801	4.23573
63	1.82355	2.46211	3.06122	3.28126	0.32480	0.46628	1.54801	4.37412
64	1.89172	2.56089	3.18740	3.29110	0.32509	0.46670	1.54937	4.51251
65	1.95994	2.65974	3.31369	3.30420	0.32566	0.46752	1.55210	4.65091

**Table A-38**  
**Jefferson 1990 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	150.96994	181.84718	252.36024	384.15259	5.16275	6.06061	44.96603	154.38005
4	115.00104	139.05377	193.28412	350.98364	4.75806	5.58554	41.44128	123.11748
5	92.79370	112.13522	155.32555	321.38501	4.39308	5.15709	38.26241	100.52768
6	77.74426	93.73195	129.04906	294.93042	4.06348	4.77017	35.39172	83.84328
7	66.91002	80.44817	109.94977	271.25000	3.76546	4.42032	32.79602	71.27170
8	58.76726	70.47633	95.56227	250.02032	3.49565	4.10359	30.44609	61.62378
9	52.44438	62.76053	84.41568	230.95964	3.25109	3.81649	28.31602	54.09349
10	47.40599	56.64198	75.57796	213.82178	3.02914	3.55595	26.38292	48.12291
11	43.30507	51.68883	68.43175	198.39174	2.82749	3.31923	24.62659	43.31873
12	39.90703	47.60664	62.55328	184.48048	2.64407	3.10391	23.02908	39.39854
13	37.04781	44.18826	57.64334	171.92255	2.47706	2.90785	21.57442	36.15639
14	34.60934	41.28386	53.48531	160.57205	2.32481	2.72913	20.24844	33.43990
15	32.50458	38.78281	49.91933	150.30156	2.18591	2.56606	19.03860	31.13466
16	30.66823	36.60187	46.82532	140.99751	2.05904	2.41713	17.93364	29.15388
17	29.05029	34.67743	44.11171	132.56110	1.94307	2.28099	16.92361	27.43105
18	27.61198	32.96042	41.70772	124.90379	1.83697	2.15645	15.99956	25.91476
19	26.32295	31.41273	39.55829	117.94788	1.73983	2.04241	15.15347	24.56494
20	25.19424	30.34975	38.04248	111.62488	1.65083	1.93793	14.37831	23.35051
21	24.19711	29.34219	36.64978	105.87332	1.56924	1.84215	13.66763	22.24692
22	23.28513	28.40695	35.37341	100.63933	1.49439	1.75428	13.01575	21.23518
23	22.44650	27.53326	34.19612	95.87479	1.42571	1.67366	12.41754	20.30032
24	21.67188	26.71310	33.10431	91.53697	1.36266	1.59964	11.86841	19.43083
25	20.95354	25.94046	32.08728	87.58795	1.30477	1.53169	11.36422	18.61790
26	20.28520	25.21103	31.13655	83.99385	1.25162	1.46929	10.90128	17.85463
27	19.66183	24.52170	30.24571	80.72466	1.20282	1.41200	10.47624	17.13599
28	19.07918	23.87024	29.40945	77.75342	1.15803	1.35942	10.08611	16.45804
29	18.53378	23.25514	28.62383	75.05666	1.11694	1.31118	9.72822	15.81809
30	18.02266	22.67525	27.88553	72.61290	1.07926	1.26696	9.40010	15.21409
31	17.54335	22.12981	27.19199	70.40346	1.04476	1.22646	9.09959	14.64442
32	17.09367	21.61813	26.54106	68.41159	1.01321	1.18941	8.82474	14.10793
33	16.67177	21.13953	25.93103	66.62253	0.98439	1.15559	8.57380	13.60405
34	16.27596	20.69344	25.36018	65.02309	0.95814	1.12477	8.34513	13.13175
35	15.90473	20.27919	24.82710	63.60184	0.93429	1.09677	8.13738	12.69072
36	15.55672	19.89601	24.33043	62.34865	0.91269	1.07142	7.94926	12.27996
37	15.23061	19.54311	23.86887	61.25475	0.89321	1.04855	7.77963	11.89926
38	14.92523	19.21957	23.44102	60.31270	0.87575	1.02805	7.62749	11.54746
39	14.63942	18.92430	23.04549	59.51576	0.86018	1.00978	7.49195	11.22383
40	14.37207	18.65617	22.68082	58.85883	0.84644	0.99364	7.37222	10.92739
41	14.12210	18.41391	22.34550	58.33733	0.83443	0.97954	7.26762	10.65700
42	13.88839	18.19595	22.03769	57.94775	0.82409	0.96741	7.17756	10.41106
43	13.66986	18.00056	21.75571	57.68759	0.81536	0.95716	7.10152	10.18817
44	13.46532	17.82582	21.49739	57.55502	0.80819	0.94874	7.03909	9.98622
45	13.27358	17.66931	21.26060	57.54932	0.80254	0.94212	6.98993	9.80328
46	13.09326	17.52812	21.04271	57.67026	0.79839	0.93724	6.95374	9.63686
47	12.92289	17.39891	20.84070	57.91876	0.79570	0.93409	6.93034	9.48396
48	12.76085	17.27776	20.65146	58.29651	0.79447	0.93264	6.91961	9.34157
49	12.76085	17.27776	20.65146	58.80591	0.79469	0.93289	6.92148	9.34157
50	12.76085	17.27776	20.65146	59.45038	0.79635	0.93484	6.93596	9.34157
51	12.76085	17.27776	20.65146	60.23428	0.79947	0.93850	6.96312	9.34157
52	12.76085	17.27776	20.65146	61.16299	0.80406	0.94390	7.00314	9.34157
53	12.76085	17.27776	20.65146	62.24272	0.81016	0.95105	7.05622	9.34157
54	12.76085	17.27776	20.65146	63.48112	0.81778	0.96000	7.12264	9.34157
55	12.76085	17.27776	20.65146	64.88663	0.82698	0.97081	7.20280	9.34157
56	15.23120	21.02690	25.27386	66.46944	0.83781	0.98352	7.29712	11.59087
57	17.70151	24.77605	29.89630	68.24072	0.85033	0.99821	7.40614	13.84019
58	20.17183	28.52521	34.51877	70.21356	0.86461	1.01497	7.53049	16.08948
59	22.64217	32.27437	39.14120	72.40257	0.88073	1.03389	7.67086	18.33879
60	25.11252	36.02351	43.76367	74.82422	0.89878	1.05508	7.82809	20.58809
61	27.58287	39.77267	48.38611	77.49719	0.91887	1.07867	8.00310	22.83740
62	30.05324	43.52187	53.00858	80.44246	0.94113	1.10480	8.19693	25.08667
63	32.52354	47.27103	57.63103	83.68355	0.96567	1.13361	8.41073	27.33601
64	34.99391	51.02019	62.25345	87.24696	0.99267	1.16530	8.64585	29.58530
65	37.46425	54.76938	66.87593	91.16211	1.02227	1.20006	8.90372	31.83461



**Table A-39**  
**Jefferson 1990 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.43432	2.67168	3.02111	5.30427	2.81461	3.29355	37.40141	0.90002
4	2.27365	2.48211	2.83870	5.35915	2.69606	3.15483	35.82616	0.86085
5	2.17236	2.36583	2.72932	5.41404	2.58618	3.02626	34.36604	0.82835
6	2.10150	2.28733	2.65721	5.46893	2.48431	2.90704	33.01222	0.80200
7	2.04862	2.23125	2.60695	5.52382	2.38983	2.79649	31.75685	0.78132
8	2.00742	2.18985	2.57076	5.57871	2.30222	2.69397	30.59259	0.76582
9	1.97438	2.15872	2.54426	5.63360	2.22097	2.59889	29.51292	0.75504
10	1.94733	2.13515	2.52477	5.68849	2.14563	2.51073	28.51180	0.74856
11	1.92488	2.11736	2.51053	5.74338	2.07579	2.42901	27.58379	0.74594
12	1.90606	2.10413	2.50035	5.79827	2.01108	2.35329	26.72391	0.74679
13	1.89018	2.09453	2.49336	5.85316	1.95116	2.28317	25.92760	0.75072
14	1.87675	2.08790	2.48892	5.90804	1.89571	2.21829	25.19078	0.75736
15	1.86535	2.08370	2.48654	5.96293	1.84445	2.15831	24.50967	0.76637
16	1.85569	2.08150	2.48582	6.01782	1.79713	2.10294	23.88087	0.77740
17	1.84752	2.08095	2.48644	6.07271	1.75352	2.05190	23.30127	0.79015
18	1.84065	2.08177	2.48817	6.12760	1.71339	2.00494	22.76804	0.80432
19	1.83489	2.08370	2.49078	6.18249	1.67656	1.96184	22.27863	0.81964
20	1.83270	2.09507	2.50346	6.23738	1.64285	1.92240	21.83070	0.83584
21	1.83915	2.12089	2.53138	6.29226	1.61211	1.88643	21.42223	0.85269
22	1.84541	2.14525	2.55754	6.34715	1.58419	1.85376	21.05122	0.86995
23	1.85152	2.16826	2.58210	6.40204	1.55897	1.82424	20.71606	0.88742
24	1.85752	2.19003	2.60522	6.45693	1.53632	1.79775	20.41518	0.90492
25	1.86341	2.21064	2.62702	6.51182	1.51616	1.77416	20.14726	0.92228
26	1.86923	2.23016	2.64761	6.56671	1.49839	1.75336	19.91115	0.93934
27	1.87497	2.24865	2.66707	6.62160	1.48293	1.73527	19.70572	0.95596
28	1.88067	2.26614	2.68549	6.67648	1.46972	1.71981	19.53014	0.97203
29	1.88632	2.28270	2.70294	6.73138	1.45869	1.70691	19.38364	0.98746
30	1.89194	2.29836	2.71950	6.78626	1.44981	1.69651	19.26556	1.00216
31	1.89756	2.31316	2.73523	6.84116	1.44303	1.68857	19.17540	1.01608
32	1.90318	2.32716	2.75020	6.89604	1.43831	1.68306	19.11282	1.02915
33	1.90881	2.34040	2.76448	6.95093	1.43566	1.67995	19.07748	1.04137
34	1.91449	2.35293	2.77813	7.00582	1.43504	1.67923	19.06927	1.05271
35	1.92023	2.36479	2.79123	7.06071	1.43646	1.68089	19.08817	1.06320
36	1.92606	2.37606	2.80384	7.11560	1.43993	1.68495	19.13422	1.07285
37	1.93201	2.38678	2.81605	7.17048	1.44545	1.69141	19.20766	1.08172
38	1.93810	2.39703	2.82793	7.22538	1.45306	1.70032	19.30876	1.08985
39	1.94437	2.40688	2.83956	7.28026	1.46278	1.71170	19.43797	1.09735
40	1.95085	2.41641	2.85103	7.33516	1.47467	1.72560	19.59587	1.10430
41	1.95759	2.42571	2.86243	7.39004	1.48876	1.74209	19.78310	1.11082
42	1.96464	2.43485	2.87386	7.44493	1.50512	1.76123	20.00052	1.11704
43	1.97203	2.44396	2.88542	7.49982	1.52382	1.78312	20.24907	1.12313
44	1.97983	2.45311	2.89722	7.55471	1.54495	1.80785	20.52983	1.12924
45	1.98808	2.46244	2.90937	7.60960	1.56860	1.83552	20.84404	1.13557
46	1.99684	2.47206	2.92198	7.66449	1.59487	1.86626	21.19316	1.14233
47	2.00619	2.48209	2.93519	7.71938	1.62389	1.90021	21.57874	1.14973
48	2.01618	2.49267	2.94911	7.77427	1.65578	1.93753	22.00253	1.15803
49	2.10639	2.59624	3.07848	7.82916	1.69070	1.97839	22.46657	1.19574
50	2.19661	2.69981	3.20785	7.88405	1.72881	2.02299	22.97296	1.23344
51	2.28682	2.80339	3.33722	7.93893	1.77029	2.07152	23.52414	1.27115
52	2.37703	2.90696	3.46659	7.99382	1.81534	2.12424	24.12282	1.30886
53	2.46724	3.01053	3.59596	8.04871	1.86418	2.18140	24.77185	1.34657
54	2.55746	3.11411	3.72533	8.10360	1.91706	2.24327	25.47447	1.38428
55	2.64767	3.21768	3.85470	8.15849	1.97424	2.31018	26.23433	1.42198
56	2.73788	3.32125	3.98407	8.21338	2.03601	2.38247	27.05515	1.45969
57	2.82809	3.42483	4.11344	8.26827	2.10270	2.46050	27.94138	1.49740
58	2.91831	3.52840	4.24281	8.32315	2.17466	2.54471	28.89758	1.53511
59	3.00852	3.63198	4.37218	8.37805	2.25228	2.63553	29.92902	1.57282
60	3.09873	3.73555	4.50155	8.43293	2.33598	2.73348	31.04131	1.61053
61	3.18894	3.83912	4.63092	8.48783	2.42624	2.83910	32.24065	1.64823
62	3.27916	3.94270	4.76029	8.54271	2.52357	2.95298	33.53394	1.68594
63	3.36937	4.04627	4.88966	8.59760	2.62852	3.07580	34.92868	1.72365
64	3.45958	4.14985	5.01903	8.65249	2.74174	3.20828	36.43315	1.76136
65	3.54979	4.25342	5.14840	8.70738	2.86390	3.35123	38.05637	1.79906

**Table A-40**  
**Jefferson 1990 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	20.24820	21.99396	29.68407	46.02719	1.54197	2.21364	7.34907	18.99657
4	14.52153	15.98771	21.30542	35.62216	1.46395	2.10164	6.97724	16.12433
5	11.34591	12.59290	16.59454	29.87752	1.39111	1.99706	6.63006	14.00174
6	9.33681	10.41646	13.58646	26.08063	1.32305	1.89936	6.30570	12.40276
7	7.95649	8.90940	11.51111	23.28596	1.25943	1.80803	6.00248	11.17709
8	7.08797	7.93310	10.17517	21.43703	1.19993	1.72261	5.71888	10.22261
9	6.41791	7.18127	9.15044	19.86612	1.14424	1.64266	5.45347	9.46849
10	5.87427	6.57655	8.32976	18.47995	1.09210	1.56781	5.20496	8.86465
11	5.42303	6.07973	7.65892	17.24786	1.04325	1.49768	4.97215	8.37504
12	5.04118	5.66395	7.10070	16.14653	0.99747	1.43195	4.75393	7.97328
13	4.71266	5.31022	6.62883	15.15771	0.95453	1.37031	4.54930	7.63980
14	4.42588	5.00479	6.22426	14.26661	0.91424	1.31248	4.35730	7.35980
15	4.17231	4.73745	5.87291	13.46110	0.87643	1.25819	4.17708	7.12201
16	3.94553	4.50052	5.56416	12.73097	0.84092	1.20722	4.00784	6.91773
17	3.74063	4.28810	5.28986	12.06753	0.80756	1.15933	3.84884	6.74016
18	3.55380	4.09564	5.04375	11.46333	0.77621	1.11431	3.69941	6.58395
19	3.38203	3.91959	4.82088	10.91200	0.74673	1.07199	3.55891	6.44491
20	3.23377	3.78431	4.64846	10.41391	0.71900	1.03219	3.42675	6.31969
21	3.11369	3.65520	4.48111	9.96717	0.69291	0.99473	3.30241	6.20566
22	3.00348	3.53593	4.32763	9.55853	0.66835	0.95948	3.18538	6.10071
23	2.90182	3.42513	4.18604	9.18422	0.64524	0.92630	3.07521	6.00323
24	2.80760	3.32170	4.05478	8.84091	0.62347	0.89505	2.97146	5.91192
25	2.71993	3.22480	3.93256	8.52564	0.60296	0.86561	2.87374	5.82584
26	2.63809	3.13376	3.81836	8.23578	0.58365	0.83788	2.78167	5.74426
27	2.56145	3.04806	3.71137	7.96899	0.56545	0.81175	2.69493	5.66664
28	2.48950	2.96729	3.61091	7.72319	0.54830	0.78713	2.61319	5.59263
29	2.42182	2.89111	3.51644	7.49650	0.53214	0.76393	2.53617	5.52201
30	2.35804	2.81928	3.42753	7.28728	0.51690	0.74206	2.46357	5.45461
31	2.29785	2.75156	3.34379	7.09399	0.50255	0.72146	2.39517	5.39042
32	2.24098	2.68779	3.26494	6.91532	0.48903	0.70204	2.33071	5.32940
33	2.18720	2.62779	3.19069	6.75005	0.47629	0.68375	2.26998	5.27163
34	2.13630	2.57143	3.12083	6.59709	0.46429	0.66652	2.21279	5.21713
35	2.08810	2.51858	3.05513	6.45545	0.45298	0.65030	2.15893	5.16600
36	2.04241	2.46908	2.99341	6.32427	0.44235	0.63503	2.10824	5.11831
37	1.99911	2.42282	2.93547	6.20273	0.43234	0.62067	2.06055	5.07409
38	1.95804	2.37965	2.88115	6.09013	0.42294	0.60716	2.01571	5.03340
39	1.91906	2.33945	2.83026	5.98581	0.41410	0.59447	1.97359	4.99627
40	1.88206	2.30204	2.78264	5.88918	0.40580	0.58256	1.93404	4.96266
41	1.84691	2.26731	2.73811	5.79972	0.39802	0.57139	1.89696	4.93257
42	1.81348	2.23506	2.69647	5.71695	0.39073	0.56093	1.86222	4.90588
43	1.78167	2.20514	2.65752	5.64042	0.38391	0.55114	1.82974	4.88240
44	1.75135	2.17733	2.62108	5.56976	0.37755	0.54201	1.79940	4.86203
45	1.72240	2.15140	2.58690	5.50462	0.37162	0.53349	1.77112	4.84448
46	1.69469	2.12713	2.55476	5.44467	0.36610	0.52557	1.74482	4.82943
47	1.66809	2.10423	2.52437	5.38963	0.36098	0.51822	1.72043	4.81648
48	1.64272	2.08229	2.49520	5.33847	0.35624	0.51142	1.69786	4.80510
49	1.63682	2.07598	2.48579	5.28510	0.35188	0.50516	1.67707	4.80510
50	1.63126	2.07004	2.47694	5.23675	0.34788	0.49941	1.65800	4.80510
51	1.62602	2.06444	2.46859	5.19316	0.34423	0.49417	1.64058	4.80510
52	1.62107	2.05915	2.46072	5.15413	0.34091	0.48941	1.62478	4.80510
53	1.61639	2.05415	2.45329	5.11945	0.33792	0.48512	1.61054	4.80510
54	1.61197	2.04943	2.44626	5.08897	0.33526	0.48129	1.59784	4.80510
55	1.60778	2.04495	2.43961	5.06254	0.33291	0.47792	1.58663	4.80510
56	1.68103	2.15251	2.56911	5.04005	0.33086	0.47498	1.57688	4.94252
57	1.75449	2.26029	2.69893	5.02140	0.32912	0.47248	1.56858	5.07994
58	1.82813	2.36827	2.82906	5.00651	0.32767	0.47041	1.56169	5.21736
59	1.90195	2.47644	2.95947	4.99533	0.32652	0.46875	1.55621	5.35478
60	1.97594	2.58479	3.09014	4.98780	0.32566	0.46752	1.55210	5.49219
61	2.05008	2.69330	3.22106	4.98392	0.32509	0.46669	1.54937	5.62961
62	2.12436	2.80196	3.35222	4.98368	0.32480	0.46628	1.54801	5.76703
63	2.19879	2.91078	3.48358	4.98711	0.32480	0.46628	1.54801	5.90445
64	2.27333	3.01972	3.61516	4.99423	0.32509	0.46670	1.54937	6.04187
65	2.34800	3.12879	3.74692	5.00510	0.32566	0.46752	1.55210	6.17929

**Table A-41**  
**Jefferson 1990 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	184.19466	218.56775	295.79102	500.19458	5.16275	6.06061	44.96603	184.65494
4	140.14742	167.34569	226.44659	457.00659	4.75806	5.58554	41.44128	147.26219
5	112.93495	134.96809	181.86479	418.46631	4.39308	5.15709	38.26241	120.24701
6	94.49178	112.78822	151.00017	384.02100	4.06348	4.77017	35.39172	100.29649
7	81.21701	96.77335	128.56877	353.18701	3.76546	4.42032	32.79602	85.26530
8	71.24368	84.75974	111.67537	325.54419	3.49565	4.10359	30.44609	73.73056
9	63.50285	75.47623	98.59126	300.72534	3.25109	3.81649	28.31602	64.72803
10	57.33748	68.12648	88.22054	278.41064	3.02914	3.55595	26.38292	57.59029
11	52.32153	62.18694	79.83719	258.32007	2.82749	3.31923	24.62659	51.84697
12	48.16698	57.30006	72.94289	240.20711	2.64407	3.10391	23.02908	47.16032
13	44.67232	53.21379	67.18565	223.85577	2.47706	2.90785	21.57442	43.28416
14	41.69249	49.74574	62.31094	209.07660	2.32481	2.72913	20.24844	40.03615
15	39.12064	46.76105	58.13072	195.70369	2.18591	2.56606	19.03860	37.27960
16	36.87650	44.15829	54.50385	183.58916	2.05904	2.41713	17.93364	34.91069
17	34.89864	41.86005	51.32275	172.60428	1.94307	2.28099	16.92361	32.84995
18	33.13959	39.80656	48.50430	162.63390	1.83697	2.15645	15.99956	31.03592
19	31.56204	37.95169	45.98384	153.57680	1.73983	2.04241	15.15347	29.42072
20	30.17798	36.65880	44.20818	145.34373	1.65083	1.93793	14.37831	27.96715
21	28.95630	35.42502	42.56517	137.85487	1.56924	1.84215	13.66763	26.64595
22	27.83759	34.27507	41.05890	131.03981	1.49439	1.75428	13.01575	25.43445
23	26.80766	33.19620	39.66902	124.83604	1.42571	1.67366	12.41754	24.31474
24	25.85518	32.17915	38.37965	119.18787	1.36266	1.59964	11.86841	23.27309
25	24.97086	31.21724	37.17821	114.04591	1.30477	1.53169	11.36422	22.29903
26	24.14720	30.30583	36.05475	109.36613	1.25162	1.46929	10.90128	21.38435
27	23.37823	29.44186	35.00183	105.10944	1.20282	1.41200	10.47624	20.52301
28	22.65892	28.62331	34.01326	101.24066	1.15803	1.35942	10.08611	19.71037
29	21.98520	27.84894	33.08441	97.72929	1.11694	1.31118	9.72822	18.94325
30	21.35355	27.11800	32.21150	94.54735	1.07926	1.26696	9.40010	18.21921
31	20.76115	26.43010	31.39156	91.67046	1.04476	1.22646	9.09959	17.53630
32	20.20541	25.78485	30.62207	89.07692	1.01321	1.18941	8.82474	16.89323
33	19.68416	25.18184	29.90105	86.74739	0.98439	1.15559	8.57380	16.28931
34	19.19545	24.62071	29.22655	84.66487	0.95814	1.12477	8.34513	15.73227
35	18.73746	24.10092	28.59688	82.81424	0.93429	1.09677	8.13738	15.19478
36	18.30855	23.62166	28.01045	81.18251	0.91269	1.07142	7.94926	14.70265
37	17.90720	23.18213	27.46576	79.75821	0.89321	1.04855	7.77963	14.24662
38	17.53197	22.78128	26.96115	78.53157	0.87575	1.02805	7.62749	13.82531
39	17.18137	22.41782	26.49492	77.49393	0.86018	1.00978	7.49195	13.43782
40	16.85411	22.09032	26.06541	76.63853	0.84644	0.99364	7.37222	13.08300
41	16.54880	21.79709	25.67081	75.95949	0.83443	0.97954	7.26762	12.75944
42	16.26404	21.53613	25.30885	75.45221	0.82409	0.96741	7.17756	12.46524
43	15.99845	21.30513	24.97758	75.11346	0.81536	0.95716	7.10152	12.19867
44	15.75051	21.10139	24.67441	74.94090	0.80819	0.94874	7.03909	11.95723
45	15.51864	20.92163	24.39674	74.93346	0.80254	0.94212	6.98993	11.73856
46	15.30104	20.76178	24.14142	75.09093	0.79839	0.93724	6.95374	11.53966
47	15.09574	20.61711	23.90485	75.41455	0.79570	0.93409	6.93034	11.35691
48	14.90056	20.48207	23.68323	75.90634	0.79447	0.93264	6.91961	11.18667
49	14.90056	20.48207	23.68323	76.56961	0.79469	0.93289	6.92148	11.18667
50	14.90056	20.48207	23.68323	77.40878	0.79635	0.93484	6.93596	11.18667
51	14.90056	20.48207	23.68323	78.42944	0.79947	0.93850	6.96312	11.18667
52	14.90056	20.48207	23.68323	79.63872	0.80406	0.94390	7.00314	11.18667
53	14.90056	20.48207	23.68323	81.04457	0.81016	0.95105	7.05622	11.18667
54	14.90056	20.48207	23.68323	82.65707	0.81778	0.96000	7.12264	11.18667
55	14.90056	20.48207	23.68323	84.48718	0.82698	0.97081	7.20280	11.18667
56	17.87924	25.01015	29.04213	86.54807	0.83781	0.98352	7.29712	13.88032
57	20.85796	29.53824	34.40108	88.85445	0.85033	0.99821	7.40614	16.57396
58	23.83667	34.06633	39.76003	91.42319	0.86461	1.01497	7.53049	19.26759
59	26.81538	38.59441	45.11896	94.27350	0.88073	1.03389	7.67086	21.96126
60	29.79411	43.12251	50.47791	97.42667	0.89878	1.05508	7.82809	24.65488
61	32.77286	47.65060	55.83684	100.90706	0.91887	1.07867	8.00310	27.34853
62	35.75159	52.17870	61.19579	104.74200	0.94113	1.10480	8.19693	30.04214
63	38.73027	56.70682	66.55476	108.96211	0.96567	1.13361	8.41073	32.73584
64	41.70903	61.23491	71.91370	113.60197	0.99267	1.16530	8.64585	35.42947
65	44.68776	65.76302	77.27266	118.69980	1.02227	1.20006	8.90372	38.12311

**Table A-42**  
**Jefferson 1990 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC
3	2.30030	2.55905	2.81524	4.84860	2.81461	3.29355	37.40141	0.81628
4	2.14126	2.37336	2.63671	4.89877	2.69606	3.15483	35.82616	0.78076
5	2.04201	2.25981	2.52965	4.94894	2.58618	3.02626	34.36604	0.75128
6	1.97326	2.18335	2.45895	4.99912	2.48431	2.90704	33.01222	0.72739
7	1.92245	2.12882	2.40951	5.04929	2.38983	2.79649	31.75685	0.70862
8	1.88322	2.08859	2.37368	5.09946	2.30222	2.69397	30.59259	0.69457
9	1.85201	2.05831	2.34721	5.14964	2.22097	2.59889	29.51292	0.68480
10	1.82665	2.03534	2.32747	5.19981	2.14563	2.51073	28.51180	0.67891
11	1.80575	2.01793	2.31275	5.24999	2.07579	2.42901	27.58379	0.67654
12	1.78833	2.00488	2.30191	5.30016	2.01108	2.35329	26.72391	0.67731
13	1.77373	1.99530	2.29410	5.35033	1.95116	2.28317	25.92760	0.68088
14	1.76142	1.98855	2.28871	5.40051	1.89571	2.21829	25.19078	0.68690
15	1.75104	1.98410	2.28527	5.45068	1.84445	2.15831	24.50967	0.69506
16	1.74227	1.98155	2.28341	5.50085	1.79713	2.10294	23.88087	0.70507
17	1.73487	1.98056	2.28283	5.55103	1.75352	2.05190	23.30127	0.71664
18	1.72867	1.98085	2.28329	5.60120	1.71339	2.00494	22.76804	0.72949
19	1.72348	1.98220	2.28459	5.65137	1.67656	1.96184	22.27863	0.74338
20	1.72182	1.99257	2.29549	5.70155	1.64285	1.92240	21.83070	0.75808
21	1.72878	2.01724	2.32142	5.75172	1.61211	1.88643	21.42223	0.77335
22	1.73547	2.04045	2.34564	5.80189	1.58419	1.85376	21.05122	0.78901
23	1.74192	2.06234	2.36833	5.85207	1.55897	1.82424	20.71606	0.80486
24	1.74816	2.08301	2.38963	5.90224	1.53632	1.79775	20.41518	0.82073
25	1.75422	2.10254	2.40966	5.95242	1.51616	1.77416	20.14726	0.83647
26	1.76012	2.12100	2.42854	6.00259	1.49839	1.75336	19.91115	0.85194
27	1.76588	2.13845	2.44635	6.05276	1.48293	1.73527	19.70572	0.86702
28	1.77152	2.15495	2.46317	6.10294	1.46972	1.71981	19.53014	0.88160
29	1.77704	2.17054	2.47907	6.15311	1.45869	1.70691	19.38364	0.89559
30	1.78247	2.18526	2.49414	6.20328	1.44981	1.69651	19.26556	0.90892
31	1.78782	2.19915	2.50842	6.25346	1.44303	1.68857	19.17540	0.92154
32	1.79311	2.21227	2.52199	6.30363	1.43831	1.68306	19.11282	0.93340
33	1.79835	2.22466	2.53491	6.35381	1.43566	1.67995	19.07748	0.94448
34	1.80357	2.23635	2.54723	6.40398	1.43504	1.67923	19.06927	0.95477
35	1.80878	2.24742	2.55902	6.45416	1.43646	1.68089	19.08817	0.96428
36	1.81400	2.25790	2.57035	6.50432	1.43993	1.68495	19.13422	0.97304
37	1.81927	2.26785	2.58128	6.55449	1.44545	1.69141	19.20766	0.98107
38	1.82461	2.27734	2.59188	6.60467	1.45306	1.70032	19.30876	0.98846
39	1.83005	2.28644	2.60223	6.65484	1.46278	1.71170	19.43797	0.99525
40	1.83562	2.29521	2.61239	6.70502	1.47467	1.72560	19.59587	1.00155
41	1.84136	2.30373	2.62245	6.75519	1.48876	1.74209	19.78310	1.00747
42	1.84731	2.31209	2.63249	6.80537	1.50512	1.76123	20.00052	1.01311
43	1.85350	2.32037	2.64259	6.85554	1.52382	1.78312	20.24907	1.01863
44	1.85999	2.32866	2.65285	6.90572	1.54495	1.80785	20.52983	1.02418
45	1.86683	2.33708	2.66337	6.95589	1.56860	1.83552	20.84404	1.02992
46	1.87406	2.34573	2.67423	7.00606	1.59487	1.86626	21.19316	1.03605
47	1.88174	2.35471	2.68556	7.05623	1.62389	1.90021	21.57874	1.04276
48	1.88993	2.36416	2.69745	7.10641	1.65578	1.93753	22.00253	1.05029
49	1.97404	2.46227	2.81545	7.15658	1.69070	1.97839	22.46657	1.08449
50	2.05816	2.56038	2.93346	7.20676	1.72881	2.02299	22.97296	1.11869
51	2.14227	2.65849	3.05147	7.25693	1.77029	2.07152	23.52414	1.15288
52	2.22639	2.75661	3.16948	7.30710	1.81534	2.12424	24.12282	1.18709
53	2.31050	2.85472	3.28749	7.35728	1.86418	2.18140	24.77185	1.22128
54	2.39462	2.95283	3.40550	7.40745	1.91706	2.24327	25.47447	1.25548
55	2.47874	3.05095	3.52351	7.45763	1.97424	2.31018	26.23433	1.28968
56	2.56285	3.14906	3.64153	7.50780	2.03601	2.38247	27.05515	1.32388
57	2.64697	3.24717	3.75953	7.55797	2.10270	2.46050	27.94138	1.35808
58	2.73108	3.34528	3.87754	7.60814	2.17466	2.54471	28.89758	1.39228
59	2.81520	3.44340	3.99556	7.65832	2.25228	2.63553	29.92902	1.42648
60	2.89931	3.54151	4.11356	7.70849	2.33598	2.73348	31.04131	1.46068
61	2.98343	3.63962	4.23158	7.75867	2.42624	2.83910	32.24065	1.49488
62	3.06755	3.73773	4.34959	7.80884	2.52357	2.95298	33.53394	1.52908
63	3.15166	3.83585	4.46760	7.85902	2.62852	3.07580	34.92868	1.56328
64	3.23578	3.93396	4.58561	7.90919	2.74174	3.20828	36.43315	1.59748
65	3.31989	4.03207	4.70361	7.95936	2.86390	3.35123	38.05637	1.63168

**Table A-43**  
**Jefferson 1990 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	21.20966	22.81313	30.75850	48.48105	1.54197	2.21364	7.34907	19.17415
4	15.14585	16.50240	21.94736	37.16971	1.46395	2.10164	6.97724	16.30255
5	11.80055	12.95824	17.03156	30.99292	1.39111	1.99706	6.63006	14.18047
6	9.69192	10.69617	13.90959	26.95253	1.32305	1.89936	6.30570	12.58186
7	8.24721	9.13486	11.76400	24.00470	1.25943	1.80803	6.00248	11.35649
8	7.34848	8.13256	10.39781	22.08865	1.19993	1.72261	5.71888	10.40225
9	6.65529	7.36194	9.35156	20.46741	1.14424	1.64266	5.45347	9.64832
10	6.09203	6.74243	8.51384	19.03912	1.09210	1.56781	5.20496	9.04462
11	5.62372	6.23372	7.82919	17.77109	1.04325	1.49768	4.97215	8.55514
12	5.22671	5.80824	7.25960	16.63864	0.99747	1.43195	4.75393	8.15348
13	4.88450	5.44650	6.77823	15.62254	0.95453	1.37031	4.54930	7.82009
14	4.58518	5.13435	6.36565	14.70732	0.91424	1.31248	4.35730	7.54016
15	4.32000	4.86133	6.00746	13.88019	0.87643	1.25819	4.17708	7.30243
16	4.08235	4.61953	5.69281	13.13060	0.84092	1.20722	4.00784	7.09821
17	3.86719	4.40291	5.41343	12.44953	0.80756	1.15933	3.84884	6.92068
18	3.67059	4.20681	5.16287	11.82927	0.77621	1.11431	3.69941	6.76451
19	3.48949	4.02757	4.93613	11.26321	0.74673	1.07199	3.55891	6.62552
20	3.33430	3.88929	4.76029	10.75243	0.71900	1.03219	3.42675	6.50033
21	3.21068	3.75654	4.58895	10.29532	0.69291	0.99473	3.30241	6.38633
22	3.09720	3.63392	4.43183	9.87722	0.66835	0.95948	3.18538	6.28141
23	2.99249	3.51998	4.28691	9.49424	0.64524	0.92630	3.07521	6.18395
24	2.89542	3.41363	4.15257	9.14295	0.62347	0.89505	2.97146	6.09267
25	2.80509	3.31399	4.02751	8.82034	0.60296	0.86561	2.87374	6.00661
26	2.72073	3.22037	3.91068	8.52370	0.58365	0.83788	2.78167	5.92505
27	2.64172	3.13224	3.80123	8.25064	0.56545	0.81175	2.69493	5.84745
28	2.56753	3.04917	3.69848	7.99902	0.54830	0.78713	2.61319	5.77346
29	2.49772	2.97082	3.60186	7.76694	0.53214	0.76393	2.53617	5.70285
30	2.43191	2.89693	3.51094	7.55267	0.51690	0.74206	2.46357	5.63548
31	2.36979	2.82728	3.42530	7.35469	0.50255	0.72146	2.39517	5.57130
32	2.31108	2.76168	3.34466	7.17163	0.48903	0.70204	2.33071	5.51030
33	2.25553	2.69995	3.26872	7.00225	0.47629	0.68375	2.26998	5.45255
34	2.20294	2.64196	3.19725	6.84544	0.46429	0.66652	2.21279	5.39806
35	2.15312	2.58755	3.13003	6.70020	0.45298	0.65030	2.15893	5.34694
36	2.10588	2.53660	3.06686	6.56562	0.44235	0.63503	2.10824	5.29926
37	2.06108	2.48896	3.00753	6.44090	0.43234	0.62067	2.06055	5.25505
38	2.01857	2.44450	2.95189	6.32529	0.42294	0.60716	2.01571	5.21437
39	1.97821	2.40307	2.89975	6.21813	0.41410	0.59447	1.97359	5.17725
40	1.93987	2.36452	2.85091	6.11882	0.40580	0.58256	1.93404	5.14365
41	1.90342	2.32870	2.80522	6.02684	0.39802	0.57139	1.89696	5.11357
42	1.86875	2.29544	2.76246	5.94167	0.39073	0.56093	1.86222	5.08688
43	1.83572	2.26454	2.72244	5.86289	0.38391	0.55114	1.82974	5.06341
44	1.80423	2.23582	2.68496	5.79008	0.37755	0.54201	1.79940	5.04304
45	1.77414	2.20903	2.64979	5.72290	0.37162	0.53349	1.77112	5.02550
46	1.74532	2.18394	2.61668	5.66103	0.36610	0.52557	1.74482	5.01045
47	1.71763	2.16024	2.58537	5.60417	0.36098	0.51822	1.72043	4.99750
48	1.69122	2.13752	2.55527	5.55118	0.35624	0.51142	1.69786	4.98613
49	1.68473	2.13058	2.54489	5.49535	0.35188	0.50516	1.67707	4.98613
50	1.67861	2.12404	2.53513	5.44471	0.34788	0.49941	1.65800	4.98613
51	1.67285	2.11788	2.52594	5.39898	0.34423	0.49417	1.64058	4.98613
52	1.66741	2.11207	2.51726	5.35795	0.34091	0.48941	1.62478	4.98613
53	1.66226	2.10657	2.50907	5.32142	0.33792	0.48512	1.61054	4.98613
54	1.65740	2.10138	2.50132	5.28920	0.33526	0.48129	1.59784	4.98613
55	1.65280	2.09646	2.49398	5.26117	0.33291	0.47792	1.58663	4.98613
56	1.72671	2.20520	2.62393	5.23718	0.33086	0.47498	1.57688	5.12350
57	1.80084	2.31418	2.75422	5.21713	0.32912	0.47248	1.56858	5.26088
58	1.87518	2.42339	2.88486	5.20096	0.32767	0.47041	1.56169	5.39826
59	1.94971	2.53280	3.01580	5.18857	0.32652	0.46875	1.55621	5.53563
60	2.02443	2.64241	3.14704	5.17995	0.32566	0.46752	1.55210	5.67301
61	2.09932	2.75220	3.27855	5.17506	0.32509	0.46669	1.54937	5.81039
62	2.17436	2.86216	3.41031	5.17390	0.32480	0.46628	1.54801	5.94776
63	2.24956	2.97228	3.54232	5.17648	0.32480	0.46628	1.54801	6.08514
64	2.32490	3.08255	3.67455	5.18284	0.32509	0.46670	1.54937	6.22252
65	2.40036	3.19296	3.80699	5.19302	0.32566	0.46752	1.55210	6.35989

**Table A-44**  
**Jefferson 1990 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	189.44995	224.51628	302.61523	515.31616	5.16275	6.06061	44.96603	188.96344
4	144.12363	171.92079	231.64702	470.82251	4.75806	5.58554	41.44128	150.69829
5	116.12039	138.65823	186.02521	431.11743	4.39308	5.15709	38.26241	123.05321
6	97.14162	115.86758	154.44252	395.63037	4.06348	4.77017	35.39172	102.63774
7	83.48186	99.41145	131.49034	363.86377	3.76546	4.42032	32.79602	87.25636
8	73.21980	87.06795	114.20529	335.38501	3.49565	4.10359	30.44609	75.45302
9	65.25526	77.53096	100.81812	309.81689	3.25109	3.81649	28.31602	66.24081
10	58.91203	69.98192	90.20732	286.82739	3.02914	3.55595	26.38292	58.93690
11	53.75163	63.88261	81.62997	266.12939	2.82749	3.31923	24.62659	53.05984
12	49.47758	58.86517	74.57613	247.46875	2.64407	3.10391	23.02908	48.26410
13	45.88248	54.67043	68.68564	230.62320	2.47706	2.90785	21.57442	44.29765
14	42.81708	51.11070	63.69806	215.39717	2.32481	2.72913	20.24844	40.97397
15	40.17134	48.04732	59.42101	201.62004	2.18591	2.56606	19.03860	38.15317
16	37.86272	45.37593	55.71005	189.13925	2.05904	2.41713	17.93364	35.72905
17	35.82793	43.01680	52.45515	177.82233	1.94307	2.28099	16.92361	33.62016
18	34.01814	40.90860	49.57130	167.55051	1.83697	2.15645	15.99956	31.76376
19	32.39496	39.00378	46.99226	158.21962	1.73983	2.04241	15.15347	30.11082
20	30.97060	37.67433	45.17671	149.73766	1.65083	1.93793	14.37831	28.62328
21	29.71332	36.40482	43.49550	142.02233	1.56924	1.84215	13.66763	27.27113
22	28.56192	35.22096	41.95413	135.00127	1.49439	1.75428	13.01575	26.03122
23	27.50175	34.10971	40.53186	128.60995	1.42571	1.67366	12.41754	24.88524
24	26.52113	33.06161	39.21245	122.79106	1.36266	1.59964	11.86841	23.81914
25	25.61060	32.06990	37.98294	117.49367	1.30477	1.53169	11.36422	22.82219
26	24.76242	31.12987	36.83328	112.67241	1.25162	1.46929	10.90128	21.88597
27	23.97047	30.23845	35.75577	108.28700	1.20282	1.41200	10.47624	21.00441
28	23.22960	29.39363	34.74408	104.30128	1.15803	1.35942	10.08611	20.17265
29	22.53563	28.59425	33.79356	100.68372	1.11694	1.31118	9.72822	19.38747
30	21.88499	27.83958	32.90030	97.40567	1.07926	1.26696	9.40010	18.64636
31	21.27475	27.12933	32.06122	94.44176	1.04476	1.22646	9.09959	17.94740
32	20.70229	26.46310	31.27379	91.76981	1.01321	1.18941	8.82474	17.28917
33	20.16537	25.84055	30.53598	89.36986	0.98439	1.15559	8.57380	16.67104
34	19.66202	25.26137	29.84575	87.22437	0.95814	1.12477	8.34513	16.09167
35	19.19035	24.72498	29.20145	85.31784	0.93429	1.09677	8.13738	15.55077
36	18.74867	24.23062	28.60138	83.63676	0.91269	1.07142	7.94926	15.04708
37	18.33540	23.77745	28.04407	82.16939	0.89321	1.04855	7.77963	14.58035
38	17.94914	23.36443	27.52774	80.90564	0.87575	1.02805	7.62749	14.14916
39	17.58829	22.99017	27.05070	79.83665	0.86018	1.00978	7.49195	13.75260
40	17.25154	22.65327	26.61127	78.95537	0.84644	0.99364	7.37222	13.38947
41	16.93745	22.35197	26.20753	78.25581	0.83443	0.97954	7.26762	13.05835
42	16.64459	22.08415	25.83722	77.73320	0.82409	0.96741	7.17756	12.75728
43	16.37149	21.84744	25.49829	77.38426	0.81536	0.95716	7.10152	12.48450
44	16.11665	21.63905	25.18811	77.20644	0.80819	0.94874	7.03909	12.23743
45	15.87837	21.45552	24.90405	77.19878	0.80254	0.94212	6.98993	12.01367
46	15.65479	21.29257	24.64285	77.36102	0.79839	0.93724	6.95374	11.81015
47	15.44390	21.14536	24.40079	77.69437	0.79570	0.93409	6.93034	11.62315
48	15.24342	21.00801	24.17407	78.20108	0.79447	0.93264	6.91961	11.44894
49	15.24342	21.00801	24.17407	78.88440	0.79469	0.93289	6.92148	11.44894
50	15.24342	21.00801	24.17407	79.74892	0.79635	0.93484	6.93596	11.44894
51	15.24342	21.00801	24.17407	80.80045	0.79947	0.93850	6.96312	11.44894
52	15.24342	21.00801	24.17407	82.04631	0.80406	0.94390	7.00314	11.44894
53	15.24342	21.00801	24.17407	83.49466	0.81016	0.95105	7.05622	11.44894
54	15.24342	21.00801	24.17407	85.15588	0.81778	0.96000	7.12264	11.44894
55	15.24342	21.00801	24.17407	87.04132	0.82698	0.97081	7.20280	11.44894
56	18.30328	25.66313	29.65115	89.16452	0.83781	0.98352	7.29712	14.20575
57	21.36320	30.31828	35.12828	91.54062	0.85033	0.99821	7.40614	16.96254
58	24.42311	34.97346	40.60542	94.18704	0.86461	1.01497	7.53049	19.71933
59	27.48302	39.62859	46.08257	97.12346	0.88073	1.03389	7.67086	22.47614
60	30.54295	44.28377	51.55969	100.37196	0.89878	1.05508	7.82809	25.23296
61	33.60289	48.93893	57.03680	103.95760	0.91887	1.07867	8.00310	27.98976
62	36.66281	53.59410	62.51396	107.90846	0.94113	1.10480	8.19693	30.74654
63	39.72272	58.24927	67.99110	112.25616	0.96567	1.13361	8.41073	33.50337
64	42.78265	62.90442	73.46819	117.03627	0.99267	1.16530	8.64585	36.26018
65	45.84258	67.55960	78.94534	122.28822	1.02227	1.20006	8.90372	39.01697

**Table A-45**  
**Jefferson 1990 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	2.28802	2.54858	2.79601	4.80450	2.81461	3.29355	37.40141	0.80778
4	2.12912	2.36322	2.61781	4.85422	2.69606	3.15483	35.82616	0.77263
5	2.03003	2.24992	2.51094	4.90393	2.58618	3.02626	34.36604	0.74346
6	1.96148	2.17363	2.44036	4.95365	2.48431	2.90704	33.01222	0.71982
7	1.91085	2.11925	2.39098	5.00337	2.38983	2.79649	31.75685	0.70125
8	1.87179	2.07911	2.35518	5.05308	2.30222	2.69397	30.59259	0.68734
9	1.84075	2.04891	2.32870	5.10280	2.22097	2.59889	29.51292	0.67767
10	1.81555	2.02599	2.30892	5.15252	2.14563	2.51073	28.51180	0.67185
11	1.79478	2.00861	2.29416	5.20224	2.07579	2.42901	27.58379	0.66950
12	1.77749	1.99556	2.28324	5.25195	2.01108	2.35329	26.72391	0.67026
13	1.76300	1.98598	2.27535	5.30167	1.95116	2.28317	25.92760	0.67379
14	1.75080	1.97921	2.26986	5.35139	1.89571	2.21829	25.19078	0.67975
15	1.74050	1.97473	2.26631	5.40110	1.84445	2.15831	24.50967	0.68783
16	1.73181	1.97213	2.26433	5.45082	1.79713	2.10294	23.88087	0.69774
17	1.72448	1.97109	2.26363	5.50054	1.75352	2.05190	23.30127	0.70918
18	1.71833	1.97133	2.26397	5.55026	1.71339	2.00494	22.76804	0.72190
19	1.71319	1.97261	2.26515	5.59997	1.67656	1.96184	22.27863	0.73565
20	1.71158	1.98288	2.27587	5.64969	1.64285	1.92240	21.83070	0.75019
21	1.71859	2.00743	2.30161	5.69941	1.61211	1.88643	21.42223	0.76531
22	1.72531	2.03054	2.32565	5.74912	1.58419	1.85376	21.05122	0.78080
23	1.73179	2.05232	2.34816	5.79884	1.55897	1.82424	20.71606	0.79648
24	1.73805	2.07288	2.36928	5.84855	1.53632	1.79775	20.41518	0.81219
25	1.74413	2.09230	2.38915	5.89828	1.51616	1.77416	20.14726	0.82777
26	1.75003	2.11066	2.40786	5.94799	1.49839	1.75336	19.91115	0.84308
27	1.75579	2.12801	2.42552	5.99771	1.48293	1.73527	19.70572	0.85800
28	1.76142	2.14441	2.44218	6.04743	1.46972	1.71981	19.53014	0.87242
29	1.76693	2.15989	2.45794	6.09715	1.45869	1.70691	19.38364	0.88627
30	1.77234	2.17452	2.47287	6.14686	1.44981	1.69651	19.26556	0.89947
31	1.77767	2.18833	2.48701	6.19658	1.44303	1.68857	19.17540	0.91195
32	1.78293	2.20136	2.50045	6.24629	1.43831	1.68306	19.11282	0.92369
33	1.78813	2.21367	2.51323	6.29601	1.43566	1.67995	19.07748	0.93465
34	1.79330	2.22528	2.52543	6.34573	1.43504	1.67923	19.06927	0.94484
35	1.79846	2.23627	2.53710	6.39545	1.43646	1.68089	19.08817	0.95425
36	1.80363	2.24667	2.54831	6.44517	1.43993	1.68495	19.13422	0.96291
37	1.80883	2.25655	2.55912	6.49488	1.44545	1.69141	19.20766	0.97087
38	1.81410	2.26597	2.56960	6.54460	1.45306	1.70032	19.30876	0.97817
39	1.81946	2.27499	2.57982	6.59431	1.46278	1.71170	19.43797	0.98490
40	1.82494	2.28369	2.58986	6.64404	1.47467	1.72560	19.59587	0.99113
41	1.83059	2.29213	2.59979	6.69375	1.48876	1.74209	19.78310	0.99698
42	1.83643	2.30041	2.60970	6.74347	1.50512	1.76123	20.00052	1.00257
43	1.84252	2.30862	2.61966	6.79318	1.52382	1.78312	20.24907	1.00803
44	1.84889	2.31683	2.62978	6.84291	1.54495	1.80785	20.52983	1.01352
45	1.85559	2.32517	2.64014	6.89262	1.56860	1.83552	20.84404	1.01920
46	1.86268	2.33372	2.65084	6.94234	1.59487	1.86626	21.19316	1.02527
47	1.87020	2.34260	2.66198	6.99205	1.62389	1.90021	21.57874	1.03191
48	1.87822	2.35194	2.67368	7.04178	1.65578	1.93753	22.00253	1.03936
49	1.96177	2.44953	2.79062	7.09149	1.69070	1.97839	22.46657	1.07320
50	2.04532	2.54713	2.90755	7.14121	1.72881	2.02299	22.97296	1.10705
51	2.12887	2.64473	3.02449	7.19093	1.77029	2.07152	23.52414	1.14089
52	2.21243	2.74232	3.14143	7.24064	1.81534	2.12424	24.12282	1.17473
53	2.29598	2.83992	3.25837	7.29036	1.86418	2.18140	24.77185	1.20858
54	2.37953	2.93752	3.37530	7.34008	1.91706	2.24327	25.47447	1.24242
55	2.46308	3.03512	3.49224	7.38980	1.97424	2.31018	26.23433	1.27626
56	2.54664	3.13271	3.60918	7.43951	2.03601	2.38247	27.05515	1.31011
57	2.63019	3.23031	3.72612	7.48923	2.10270	2.46050	27.94138	1.34395
58	2.71374	3.32791	3.84305	7.53894	2.17466	2.54471	28.89758	1.37780
59	2.79729	3.42551	3.95999	7.58867	2.25228	2.63553	29.92902	1.41164
60	2.88085	3.52310	4.07693	7.63838	2.33598	2.73348	31.04131	1.44548
61	2.96440	3.62070	4.19387	7.68810	2.42624	2.83910	32.24065	1.47933
62	3.04795	3.71830	4.31080	7.73781	2.52357	2.95298	33.53394	1.51317
63	3.13150	3.81590	4.42774	7.78754	2.62852	3.07580	34.92868	1.54702
64	3.21506	3.91349	4.54468	7.83725	2.74174	3.20828	36.43315	1.58086
65	3.29861	4.01109	4.66162	7.88697	2.86390	3.35123	38.05637	1.61470

**Table A-46**  
**Jefferson 1990 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	15.54504	17.81184	24.56932	33.61494	1.54197	2.21364	7.34907	17.59135
4	11.39239	13.24904	18.16356	27.25728	1.46395	2.10164	6.97724	14.70154
5	9.01998	10.58051	14.39574	23.47633	1.39111	1.99706	6.63006	12.56586
6	7.48745	8.82987	11.91606	20.81013	1.32305	1.89936	6.30570	10.95695
7	6.41850	7.59761	10.16917	18.74432	1.25943	1.80803	6.00248	9.72363
8	5.70551	6.76519	8.98287	17.24197	1.19993	1.72261	5.71888	8.76316
9	5.15420	6.11899	8.06565	15.93902	1.14424	1.64266	5.45347	8.00428
10	4.70977	5.59740	7.33011	14.78001	1.09210	1.56781	5.20496	7.39662
11	4.34349	5.16724	6.72813	13.74364	1.04325	1.49768	4.97215	6.90389
12	4.03592	4.80580	6.22659	12.81316	0.99747	1.43195	4.75393	6.49958
13	3.77347	4.49698	5.80202	11.97504	0.95453	1.37031	4.54930	6.16396
14	3.54634	4.22913	5.43738	11.21800	0.91424	1.31248	4.35730	5.88217
15	3.34731	3.99360	5.12004	10.53256	0.87643	1.25819	4.17708	5.64286
16	3.17094	3.78386	4.84048	9.91063	0.84092	1.20722	4.00784	5.43726
17	3.01306	3.59493	4.59143	9.34524	0.80756	1.15933	3.84884	5.25855
18	2.87045	3.42294	4.36723	8.83030	0.77621	1.11431	3.69941	5.10133
19	2.74057	3.26486	4.16350	8.36055	0.74673	1.07199	3.55891	4.96140
20	2.62460	3.14592	4.00708	7.93410	0.71900	1.03219	3.42675	4.83537
21	2.52371	3.03651	3.85912	7.54825	0.69291	0.99473	3.30241	4.72060
22	2.43124	2.93549	3.72330	7.19524	0.66835	0.95948	3.18538	4.61498
23	2.34605	2.84167	3.59786	6.87191	0.64524	0.92630	3.07521	4.51687
24	2.26721	2.75413	3.48141	6.57541	0.62347	0.89505	2.97146	4.42498
25	2.19395	2.67213	3.37284	6.30321	0.60296	0.86561	2.87374	4.33834
26	2.12564	2.59511	3.27127	6.05307	0.58365	0.83788	2.78167	4.25623
27	2.06176	2.52262	3.17597	5.82299	0.56545	0.81175	2.69493	4.17812
28	2.00188	2.45431	3.08640	5.61115	0.54830	0.78713	2.61319	4.10363
29	1.94563	2.38988	3.00209	5.41596	0.53214	0.76393	2.53617	4.03255
30	1.89270	2.32912	2.92267	5.23597	0.51690	0.74206	2.46357	3.96473
31	1.84282	2.27185	2.84785	5.06988	0.50255	0.72146	2.39517	3.90012
32	1.79578	2.21791	2.77737	4.91653	0.48903	0.70204	2.33071	3.83872
33	1.75136	2.16715	2.71102	4.77487	0.47629	0.68375	2.26998	3.78058
34	1.70940	2.11948	2.64861	4.64394	0.46429	0.66652	2.21279	3.72573
35	1.66975	2.07475	2.58997	4.52291	0.45298	0.65030	2.15893	3.67428
36	1.63225	2.03287	2.53494	4.41101	0.44235	0.63503	2.10824	3.62628
37	1.59678	1.99371	2.48336	4.30753	0.43234	0.62067	2.06055	3.58178
38	1.56322	1.95717	2.43509	4.21185	0.42294	0.60716	2.01571	3.54084
39	1.53146	1.92314	2.38998	4.12341	0.41410	0.59447	1.97359	3.50347
40	1.50140	1.89148	2.34787	4.04169	0.40580	0.58256	1.93404	3.46966
41	1.47292	1.86208	2.30861	3.96624	0.39802	0.57139	1.89696	3.43938
42	1.44593	1.83479	2.27202	3.89664	0.39073	0.56093	1.86222	3.41252
43	1.42032	1.80946	2.23792	3.83250	0.38391	0.55114	1.82974	3.38890
44	1.39600	1.78593	2.20613	3.77349	0.37755	0.54201	1.79940	3.36841
45	1.37286	1.76401	2.17642	3.71930	0.37162	0.53349	1.77112	3.35076
46	1.35078	1.74350	2.14857	3.66966	0.36610	0.52557	1.74482	3.33563
47	1.32966	1.72415	2.12232	3.62433	0.36098	0.51822	1.72043	3.32259
48	1.30953	1.70571	2.09731	3.58266	0.35624	0.51142	1.69786	3.31116
49	1.30624	1.70221	2.09216	3.54142	0.35188	0.50516	1.67707	3.31116
50	1.30314	1.69890	2.08732	3.50431	0.34788	0.49941	1.65800	3.31116
51	1.30022	1.69579	2.08275	3.47114	0.34423	0.49417	1.64058	3.31116
52	1.29745	1.69285	2.07843	3.44174	0.34091	0.48941	1.62478	3.31116
53	1.29484	1.69006	2.07436	3.41598	0.33792	0.48512	1.61054	3.31116
54	1.29237	1.68743	2.07050	3.39372	0.33526	0.48129	1.59784	3.31116
55	1.29002	1.68493	2.06685	3.37486	0.33291	0.47792	1.58663	3.31116
56	1.35764	1.78321	2.19205	3.35932	0.33086	0.47498	1.57688	3.44950
57	1.42536	1.88161	2.31743	3.34702	0.32912	0.47248	1.56858	3.58785
58	1.49319	1.98012	2.44297	3.33791	0.32767	0.47041	1.56169	3.72620
59	1.56112	2.07873	2.56866	3.33196	0.32652	0.46875	1.55621	3.86454
60	1.62914	2.17744	2.69450	3.32914	0.32566	0.46752	1.55210	4.00289
61	1.69725	2.27624	2.82048	3.32945	0.32509	0.46669	1.54937	4.14124
62	1.76544	2.37512	2.94658	3.33290	0.32480	0.46628	1.54801	4.27958
63	1.83370	2.47409	3.07279	3.33952	0.32480	0.46628	1.54801	4.41793
64	1.90203	2.57313	3.19912	3.34935	0.32509	0.46670	1.54937	4.55628
65	1.97043	2.67225	3.32556	3.36245	0.32566	0.46752	1.55210	4.69462



**Table A-47**  
**Jefferson 1990 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	151.68867	182.63007	253.31120	387.25244	5.16275	6.06061	44.96603	155.08058
4	115.54515	139.65736	194.01099	353.81567	4.75806	5.58554	41.44128	123.67615
5	93.22949	112.62244	155.90729	323.97827	4.39308	5.15709	38.26241	100.98401
6	78.10657	94.13852	129.53012	297.31055	4.06348	4.77017	35.39172	84.22409
7	67.21945	80.79643	110.35764	273.43896	3.76546	4.42032	32.79602	71.59561
8	59.03705	70.78101	95.91515	252.03775	3.49565	4.10359	30.44609	61.90405
9	52.68346	63.03171	84.72606	232.82338	3.25109	3.81649	28.31602	54.33977
10	47.62067	56.88689	75.85475	215.54718	3.02914	3.55595	26.38292	48.34219
11	43.49994	51.91272	68.68146	199.99266	2.82749	3.31923	24.62659	43.51627
12	40.08553	47.81339	62.78076	185.96913	2.64407	3.10391	23.02908	39.57834
13	37.21255	44.38077	57.85233	173.93991	2.47706	2.90785	21.57442	36.32156
14	34.76239	41.46437	53.67865	161.86777	2.32481	2.72913	20.24844	33.59277
15	32.64752	38.95302	50.09927	151.51443	2.18591	2.56606	19.03860	31.27710
16	30.80237	36.76311	46.99362	142.13533	2.05904	2.41713	17.93364	29.28735
17	29.17664	34.83070	44.26982	133.63083	1.94307	2.28099	16.92361	27.55670
18	27.73138	33.10654	41.85680	125.91173	1.83697	2.15645	15.99956	26.03352
19	26.43613	31.55232	39.69928	118.89964	1.73983	2.04241	15.15347	24.67758
20	25.30191	30.48439	38.17772	112.52563	1.65083	1.93793	14.37831	23.45758
21	24.29991	29.47198	36.77946	106.72766	1.56924	1.84215	13.66763	22.34897
22	23.38344	28.53212	35.49800	101.45145	1.49439	1.75428	13.01575	21.33258
23	22.54068	27.65402	34.31598	96.64845	1.42571	1.67366	12.41754	20.39345
24	21.76221	26.82964	33.21979	92.27565	1.36266	1.59964	11.86841	19.51993
25	21.04027	26.05292	32.19865	88.29475	1.30477	1.53169	11.36422	18.70326
26	20.36858	25.31958	31.24408	84.67165	1.25162	1.46929	10.90128	17.93649
27	19.74207	24.62650	30.34962	81.37607	1.20282	1.41200	10.47624	17.21452
28	19.15645	23.97144	29.50995	78.38086	1.15803	1.35942	10.08611	16.53346
29	18.60828	23.35291	28.72113	75.66234	1.11694	1.31118	9.72822	15.89056
30	18.09453	22.76978	27.97983	73.19887	1.07926	1.26696	9.40010	15.28977
31	17.61278	22.22127	27.28348	70.97157	1.04476	1.22646	9.09959	14.71146
32	17.16080	21.70673	26.62990	68.96364	1.01321	1.18941	8.82474	14.17250
33	16.73674	21.22543	26.01738	67.16014	0.98439	1.15559	8.57380	13.66630
34	16.33891	20.77687	25.44421	65.54781	0.95814	1.12477	8.34513	13.19182
35	15.96581	20.36037	24.90900	64.11510	0.93429	1.09677	8.13738	12.74876
36	15.61604	19.97511	24.41031	62.85175	0.91269	1.07142	7.94926	12.33611
37	15.28831	19.62035	23.94691	61.74905	0.89321	1.04855	7.77963	11.95367
38	14.98142	19.29515	23.51736	60.79939	0.87575	1.02805	7.62749	11.60026
39	14.69421	18.99841	23.12025	59.99603	0.86018	1.00978	7.49195	11.27514
40	14.42556	18.72902	22.75417	59.33377	0.84644	0.99364	7.37222	10.97736
41	14.17439	18.48566	22.41754	58.80806	0.83443	0.97954	7.26762	10.70573
42	13.93958	18.26677	22.10854	58.41536	0.82409	0.96741	7.17756	10.45868
43	13.72004	18.07063	21.82549	58.15309	0.81536	0.95716	7.10152	10.23477
44	13.51457	17.89528	21.56619	58.01947	0.80819	0.94874	7.03909	10.03191
45	13.32197	17.73828	21.32852	58.01370	0.80254	0.94212	6.98993	9.84814
46	13.14084	17.59668	21.10982	58.13565	0.79839	0.93724	6.95374	9.68097
47	12.96972	17.46715	20.90707	58.38615	0.79570	0.93409	6.93034	9.52738
48	12.80697	17.34569	20.71713	58.76691	0.79447	0.93264	6.91961	9.38435
49	12.80697	17.34569	20.71713	59.28047	0.79469	0.93289	6.92148	9.38435
50	12.80697	17.34569	20.71713	59.93010	0.79635	0.93484	6.93596	9.38435
51	12.80697	17.34569	20.71713	60.72032	0.79947	0.93850	6.96312	9.38435
52	12.80697	17.34569	20.71713	61.65656	0.80406	0.94390	7.00314	9.38435
53	12.80697	17.34569	20.71713	62.74496	0.81016	0.95105	7.05622	9.38435
54	12.80697	17.34569	20.71713	63.99338	0.81778	0.96000	7.12264	9.38435
55	12.80697	17.34569	20.71713	65.41023	0.82698	0.97081	7.20280	9.38435
56	15.28828	21.11139	25.35555	67.00581	0.83781	0.98352	7.29712	11.64396
57	17.76956	24.87708	29.99399	68.79141	0.85033	0.99821	7.40614	13.90357
58	20.25085	28.64279	34.63246	70.78014	0.86461	1.01497	7.53049	16.16318
59	22.73215	32.40851	39.27090	72.98682	0.88073	1.03389	7.67086	18.42278
60	25.21347	36.17419	43.90938	75.42801	0.89878	1.05508	7.82809	20.68237
61	27.69479	39.93991	48.54782	78.12256	0.91887	1.07867	8.00310	22.94200
62	30.17612	43.70564	53.18629	81.09157	0.94113	1.10480	8.19693	25.20158
63	32.65739	47.47134	57.82475	84.35884	0.96567	1.13361	8.41073	27.46121
64	35.13873	51.23706	62.46321	87.95099	0.99267	1.16530	8.64585	29.72081
65	37.62003	55.00281	67.10168	91.89777	1.02227	1.20006	8.90372	31.98041

**Table A-48**  
**Jefferson 1990 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	2.42961	2.66765	3.01377	5.28782	2.81461	3.29355	37.40141	0.89726
4	2.26900	2.47824	2.83152	5.34254	2.69606	3.15483	35.82616	0.85822
5	2.16778	2.36206	2.72223	5.39726	2.58618	3.02626	34.36604	0.82582
6	2.09700	2.28363	2.65018	5.45198	2.48431	2.90704	33.01222	0.79955
7	2.04419	2.22761	2.59995	5.50670	2.38983	2.79649	31.75685	0.77893
8	2.00306	2.18625	2.56378	5.56142	2.30222	2.69397	30.59259	0.76348
9	1.97008	2.15515	2.53729	5.61614	2.22097	2.59889	29.51292	0.75274
10	1.94310	2.13161	2.51779	5.67086	2.14563	2.51073	28.51180	0.74627
11	1.92070	2.11384	2.50354	5.72557	2.07579	2.42901	27.58379	0.74366
12	1.90193	2.10061	2.49334	5.78029	2.01108	2.35329	26.72391	0.74451
13	1.88610	2.09102	2.48633	5.83501	1.95116	2.28317	25.92760	0.74843
14	1.87270	2.08439	2.48186	5.88973	1.89571	2.21829	25.19078	0.75505
15	1.86135	2.08018	2.47944	5.94445	1.84445	2.15831	24.50967	0.76402
16	1.85172	2.07797	2.47868	5.99917	1.79713	2.10294	23.88087	0.77502
17	1.84358	2.07741	2.47927	6.05389	1.75352	2.05190	23.30127	0.78774
18	1.83673	2.07822	2.48095	6.10861	1.71339	2.00494	22.76804	0.80187
19	1.83099	2.08013	2.48351	6.16333	1.67656	1.96184	22.27863	0.81714
20	1.82882	2.09146	2.49614	6.21805	1.64285	1.92240	21.83070	0.83329
21	1.83529	2.11724	2.52399	6.27276	1.61211	1.88643	21.42223	0.85008
22	1.84157	2.14156	2.55007	6.32748	1.58419	1.85376	21.05122	0.86729
23	1.84769	2.16453	2.57457	6.38220	1.55897	1.82424	20.71606	0.88471
24	1.85370	2.18627	2.59762	6.43691	1.53632	1.79775	20.41518	0.90216
25	1.85960	2.20684	2.61936	6.49164	1.51616	1.77416	20.14726	0.91946
26	1.86542	2.22632	2.63989	6.54635	1.49839	1.75336	19.91115	0.93646
27	1.87117	2.24477	2.65929	6.60108	1.48293	1.73527	19.70572	0.95304
28	1.87686	2.26223	2.67765	6.65579	1.46972	1.71981	19.53014	0.96906
29	1.88251	2.27875	2.69505	6.71051	1.45869	1.70691	19.38364	0.98444
30	1.88813	2.29438	2.71156	6.76523	1.44981	1.69651	19.26556	0.99910
31	1.89373	2.30916	2.72723	6.81995	1.44303	1.68857	19.17540	1.01297
32	1.89934	2.32312	2.74216	6.87467	1.43831	1.68306	19.11282	1.02601
33	1.90497	2.33633	2.75638	6.92939	1.43566	1.67995	19.07748	1.03818
34	1.91063	2.34883	2.76999	6.98411	1.43504	1.67923	19.06927	1.04950
35	1.91635	2.36067	2.78304	7.03883	1.43646	1.68089	19.08817	1.05995
36	1.92216	2.37190	2.79561	7.09354	1.43993	1.68495	19.13422	1.06957
37	1.92808	2.38260	2.80777	7.14826	1.44545	1.69141	19.20766	1.07841
38	1.93415	2.39283	2.81960	7.20298	1.45306	1.70032	19.30876	1.08652
39	1.94039	2.40265	2.83119	7.25770	1.46278	1.71170	19.43797	1.09399
40	1.94684	2.41215	2.84262	7.31242	1.47467	1.72560	19.59587	1.10092
41	1.95355	2.42142	2.85397	7.36714	1.48876	1.74209	19.78310	1.10742
42	1.96055	2.43054	2.86535	7.42186	1.50512	1.76123	20.00052	1.11363
43	1.96791	2.43961	2.87686	7.47657	1.52382	1.78312	20.24907	1.11969
44	1.97565	2.44874	2.88861	7.53130	1.54495	1.80785	20.52983	1.12579
45	1.98386	2.45804	2.90070	7.58601	1.56860	1.83552	20.84404	1.13210
46	1.99257	2.46762	2.91325	7.64073	1.59487	1.86626	21.19316	1.13884
47	2.00185	2.47761	2.92639	7.69545	1.62389	1.90021	21.57874	1.14622
48	2.01178	2.48815	2.94024	7.75017	1.65578	1.93753	22.00253	1.15449
49	2.10178	2.59153	3.06921	7.80489	1.69070	1.97839	22.46657	1.19208
50	2.19178	2.69491	3.19818	7.85961	1.72881	2.02299	22.97296	1.22967
51	2.28178	2.79829	3.32715	7.91433	1.77029	2.07152	23.52414	1.26727
52	2.37177	2.90167	3.45612	7.96905	1.81534	2.12424	24.12282	1.30486
53	2.46177	3.00505	3.58508	8.02376	1.86418	2.18140	24.77185	1.34245
54	2.55177	3.10843	3.71406	8.07848	1.91706	2.24327	25.47447	1.38004
55	2.64177	3.21181	3.84302	8.13320	1.97424	2.31018	26.23433	1.41764
56	2.73177	3.31519	3.97199	8.18791	2.03601	2.38247	27.05515	1.45523
57	2.82176	3.41857	4.10096	8.24264	2.10270	2.46050	27.94138	1.49282
58	2.91176	3.52195	4.22993	8.29736	2.17466	2.54471	28.89758	1.53042
59	3.00176	3.62533	4.35890	8.35208	2.25228	2.63553	29.92902	1.56801
60	3.09176	3.72871	4.48787	8.40679	2.33598	2.73348	31.04131	1.60560
61	3.18176	3.83209	4.61684	8.46152	2.42624	2.83910	32.24065	1.64320
62	3.27175	3.93547	4.74581	8.51623	2.52357	2.95298	33.53394	1.68079
63	3.36175	4.03885	4.87478	8.57095	2.62852	3.07580	34.92868	1.71838
64	3.45175	4.14223	5.00375	8.62567	2.74174	3.20828	36.43315	1.75597
65	3.54175	4.24561	5.13272	8.68039	2.86390	3.35123	38.05637	1.79356

**Table A-49**  
**Jefferson 1996 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	8.59345	9.89890	12.64781	15.69553	1.65438	2.28766	5.47575	15.39995
4	6.33656	7.36580	9.38183	12.89058	1.57068	2.17192	5.19870	12.98292
5	5.06194	5.91003	7.48784	11.17475	1.49252	2.06384	4.94001	11.19275
6	4.24536	4.96638	6.25291	9.94098	1.41950	1.96287	4.69834	9.84154
7	3.67864	4.30655	5.38694	8.97268	1.35125	1.86849	4.47241	8.80401
8	3.31194	3.87051	4.80770	8.26260	1.28740	1.78021	4.26110	7.99482
9	3.02779	3.53033	4.35757	7.64343	1.22766	1.69759	4.06335	7.35463
10	2.79668	3.25262	3.99288	7.09010	1.17171	1.62023	3.87819	6.84140
11	2.60419	3.02048	3.69070	6.59324	1.11930	1.54776	3.70472	6.42483
12	2.44067	2.82252	3.43547	6.14537	1.07018	1.47983	3.54212	6.08270
13	2.29942	2.65079	3.21625	5.74038	1.02412	1.41613	3.38965	5.79849
14	2.17565	2.49956	3.02517	5.37316	0.98090	1.35637	3.24660	5.55969
15	2.06582	2.36462	2.85640	5.03937	0.94033	1.30027	3.11232	5.35678
16	1.96730	2.24282	2.70556	4.73528	0.90223	1.24759	2.98622	5.18237
17	1.87806	2.13171	2.56932	4.45767	0.86643	1.19809	2.86775	5.03071
18	1.79653	2.02943	2.44508	4.20374	0.83279	1.15158	2.75640	4.89725
19	1.72147	1.93451	2.33080	3.97102	0.80116	1.10784	2.65172	4.77845
20	1.64986	1.85673	2.23716	3.76240	0.77141	1.06670	2.55325	4.67143
21	1.58741	1.79062	2.15474	3.57850	0.74342	1.02800	2.46060	4.57398
22	1.53022	1.72999	2.07927	3.41006	0.71708	0.99157	2.37341	4.48429
23	1.47762	1.67410	2.00982	3.25560	0.69228	0.95727	2.29132	4.40099
24	1.42902	1.62236	1.94559	3.11377	0.66892	0.92498	2.21402	4.32299
25	1.38394	1.57427	1.88596	2.98340	0.64692	0.89456	2.14120	4.24946
26	1.34198	1.52944	1.83041	2.86343	0.62620	0.86590	2.07261	4.17979
27	1.30281	1.48754	1.77849	2.75291	0.60667	0.83890	2.00798	4.11352
28	1.26612	1.44827	1.72986	2.65100	0.58827	0.81345	1.94707	4.05036
29	1.23168	1.41141	1.68422	2.55694	0.57093	0.78948	1.88968	3.99010
30	1.19926	1.37676	1.64132	2.47005	0.55459	0.76688	1.83559	3.93261
31	1.16869	1.34414	1.60093	2.38973	0.53919	0.74558	1.78462	3.87788
32	1.13979	1.31340	1.56288	2.31541	0.52468	0.72552	1.73660	3.82588
33	1.11242	1.28442	1.52701	2.24662	0.51101	0.70662	1.69135	3.77667
34	1.08646	1.25707	1.49318	2.18289	0.49813	0.68881	1.64873	3.73027
35	1.06180	1.23125	1.46126	2.12383	0.48601	0.67205	1.60861	3.68677
36	1.03833	1.20686	1.43114	2.06908	0.47460	0.65627	1.57084	3.64622
37	1.01597	1.18382	1.40270	2.01831	0.46386	0.64142	1.53531	3.60866
38	0.99464	1.16203	1.37586	1.97122	0.45377	0.62747	1.50190	3.57414
39	0.97425	1.14143	1.35051	1.92755	0.44428	0.61435	1.47051	3.54268
40	0.95475	1.12193	1.32657	1.88706	0.43538	0.60204	1.44104	3.51425
41	0.93606	1.10347	1.30396	1.84952	0.42704	0.59050	1.41341	3.48885
42	0.91814	1.08597	1.28258	1.81475	0.41922	0.57969	1.38753	3.46637
43	0.90093	1.06936	1.26235	1.78255	0.41190	0.56957	1.36333	3.44666
44	0.88438	1.05359	1.24318	1.75278	0.40507	0.56013	1.34072	3.42962
45	0.86845	1.03856	1.22499	1.72529	0.39871	0.55133	1.31965	3.41500
46	0.85308	1.02421	1.20769	1.69995	0.39279	0.54314	1.30006	3.40252
47	0.83823	1.01047	1.19117	1.67664	0.38729	0.53555	1.28188	3.39183
48	0.82411	0.99734	1.17539	1.65530	0.38222	0.52852	1.26507	3.38248
49	0.82224	0.99545	1.17291	1.63628	0.37754	0.52205	1.24958	3.38248
50	0.82049	0.99367	1.17057	1.61919	0.37324	0.51611	1.23537	3.38248
51	0.81882	0.99198	1.16835	1.60395	0.36932	0.51069	1.22239	3.38248
52	0.81725	0.99039	1.16626	1.59047	0.36576	0.50577	1.21061	3.38248
53	0.81576	0.98887	1.16428	1.57869	0.36256	0.50134	1.20001	3.38248
54	0.81435	0.98744	1.16241	1.56855	0.35970	0.49739	1.19054	3.38248
55	0.81301	0.98608	1.16063	1.56000	0.35718	0.49390	1.18219	3.38248
56	0.84234	1.02713	1.21517	1.55301	0.35498	0.49086	1.17493	3.50160
57	0.87172	1.06824	1.26979	1.54755	0.35311	0.48828	1.16874	3.62073
58	0.90117	1.10940	1.32449	1.54358	0.35156	0.48614	1.16361	3.73985
59	0.93067	1.15063	1.37927	1.54110	0.35033	0.48443	1.15952	3.85897
60	0.96022	1.19190	1.43411	1.54009	0.34940	0.48315	1.15647	3.97809
61	0.98982	1.23323	1.48901	1.54057	0.34879	0.48230	1.15443	4.09721
62	1.01947	1.27460	1.54398	1.54252	0.34848	0.48188	1.15342	4.21633
63	1.04915	1.31601	1.59900	1.54597	0.34848	0.48188	1.15342	4.33546
64	1.07888	1.35746	1.65408	1.55093	0.34879	0.48230	1.15443	4.45458
65	1.10864	1.39895	1.70921	1.55744	0.34940	0.48315	1.15647	4.57370

**Table A-50**  
**Jefferson 1996 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	78.45877	94.64383	121.90532	167.71935	5.39228	6.10980	38.25746	155.49950
4	60.37766	72.88301	93.74591	153.23802	4.96959	5.63087	35.25856	124.01422
5	49.44116	59.56934	76.17897	140.31532	4.58839	5.19894	32.55399	101.28938
6	42.11794	50.60429	64.21089	128.76546	4.24413	4.80888	30.11156	84.52023
7	36.87740	44.17758	55.57663	118.42647	3.93287	4.45620	27.90314	71.89357
8	32.94637	39.36038	49.08626	109.15756	3.65106	4.13689	25.90379	62.20830
9	29.89169	35.62550	44.05144	100.83569	3.39563	3.84747	24.09151	54.65146
10	27.45172	32.65141	40.04590	93.35335	3.16381	3.58481	22.44684	48.66087
11	25.45906	30.23080	36.79202	86.61671	2.95320	3.36617	20.95255	43.84062
12	23.80164	28.22426	34.10146	80.54314	2.76162	3.12910	19.59334	39.90669
13	22.40176	26.53450	31.84219	75.06041	2.58718	2.93144	18.35571	36.65199
14	21.20370	25.09178	29.91933	70.10483	2.42817	2.75128	17.22757	33.92343
15	20.16660	23.84470	28.26299	65.62080	2.28309	2.58688	16.19820	31.60617
16	19.25983	22.75478	26.82066	61.55870	2.15058	2.43675	15.25812	29.61305
17	18.45995	21.79253	25.55235	57.87538	2.02946	2.29951	14.39876	27.87738
18	17.74873	20.93517	24.42708	54.53226	1.91864	2.17395	13.61255	26.34764
19	17.11188	20.16484	23.42053	51.49538	1.81718	2.05899	12.89270	24.98370
20	16.42630	19.47670	22.56667	48.73474	1.72422	1.95366	12.23318	23.75449
21	15.69214	18.68140	21.64230	46.22366	1.63900	1.85709	11.62853	22.63545
22	15.02369	17.95348	20.79921	43.93854	1.56083	1.76852	11.07390	21.60783
23	14.41229	17.28383	20.02615	41.85835	1.48909	1.68724	10.56495	20.65671
24	13.85080	16.66513	19.31410	39.96449	1.42324	1.61263	10.09774	19.77071
25	13.33323	16.09142	18.65564	38.24034	1.36278	1.54412	9.66877	18.94121
26	12.85457	15.55781	18.04462	36.67119	1.30726	1.48122	9.27490	18.16148
27	12.41059	15.06029	17.47609	35.24388	1.25630	1.42346	8.91327	17.42665
28	11.99769	14.59555	16.94574	33.94666	1.20951	1.37046	8.58135	16.73296
29	11.61278	14.16079	16.45013	32.76929	1.16659	1.32183	8.27684	16.07784
30	11.25321	13.75364	15.98628	31.70235	1.12724	1.27724	7.99768	15.45945
31	10.91667	13.37211	15.55165	30.73770	1.09121	1.23641	7.74201	14.87624
32	10.60114	13.01440	15.14403	29.86806	1.05825	1.19907	7.50816	14.32718
33	10.30486	12.67896	14.76155	29.08699	1.02816	1.16497	7.29465	13.81181
34	10.02625	12.36440	14.40252	28.38866	1.00074	1.13390	7.10011	13.32907
35	9.76394	12.06943	14.06545	27.76817	0.97583	1.10567	6.92335	12.87880
36	9.51666	11.79289	13.74896	27.22104	0.95327	1.08011	6.76330	12.45991
37	9.28331	11.53369	13.45185	26.74345	0.93293	1.05707	6.61897	12.07227
38	9.06286	11.29083	13.17293	26.33214	0.91468	1.03639	6.48953	11.71464
39	8.85441	11.06332	12.91111	25.98421	0.89843	1.01797	6.37421	11.38624
40	8.65709	10.85025	12.66538	25.69739	0.88407	1.00171	6.27235	11.08604
41	8.47016	10.65072	12.43474	25.46974	0.87153	0.98750	6.18335	10.81281
42	8.29286	10.46383	12.21817	25.29962	0.86073	0.97526	6.10672	10.56485
43	8.12456	10.28868	12.01474	25.18605	0.85161	0.96493	6.04203	10.34063
44	7.96459	10.12437	11.82345	25.12816	0.84412	0.95644	5.98891	10.13789
45	7.81236	9.96992	11.64334	25.12570	0.83822	0.94976	5.94708	9.95453
46	7.66727	9.82425	11.47332	25.17847	0.83388	0.94485	5.91629	9.78790
47	7.52873	9.68621	11.31227	25.28699	0.83108	0.94167	5.89639	9.63473
48	7.39616	9.55453	11.15905	25.45189	0.82979	0.94021	5.88725	9.49179
49	7.39616	9.55453	11.15905	25.67430	0.83002	0.94046	5.88885	9.49179
50	7.39616	9.55453	11.15905	25.95564	0.83175	0.94243	5.90117	9.49179
51	7.39616	9.55453	11.15905	26.29790	0.83501	0.94612	5.92428	9.49179
52	7.39616	9.55453	11.15905	26.70340	0.83981	0.95156	5.95833	9.49179
53	7.39616	9.55453	11.15905	27.17479	0.84617	0.95877	6.00349	9.49179
54	7.39616	9.55453	11.15905	27.71545	0.85414	0.96780	6.06000	9.49179
55	7.39616	9.55453	11.15905	28.32912	0.86375	0.97869	6.12820	9.49179
56	8.42505	11.11511	13.12916	29.02014	0.87506	0.99150	6.20845	11.77769
57	9.45394	12.67570	15.09928	29.79346	0.88814	1.00632	6.30120	14.06359
58	10.48283	14.23629	17.06938	30.65479	0.90305	1.02321	6.40699	16.34947
59	11.51172	15.79687	19.03944	31.61055	0.91988	1.04228	6.52643	18.63536
60	12.54061	17.35742	21.00957	32.66782	0.93874	1.06365	6.66020	20.92125
61	13.56951	18.91800	22.97966	33.83479	0.95972	1.08743	6.80910	23.20712
62	14.59839	20.47858	24.94975	35.12068	0.98297	1.11376	6.97401	25.49298
63	15.62728	22.03914	26.91988	36.53571	1.00861	1.14281	7.15592	27.77892
64	16.65614	23.59975	28.88998	38.09148	1.03680	1.17476	7.35595	30.06480
65	17.68503	25.16032	30.86009	39.80083	1.06772	1.20980	7.57536	32.35069

**Table A-51**  
**Jefferson 1996 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC
3	2.22263	2.38856	2.64982	4.36230	2.76132	3.11727	23.65694	0.91266
4	2.04170	2.19386	2.44589	4.40744	2.64502	2.98598	22.66058	0.87295
5	1.93212	2.07641	2.32375	4.45258	2.53722	2.86428	21.73701	0.83999
6	1.85835	1.99787	2.24270	4.49772	2.43727	2.75145	20.88072	0.81327
7	1.80517	1.94180	2.18526	4.54286	2.34459	2.64681	20.08667	0.79230
8	1.76494	1.89995	2.14267	4.58800	2.25863	2.54978	19.35028	0.77658
9	1.73342	1.86769	2.11007	4.63315	2.17892	2.45979	18.66737	0.76565
10	1.70804	1.84226	2.08451	4.67829	2.10501	2.37635	18.03415	0.75908
11	1.68719	1.82187	2.06409	4.72343	2.03649	2.29901	17.44716	0.75643
12	1.66976	1.80530	2.04757	4.76857	1.97301	2.22733	16.90327	0.75729
13	1.65499	1.79172	2.03405	4.81371	1.91422	2.16097	16.39961	0.76127
14	1.64235	1.78051	2.02291	4.85885	1.85982	2.09956	15.93357	0.76800
15	1.63143	1.77121	2.01367	4.90399	1.80953	2.04279	15.50276	0.77713
16	1.62191	1.76348	2.00596	4.94914	1.76311	1.99038	15.10504	0.78832
17	1.61357	1.75703	1.99950	4.99428	1.72031	1.94207	14.73843	0.80125
18	1.60622	1.75164	1.99409	5.03942	1.68095	1.89763	14.40115	0.81563
19	1.59971	1.74715	1.98954	5.08456	1.64481	1.85684	14.09158	0.83116
20	1.60077	1.74571	1.98860	5.12970	1.61175	1.81951	13.80827	0.84759
21	1.60982	1.75743	2.00219	5.17484	1.58159	1.78546	13.54989	0.86467
22	1.61812	1.76832	2.01476	5.21998	1.55420	1.75454	13.31522	0.88217
23	1.62577	1.77847	2.02642	5.26512	1.52945	1.72660	13.10323	0.89989
24	1.63286	1.78796	2.03728	5.31026	1.50724	1.70153	12.91292	0.91764
25	1.63946	1.79685	2.04742	5.35540	1.48746	1.67920	12.74346	0.93524
26	1.64563	1.80519	2.05691	5.40055	1.47002	1.65951	12.59410	0.95253
27	1.65142	1.81302	2.06581	5.44569	1.45486	1.64239	12.46417	0.96939
28	1.65686	1.82038	2.07418	5.49083	1.44189	1.62776	12.35311	0.98569
29	1.66201	1.82731	2.08206	5.53597	1.43108	1.61555	12.26045	1.00134
30	1.66689	1.83383	2.08950	5.58111	1.42236	1.60571	12.18576	1.01624
31	1.67153	1.83998	2.09653	5.62626	1.41571	1.59819	12.12874	1.03035
32	1.67596	1.84578	2.10320	5.67140	1.41108	1.59298	12.08915	1.04361
33	1.68020	1.85125	2.10954	5.71654	1.40847	1.59003	12.06681	1.05600
34	1.68428	1.85642	2.11557	5.76168	1.40787	1.58935	12.06161	1.06751
35	1.68821	1.86132	2.12135	5.80682	1.40926	1.59093	12.07357	1.07814
36	1.69202	1.86596	2.12688	5.85196	1.41266	1.59476	12.10269	1.08793
37	1.69572	1.87038	2.13222	5.89710	1.41809	1.60088	12.14914	1.09692
38	1.69933	1.87459	2.13738	5.94224	1.42555	1.60931	12.21309	1.10517
39	1.70286	1.87862	2.14239	5.98738	1.43509	1.62008	12.29481	1.11277
40	1.70634	1.88251	2.14730	6.03253	1.44675	1.63324	12.39469	1.11981
41	1.70977	1.88626	2.15213	6.07767	1.46057	1.64885	12.51312	1.12642
42	1.71318	1.88993	2.15692	6.12281	1.47662	1.66697	12.65064	1.13274
43	1.71657	1.89354	2.16169	6.16795	1.49497	1.68768	12.80786	1.13891
44	1.71998	1.89711	2.16649	6.21309	1.51570	1.71108	12.98543	1.14511
45	1.72340	1.90068	2.17135	6.25823	1.53890	1.73727	13.18418	1.15153
46	1.72687	1.90429	2.17630	6.30338	1.56467	1.76637	13.40501	1.15838
47	1.73039	1.90798	2.18139	6.34852	1.59314	1.79850	13.64889	1.16589
48	1.73398	1.91178	2.18665	6.39366	1.62443	1.83383	13.91696	1.17430
49	1.79827	1.98815	2.27661	6.43880	1.65869	1.87250	14.21047	1.21254
50	1.86257	2.06453	2.36656	6.48395	1.69608	1.91471	14.53077	1.25078
51	1.92686	2.14090	2.45652	6.52908	1.73677	1.96065	14.87940	1.28901
52	1.99116	2.21728	2.54648	6.57423	1.78097	2.01054	15.25807	1.32725
53	2.05545	2.29365	2.63643	6.61937	1.82889	2.06464	15.66859	1.36549
54	2.11974	2.37002	2.72639	6.66451	1.88076	2.12320	16.11301	1.40373
55	2.18404	2.44640	2.81634	6.70965	1.93686	2.18653	16.59363	1.44196
56	2.24833	2.52277	2.90630	6.75479	1.99746	2.25495	17.11281	1.48020
57	2.31262	2.59915	2.99626	6.79993	2.06289	2.32881	17.67336	1.51844
58	2.37692	2.67552	3.08621	6.84507	2.13349	2.40851	18.27815	1.55668
59	2.44122	2.75190	3.17617	6.89021	2.20964	2.49447	18.93054	1.59492
60	2.50551	2.82827	3.26612	6.93535	2.29175	2.58717	19.63409	1.63315
61	2.56980	2.90465	3.35608	6.98050	2.38031	2.68714	20.39268	1.67139
62	2.63410	2.98102	3.44604	7.02564	2.47579	2.79493	21.21071	1.70963
63	2.69839	3.05740	3.53599	7.07078	2.57876	2.91117	22.09290	1.74787
64	2.76268	3.13377	3.62595	7.11592	2.68983	3.03657	23.04448	1.78610
65	2.82698	3.21015	3.71591	7.16107	2.80968	3.17185	24.07120	1.82434

**Table A-52**  
**Jefferson 1996 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	10.94413	11.65178	14.82604	21.32257	1.65438	2.28766	5.47575	17.23112
4	7.87986	8.46710	10.69382	16.74973	1.57068	2.17192	5.19870	14.83976
5	6.19782	6.69540	8.39101	14.16450	1.49252	2.06384	4.94001	13.06859
6	5.14170	5.57240	6.92972	12.42466	1.41950	1.96287	4.69834	11.73172
7	4.41964	4.80000	5.92468	11.12745	1.35125	1.86849	4.47241	10.70520
8	3.98507	4.31212	5.28661	10.26307	1.28740	1.78021	4.26110	9.90459
9	3.64842	3.93512	4.79520	9.52329	1.22766	1.69759	4.06335	9.27119
10	3.37156	3.62876	4.39816	8.86606	1.17171	1.62023	3.87819	8.76341
11	3.13822	3.37395	4.07014	8.27812	1.11930	1.54776	3.70472	8.35126
12	2.93754	3.15781	3.79394	7.74936	1.07018	1.47983	3.54212	8.01276
13	2.76196	2.97132	3.55751	7.27172	1.02412	1.41613	3.38965	7.73156
14	2.60607	2.80801	3.35215	6.83866	0.98090	1.35637	3.24660	7.49530
15	2.46590	2.66312	3.17148	6.44472	0.94033	1.30027	3.11232	7.29454
16	2.33846	2.53305	3.01066	6.08532	0.90223	1.24759	2.98622	7.12198
17	2.22149	2.41506	2.86602	5.75657	0.86643	1.19809	2.86775	6.97193
18	2.11321	2.30703	2.73471	5.45506	0.83279	1.15158	2.75640	6.83989
19	2.01222	2.20730	2.61447	5.17790	0.80116	1.10784	2.65172	6.72235
20	1.92202	2.12428	2.51499	4.93284	0.77141	1.06670	2.55325	6.61647
21	1.85155	2.05054	2.42435	4.72279	0.74342	1.02800	2.46060	6.52005
22	1.78687	1.98283	2.34135	4.53034	0.71708	0.99157	2.37341	6.43132
23	1.72721	1.92035	2.26498	4.35376	0.69228	0.95727	2.29132	6.34890
24	1.67195	1.86245	2.19436	4.19151	0.66892	0.92498	2.21402	6.27172
25	1.62055	1.80857	2.12880	4.04224	0.64692	0.89456	2.14120	6.19898
26	1.57257	1.75830	2.06773	3.90473	0.62620	0.86590	2.07261	6.13004
27	1.52765	1.71125	2.01067	3.77791	0.60667	0.83890	2.00798	6.06448
28	1.48546	1.66712	1.95722	3.66082	0.58827	0.81345	1.94707	6.00198
29	1.44573	1.62566	1.90705	3.55258	0.57093	0.78948	1.88968	5.94237
30	1.40823	1.58665	1.85987	3.45243	0.55459	0.76688	1.83559	5.88549
31	1.37275	1.54990	1.81546	3.35967	0.53919	0.74558	1.78462	5.83134
32	1.33911	1.51525	1.77360	3.27369	0.52468	0.72552	1.73660	5.77989
33	1.30716	1.48256	1.73411	3.19392	0.51101	0.70662	1.69135	5.73120
34	1.27676	1.45169	1.69683	3.11986	0.49813	0.68881	1.64873	5.68529
35	1.24778	1.42253	1.66162	3.05106	0.48601	0.67205	1.60861	5.64225
36	1.22013	1.39498	1.62836	2.98710	0.47460	0.65627	1.57084	5.60214
37	1.19368	1.36894	1.59692	2.92762	0.46386	0.64142	1.53531	5.56498
38	1.16837	1.34431	1.56719	2.87228	0.45377	0.62747	1.50190	5.53082
39	1.14410	1.32101	1.53908	2.82078	0.44428	0.61435	1.47051	5.49969
40	1.12081	1.29896	1.51248	2.77286	0.43538	0.60204	1.44104	5.47156
41	1.09842	1.27807	1.48730	2.72826	0.42704	0.59050	1.41341	5.44644
42	1.07687	1.25827	1.46344	2.68677	0.41922	0.57969	1.38753	5.42420
43	1.05610	1.23948	1.44082	2.64818	0.41190	0.56957	1.36333	5.40469
44	1.03606	1.22162	1.41934	2.61230	0.40507	0.56013	1.34072	5.38783
45	1.01670	1.20460	1.39892	2.57899	0.39871	0.55133	1.31965	5.37337
46	0.99795	1.18834	1.37944	2.54809	0.39279	0.54314	1.30006	5.36103
47	0.97978	1.17276	1.36081	2.51947	0.38729	0.53555	1.28188	5.35045
48	0.96254	1.15783	1.34295	2.49303	0.38222	0.52852	1.26507	5.34120
49	0.95926	1.15450	1.33848	2.46903	0.37754	0.52205	1.24958	5.34120
50	0.95617	1.15136	1.33426	2.44732	0.37324	0.51611	1.23537	5.34120
51	0.95325	1.14840	1.33029	2.42779	0.36932	0.51069	1.22239	5.34120
52	0.95050	1.14560	1.32654	2.41034	0.36576	0.50577	1.21061	5.34120
53	0.94789	1.14295	1.32299	2.39489	0.36256	0.50134	1.20001	5.34120
54	0.94542	1.14044	1.31963	2.38136	0.35970	0.49739	1.19054	5.34120
55	0.94308	1.13807	1.31644	2.36969	0.35718	0.49390	1.18219	5.34120
56	0.97291	1.18110	1.37176	2.35984	0.35498	0.49086	1.17493	5.45905
57	1.00286	1.22425	1.42724	2.35175	0.35311	0.48828	1.16874	5.57691
58	1.03290	1.26750	1.48285	2.34539	0.35156	0.48614	1.16361	5.69477
59	1.06305	1.31085	1.53860	2.34074	0.35033	0.48443	1.15952	5.81263
60	1.09328	1.35430	1.59447	2.33779	0.34940	0.48315	1.15647	5.93049
61	1.12360	1.39783	1.65046	2.33652	0.34879	0.48230	1.15443	6.04834
62	1.15400	1.44144	1.70656	2.33694	0.34848	0.48188	1.15342	6.16620
63	1.18448	1.48513	1.76276	2.33906	0.34848	0.48188	1.15342	6.28406
64	1.21502	1.52888	1.81906	2.34289	0.34879	0.48230	1.15443	6.40192
65	1.24563	1.57271	1.87545	2.34846	0.34940	0.48315	1.15647	6.51977

**Table A-53**  
**Jefferson 1996 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	84.87216	104.18317	134.47006	209.99983	5.39228	6.10980	38.25746	188.99744
4	65.22758	80.22202	103.33661	191.86787	4.96959	5.63087	35.25856	150.72957
5	53.32358	65.48767	83.85291	175.68750	4.58839	5.19894	32.55399	123.10927
6	45.34488	55.54161	70.55756	161.22603	4.24413	4.80888	30.11156	102.72772
7	39.63322	48.40623	60.95958	148.28070	3.93287	4.45620	27.90314	87.38103
8	35.34895	43.05952	53.74454	136.67516	3.65106	4.13689	25.90379	75.60933
9	32.02071	38.91817	48.14940	126.25542	3.39563	3.84747	24.09151	66.42461
10	29.36333	35.62482	43.70053	116.88689	3.16381	3.58481	22.44684	59.14346
11	27.19414	32.94838	40.08885	108.45200	2.95320	3.34617	20.95255	53.28484
12	25.39076	30.73305	37.10443	100.84732	2.76162	3.12910	19.59334	48.50346
13	23.86829	28.86993	34.60008	93.98245	2.58718	2.93144	18.35571	44.54764
14	22.56577	27.28088	32.46986	87.77763	2.42817	2.75128	17.22757	41.23129
15	21.43852	25.90820	30.63579	82.16321	2.28309	2.58688	16.19820	38.41486
16	20.45305	24.70871	29.03926	77.07712	2.15058	2.43675	15.25812	35.99239
17	19.58374	23.64935	27.63568	72.46524	2.02946	2.29951	14.39876	33.88278
18	18.81062	22.70461	26.39044	68.27933	1.91864	2.17395	13.61255	32.02344
19	18.11812	21.85451	25.27652	64.47687	1.81718	2.05899	12.89270	30.36572
20	17.38330	21.10744	24.34782	61.02034	1.72422	1.95366	12.23318	28.87169
21	16.60588	20.25381	23.35112	57.87624	1.63900	1.85709	11.62853	27.51163
22	15.89767	19.47058	22.44156	55.01503	1.56083	1.76852	11.07390	26.26262
23	15.24948	18.74808	21.60704	52.41046	1.48909	1.68724	10.56495	25.10663
24	14.65379	18.07867	20.83789	50.03920	1.42324	1.61263	10.09774	24.02971
25	14.10432	17.45625	20.12611	47.88040	1.36278	1.54412	9.66877	23.02151
26	13.59582	16.87582	19.46518	45.91566	1.30726	1.48122	9.27490	22.07382
27	13.12388	16.33340	18.84981	44.12857	1.25630	1.42346	8.91327	21.18071
28	12.68475	15.82570	18.27547	42.50429	1.20951	1.37046	8.58135	20.33755
29	12.27521	15.35001	17.73848	41.03011	1.16659	1.32183	8.27684	19.54134
30	11.89251	14.90405	17.23572	39.69424	1.12724	1.27724	7.99768	18.78973
31	11.53427	14.48591	16.76457	38.48639	1.09121	1.23641	7.74201	18.08089
32	11.19839	14.09389	16.32271	37.39752	1.05825	1.19907	7.50816	17.41354
33	10.88305	13.72649	15.90819	36.41954	1.02816	1.16497	7.29465	16.78716
34	10.58662	13.38237	15.51922	35.54518	1.00074	1.13390	7.10011	16.20044
35	10.30766	13.06028	15.15425	34.76828	0.97583	1.10567	6.92335	15.65317
36	10.04485	12.75904	14.81184	34.08321	0.95327	1.08011	6.76330	15.14405
37	9.79705	12.47758	14.49071	33.48520	0.93293	1.05707	6.61897	14.67289
38	9.56318	12.21484	14.18961	32.97023	0.91468	1.03639	6.48953	14.23823
39	9.34228	11.96979	13.90736	32.53462	0.89843	1.01797	6.37421	13.83908
40	9.13344	11.74143	13.64288	32.17545	0.88407	1.00171	6.27235	13.47421
41	8.93586	11.52877	13.39509	31.89041	0.87153	0.98750	6.18335	13.14213
42	8.74873	11.33080	13.16286	31.67743	0.86073	0.97526	6.10672	12.84075
43	8.57136	11.14645	12.94517	31.53522	0.85161	0.96493	6.04203	12.56822
44	8.40302	10.97465	12.74088	31.46272	0.84412	0.95644	5.98891	12.32181
45	8.24305	10.81418	12.54893	31.45964	0.83822	0.94976	5.94708	12.09895
46	8.09076	10.66366	12.36806	31.52573	0.83388	0.94485	5.91629	11.89643
47	7.94549	10.52160	12.19698	31.66158	0.83108	0.94167	5.89639	11.71026
48	7.80653	10.38631	12.03439	31.86807	0.82979	0.94021	5.88725	11.53653
49	7.80653	10.38631	12.03439	32.14655	0.83002	0.94046	5.88885	11.53653
50	7.80653	10.38631	12.03439	32.49884	0.83175	0.94243	5.90117	11.53653
51	7.80653	10.38631	12.03439	32.92737	0.83501	0.94612	5.92428	11.53653
52	7.80653	10.38631	12.03439	33.43509	0.83981	0.95156	5.95833	11.53653
53	7.80653	10.38631	12.03439	34.02527	0.84617	0.95877	6.00349	11.53653
54	7.80653	10.38631	12.03439	34.70229	0.85414	0.96780	6.06000	11.53653
55	7.80653	10.38631	12.03439	35.47063	0.86375	0.97869	6.12820	11.53653
56	8.93298	12.14891	14.21719	36.33585	0.87506	0.99150	6.20845	14.31485
57	10.05944	13.91151	16.39998	37.30412	0.88814	1.00632	6.30120	17.09319
58	11.18590	15.67410	18.58278	38.38258	0.90305	1.02321	6.40699	19.87149
59	12.31236	17.43669	20.76553	39.57925	0.91988	1.04228	6.52643	22.64983
60	13.43882	19.19926	22.94836	40.90308	0.93874	1.06365	6.66020	25.42812
61	14.56528	20.96184	25.13115	42.36424	0.95972	1.08743	6.80910	28.20644
62	15.69173	22.72443	27.31395	43.97429	0.98297	1.11376	6.97401	30.98476
63	16.81818	24.48703	29.49675	45.74605	1.00861	1.14281	7.15592	33.76311
64	17.94463	26.24963	31.67957	47.69400	1.03680	1.17476	7.35595	36.54140
65	19.07106	28.01224	33.86237	49.83424	1.06772	1.20980	7.57536	39.31975

**Table A-54**  
**Jefferson 1996 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.21889	2.37780	2.60602	4.23297	2.76132	3.11727	23.65694	0.82775
4	2.03610	2.18235	2.40147	4.27677	2.64502	2.98598	22.66058	0.79173
5	1.92564	2.06456	2.27895	4.32057	2.53722	2.86428	21.73701	0.76184
6	1.85145	1.98587	2.19760	4.36437	2.43727	2.75145	20.88072	0.73761
7	1.79810	1.92971	2.13989	4.40818	2.34459	2.64681	20.08667	0.71858
8	1.75782	1.88779	2.09703	4.45198	2.25863	2.54978	19.35028	0.70432
9	1.72634	1.85548	2.06413	4.49578	2.17892	2.45979	18.66737	0.69442
10	1.70105	1.82998	2.03825	4.53959	2.10501	2.37635	18.03415	0.68845
11	1.68029	1.80949	2.01750	4.58339	2.03649	2.29901	17.44716	0.68605
12	1.66298	1.79281	2.00061	4.62719	1.97301	2.22733	16.90327	0.68683
13	1.64833	1.77910	1.98672	4.67100	1.91422	2.16097	16.39961	0.69044
14	1.63581	1.76774	1.97517	4.71480	1.85982	2.09956	15.93357	0.69655
15	1.62498	1.75827	1.96551	4.75860	1.80953	2.04279	15.50276	0.70483
16	1.61556	1.75035	1.95737	4.80240	1.76311	1.99038	15.10504	0.71498
17	1.60731	1.74370	1.95048	4.84621	1.72031	1.94207	14.73843	0.72671
18	1.60003	1.73810	1.94462	4.89001	1.68095	1.89763	14.40115	0.73974
19	1.59358	1.73339	1.93962	4.93381	1.64481	1.85684	14.09158	0.75383
20	1.59480	1.73159	1.93805	4.97762	1.61175	1.81951	13.80827	0.76873
21	1.60409	1.74301	1.95106	5.02142	1.58159	1.78546	13.54989	0.78422
22	1.61260	1.75361	1.96307	5.06522	1.55420	1.75454	13.31522	0.80010
23	1.62044	1.76347	1.97419	5.10902	1.52945	1.72660	13.10323	0.81617
24	1.62768	1.77267	1.98451	5.15283	1.50724	1.70153	12.91292	0.83226
25	1.63441	1.78128	1.99413	5.19663	1.48746	1.67920	12.74346	0.84822
26	1.64068	1.78934	2.00312	5.24043	1.47002	1.65951	12.59410	0.86391
27	1.64655	1.79690	2.01154	5.28424	1.45486	1.64239	12.46417	0.87920
28	1.65206	1.80400	2.01943	5.32804	1.44189	1.62776	12.35311	0.89398
29	1.65725	1.81067	2.02686	5.37184	1.43108	1.61555	12.26045	0.90817
30	1.66215	1.81694	2.03385	5.41564	1.42236	1.60571	12.18576	0.92169
31	1.66679	1.82284	2.04046	5.45945	1.41571	1.59819	12.12874	0.93449
32	1.67120	1.82840	2.04671	5.50325	1.41108	1.59298	12.08915	0.94652
33	1.67541	1.83365	2.05263	5.54706	1.40847	1.59003	12.06681	0.95775
34	1.67943	1.83859	2.05827	5.59086	1.40787	1.58935	12.06161	0.96819
35	1.68329	1.84327	2.06365	5.63466	1.40926	1.59093	12.07357	0.97783
36	1.68701	1.84770	2.06879	5.67846	1.41266	1.59476	12.10269	0.98671
37	1.69060	1.85190	2.07373	5.72227	1.41809	1.60088	12.14914	0.99486
38	1.69408	1.85590	2.07850	5.76607	1.42555	1.60931	12.21309	1.00234
39	1.69746	1.85972	2.08312	5.80987	1.43509	1.62008	12.29481	1.00924
40	1.70077	1.86339	2.08762	5.85368	1.44675	1.63324	12.39469	1.01563
41	1.70401	1.86693	2.09203	5.89748	1.46057	1.64885	12.51312	1.02162
42	1.70720	1.87037	2.09638	5.94128	1.47662	1.66697	12.65064	1.02735
43	1.71036	1.87374	2.10069	5.98508	1.49497	1.68768	12.80786	1.03294
44	1.71350	1.87706	2.10501	6.02889	1.51570	1.71108	12.98543	1.03857
45	1.71664	1.88038	2.10935	6.07269	1.53890	1.73727	13.18418	1.04439
46	1.71978	1.88371	2.11374	6.11650	1.56467	1.76637	13.40501	1.05060
47	1.72295	1.88709	2.11824	6.16030	1.59314	1.79850	13.64889	1.05741
48	1.72617	1.89056	2.12285	6.20410	1.62443	1.83383	13.91696	1.06504
49	1.78980	1.96597	2.20981	6.24790	1.65869	1.87250	14.21047	1.09972
50	1.85344	2.04138	2.29676	6.29171	1.69608	1.91471	14.53077	1.13440
51	1.91708	2.11679	2.38372	6.33551	1.73677	1.96065	14.87940	1.16908
52	1.98072	2.19220	2.47068	6.37932	1.78097	2.01054	15.25807	1.20376
53	2.04436	2.26761	2.55763	6.42312	1.82889	2.06464	15.66859	1.23845
54	2.10801	2.34302	2.64459	6.46692	1.88076	2.12320	16.11301	1.27312
55	2.17165	2.41843	2.73154	6.51072	1.93686	2.18653	16.59363	1.30780
56	2.23528	2.49384	2.81850	6.55452	1.99746	2.25495	17.11281	1.34249
57	2.29892	2.56925	2.90546	6.59833	2.06289	2.32881	17.67336	1.37717
58	2.36256	2.64466	2.99241	6.64213	2.13349	2.40851	18.27815	1.41185
59	2.42621	2.72007	3.07937	6.68593	2.20964	2.49447	18.93054	1.44653
60	2.48984	2.79548	3.16632	6.72974	2.29175	2.58717	19.63409	1.48121
61	2.55349	2.87088	3.25328	6.77354	2.38031	2.68714	20.39268	1.51588
62	2.61713	2.94629	3.34023	6.81734	2.47579	2.79493	21.21071	1.55057
63	2.68077	3.02171	3.42719	6.86115	2.57876	2.91117	22.09290	1.58525
64	2.74440	3.09711	3.51415	6.90495	2.68983	3.03657	23.04448	1.61993
65	2.80804	3.17252	3.60110	6.94876	2.80968	3.17185	24.07120	1.65461



**Table A-55**  
**Jefferson 1996 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	11.47160	12.02686	15.31443	22.49597	1.65438	2.28766	5.47575	17.45241
4	8.22022	8.69355	10.98054	17.50772	1.57068	2.17192	5.19870	15.06276
5	6.44441	6.85104	8.58313	14.72106	1.49252	2.06384	4.94001	13.29286
6	5.33350	5.68852	7.06979	12.86602	1.41950	1.96287	4.69834	11.95695
7	4.57609	4.89165	6.03294	11.49536	1.35125	1.86849	4.47241	10.93117
8	4.12647	4.39353	5.38215	10.59863	1.28740	1.78021	4.26110	10.13113
9	3.77814	4.00943	4.88195	9.83407	1.22766	1.69759	4.06335	9.49819
10	3.49098	3.69759	4.47806	9.15564	1.17171	1.62023	3.87819	8.99077
11	3.24836	3.43848	4.14459	8.54921	1.11930	1.54776	3.70472	8.57892
12	3.03917	3.21891	3.86400	8.00406	1.07018	1.47983	3.54212	8.24067
13	2.85566	3.02969	3.62398	7.51171	1.02412	1.41613	3.38965	7.95967
14	2.69230	2.86417	3.41569	7.06530	0.98090	1.35637	3.24660	7.72357
15	2.54503	2.71749	3.23258	6.65915	0.94033	1.30027	3.11232	7.52296
16	2.41079	2.58597	3.06975	6.28848	0.90223	1.24759	2.98622	7.35053
17	2.28726	2.46681	2.92343	5.94925	0.86643	1.19809	2.86775	7.20058
18	2.17262	2.35784	2.79072	5.63797	0.83279	1.15158	2.75640	7.06864
19	2.06545	2.25736	2.66934	5.35162	0.80116	1.10784	2.65172	6.95118
20	1.97091	2.17335	2.56858	5.09923	0.77141	1.06670	2.55325	6.84538
21	1.89878	2.09796	2.47603	4.88432	0.74342	1.02800	2.46060	6.74903
22	1.83255	2.02872	2.39129	4.68740	0.71708	0.99157	2.37341	6.66036
23	1.77142	1.96481	2.31329	4.50670	0.69228	0.95727	2.29132	6.57800
24	1.71477	1.90556	2.24117	4.34066	0.66892	0.92498	2.21402	6.50088
25	1.66207	1.85042	2.17421	4.18786	0.64692	0.89456	2.14120	6.42818
26	1.61284	1.79895	2.11183	4.04708	0.62620	0.86590	2.07261	6.35930
27	1.56673	1.75076	2.05353	3.91721	0.60667	0.83890	2.00798	6.29378
28	1.52341	1.70556	1.99891	3.79727	0.58827	0.81345	1.94707	6.23133
29	1.48258	1.66308	1.94764	3.68637	0.57093	0.78948	1.88968	6.17175
30	1.44403	1.62309	1.89943	3.58372	0.55459	0.76688	1.83559	6.11492
31	1.40753	1.58540	1.85401	3.48861	0.53919	0.74558	1.78462	6.06081
32	1.37292	1.54986	1.81120	3.40042	0.52468	0.72552	1.73660	6.00939
33	1.34002	1.51631	1.77081	3.31857	0.51101	0.70662	1.69135	5.96074
34	1.30869	1.48463	1.73266	3.24253	0.49813	0.68881	1.64873	5.91487
35	1.27883	1.45469	1.69662	3.17186	0.48601	0.67205	1.60861	5.87186
36	1.25030	1.42638	1.66256	3.10614	0.47460	0.65627	1.57084	5.83177
37	1.22301	1.39962	1.63035	3.04498	0.46386	0.64142	1.53531	5.79464
38	1.19687	1.37430	1.59988	2.98805	0.45377	0.62747	1.50190	5.76051
39	1.17180	1.35034	1.57105	2.93503	0.44428	0.61435	1.47051	5.72940
40	1.14772	1.32765	1.54375	2.88566	0.43538	0.60204	1.44104	5.70129
41	1.12455	1.30614	1.51790	2.83967	0.42704	0.59050	1.41341	5.67618
42	1.10225	1.28575	1.49339	2.79685	0.41922	0.57969	1.38753	5.65395
43	1.08074	1.26638	1.47014	2.75699	0.41190	0.56957	1.36333	5.63446
44	1.05998	1.24796	1.44804	2.71991	0.40507	0.56013	1.34072	5.61762
45	1.03990	1.23041	1.42701	2.68543	0.39871	0.55133	1.31965	5.60316
46	1.02045	1.21363	1.40695	2.65342	0.39279	0.54314	1.30006	5.59083
47	1.00159	1.19753	1.38775	2.62373	0.38729	0.53555	1.28188	5.58026
48	0.98369	1.18211	1.36933	2.59625	0.38222	0.52852	1.26507	5.57102
49	0.98008	1.17845	1.36439	2.57118	0.37754	0.52205	1.24958	5.57102
50	0.97668	1.17499	1.35974	2.54847	0.37324	0.51611	1.23537	5.57102
51	0.97347	1.17173	1.35535	2.52801	0.36932	0.51069	1.22239	5.57102
52	0.97044	1.16865	1.35120	2.50969	0.36576	0.50577	1.21061	5.57102
53	0.96757	1.16574	1.34728	2.49343	0.36256	0.50134	1.20001	5.57102
54	0.96485	1.16298	1.34358	2.47915	0.35970	0.49739	1.19054	5.57102
55	0.96228	1.16036	1.34006	2.46679	0.35718	0.49390	1.18219	5.57102
56	0.99210	1.20360	1.39540	2.45628	0.35498	0.49086	1.17493	5.68879
57	1.02204	1.24696	1.45092	2.44759	0.35311	0.48828	1.16874	5.80656
58	1.05209	1.29045	1.50659	2.44068	0.35156	0.48614	1.16361	5.92434
59	1.08225	1.33404	1.56240	2.43552	0.35033	0.48443	1.15952	6.04211
60	1.11251	1.37773	1.61836	2.43210	0.34940	0.48315	1.15647	6.15988
61	1.14287	1.42151	1.67444	2.43039	0.34879	0.48230	1.15443	6.27766
62	1.17331	1.46539	1.73065	2.43041	0.34848	0.48188	1.15342	6.39543
63	1.20383	1.50935	1.78696	2.43217	0.34848	0.48188	1.15342	6.51320
64	1.23444	1.55339	1.84339	2.43568	0.34879	0.48230	1.15443	6.63098
65	1.26511	1.59750	1.89991	2.44097	0.34940	0.48315	1.15647	6.74875

**Table A-56**  
**Jefferson 1996 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	85.86397	105.68509	136.39758	215.57297	5.39228	6.10980	38.25746	193.69504
4	65.97716	81.37605	104.80554	196.95981	4.96959	5.63087	35.25856	154.47600
5	53.92361	66.41798	85.02795	180.34999	4.58839	5.19894	32.55399	126.16920
6	45.84372	56.31772	71.52965	165.50476	4.24413	4.80888	30.11156	105.28107
7	40.05939	49.07103	61.78448	152.21587	3.93287	4.45620	27.90314	89.55292
8	35.72063	43.64117	54.45869	140.30232	3.65106	4.13689	25.90379	77.48860
9	32.35017	39.43596	48.77791	129.60608	3.39563	3.84747	24.09151	68.07561
10	29.65923	36.09242	44.26118	119.98892	3.16381	3.58481	22.44684	60.61348
11	27.46280	33.37575	40.59468	111.33014	2.95320	3.34617	20.95255	54.60925
12	25.63687	31.12756	37.56520	103.52367	2.76162	3.12910	19.59334	49.70900
13	24.09546	29.23715	35.02322	96.47662	2.58718	2.93144	18.35571	45.65485
14	22.77679	27.62502	32.86111	90.10709	2.42817	2.75128	17.22757	42.25610
15	21.63559	26.23251	30.99969	84.34373	2.28309	2.58688	16.19820	39.36964
16	20.63795	25.01573	29.37944	79.12262	2.15058	2.43675	15.25812	36.88695
17	19.75789	23.94104	27.95502	74.38838	2.02946	2.29951	14.39876	34.72493
18	18.97522	22.98251	26.69130	70.09140	1.91864	2.17395	13.61255	32.81944
19	18.27408	22.11983	25.56085	66.18802	1.81718	2.05899	12.89270	31.12048
20	17.53166	21.36359	24.62086	62.63976	1.72422	1.95366	12.23318	29.58926
21	16.74757	20.50092	23.61327	59.41220	1.63900	1.85709	11.62853	28.19545
22	16.03319	19.70908	22.69370	56.47505	1.56083	1.76852	11.07390	26.91541
23	15.37933	18.97838	21.84996	53.80139	1.48909	1.68724	10.56495	25.73062
24	14.77836	18.30112	21.07225	51.36714	1.42324	1.61263	10.09774	24.62698
25	14.22396	17.67116	20.35248	49.15108	1.36278	1.54412	9.66877	23.59372
26	13.71085	17.08347	19.68408	47.13422	1.30726	1.48122	9.27490	22.62248
27	13.23460	16.53410	19.06169	45.29967	1.25630	1.42346	8.91327	21.70712
28	12.79142	16.01973	18.48077	43.63229	1.20951	1.37046	8.58135	20.84306
29	12.37808	15.53771	17.93761	42.11900	1.16659	1.32183	8.27684	20.02702
30	11.99182	15.08574	17.42905	40.74765	1.12724	1.27724	7.99768	19.25674
31	11.63023	14.66194	16.95244	39.50778	1.09121	1.23641	7.74201	18.53029
32	11.29122	14.26460	16.50548	38.39001	1.05825	1.19907	7.50816	17.84636
33	10.97294	13.89225	16.08617	37.38606	1.02816	1.16497	7.29465	17.20439
34	10.67376	13.54355	15.69273	36.48854	1.00074	1.13390	7.10011	16.60310
35	10.39223	13.21727	15.32358	35.69096	0.97583	1.10567	6.92335	16.04222
36	10.12703	12.91221	14.97729	34.98769	0.95327	1.08011	6.76330	15.52045
37	9.87699	12.62730	14.65256	34.37387	0.93293	1.05707	6.61897	15.03759
38	9.64105	12.36147	14.34813	33.84523	0.91468	1.03639	6.48953	14.59212
39	9.41822	12.11370	14.06280	33.39806	0.89843	1.01797	6.37421	14.18305
40	9.20760	11.88296	13.79549	33.02937	0.88407	1.00171	6.27235	13.80911
41	9.00837	11.66827	13.54510	32.73671	0.87153	0.98750	6.18335	13.46878
42	8.81972	11.46856	13.31049	32.51810	0.86073	0.97526	6.10672	13.15991
43	8.64094	11.28278	13.09062	32.37212	0.85161	0.96493	6.04203	12.88061
44	8.47130	11.10981	12.88435	32.29773	0.84412	0.95644	5.98891	12.62807
45	8.31013	10.94839	12.69057	32.29451	0.83822	0.94976	5.94708	12.39967
46	8.15672	10.79710	12.50803	32.36237	0.83388	0.94485	5.91629	12.19211
47	8.01039	10.65440	12.33540	32.50185	0.83108	0.94167	5.89639	12.00132
48	7.87043	10.51854	12.17134	32.71384	0.82979	0.94021	5.88725	11.82327
49	7.87043	10.51854	12.17134	32.99966	0.83002	0.94046	5.88885	11.82327
50	7.87043	10.51854	12.17134	33.36131	0.83175	0.94243	5.90117	11.82327
51	7.87043	10.51854	12.17134	33.80122	0.83501	0.94612	5.92428	11.82327
52	7.87043	10.51854	12.17134	34.32239	0.83981	0.95156	5.95833	11.82327
53	7.87043	10.51854	12.17134	34.92825	0.84617	0.95877	6.00349	11.82327
54	7.87043	10.51854	12.17134	35.62321	0.85414	0.96780	6.06000	11.82327
55	7.87043	10.51854	12.17134	36.41196	0.86375	0.97869	6.12820	11.82327
56	9.01205	12.31312	14.38722	37.30016	0.87506	0.99150	6.20845	14.67065
57	10.15368	14.10771	16.60307	38.29413	0.88814	1.00632	6.30120	17.51804
58	11.29530	15.90229	18.81894	39.40120	0.90305	1.02321	6.40699	20.36540
59	12.43693	17.69684	21.03476	40.62964	0.91988	1.04228	6.52643	23.21277
60	13.57855	19.49142	23.25067	41.98856	0.93874	1.06365	6.66020	26.06015
61	14.72018	21.28598	25.46654	43.48853	0.95972	1.08743	6.80910	28.90752
62	15.86178	23.08055	27.68239	45.14130	0.98297	1.11376	6.97401	31.75490
63	17.00340	24.87514	29.89828	46.96007	1.00861	1.14281	7.15592	34.60229
64	18.14500	26.66974	32.11417	48.95973	1.03680	1.17476	7.35595	37.44968
65	19.28662	28.46431	34.33003	51.15680	1.06772	1.20980	7.57536	40.29706

**Table A-57**  
**Jefferson 1996 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.21894	2.37713	2.60226	4.22148	2.76132	3.11727	23.65694	0.81913
4	2.03594	2.18159	2.39761	4.26517	2.64502	2.98598	22.66058	0.78349
5	1.92538	2.06375	2.27503	4.30885	2.53722	2.86428	21.73701	0.75391
6	1.85114	1.98502	2.19364	4.35254	2.43727	2.75145	20.88072	0.72993
7	1.79775	1.92885	2.13589	4.39622	2.34459	2.64681	20.08667	0.71110
8	1.75747	1.88691	2.09300	4.43990	2.25863	2.54978	19.35028	0.69700
9	1.72598	1.85459	2.06007	4.48359	2.17892	2.45979	18.66737	0.68719
10	1.70069	1.82907	2.03415	4.52727	2.10501	2.37635	18.03415	0.68129
11	1.67994	1.80857	2.01336	4.57096	2.03649	2.29901	17.44716	0.67891
12	1.66264	1.79188	1.99643	4.61464	1.97301	2.22733	16.90327	0.67968
13	1.64800	1.77815	1.98249	4.65833	1.91422	2.16097	16.39961	0.68326
14	1.63548	1.76677	1.97091	4.70201	1.85982	2.09956	15.93357	0.68930
15	1.62466	1.75728	1.96120	4.74569	1.80953	2.04279	15.50276	0.69750
16	1.61525	1.74934	1.95302	4.78938	1.76311	1.99038	15.10504	0.70754
17	1.60700	1.74267	1.94608	4.83306	1.72031	1.94207	14.73843	0.71914
18	1.59972	1.73705	1.94018	4.87675	1.68095	1.89763	14.40115	0.73204
19	1.59328	1.73230	1.93514	4.92043	1.64481	1.85684	14.09158	0.74598
20	1.59451	1.73047	1.93350	4.96412	1.61175	1.81951	13.80827	0.76073
21	1.60383	1.74187	1.94646	5.00780	1.58159	1.78546	13.54989	0.77606
22	1.61236	1.75244	1.95842	5.05148	1.55420	1.75454	13.31522	0.79177
23	1.62022	1.76227	1.96948	5.09517	1.52945	1.72660	13.10323	0.80768
24	1.62748	1.77145	1.97976	5.13885	1.50724	1.70153	12.91292	0.82360
25	1.63422	1.78002	1.98933	5.18253	1.48746	1.67920	12.74346	0.83940
26	1.64050	1.78806	1.99827	5.22622	1.47002	1.65951	12.59410	0.85492
27	1.64637	1.79559	2.00664	5.26990	1.45486	1.64239	12.46417	0.87005
28	1.65189	1.80266	2.01449	5.31359	1.44189	1.62776	12.35311	0.88468
29	1.65708	1.80931	2.02187	5.35727	1.43108	1.61555	12.26045	0.89872
30	1.66198	1.81555	2.02883	5.40095	1.42236	1.60571	12.18576	0.91210
31	1.66663	1.82144	2.03539	5.44464	1.41571	1.59819	12.12874	0.92477
32	1.67104	1.82697	2.04160	5.48832	1.41108	1.59298	12.08915	0.93667
33	1.67524	1.83219	2.04749	5.53201	1.40847	1.59003	12.06681	0.94779
34	1.67926	1.83712	2.05309	5.57569	1.40787	1.58935	12.06161	0.95811
35	1.68312	1.84177	2.05843	5.61938	1.40926	1.59093	12.07357	0.96766
36	1.68682	1.84618	2.06354	5.66306	1.41266	1.59476	12.10269	0.97644
37	1.69040	1.85036	2.06844	5.70674	1.41809	1.60088	12.14914	0.98451
38	1.69387	1.85434	2.07317	5.75043	1.42555	1.60931	12.21309	0.99192
39	1.69724	1.85814	2.07775	5.79411	1.43509	1.62008	12.29481	0.99874
40	1.70053	1.86179	2.08222	5.83780	1.44675	1.63324	12.39469	1.00506
41	1.70375	1.86531	2.08659	5.88148	1.46057	1.64885	12.51312	1.01099
42	1.70693	1.86873	2.09089	5.92517	1.47662	1.66697	12.65064	1.01666
43	1.71006	1.87208	2.09517	5.96885	1.49497	1.68768	12.80786	1.02220
44	1.71318	1.87538	2.09943	6.01254	1.51570	1.71108	12.98543	1.02776
45	1.71629	1.87867	2.10372	6.05622	1.53890	1.73727	13.18418	1.03352
46	1.71940	1.88197	2.10807	6.09991	1.56467	1.76637	13.40501	1.03967
47	1.72254	1.88533	2.11251	6.14359	1.59314	1.79850	13.64889	1.04641
48	1.72572	1.88877	2.11706	6.18727	1.62443	1.83383	13.91696	1.05396
49	1.78931	1.96409	2.20374	6.23096	1.65869	1.87250	14.21047	1.08828
50	1.85290	2.03942	2.29043	6.27464	1.69608	1.91471	14.53077	1.12260
51	1.91649	2.11475	2.37711	6.31832	1.73677	1.96065	14.87940	1.15692
52	1.98008	2.19008	2.46379	6.36201	1.78097	2.01054	15.25807	1.19124
53	2.04367	2.26540	2.55047	6.40569	1.82889	2.06464	15.66859	1.22556
54	2.10726	2.34073	2.63715	6.44938	1.88076	2.12320	16.11301	1.25988
55	2.17085	2.41606	2.72383	6.49306	1.93686	2.18653	16.59363	1.29420
56	2.23444	2.49139	2.81052	6.53674	1.99746	2.25495	17.11281	1.32852
57	2.29803	2.56672	2.89720	6.58043	2.06289	2.32881	17.67336	1.36284
58	2.36162	2.64204	2.98388	6.62411	2.13349	2.40851	18.27815	1.39715
59	2.42521	2.71737	3.07056	6.66780	2.20964	2.49447	18.93054	1.43147
60	2.48880	2.79270	3.15724	6.71148	2.29175	2.58717	19.63409	1.46579
61	2.55239	2.86803	3.24393	6.75517	2.38031	2.68714	20.39268	1.50011
62	2.61598	2.94335	3.33061	6.79885	2.47579	2.79493	21.21071	1.53443
63	2.67957	3.01868	3.41729	6.84254	2.57876	2.91117	22.09290	1.56875
64	2.74316	3.09401	3.50397	6.88622	2.68983	3.03657	23.04448	1.60307
65	2.80675	3.16934	3.59065	6.92991	2.80968	3.17185	24.07120	1.63739

**Table A-58**  
**Jefferson 1996 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGCV	LDDV	LDDT	HDDV	MC
3	8.62765	9.93949	12.69153	15.79352	1.65438	2.28766	5.47575	15.45095
4	6.35995	7.39421	9.41114	12.96565	1.57068	2.17192	5.19870	13.03499
5	5.07977	5.93199	7.50987	11.23804	1.49252	2.06384	4.94001	11.24561
6	4.25987	4.98438	6.27065	9.99706	1.41950	1.96287	4.69834	9.89500
7	3.69096	4.32192	5.40190	9.02383	1.35125	1.86849	4.47241	8.85793
8	3.32327	3.88455	4.82137	8.31108	1.28740	1.78021	4.26110	8.04909
9	3.03835	3.54333	4.37025	7.68974	1.22766	1.69759	4.06335	7.40918
10	2.80659	3.26471	4.00469	7.13451	1.17171	1.62023	3.87819	6.89618
11	2.61353	3.03178	3.70175	6.63597	1.11930	1.54776	3.70472	6.47980
12	2.44949	2.83311	3.44583	6.18660	1.07018	1.47983	3.54212	6.13782
13	2.30778	2.66072	3.22598	5.78027	1.02412	1.41613	3.38965	5.85373
14	2.18357	2.50889	3.03431	5.41182	0.98090	1.35637	3.24660	5.61504
15	2.07334	2.37338	2.86498	5.07691	0.94033	1.30027	3.11232	5.41221
16	1.97444	2.25103	2.71363	4.77181	0.90223	1.24759	2.98622	5.23788
17	1.88484	2.13941	2.57689	4.49326	0.86643	1.19809	2.86775	5.08629
18	1.80297	2.03663	2.45217	4.23846	0.83279	1.15158	2.75640	4.95289
19	1.72758	1.94123	2.33743	4.00494	0.80116	1.10784	2.65172	4.83414
20	1.65572	1.86312	2.24348	3.79563	0.77141	1.06670	2.55325	4.72717
21	1.59313	1.79687	2.16092	3.61118	0.74342	1.02800	2.46060	4.62976
22	1.53582	1.73610	2.08533	3.44223	0.71708	0.99157	2.37341	4.54012
23	1.48310	1.68008	2.01576	3.28730	0.69228	0.95727	2.29132	4.45685
24	1.43438	1.62821	1.95142	3.14504	0.66892	0.92498	2.21402	4.37888
25	1.38920	1.58001	1.89169	3.01427	0.64692	0.89456	2.14120	4.30539
26	1.34714	1.53507	1.83603	2.89393	0.62620	0.86590	2.07261	4.23575
27	1.30787	1.49306	1.78403	2.78307	0.60667	0.83890	2.00798	4.16951
28	1.27109	1.45369	1.73531	2.68084	0.58827	0.81345	1.94707	4.10637
29	1.23656	1.41674	1.68959	2.58648	0.57093	0.78948	1.88968	4.04614
30	1.20405	1.38199	1.64661	2.49932	0.55459	0.76688	1.83559	3.98868
31	1.17339	1.34929	1.60615	2.41873	0.53919	0.74558	1.78462	3.93397
32	1.14441	1.31847	1.56803	2.34418	0.52468	0.72552	1.73660	3.88199
33	1.11697	1.28941	1.53209	2.27516	0.51101	0.70662	1.69135	3.83280
34	1.09093	1.26198	1.49820	2.21122	0.49813	0.68881	1.64873	3.78642
35	1.06620	1.23609	1.46622	2.15196	0.48601	0.67205	1.60861	3.74294
36	1.04266	1.21163	1.43603	2.09703	0.47460	0.65627	1.57084	3.70241
37	1.02023	1.18852	1.40753	2.04608	0.46386	0.64142	1.53531	3.66487
38	0.99882	1.16667	1.38064	1.99883	0.45377	0.62747	1.50190	3.63037
39	0.97837	1.14601	1.35523	1.95500	0.44428	0.61435	1.47051	3.59892
40	0.95880	1.12645	1.33124	1.91436	0.43538	0.60204	1.44104	3.57050
41	0.94005	1.10793	1.30857	1.87669	0.42704	0.59050	1.41341	3.54511
42	0.92207	1.09038	1.28714	1.84178	0.41922	0.57969	1.38753	3.52264
43	0.90480	1.07373	1.26687	1.80946	0.41190	0.56957	1.36333	3.50294
44	0.88819	1.05790	1.24765	1.77958	0.40507	0.56013	1.34072	3.48590
45	0.87219	1.04283	1.22942	1.75197	0.39871	0.55133	1.31965	3.47129
46	0.85676	1.02844	1.21207	1.72653	0.39279	0.54314	1.30006	3.45882
47	0.84185	1.01465	1.19550	1.70312	0.38729	0.53555	1.28188	3.44814
48	0.82768	1.00148	1.17968	1.68168	0.38222	0.52852	1.26507	3.43879
49	0.82580	0.99957	1.17717	1.66259	0.37754	0.52205	1.24958	3.43879
50	0.82402	0.99777	1.17480	1.64542	0.37324	0.51611	1.23537	3.43879
51	0.82234	0.99606	1.17256	1.63011	0.36932	0.51069	1.22239	3.43879
52	0.82075	0.99445	1.17045	1.61656	0.36576	0.50577	1.21061	3.43879
53	0.81925	0.99292	1.16845	1.60472	0.36256	0.50134	1.20001	3.43879
54	0.81782	0.99147	1.16655	1.59453	0.35970	0.49739	1.19054	3.43879
55	0.81646	0.99010	1.16476	1.58594	0.35718	0.49390	1.18219	3.43879
56	0.81511	1.03120	1.21933	1.57891	0.35498	0.49086	1.17493	3.55786
57	0.87522	1.07237	1.27398	1.57341	0.35311	0.48828	1.16874	3.67693
58	0.90469	1.11360	1.32872	1.56941	0.35156	0.48614	1.16361	3.79600
59	0.93422	1.15489	1.38352	1.56690	0.35033	0.48443	1.15952	3.91507
60	0.96380	1.19622	1.43840	1.56587	0.34940	0.48315	1.15647	4.03414
61	0.99342	1.23761	1.49334	1.56632	0.34879	0.48230	1.15443	4.15321
62	1.02309	1.27904	1.54834	1.56826	0.34848	0.48188	1.15342	4.27227
63	1.05280	1.32052	1.60340	1.57169	0.34848	0.48188	1.15342	4.39135
64	1.08256	1.36203	1.65852	1.57666	0.34879	0.48230	1.15443	4.51041
65	1.11235	1.40359	1.71368	1.58317	0.34940	0.48315	1.15647	4.62948

**Table A-59**  
**Jefferson 1996 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	78.60014	94.85135	122.18365	168.84947	5.39228	6.10980	38.25746	156.29434
4	60.48465	73.04279	93.95860	154.27052	4.96959	5.63087	35.25856	124.64815
5	49.52682	59.69821	76.34917	141.26074	4.58839	5.19894	32.55399	101.80711
6	42.18913	50.71179	64.35162	129.63307	4.24413	4.80888	30.11156	84.95224
7	36.93819	44.26964	55.69594	119.22444	3.93287	4.45620	27.90314	72.26106
8	32.99936	39.44089	49.18950	109.89307	3.65106	4.13689	25.90379	62.52628
9	29.93863	35.69714	44.14223	101.51512	3.39563	3.84747	24.09151	54.93085
10	27.49387	32.71608	40.12688	93.98239	3.16381	3.58481	22.44684	48.90961
11	25.49730	30.28990	36.86508	87.20035	2.95320	3.34617	20.95255	44.06471
12	23.83665	28.27881	34.16800	81.08582	2.76162	3.12910	19.59334	40.11064
13	22.43408	26.58527	31.90332	75.56618	2.58718	2.93144	18.35571	36.83934
14	21.23372	25.13936	29.97589	70.57721	2.42817	2.75128	17.22757	34.09685
15	20.19463	23.88956	28.31561	66.06299	2.28309	2.58688	16.19820	31.76772
16	19.28613	22.79724	26.86989	61.97350	2.15058	2.43675	15.25812	29.76440
17	18.48473	21.83289	25.59860	58.26534	2.02946	2.29951	14.39876	28.01987
18	17.77214	20.97363	24.47067	54.89969	1.91864	2.17395	13.61255	26.48232
19	17.13405	20.20157	23.46176	51.84236	1.81718	2.05899	12.89270	25.11140
20	16.44739	19.51213	22.60622	49.06313	1.72422	1.95366	12.23318	23.87589
21	15.71228	18.71558	21.68024	46.53513	1.63900	1.85709	11.62853	22.75116
22	15.04295	17.98643	20.83566	44.23460	1.56083	1.76852	11.07390	21.71831
23	14.43074	17.31563	20.06122	42.14038	1.48909	1.68724	10.56495	20.76231
24	13.86850	16.69582	19.34790	40.23378	1.42324	1.61263	10.09774	19.87178
25	13.35022	16.12105	18.68823	38.49799	1.36278	1.54412	9.66877	19.03801
26	12.87090	15.58642	18.07610	36.91829	1.30726	1.48122	9.27490	18.25432
27	12.42631	15.08793	17.50650	35.48137	1.25630	1.42346	8.91327	17.51573
28	12.01283	14.62224	16.97517	34.17538	1.20951	1.37046	8.58135	16.81848
29	11.62738	14.18659	16.47864	32.99007	1.16659	1.32183	8.27684	16.16002
30	11.26730	13.77860	16.01390	31.91597	1.12724	1.27724	7.99768	15.53847
31	10.93028	13.39627	15.57844	30.94482	1.09121	1.23641	7.74201	14.95228
32	10.61430	13.03781	15.17005	30.06932	1.05825	1.19907	7.50816	14.40041
33	10.31760	12.70167	14.78686	29.28297	1.02816	1.16497	7.29465	13.88241
34	10.03860	12.38646	14.42715	28.57996	1.00074	1.13390	7.10011	13.39721
35	9.77592	12.09091	14.08945	27.95529	0.97583	1.10567	6.92335	12.94463
36	9.52830	11.81382	13.77239	27.40443	0.95327	1.08011	6.76330	12.52360
37	9.29462	11.55414	13.47473	26.92363	0.93293	1.05707	6.61897	12.13397
38	9.07388	11.31084	13.19532	26.50955	0.91468	1.03639	6.48953	11.77452
39	8.86515	11.08295	12.93305	26.15930	0.89843	1.01797	6.37421	11.44444
40	8.66759	10.86955	12.68689	25.87053	0.88407	1.00171	6.27235	11.14270
41	8.48042	10.66973	12.45588	25.64136	0.87153	0.98750	6.18335	10.86808
42	8.30291	10.48260	12.23895	25.47009	0.86073	0.97526	6.10672	10.61885
43	8.13440	10.30725	12.03522	25.35576	0.85161	0.96493	6.04203	10.39348
44	7.97425	10.14278	11.84364	25.29747	0.84412	0.95644	5.98891	10.18971
45	7.82185	9.98820	11.66327	25.29500	0.83822	0.94976	5.94708	10.00541
46	7.67660	9.84242	11.49301	25.34813	0.83388	0.94485	5.91629	9.83793
47	7.53792	9.70429	11.33174	25.45735	0.83108	0.94167	5.89639	9.68398
48	7.40521	9.57253	11.17832	25.62338	0.82979	0.94021	5.88725	9.54031
49	7.40521	9.57253	11.17832	25.84729	0.83002	0.94046	5.88885	9.54031
50	7.40521	9.57253	11.17832	26.13054	0.83175	0.94243	5.90117	9.54031
51	7.40521	9.57253	11.17832	26.47510	0.83501	0.94612	5.92428	9.54031
52	7.40521	9.57253	11.17832	26.88333	0.83981	0.95156	5.95833	9.54031
53	7.40521	9.57253	11.17832	27.35788	0.84617	0.95877	6.00349	9.54031
54	7.40521	9.57253	11.17832	27.90222	0.85414	0.96780	6.06000	9.54031
55	7.40521	9.57253	11.17832	28.52000	0.86375	0.97869	6.12820	9.54031
56	8.43625	11.13749	13.15313	29.21567	0.87506	0.99150	6.20845	11.83789
57	9.46729	12.70246	15.12793	29.99420	0.88814	1.00632	6.30120	14.13548
58	10.49833	14.26742	17.10272	30.86134	0.90305	1.02321	6.40699	16.43304
59	11.52937	15.83238	19.07750	31.82355	0.91988	1.04228	6.52643	18.73062
60	12.56041	17.39731	21.05231	32.88792	0.93874	1.06365	6.66020	21.02818
61	13.59146	18.96227	23.02710	34.06277	0.95972	1.08743	6.80910	23.32578
62	14.62249	20.52721	25.00189	35.35733	0.98297	1.11376	6.97401	25.62332
63	15.65353	22.09216	26.97668	36.78191	1.00861	1.14281	7.15592	27.92090
64	16.68456	23.65715	28.95151	38.34816	1.03680	1.17476	7.35595	30.21849
65	17.71558	25.22209	30.92630	40.06902	1.06772	1.20980	7.57536	32.51607

**Table A-60  
Jefferson 1996 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.22268	2.38830	2.64839	4.35620	2.76132	3.11727	23.65694	0.90987
4	2.04167	2.19357	2.44442	4.40128	2.64502	2.98598	22.66058	0.87028
5	1.93205	2.07610	2.32227	4.44636	2.53722	2.86428	21.73701	0.83742
6	1.85826	1.99755	2.24120	4.49144	2.43727	2.75145	20.88072	0.81079
7	1.80507	1.94148	2.18375	4.53652	2.34459	2.64681	20.08667	0.78987
8	1.76484	1.89962	2.14116	4.58159	2.25863	2.54978	19.35028	0.77420
9	1.73331	1.86736	2.10854	4.62667	2.17892	2.45979	18.66737	0.76331
10	1.70794	1.84193	2.08296	4.67175	2.10501	2.37635	18.03415	0.75676
11	1.68708	1.82153	2.06254	4.71683	2.03649	2.29901	17.44716	0.75411
12	1.66966	1.80496	2.04601	4.76190	1.97301	2.22733	16.90327	0.75497
13	1.65490	1.79137	2.03248	4.80698	1.91422	2.16097	16.39961	0.75894
14	1.64226	1.78016	2.02132	4.85206	1.85982	2.09956	15.93357	0.76566
15	1.63134	1.77085	2.01206	4.89714	1.80953	2.04279	15.50276	0.77476
16	1.62182	1.76311	2.00433	4.94222	1.76311	1.99038	15.10504	0.78591
17	1.61348	1.75665	1.99787	4.98730	1.72031	1.94207	14.73843	0.79880
18	1.60613	1.75126	1.99244	5.03238	1.68095	1.89763	14.40115	0.81313
19	1.59962	1.74676	1.98787	5.07745	1.64481	1.85684	14.09158	0.82862
20	1.60070	1.74531	1.98691	5.12253	1.61175	1.81951	13.80827	0.84500
21	1.60976	1.75701	2.00048	5.16761	1.58159	1.78546	13.54989	0.86203
22	1.61806	1.76790	2.01303	5.21268	1.55420	1.75454	13.31522	0.87948
23	1.62572	1.77804	2.02467	5.25777	1.52945	1.72660	13.10323	0.89714
24	1.63282	1.78752	2.03551	5.30284	1.50724	1.70153	12.91292	0.91483
25	1.63943	1.79640	2.04563	5.34792	1.48746	1.67920	12.74346	0.93238
26	1.64560	1.80472	2.05510	5.39300	1.47002	1.65951	12.59410	0.94962
27	1.65138	1.81254	2.06399	5.43808	1.45486	1.64239	12.46417	0.96643
28	1.65683	1.81990	2.07234	5.48316	1.44189	1.62776	12.35311	0.98268
29	1.66198	1.82682	2.08020	5.52823	1.43108	1.61555	12.26045	0.99828
30	1.66686	1.83333	2.08762	5.57331	1.42236	1.60571	12.18576	1.01314
31	1.67150	1.83947	2.09464	5.61839	1.41571	1.59819	12.12874	1.02720
32	1.67594	1.84526	2.10130	5.66347	1.41108	1.59298	12.08915	1.04042
33	1.68018	1.85073	2.10762	5.70855	1.40847	1.59003	12.06681	1.05277
34	1.68425	1.85589	2.11364	5.75362	1.40787	1.58935	12.06161	1.06424
35	1.68818	1.86078	2.11940	5.79871	1.40926	1.59093	12.07357	1.07484
36	1.69199	1.86541	2.12492	5.84378	1.41266	1.59476	12.10269	1.08460
37	1.69568	1.86982	2.13024	5.88886	1.41809	1.60088	12.14914	1.09356
38	1.69929	1.87402	2.13539	5.93394	1.42555	1.60931	12.21309	1.10179
39	1.70282	1.87805	2.14039	5.97902	1.43509	1.62008	12.29481	1.10937
40	1.70629	1.88193	2.14529	6.02410	1.44675	1.63324	12.39469	1.11639
41	1.70971	1.88568	2.15010	6.06917	1.46057	1.64885	12.51312	1.12298
42	1.71312	1.88934	2.15487	6.11425	1.47662	1.66697	12.65064	1.12927
43	1.71651	1.89293	2.15963	6.15933	1.49497	1.68768	12.80786	1.13542
44	1.71990	1.89650	2.16441	6.20441	1.51570	1.71108	12.98543	1.14161
45	1.72331	1.90006	2.16925	6.24949	1.53890	1.73727	13.18418	1.14801
46	1.72677	1.90366	2.17418	6.29457	1.56467	1.76637	13.40501	1.15484
47	1.73027	1.90734	2.17925	6.33964	1.59314	1.79850	13.64889	1.16232
48	1.73385	1.91113	2.18449	6.38472	1.62443	1.83383	13.91696	1.17071
49	1.79813	1.98747	2.27434	6.42980	1.65869	1.87250	14.21047	1.20883
50	1.86240	2.06381	2.36420	6.47488	1.69608	1.91471	14.53077	1.24695
51	1.92668	2.14016	2.45405	6.51996	1.73677	1.96065	14.87940	1.28507
52	1.99095	2.21650	2.54390	6.56504	1.78097	2.01054	15.25807	1.32319
53	2.05523	2.29284	2.63376	6.61012	1.82889	2.06464	15.66859	1.36131
54	2.11950	2.36919	2.72361	6.65519	1.88076	2.12320	16.11301	1.39944
55	2.18378	2.44553	2.81346	6.70027	1.93686	2.18653	16.59363	1.43756
56	2.24806	2.52187	2.90332	6.74535	1.99746	2.25495	17.11281	1.47568
57	2.31233	2.59822	2.99317	6.79043	2.06289	2.32881	17.67336	1.51380
58	2.37661	2.67456	3.08302	6.83550	2.13349	2.40851	18.27815	1.55192
59	2.44088	2.75090	3.17288	6.88059	2.20964	2.49447	18.93054	1.59004
60	2.50516	2.82725	3.26273	6.92566	2.29175	2.58717	19.63409	1.62816
61	2.56944	2.90359	3.35258	6.97074	2.38031	2.68714	20.39268	1.66628
62	2.63371	2.97993	3.44244	7.01582	2.47579	2.79493	21.21071	1.70440
63	2.69799	3.05628	3.53229	7.06090	2.57876	2.91117	22.09290	1.74252
64	2.76226	3.13262	3.62215	7.10598	2.68983	3.03657	23.04448	1.78064
65	2.82654	3.20897	3.71200	7.15106	2.80968	3.17185	24.07120	1.81876

**Table A-61**  
**Jefferson 1999 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	7.87343	8.73259	10.76556	12.13477	1.49247	1.94522	5.02410	14.81863
4	5.79200	6.46132	7.95253	9.98226	1.41696	1.84680	4.76991	12.51265
5	4.63054	5.17579	6.34560	8.65971	1.34645	1.75491	4.53256	10.80472
6	3.89269	4.35105	5.30840	7.70598	1.28058	1.66905	4.31082	9.51560
7	3.38364	3.77834	4.58577	6.95609	1.21901	1.58879	4.10353	8.52574
8	3.05803	3.40380	4.10696	6.40581	1.16141	1.51373	3.90965	7.75371
9	2.80628	3.11237	3.73543	5.92559	1.10751	1.44348	3.72820	7.14294
10	2.60168	2.87470	3.43429	5.49612	1.05704	1.37770	3.55831	6.65329
11	2.43139	2.67622	3.18455	5.11021	1.00976	1.31608	3.39915	6.25586
12	2.28682	2.50711	2.97338	4.76213	0.96545	1.25832	3.24997	5.92945
13	2.16203	2.36056	2.79180	4.44717	0.92389	1.20415	3.11007	5.65829
14	2.05277	2.23166	2.63338	4.16139	0.88490	1.15333	2.97882	5.43047
15	1.95592	2.11683	2.49336	3.90146	0.84830	1.10563	2.85561	5.23687
16	1.86913	2.01336	2.36819	3.66450	0.81393	1.06084	2.73991	5.07048
17	1.79061	1.91917	2.25513	3.44802	0.78164	1.01875	2.63122	4.92579
18	1.71897	1.83268	2.15208	3.24986	0.75129	0.97920	2.52906	4.79847
19	1.65311	1.75262	2.05737	3.06811	0.72276	0.94201	2.43300	4.68512
20	1.58529	1.68143	1.97363	2.90554	0.69592	0.90703	2.34266	4.58302
21	1.52323	1.61982	1.89917	2.76288	0.67067	0.87412	2.25766	4.49004
22	1.46649	1.56344	1.83112	2.63219	0.64690	0.84314	2.17765	4.40448
23	1.41436	1.51159	1.76861	2.51232	0.62453	0.81398	2.10233	4.32501
24	1.36627	1.46371	1.71095	2.40223	0.60346	0.78652	2.03140	4.25058
25	1.32175	1.41933	1.65755	2.30101	0.58361	0.76065	1.96460	4.18044
26	1.28037	1.37806	1.60793	2.20784	0.56491	0.73628	1.90166	4.11396
27	1.24181	1.33957	1.56168	2.12199	0.54730	0.71332	1.84236	4.05074
28	1.20575	1.30359	1.51846	2.04281	0.53070	0.69169	1.78648	3.99048
29	1.17195	1.26989	1.47798	1.96970	0.51505	0.67130	1.73382	3.93299
30	1.14018	1.23825	1.44000	1.90215	0.50031	0.65208	1.68420	3.87815
31	1.11026	1.20852	1.40431	1.83968	0.48642	0.63398	1.63743	3.82593
32	1.08203	1.18052	1.37071	1.78186	0.47333	0.61692	1.59336	3.77631
33	1.05532	1.15414	1.33906	1.72832	0.46100	0.60084	1.55185	3.72937
34	1.03002	1.12925	1.30921	1.67870	0.44938	0.58570	1.51275	3.68510
35	1.00600	1.10574	1.28103	1.63270	0.43844	0.57145	1.47593	3.64359
36	0.98317	1.08352	1.25441	1.59003	0.42815	0.55803	1.44127	3.60491
37	0.96144	1.06250	1.22924	1.55045	0.41846	0.54541	1.40867	3.56908
38	0.94071	1.04259	1.20544	1.51372	0.40936	0.53354	1.37802	3.53614
39	0.92091	1.02373	1.18290	1.47963	0.40080	0.52239	1.34922	3.50612
40	0.90199	1.00584	1.16154	1.44800	0.39277	0.51192	1.32219	3.47900
41	0.88386	0.98885	1.14130	1.41867	0.38524	0.50211	1.29684	3.45477
42	0.86648	0.97271	1.12208	1.39147	0.37819	0.49291	1.27309	3.43332
43	0.84980	0.95734	1.10382	1.36627	0.37159	0.48431	1.25088	3.41451
44	0.83377	0.94270	1.08646	1.34295	0.36543	0.47628	1.23014	3.39826
45	0.81833	0.92873	1.06991	1.32139	0.35969	0.46880	1.21081	3.38431
46	0.80345	0.91536	1.05410	1.30150	0.35435	0.46184	1.19283	3.37241
47	0.78908	0.90252	1.03897	1.28318	0.34939	0.45538	1.17615	3.36221
48	0.77539	0.89023	1.02448	1.26642	0.34481	0.44941	1.16073	3.35329
49	0.77351	0.88838	1.02223	1.25174	0.34059	0.44391	1.14651	3.35329
50	0.77174	0.88664	1.02010	1.23856	0.33671	0.43886	1.13347	3.35329
51	0.77007	0.88499	1.01810	1.22679	0.33318	0.43425	1.12157	3.35329
52	0.76849	0.88343	1.01620	1.21640	0.32997	0.43006	1.11076	3.35329
53	0.76700	0.88196	1.01441	1.20731	0.32708	0.42630	1.10103	3.35329
54	0.76558	0.88056	1.01271	1.19950	0.32450	0.42293	1.09235	3.35329
55	0.76423	0.87923	1.01110	1.19292	0.32222	0.41997	1.08468	3.35329
56	0.78841	0.90988	1.05103	1.18755	0.32024	0.41739	1.07802	3.46694
57	0.81265	0.94059	1.09105	1.18335	0.31855	0.41519	1.07234	3.58059
58	0.83695	0.97135	1.13113	1.18032	0.31716	0.41337	1.06764	3.69423
59	0.86130	1.00217	1.17128	1.17843	0.31604	0.41191	1.06388	3.80789
60	0.88571	1.03304	1.21149	1.17769	0.31521	0.41083	1.06108	3.92153
61	0.91016	1.06396	1.25177	1.17808	0.31465	0.41010	1.05921	4.03518
62	0.93466	1.09492	1.29209	1.17963	0.31438	0.40974	1.05828	4.14883
63	0.95921	1.12592	1.33247	1.18233	0.31438	0.40974	1.05828	4.26248
64	0.98379	1.15697	1.37290	1.18622	0.31465	0.41011	1.05922	4.37613
65	1.00841	1.18805	1.41337	1.19130	0.31521	0.41083	1.06108	4.48978

**Table A-62**  
**Jefferson 1999 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	69.18605	78.35204	99.15799	120.59068	5.10315	5.57644	36.37282	156.08669
4	53.66756	60.80067	76.72337	110.17853	4.70313	5.13931	33.52165	124.48256
5	44.33109	50.15842	62.89188	100.88710	4.34236	4.74509	30.95029	101.67188
6	38.09868	43.02795	53.53281	92.58272	4.01657	4.38908	28.62819	84.83940
7	33.64540	37.92807	46.80432	85.14893	3.72199	4.06718	26.52856	72.16504
8	30.30643	34.10724	41.75288	78.48456	3.45530	3.77575	24.62772	62.44322
9	27.71107	31.14284	37.83350	72.50110	3.21356	3.51159	22.90471	54.85780
10	25.63655	28.77902	34.71191	67.12132	2.99418	3.27186	21.34103	48.84460
11	23.94077	26.85179	32.17181	62.27763	2.79485	3.05405	19.92036	44.00618
12	22.52887	25.25117	30.06723	57.91069	2.61355	2.85594	18.62811	40.05736
13	21.33507	23.90079	28.29637	53.96864	2.44846	2.67554	17.45146	36.79042
14	20.31241	22.74585	26.78615	50.40553	2.29797	2.51110	16.37889	34.05153
15	19.42638	21.74617	25.48282	47.18152	2.16067	2.36106	15.40024	31.72551
16	18.65111	20.87154	24.34610	44.26085	2.03527	2.22403	14.50646	29.72487
17	17.96686	20.09885	23.34525	41.61256	1.92064	2.09877	13.68943	27.98264
18	17.35823	19.41026	22.45639	39.20880	1.81577	1.98417	12.94196	26.44711
19	16.81311	18.79175	21.66090	37.02527	1.71975	1.87924	12.25756	25.07805
20	16.13661	18.13483	20.86913	35.04041	1.63177	1.78311	11.63054	23.84416
21	15.34011	17.32019	19.93729	33.23492	1.55112	1.69498	11.05567	22.72098
22	14.61524	16.57628	19.08820	31.59195	1.47714	1.61414	10.52837	21.68944
23	13.95263	15.89372	18.31079	30.09624	1.40925	1.53995	10.04449	20.73473
24	13.34453	15.26484	17.59595	28.73454	1.34693	1.47185	9.60030	19.84537
25	12.78440	14.68332	16.93611	27.49492	1.28971	1.40932	9.19246	19.01273
26	12.26676	14.14393	16.32503	26.36671	1.23717	1.35191	8.81799	18.23006
27	11.78696	13.64230	15.75746	25.34044	1.18894	1.29920	8.47418	17.49245
28	11.34104	13.17475	15.22894	24.40775	1.14466	1.25082	8.15861	16.79614
29	10.92558	12.73814	14.73576	23.56120	1.10404	1.20644	7.86910	16.13855
30	10.53761	12.32980	14.27469	22.79411	1.06681	1.16575	7.60369	15.51783
31	10.17460	11.94741	13.84298	22.10051	1.03270	1.12848	7.36061	14.93242
32	9.83427	11.58894	13.43822	21.47525	1.00151	1.09440	7.13829	14.38128
33	9.51466	11.25259	13.05832	20.91365	0.97303	1.06327	6.93530	13.86397
34	9.21402	10.93677	12.70141	20.41156	0.94708	1.03492	6.75033	13.37941
35	8.93080	10.64005	12.36584	19.96542	0.92350	1.00915	6.58228	12.92743
36	8.66360	10.36110	12.05011	19.57204	0.90216	0.98582	6.43012	12.50696
37	8.41120	10.09874	11.75289	19.22867	0.88290	0.96479	6.29290	12.11785
38	8.17246	9.85188	11.47294	18.93292	0.86564	0.94592	6.16983	11.75888
39	7.94638	9.61950	11.20910	18.68279	0.85025	0.92911	6.06020	11.42924
40	7.73204	9.40064	10.96031	18.47655	0.83667	0.91426	5.96335	11.12790
41	7.52860	9.19441	10.72560	18.31284	0.82480	0.90129	5.87874	10.85365
42	7.33529	8.99995	10.50396	18.19055	0.81457	0.89012	5.80589	10.60475
43	7.15139	8.81641	10.29452	18.10889	0.80595	0.88069	5.74438	10.37968
44	6.97626	8.64298	10.09636	18.06728	0.79886	0.87295	5.69388	10.17617
45	6.80927	8.47880	9.90864	18.06548	0.79328	0.86685	5.65411	9.99212
46	6.64981	8.32299	9.73043	18.10344	0.78917	0.86236	5.62484	9.82486
47	6.49733	8.17463	9.56081	18.18146	0.78652	0.85946	5.60591	9.67111
48	6.35127	8.03273	9.39889	18.30003	0.78530	0.85813	5.59723	9.52763
49	6.35127	8.03273	9.39889	18.45993	0.78551	0.85836	5.59875	9.52763
50	6.35127	8.03273	9.39889	18.66225	0.78716	0.86016	5.61046	9.52763
51	6.35127	8.03273	9.39889	18.90833	0.79024	0.86353	5.63243	9.52763
52	6.35127	8.03273	9.39889	19.19986	0.79478	0.86849	5.66480	9.52763
53	6.35127	8.03273	9.39889	19.53879	0.80080	0.87507	5.70774	9.52763
54	6.35127	8.03273	9.39889	19.92754	0.80834	0.88331	5.76147	9.52763
55	6.35127	8.03273	9.39889	20.36874	0.81744	0.89325	5.82630	9.52763
56	7.11335	9.13889	10.80881	20.86559	0.82814	0.90495	5.90260	11.82216
57	7.87544	10.24504	12.21872	21.42163	0.84052	0.91847	5.99079	14.11670
58	8.63753	11.35120	13.62865	22.04091	0.85463	0.93389	6.09137	16.41122
59	9.39961	12.45737	15.03857	22.72806	0.87056	0.95130	6.20492	18.70573
60	10.16170	13.56352	16.44847	23.48827	0.88840	0.97080	6.33210	21.00026
61	10.92379	14.66968	17.85837	24.32733	0.90826	0.99250	6.47367	23.29478
62	11.68587	15.77583	19.26828	25.25186	0.93026	1.01654	6.63045	25.58923
63	12.44796	16.88197	20.67818	26.26927	0.95453	1.04305	6.80340	27.88379
64	13.21005	17.98811	22.08809	27.38788	0.98121	1.07221	6.99358	30.17831
65	13.97214	19.09424	23.49800	28.61691	1.01047	1.10419	7.20217	32.47290



**Table A-63**  
**Jefferson 1999 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	2.15752	2.23981	2.56552	3.95621	2.47250	2.67282	19.08861	0.91266
4	1.97642	2.05260	2.35814	3.99715	2.36837	2.56024	18.28467	0.87295
5	1.86729	1.93992	2.23392	4.03809	2.27184	2.45590	17.53944	0.83999
6	1.79421	1.86467	2.15137	4.07903	2.18235	2.35915	16.84851	0.81327
7	1.74179	1.81093	2.09272	4.11997	2.09936	2.26944	16.20779	0.79230
8	1.70231	1.77073	2.04905	4.16091	2.02239	2.18624	15.61361	0.77658
9	1.67150	1.73963	2.01541	4.20185	1.95102	2.10908	15.06258	0.76565
10	1.64679	1.71496	1.98882	4.24279	1.88484	2.03754	14.55163	0.75908
11	1.62652	1.69500	1.96738	4.28373	1.82349	1.97122	14.07799	0.75643
12	1.60962	1.67859	1.94981	4.32467	1.76664	1.90977	13.63913	0.75729
13	1.59531	1.66496	1.93522	4.36561	1.71400	1.85287	13.23272	0.76127
14	1.58305	1.65351	1.92299	4.40654	1.66529	1.80021	12.85667	0.76800
15	1.57244	1.64381	1.91263	4.44748	1.62027	1.75154	12.50905	0.77713
16	1.56318	1.63555	1.90379	4.48842	1.57870	1.70660	12.18814	0.78832
17	1.55504	1.62846	1.89620	4.52936	1.54038	1.66518	11.89232	0.80125
18	1.54783	1.62236	1.88965	4.57030	1.50513	1.62707	11.62017	0.81563
19	1.54141	1.61707	1.88395	4.61124	1.47278	1.59210	11.37039	0.83116
20	1.54333	1.61261	1.87935	4.65218	1.44317	1.56009	11.14178	0.84759
21	1.55254	1.62029	1.88875	4.69312	1.41616	1.53090	10.93330	0.86467
22	1.56095	1.62741	1.89743	4.73405	1.39164	1.50438	10.74395	0.88217
23	1.56866	1.63402	1.90546	4.77499	1.36948	1.48043	10.57289	0.89989
24	1.57577	1.64018	1.91291	4.81593	1.34959	1.45893	10.41933	0.91764
25	1.58234	1.64593	1.91986	4.85687	1.33188	1.43979	10.28259	0.93524
26	1.58844	1.65131	1.92634	4.89781	1.31627	1.42291	10.16208	0.95253
27	1.59412	1.65636	1.93241	4.93875	1.30269	1.40823	10.05724	0.96939
28	1.59943	1.66109	1.93810	4.97969	1.29108	1.39568	9.96763	0.98569
29	1.60441	1.66554	1.94346	5.02063	1.28140	1.38521	9.89286	1.00134
30	1.60909	1.66972	1.94849	5.06157	1.27359	1.37677	9.83259	1.01624
31	1.61350	1.67365	1.95325	5.10251	1.26763	1.37033	9.78658	1.03035
32	1.61767	1.67736	1.95775	5.14345	1.26349	1.36586	9.75464	1.04361
33	1.62163	1.68085	1.96202	5.18439	1.26116	1.36333	9.73661	1.05600
34	1.62539	1.68415	1.96607	5.22532	1.26062	1.36275	9.73242	1.06751
35	1.62897	1.68727	1.96994	5.26627	1.26187	1.36410	9.74206	1.07814
36	1.63240	1.69022	1.97364	5.30720	1.26491	1.36739	9.76557	1.08793
37	1.63569	1.69303	1.97719	5.34814	1.26976	1.37264	9.80305	1.09692
38	1.63884	1.69570	1.98061	5.38908	1.27645	1.37986	9.85464	1.10517
39	1.64189	1.69825	1.98393	5.43002	1.28499	1.38910	9.92059	1.11277
40	1.64484	1.70070	1.98716	5.47096	1.29543	1.40038	10.00118	1.11981
41	1.64770	1.70307	1.99032	5.51190	1.30781	1.41376	10.09674	1.12642
42	1.65048	1.70537	1.99344	5.55284	1.32218	1.42930	10.20770	1.13274
43	1.65320	1.70762	1.99654	5.59378	1.33861	1.44706	10.33456	1.13891
44	1.65587	1.70984	1.99962	5.63472	1.35717	1.46712	10.47784	1.14511
45	1.65850	1.71204	2.00273	5.67566	1.37794	1.48958	10.63821	1.15153
46	1.66110	1.71425	2.00588	5.71660	1.40102	1.51453	10.81639	1.15838
47	1.66368	1.71649	2.00909	5.75754	1.42651	1.54208	11.01318	1.16589
48	1.66626	1.71878	2.01239	5.79848	1.45453	1.57237	11.22948	1.17430
49	1.72269	1.78589	2.09248	5.83941	1.48520	1.60553	11.46631	1.21254
50	1.77913	1.85300	2.17256	5.88035	1.51868	1.64172	11.72476	1.25078
51	1.83557	1.92010	2.25265	5.92129	1.55511	1.68111	12.00607	1.28901
52	1.89201	1.98721	2.33274	5.96223	1.59469	1.72389	12.31161	1.32725
53	1.94845	2.05432	2.41282	6.00317	1.63760	1.77027	12.64286	1.36549
54	2.00489	2.12143	2.49291	6.04411	1.68405	1.82049	13.00146	1.40373
55	2.06133	2.18854	2.57300	6.08505	1.73428	1.87478	13.38927	1.44196
56	2.11776	2.25564	2.65308	6.12599	1.78854	1.93344	13.80820	1.48020
57	2.17420	2.32275	2.73317	6.16693	1.84712	1.99677	14.26050	1.51844
58	2.23064	2.38986	2.81325	6.20787	1.91034	2.06511	14.74851	1.55668
59	2.28708	2.45697	2.89334	6.24881	1.97852	2.13881	15.27493	1.59491
60	2.34352	2.52407	2.97343	6.28975	2.05205	2.21830	15.84261	1.63315
61	2.39996	2.59118	3.05351	6.33069	2.13134	2.30401	16.45471	1.67139
62	2.45640	2.65829	3.13360	6.37162	2.21684	2.39644	17.11478	1.70963
63	2.51283	2.72540	3.21369	6.41257	2.30904	2.49611	17.82661	1.74787
64	2.56927	2.79251	3.29377	6.45350	2.40849	2.60362	18.59444	1.78610
65	2.62571	2.85961	3.37386	6.49444	2.51580	2.71962	19.42288	1.82434

**Table A-64**  
**Jefferson 1999 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	9.99027	10.31307	12.62240	16.26234	1.49247	1.94522	5.02410	16.71082
4	7.14981	7.42753	9.05106	12.78835	1.41696	1.84680	4.76991	14.42941
5	5.61174	5.84896	7.08915	10.81839	1.34645	1.75491	4.53256	12.73967
6	4.65565	4.86035	5.85696	9.49002	1.28058	1.66905	4.31082	11.46427
7	4.00685	4.18615	5.01543	8.49840	1.21901	1.58879	4.10353	10.48495
8	3.62290	3.76774	4.48845	7.83847	1.16141	1.51373	3.90965	9.72115
9	3.32652	3.44547	4.08342	7.27318	1.10751	1.44348	3.72820	9.11687
10	3.08309	3.18378	3.75603	6.77041	1.05704	1.37770	3.55831	8.63244
11	2.87819	2.96623	3.48531	6.32017	1.00976	1.31608	3.39915	8.23925
12	2.70219	2.78177	3.25711	5.91481	0.96545	1.25832	3.24997	7.91631
13	2.54840	2.62273	3.06155	5.54824	0.92389	1.20415	3.11007	7.64804
14	2.41204	2.48357	2.89154	5.21551	0.88490	1.15333	2.97882	7.42264
15	2.28962	2.36024	2.74185	4.91250	0.84830	1.10563	2.85561	7.23111
16	2.17849	2.24969	2.60856	4.63572	0.81393	1.06084	2.73991	7.06649
17	2.07665	2.14958	2.48867	4.38222	0.78164	1.01875	2.63122	6.92333
18	1.98253	2.05812	2.37986	4.14943	0.75129	0.97920	2.52906	6.79737
19	1.89490	1.97387	2.28030	3.93514	0.72276	0.94201	2.43300	6.68523
20	1.81143	1.89808	2.19163	3.74646	0.69592	0.90703	2.34266	6.58422
21	1.74253	1.83013	2.11049	3.58621	0.67067	0.87412	2.25766	6.49223
22	1.67939	1.76787	2.03631	3.43934	0.64690	0.84314	2.17765	6.40758
23	1.62125	1.71057	1.96818	3.30454	0.62453	0.81398	2.10233	6.32895
24	1.56749	1.65760	1.90533	3.18063	0.60346	0.78652	2.03140	6.25532
25	1.51758	1.60845	1.84711	3.06659	0.58361	0.76065	1.96460	6.18592
26	1.47108	1.56270	1.79300	2.96150	0.56491	0.73628	1.90166	6.12016
27	1.42762	1.51999	1.74257	2.86453	0.54730	0.71332	1.84236	6.05761
28	1.38688	1.48003	1.69543	2.77496	0.53070	0.69169	1.78648	5.99799
29	1.34859	1.44255	1.65127	2.69213	0.51505	0.67130	1.73382	5.94111
30	1.31250	1.40735	1.60982	2.61544	0.50031	0.65208	1.68420	5.88685
31	1.27842	1.37424	1.57085	2.54438	0.48642	0.63398	1.63743	5.83519
32	1.24617	1.34304	1.53416	2.47847	0.47333	0.61692	1.59336	5.78610
33	1.21557	1.31363	1.49957	2.41729	0.46100	0.60084	1.55185	5.73965
34	1.18651	1.28586	1.46692	2.36045	0.44938	0.58570	1.51275	5.69585
35	1.15884	1.25962	1.43607	2.30760	0.43844	0.57145	1.47593	5.65480
36	1.13246	1.23481	1.40690	2.25845	0.42815	0.55803	1.44127	5.61652
37	1.10727	1.21134	1.37929	2.21270	0.41846	0.54541	1.40867	5.58107
38	1.08318	1.18910	1.35315	2.17010	0.40936	0.53354	1.37802	5.54849
39	1.06011	1.16803	1.32836	2.13042	0.40080	0.52239	1.34922	5.51879
40	1.03798	1.14804	1.30485	2.09346	0.39277	0.51192	1.32219	5.49195
41	1.01673	1.12906	1.28252	2.05902	0.38524	0.50211	1.29684	5.46798
42	0.99630	1.11102	1.26130	2.02695	0.37819	0.49291	1.27309	5.44676
43	0.97662	1.09385	1.24110	1.99709	0.37159	0.48431	1.25088	5.42815
44	0.95764	1.07748	1.22186	1.96929	0.36543	0.47628	1.23014	5.41207
45	0.93932	1.06186	1.20349	1.94344	0.35969	0.46880	1.21081	5.39827
46	0.92160	1.04690	1.18593	1.91943	0.35435	0.46184	1.19283	5.38650
47	0.90445	1.03254	1.16910	1.89715	0.34939	0.45538	1.17615	5.37641
48	0.88811	1.01875	1.15290	1.87659	0.34481	0.44941	1.16073	5.36758
49	0.88479	1.01548	1.14886	1.85838	0.34059	0.44391	1.14651	5.36758
50	0.88167	1.01240	1.14504	1.84192	0.33671	0.43886	1.13347	5.36758
51	0.87872	1.00949	1.14145	1.82710	0.33318	0.43425	1.12157	5.36758
52	0.87594	1.00675	1.13806	1.81387	0.32997	0.43006	1.11076	5.36758
53	0.87331	1.00415	1.13485	1.80216	0.32708	0.42630	1.10103	5.36758
54	0.87081	1.00170	1.13181	1.79191	0.32450	0.42293	1.09235	5.36758
55	0.86845	0.99937	1.12894	1.78307	0.32222	0.41997	1.08468	5.36758
56	0.89245	1.03092	1.16889	1.77561	0.32024	0.41739	1.07802	5.48002
57	0.91656	1.06258	1.20898	1.76950	0.31855	0.41519	1.07234	5.59246
58	0.94078	1.09435	1.24920	1.76470	0.31716	0.41337	1.06764	5.70490
59	0.96509	1.12621	1.28954	1.76120	0.31604	0.41191	1.06388	5.81734
60	0.98950	1.15816	1.33000	1.75899	0.31521	0.41083	1.06108	5.92977
61	1.01399	1.19020	1.37056	1.75806	0.31465	0.41010	1.05921	6.04221
62	1.03857	1.22232	1.41122	1.75841	0.31438	0.40974	1.05828	6.15465
63	1.06322	1.25451	1.45197	1.76006	0.31438	0.40974	1.05828	6.26709
64	1.08794	1.28677	1.49281	1.76301	0.31465	0.41011	1.05922	6.37953
65	1.11273	1.31910	1.53373	1.76728	0.31521	0.41083	1.06108	6.49197

**Table A-65**  
**Jefferson 1999 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	72.16289	83.71730	106.85434	145.58456	5.10315	5.57644	36.37282	189.69540
4	55.92287	64.93492	82.60660	133.01433	4.70313	5.13931	33.52165	151.28627
5	46.13997	53.49872	67.60085	121.79713	4.34236	4.74509	30.95029	123.56393
6	39.60559	45.82127	57.42674	111.77161	4.01657	4.38908	28.62819	103.10712
7	34.93582	40.32736	50.10597	102.79710	3.72199	4.06718	26.52856	87.70372
8	31.43497	36.21303	44.60915	94.75142	3.45530	3.77575	24.62772	75.88855
9	28.71460	33.02402	40.34557	87.52782	3.21356	3.51159	22.90471	66.66991
10	26.54103	30.48433	36.95186	81.03300	2.99418	3.27186	21.34103	59.36191
11	24.76498	28.41656	34.19235	75.18542	2.79485	3.05405	19.92036	53.48161
12	23.28690	26.70152	31.90779	69.91341	2.61355	2.85594	18.62811	48.68257
13	22.03757	25.25632	29.98694	65.15430	2.44846	2.67554	17.45146	44.71213
14	20.96761	24.02135	28.34996	60.85271	2.29797	2.51110	16.37889	41.38356
15	20.04076	22.95296	26.93803	56.96045	2.16067	2.36106	15.40024	38.55670
16	19.22977	22.01820	25.70715	53.43446	2.03527	2.22403	14.50646	36.12532
17	18.51387	21.19203	24.62373	50.23724	1.92064	2.09877	13.68943	34.00792
18	17.87691	20.45502	23.66165	47.33530	1.81577	1.98417	12.94196	32.14177
19	17.30614	19.79198	22.80063	44.69919	1.71975	1.87924	12.25756	30.47789
20	16.60677	19.10152	21.96237	42.30295	1.63177	1.78311	11.63054	28.97832
21	15.78996	18.25346	20.98575	40.12326	1.55112	1.69498	11.05567	27.61322
22	15.04622	17.47748	20.09550	38.13974	1.47714	1.61414	10.52837	26.35959
23	14.36598	16.76399	19.28000	36.33406	1.40925	1.53995	10.04449	25.19931
24	13.74133	16.10516	18.52972	34.69011	1.34693	1.47185	9.60030	24.11847
25	13.16561	15.49466	17.83679	33.19356	1.28971	1.40932	9.19246	23.10655
26	12.63327	14.92722	17.19467	31.83151	1.23717	1.35191	8.81799	22.15533
27	12.13960	14.39851	16.59795	30.59253	1.18894	1.29920	8.47418	21.25891
28	11.68057	13.90494	16.04204	29.46651	1.14466	1.25082	8.15861	20.41264
29	11.25275	13.44347	15.52309	28.44453	1.10404	1.20644	7.86910	19.61349
30	10.85316	13.01151	15.03779	27.51842	1.06681	1.16575	7.60369	18.85912
31	10.47921	12.60683	14.58332	26.68106	1.03270	1.12848	7.36061	18.14764
32	10.12864	12.22746	14.15722	25.92619	1.00151	1.09440	7.13829	17.47786
33	9.79945	11.87168	13.75735	25.24818	0.97303	1.06327	6.93530	16.84915
34	9.48989	11.53795	13.38179	24.64206	0.94708	1.03492	6.75033	16.26027
35	9.19838	11.22485	13.02886	24.10344	0.92350	1.00915	6.58228	15.71097
36	8.92352	10.93108	12.69701	23.62852	0.90216	0.98582	6.43012	15.19997
37	8.66404	10.65546	12.38488	23.21400	0.88290	0.96479	6.29290	14.72708
38	8.41881	10.39687	12.09118	22.85693	0.86564	0.94592	6.16983	14.29081
39	8.18680	10.15425	11.81470	22.55496	0.85025	0.92911	6.06020	13.89019
40	7.96704	9.92662	11.55435	22.30600	0.83667	0.91426	5.96335	13.52397
41	7.75869	9.71302	11.30908	22.10835	0.82480	0.90129	5.87874	13.19066
42	7.56094	9.51250	11.07784	21.96071	0.81457	0.89012	5.80589	12.88817
43	7.37304	9.32412	10.85968	21.86211	0.80595	0.88069	5.74438	12.61464
44	7.19430	9.14695	10.65361	21.81189	0.79886	0.87295	5.69388	12.36731
45	7.02405	8.97996	10.45870	21.80971	0.79328	0.86685	5.65411	12.14364
46	6.86162	8.82207	10.27393	21.85555	0.78917	0.86236	5.62484	11.94036
47	6.70640	8.67213	10.09828	21.94972	0.78652	0.85946	5.60591	11.75350
48	6.55774	8.52886	9.93071	22.09288	0.78530	0.85813	5.59723	11.57913
49	6.55774	8.52886	9.93071	22.28592	0.78551	0.85836	5.59875	11.57913
50	6.55774	8.52886	9.93071	22.53020	0.78716	0.86016	5.61046	11.57913
51	6.55774	8.52886	9.93071	22.82724	0.79024	0.86353	5.63243	11.57913
52	6.55774	8.52886	9.93071	23.17920	0.79478	0.86849	5.66480	11.57913
53	6.55774	8.52886	9.93071	23.58838	0.80080	0.87507	5.70774	11.57913
54	6.55774	8.52886	9.93071	24.05771	0.80834	0.88331	5.76147	11.57913
55	6.55774	8.52886	9.93071	24.59036	0.81744	0.89325	5.82630	11.57913
56	7.36868	9.75554	11.47021	25.19019	0.82814	0.90495	5.90260	14.36772
57	8.17962	10.98222	13.00970	25.86148	0.84052	0.91847	5.99079	17.15631
58	8.99057	12.20890	14.54921	26.60910	0.85463	0.93389	6.09137	19.94489
59	9.80151	13.43558	16.08870	27.43867	0.87056	0.95130	6.20492	22.73346
60	10.61245	14.66226	17.62817	28.35646	0.88840	0.97080	6.33210	25.52203
61	11.42340	15.88893	19.16765	29.36945	0.90826	0.99250	6.47367	28.31061
62	12.23434	17.11560	20.70714	30.48560	0.93026	1.01654	6.63045	31.09917
63	13.04528	18.34227	22.24661	31.71388	0.95453	1.04305	6.80340	33.88779
64	13.85623	19.56892	23.78610	33.06433	0.98121	1.07221	6.99358	36.67636
65	14.66717	20.79559	25.32561	34.54808	1.01047	1.10419	7.20217	39.46494

**Table A-66**  
**Jefferson 1999 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	2.17468	2.24957	2.55577	3.90181	2.47250	2.67282	19.08861	0.82775
4	1.99118	2.06072	2.34667	3.94219	2.36837	2.56024	18.28467	0.79173
5	1.88071	1.94713	2.22139	3.98256	2.27184	2.45590	17.53944	0.76184
6	1.80682	1.87131	2.13810	4.02294	2.18235	2.35915	16.84851	0.73761
7	1.75387	1.81718	2.07888	4.06331	2.09936	2.26944	16.20779	0.71858
8	1.71405	1.77670	2.03473	4.10369	2.02239	2.18624	15.61361	0.70432
9	1.68301	1.74537	2.00067	4.14407	1.95102	2.10908	15.06258	0.69442
10	1.65813	1.72051	1.97369	4.18444	1.88484	2.03754	14.55163	0.68845
11	1.63774	1.70037	1.95187	4.22482	1.82349	1.97122	14.07799	0.68605
12	1.62076	1.68382	1.93394	4.26519	1.76664	1.90977	13.63913	0.68683
13	1.60639	1.67003	1.91900	4.30557	1.71400	1.85287	13.23272	0.69044
14	1.59408	1.65843	1.90642	4.34595	1.66529	1.80021	12.85667	0.69655
15	1.58344	1.64859	1.89572	4.38632	1.62027	1.75154	12.50905	0.70483
16	1.57415	1.64017	1.88654	4.42670	1.57870	1.70660	12.18814	0.71498
17	1.56598	1.63294	1.87861	4.46708	1.54038	1.66518	11.89232	0.72671
18	1.55876	1.62669	1.87172	4.50745	1.50513	1.62707	11.62017	0.73974
19	1.55232	1.62125	1.86570	4.54783	1.47278	1.59210	11.37039	0.75383
20	1.55433	1.61654	1.86064	4.58821	1.44317	1.56009	11.14178	0.76873
21	1.56374	1.62409	1.86971	4.62858	1.41616	1.53090	10.93330	0.78422
22	1.57233	1.63107	1.87804	4.66895	1.39164	1.50438	10.74395	0.80010
23	1.58020	1.63755	1.88575	4.70933	1.36948	1.48043	10.57289	0.81617
24	1.58743	1.64357	1.89289	4.74971	1.34959	1.45893	10.41933	0.83226
25	1.59413	1.64919	1.89952	4.79009	1.33188	1.43979	10.28259	0.84822
26	1.60033	1.65444	1.90571	4.83046	1.31627	1.42291	10.16208	0.86391
27	1.60611	1.65935	1.91149	4.87084	1.30269	1.40823	10.05724	0.87920
28	1.61149	1.66396	1.91691	4.91121	1.29108	1.39568	9.96763	0.89398
29	1.61654	1.66828	1.92198	4.95159	1.28140	1.38521	9.89286	0.90817
30	1.62127	1.67234	1.92676	4.99197	1.27359	1.37677	9.83259	0.92169
31	1.62572	1.67616	1.93126	5.03234	1.26763	1.37033	9.78658	0.93449
32	1.62992	1.67975	1.93551	5.07272	1.26349	1.36586	9.75464	0.94652
33	1.63390	1.68313	1.93954	5.11310	1.26116	1.36333	9.73661	0.95775
34	1.63767	1.68632	1.94336	5.15347	1.26062	1.36275	9.73242	0.96819
35	1.64125	1.68933	1.94699	5.19385	1.26187	1.36410	9.74206	0.97783
36	1.64467	1.69218	1.95046	5.23423	1.26491	1.36739	9.76557	0.98671
37	1.64793	1.69487	1.95378	5.27460	1.26976	1.37264	9.80305	0.99486
38	1.65106	1.69744	1.95697	5.31498	1.27645	1.37986	9.85464	1.00234
39	1.65406	1.69989	1.96005	5.35535	1.28499	1.38910	9.92059	1.00924
40	1.65695	1.70224	1.96305	5.39573	1.29543	1.40038	10.00118	1.01563
41	1.65975	1.70449	1.96596	5.43610	1.30781	1.41376	10.09674	1.02162
42	1.66246	1.70668	1.96882	5.47648	1.32218	1.42930	10.20770	1.02735
43	1.66510	1.70881	1.97165	5.51686	1.33861	1.44706	10.33456	1.03294
44	1.66767	1.71091	1.97445	5.55724	1.35717	1.46712	10.47784	1.03857
45	1.67019	1.71298	1.97725	5.59761	1.37794	1.48958	10.63821	1.04439
46	1.67266	1.71505	1.98007	5.63799	1.40102	1.51453	10.81639	1.05060
47	1.67511	1.71714	1.98294	5.67836	1.42651	1.54208	11.01318	1.05741
48	1.67753	1.71926	1.98585	5.71874	1.45453	1.57237	11.22948	1.06504
49	1.73414	1.78631	2.06460	5.75912	1.48520	1.60553	11.46631	1.09972
50	1.79076	1.85336	2.14335	5.79949	1.51868	1.64172	11.72476	1.13440
51	1.84738	1.92041	2.22209	5.83986	1.55511	1.68111	12.00607	1.16908
52	1.90399	1.98747	2.30084	5.88025	1.59469	1.72389	12.31161	1.20376
53	1.96061	2.05452	2.37959	5.92062	1.63760	1.77027	12.64286	1.23844
54	2.01723	2.12157	2.45834	5.96099	1.68405	1.82049	13.00146	1.27312
55	2.07384	2.18863	2.53709	6.00137	1.73428	1.87478	13.38927	1.30781
56	2.13046	2.25568	2.61583	6.04175	1.78854	1.93344	13.80820	1.34248
57	2.18708	2.32273	2.69458	6.08213	1.84712	1.99677	14.26050	1.37716
58	2.24370	2.38978	2.77333	6.12250	1.91034	2.06511	14.74851	1.41185
59	2.30031	2.45683	2.85208	6.16288	1.97852	2.13881	15.27493	1.44653
60	2.35693	2.52388	2.93082	6.20325	2.05205	2.21830	15.84261	1.48120
61	2.41355	2.59094	3.00957	6.24363	2.13134	2.30401	16.45471	1.51589
62	2.47016	2.65799	3.08832	6.28401	2.21684	2.39644	17.11478	1.55056
63	2.52678	2.72504	3.16707	6.32438	2.30904	2.49611	17.82661	1.58525
64	2.58340	2.79209	3.24581	6.36476	2.40849	2.60362	18.59444	1.61992
65	2.64001	2.85914	3.32456	6.40514	2.51580	2.71962	19.42288	1.65460

**Table A-67**  
**Jefferson 1999 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	10.47620	10.66282	13.04739	17.14752	1.49247	1.94522	5.02410	16.93890
4	7.45721	7.63457	9.29759	13.36086	1.41696	1.84680	4.76991	14.65915
5	5.83096	5.98874	7.25242	11.23901	1.34645	1.75491	4.53256	12.97063
6	4.82396	4.96295	5.97466	9.82367	1.28058	1.66905	4.31082	11.69615
7	4.14265	4.26595	5.10545	8.77658	1.21901	1.58879	4.10353	10.71753
8	3.74531	3.83839	4.56770	8.09243	1.16141	1.51373	3.90965	9.95429
9	3.43865	3.50981	4.15527	7.50855	1.10751	1.44348	3.72820	9.35044
10	3.18621	3.24323	3.82211	6.98983	1.05704	1.37770	3.55831	8.86637
11	2.97322	3.02182	3.54680	6.52562	1.00976	1.31608	3.39915	8.47345
12	2.78983	2.83428	3.31489	6.10783	0.96545	1.25832	3.24997	8.15075
13	2.62919	2.67275	3.11630	5.73006	0.92389	1.20415	3.11007	7.88267
14	2.48640	2.53157	2.94380	5.38712	0.88490	1.15333	2.97882	7.65744
15	2.35787	2.40658	2.79203	5.07470	0.84830	1.10563	2.85561	7.46604
16	2.24092	2.29467	2.65703	4.78922	0.81393	1.06084	2.73991	7.30154
17	2.13347	2.19345	2.53570	4.52758	0.78164	1.01875	2.63122	7.15849
18	2.03393	2.10107	2.42570	4.28716	0.75129	0.97920	2.52906	7.03261
19	1.94104	2.01608	2.32514	4.06567	0.72276	0.94201	2.43300	6.92055
20	1.85385	1.93935	2.23536	3.87134	0.69592	0.90703	2.34266	6.81962
21	1.78347	1.86998	2.15262	3.70753	0.67067	0.87412	2.25766	6.72769
22	1.71895	1.80641	2.07699	3.55739	0.64690	0.84314	2.17765	6.64310
23	1.65951	1.74788	2.00751	3.41957	0.62453	0.81398	2.10233	6.56453
24	1.60452	1.69376	1.94340	3.29287	0.60346	0.78652	2.03140	6.49096
25	1.55345	1.64352	1.88401	3.17624	0.58361	0.76065	1.96460	6.42161
26	1.50586	1.59675	1.82881	3.06874	0.56491	0.73628	1.90166	6.35589
27	1.46135	1.55308	1.77734	2.96952	0.54730	0.71332	1.84236	6.29339
28	1.41961	1.51220	1.72924	2.87784	0.53070	0.69169	1.78648	6.23381
29	1.38035	1.47385	1.68416	2.79303	0.51505	0.67130	1.73382	6.17697
30	1.34334	1.43782	1.64184	2.71448	0.50031	0.65208	1.68420	6.12275
31	1.30838	1.40392	1.60205	2.64167	0.48642	0.63398	1.63743	6.07113
32	1.27526	1.37197	1.56457	2.57412	0.47333	0.61692	1.59336	6.02208
33	1.24384	1.34184	1.52922	2.51137	0.46100	0.60084	1.55185	5.97566
34	1.21397	1.31338	1.49585	2.45306	0.44938	0.58570	1.51275	5.93189
35	1.18553	1.28649	1.46432	2.39881	0.43844	0.57145	1.47593	5.89086
36	1.15840	1.26105	1.43448	2.34832	0.42815	0.55803	1.44127	5.85262
37	1.13247	1.23697	1.40624	2.30130	0.41846	0.54541	1.40867	5.81719
38	1.10767	1.21415	1.37948	2.25749	0.40936	0.53354	1.37802	5.78463
39	1.08390	1.19252	1.35410	2.21665	0.40080	0.52239	1.34922	5.75496
40	1.06109	1.17199	1.33001	2.17859	0.39277	0.51192	1.32219	5.72814
41	1.03917	1.15249	1.30713	2.14309	0.38524	0.50211	1.29684	5.70418
42	1.01809	1.13395	1.28536	2.11001	0.37819	0.49291	1.27309	5.68298
43	0.99777	1.11630	1.26464	2.07917	0.37159	0.48431	1.25088	5.66438
44	0.97817	1.09947	1.24489	2.05044	0.36543	0.47628	1.23014	5.64831
45	0.95923	1.08339	1.22603	2.02369	0.35969	0.46880	1.21081	5.63452
46	0.94091	1.06800	1.20798	1.99881	0.35435	0.46184	1.19283	5.62276
47	0.92316	1.05321	1.19067	1.97570	0.34939	0.45538	1.17615	5.61267
48	0.90625	1.03900	1.17402	1.95433	0.34481	0.44941	1.16073	5.60386
49	0.90260	1.03540	1.16955	1.93534	0.34059	0.44391	1.14651	5.60386
50	0.89916	1.03200	1.16534	1.91813	0.33671	0.43886	1.13347	5.60386
51	0.89591	1.02880	1.16137	1.90264	0.33318	0.43425	1.12157	5.60386
52	0.89285	1.02578	1.15763	1.88877	0.32997	0.43006	1.11076	5.60386
53	0.88995	1.02292	1.15409	1.87646	0.32708	0.42630	1.10103	5.60386
54	0.88720	1.02022	1.15074	1.86566	0.32450	0.42293	1.09235	5.60386
55	0.88461	1.01765	1.14756	1.85631	0.32222	0.41997	1.08468	5.60386
56	0.90849	1.04925	1.18743	1.84837	0.32024	0.41739	1.07802	5.71621
57	0.93250	1.08097	1.22745	1.84181	0.31855	0.41519	1.07234	5.82857
58	0.95662	1.11281	1.26761	1.83660	0.31716	0.41337	1.06764	5.94093
59	0.98086	1.14475	1.30791	1.83272	0.31604	0.41191	1.06388	6.05329
60	1.00519	1.17679	1.34833	1.83015	0.31521	0.41083	1.06108	6.16565
61	1.02962	1.20893	1.38887	1.82890	0.31465	0.41010	1.05921	6.27800
62	1.05414	1.24115	1.42952	1.82896	0.31438	0.40974	1.05828	6.39036
63	1.07874	1.27346	1.47027	1.83033	0.31438	0.40974	1.05828	6.50272
64	1.10342	1.30585	1.51112	1.83303	0.31465	0.41011	1.05922	6.61507
65	1.12818	1.33830	1.55205	1.83709	0.31521	0.41083	1.06108	6.72743

**Table A-68**  
**Jefferson 1999 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	72.63017	84.57623	108.01855	148.97975	5.10315	5.57644	36.37282	194.40894
4	56.27689	65.59618	83.49467	136.11646	4.70313	5.13931	33.52165	155.04539
5	46.42393	54.03278	68.31134	124.63760	4.34236	4.74509	30.95029	126.63425
6	39.84218	46.26779	58.01440	114.37827	4.01657	4.38908	28.62819	105.66908
7	35.13846	40.71085	50.60452	105.19447	3.72199	4.06718	26.52856	89.88295
8	31.61221	36.54953	45.04068	96.96115	3.45530	3.77575	24.62772	77.77420
9	28.87224	33.32455	40.72530	89.56912	3.21356	3.51159	22.90471	68.32649
10	26.68311	30.75670	37.29059	82.92284	2.99418	3.27186	21.34103	60.83693
11	24.89449	28.66640	34.49797	76.93881	2.79485	3.05405	19.92036	54.81053
12	23.40599	26.93301	32.18623	71.54385	2.61355	2.85594	18.62811	49.89221
13	22.14795	25.47255	30.24269	66.63760	2.44846	2.67554	17.45146	45.82317
14	21.07056	24.22475	28.58650	62.27187	2.29797	2.51110	16.37889	42.41187
15	20.13728	23.14528	27.15811	58.28886	2.16067	2.36106	15.40024	39.51472
16	19.32069	22.20088	25.91295	54.68063	2.03527	2.22403	14.50646	37.02293
17	18.59982	21.36613	24.81699	51.40883	1.92064	2.09877	13.68943	34.85294
18	17.95842	20.62134	23.84380	48.43921	1.81577	1.98417	12.94196	32.94040
19	17.38364	19.95114	22.97281	45.74168	1.71975	1.87924	12.25756	31.23518
20	16.86068	19.25536	22.12766	43.28951	1.63177	1.78311	11.63054	29.69835
21	15.86068	18.40202	21.14441	41.05901	1.55112	1.69498	11.05567	28.29936
22	15.11399	17.62099	20.24808	39.02919	1.47714	1.61414	10.52837	27.01460
23	14.43099	16.90262	19.42694	37.18141	1.40925	1.53995	10.04449	25.82545
24	13.80374	16.23907	18.67143	35.49919	1.34693	1.47185	9.60030	24.71776
25	13.22558	15.62401	17.97362	33.96765	1.28971	1.40932	9.19246	23.68066
26	12.69094	15.05215	17.32692	32.57384	1.23717	1.35191	8.81799	22.70587
27	12.19509	14.51918	16.72591	31.30602	1.18894	1.29920	8.47418	21.78714
28	11.73402	14.02153	16.16597	30.15373	1.14466	1.25082	8.15861	20.91989
29	11.30427	13.55615	15.64324	29.10788	1.10404	1.20644	7.86910	20.10086
30	10.90285	13.12048	15.15438	28.16016	1.06681	1.16575	7.60369	19.32773
31	10.52719	12.71230	14.69656	27.30331	1.03270	1.12848	7.36061	18.59859
32	10.17502	12.32965	14.26733	26.53085	1.00151	1.09440	7.13829	17.91216
33	9.84433	11.97082	13.86452	25.83699	0.97303	1.06327	6.93530	17.26781
34	9.53338	11.63428	13.48622	25.21672	0.94708	1.03492	6.75033	16.66431
35	9.24057	11.31861	13.13073	24.66557	0.92350	1.00915	6.58228	16.10135
36	8.96451	11.02251	12.79651	24.17957	0.90216	0.98582	6.43012	15.57766
37	8.70393	10.74479	12.48219	23.75534	0.88290	0.96479	6.29290	15.09301
38	8.45768	10.48435	12.18646	23.38998	0.86564	0.94592	6.16983	14.64590
39	8.22473	10.24012	11.90810	23.08096	0.85025	0.92911	6.06020	14.23533
40	8.00413	10.01111	11.64604	22.82619	0.83667	0.91426	5.96335	13.86001
41	7.79500	9.79634	11.39919	22.62393	0.82480	0.90129	5.87874	13.51842
42	7.59656	9.59486	11.16651	22.47285	0.81457	0.89012	5.80589	13.20841
43	7.40803	9.40571	10.94705	22.37198	0.80595	0.88069	5.74438	12.92809
44	7.22872	9.22793	10.73978	22.32057	0.79886	0.87295	5.69388	12.67461
45	7.05795	9.06049	10.54379	22.31836	0.79328	0.86685	5.65411	12.44538
46	6.89506	8.90226	10.35802	22.36523	0.78917	0.86236	5.62484	12.23705
47	6.73940	8.75205	10.18144	22.46162	0.78652	0.85946	5.60591	12.04555
48	6.59033	8.60855	10.01301	22.60811	0.78530	0.85813	5.59723	11.86685
49	6.59033	8.60855	10.01301	22.80566	0.78551	0.85836	5.59875	11.86685
50	6.59033	8.60855	10.01301	23.05559	0.78716	0.86016	5.61046	11.86685
51	6.59033	8.60855	10.01301	23.35959	0.79024	0.86353	5.63243	11.86685
52	6.59033	8.60855	10.01301	23.71976	0.79478	0.86849	5.66480	11.86685
53	6.59033	8.60855	10.01301	24.13846	0.80080	0.87507	5.70774	11.86685
54	6.59033	8.60855	10.01301	24.61874	0.80834	0.88331	5.76147	11.86685
55	6.59033	8.60855	10.01301	25.16383	0.81744	0.89325	5.82630	11.86685
56	7.40897	9.85452	11.57242	25.77766	0.82814	0.90495	5.90260	14.72472
57	8.22761	11.10049	13.13183	26.46458	0.84052	0.91847	5.99079	17.58260
58	9.04625	12.34646	14.69124	27.22966	0.85463	0.93389	6.09137	20.44046
59	9.86489	13.59244	16.25064	28.07861	0.87056	0.95130	6.20492	23.29836
60	10.68353	14.83841	17.81001	29.01776	0.88840	0.97080	6.33210	26.15617
61	11.50218	16.08437	19.36940	30.05437	0.90826	0.99250	6.47367	29.01408
62	12.32082	17.33032	20.92880	31.19656	0.93026	1.01654	6.63045	31.87190
63	13.13946	18.57628	22.48819	32.45349	0.95453	1.04305	6.80340	34.72981
64	13.95811	19.82222	24.04759	33.83545	0.98121	1.07221	6.99358	37.58774
65	14.77674	21.06819	25.60701	35.35378	1.01047	1.10419	7.20217	40.44559

**Table A-69**  
**Jefferson 1999 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	2.17670	2.25086	2.55527	3.89777	2.47250	2.67282	19.08861	0.81913
4	1.99294	2.06183	2.34597	3.93811	2.36837	2.56024	18.28467	0.78349
5	1.88232	1.94813	2.22056	3.97844	2.27184	2.45590	17.53944	0.75391
6	1.80834	1.87224	2.13719	4.01877	2.18235	2.35915	16.84851	0.72993
7	1.75534	1.81807	2.07790	4.05911	2.09936	2.26944	16.20779	0.71110
8	1.71548	1.77755	2.03370	4.09944	2.02239	2.18624	15.61361	0.69700
9	1.68440	1.74619	1.99959	4.13978	1.95102	2.10908	15.06258	0.68719
10	1.65950	1.72130	1.97257	4.18011	1.88484	2.03754	14.55163	0.68129
11	1.63911	1.70115	1.95072	4.22045	1.82349	1.97122	14.07799	0.67891
12	1.62210	1.68457	1.93274	4.26078	1.76664	1.90977	13.63913	0.67968
13	1.60773	1.67077	1.91777	4.30112	1.71400	1.85287	13.23272	0.68326
14	1.59542	1.65915	1.90515	4.34145	1.66529	1.80021	12.85667	0.68930
15	1.58477	1.64929	1.89441	4.38178	1.62027	1.75154	12.50905	0.69750
16	1.57548	1.64086	1.88520	4.42212	1.57870	1.70660	12.18814	0.70754
17	1.56730	1.63361	1.87723	4.46245	1.54038	1.66518	11.89232	0.71914
18	1.56007	1.62734	1.87031	4.50279	1.50513	1.62707	11.62017	0.73204
19	1.55363	1.62189	1.86426	4.54312	1.47278	1.59210	11.37039	0.74598
20	1.55566	1.61715	1.85915	4.58346	1.44317	1.56009	11.14178	0.76073
21	1.56508	1.62469	1.86818	4.62379	1.41616	1.53090	10.93330	0.77606
22	1.57368	1.63166	1.87649	4.66412	1.39164	1.50438	10.74395	0.79177
23	1.58157	1.63812	1.88417	4.70446	1.36948	1.48043	10.57289	0.80768
24	1.58882	1.64413	1.89128	4.74479	1.34959	1.45893	10.41933	0.82360
25	1.59553	1.64974	1.89788	4.78513	1.33188	1.43979	10.28259	0.83940
26	1.60174	1.65498	1.90404	4.82546	1.31627	1.42291	10.16208	0.85492
27	1.60752	1.65988	1.90980	4.86580	1.30269	1.40823	10.05724	0.87005
28	1.61292	1.66447	1.91518	4.90613	1.29108	1.39568	9.96763	0.88468
29	1.61797	1.66878	1.92024	4.94647	1.28140	1.38521	9.89286	0.89872
30	1.62271	1.67283	1.92499	4.98680	1.27359	1.37677	9.83259	0.91210
31	1.62717	1.67663	1.92947	5.02713	1.26763	1.37033	9.78658	0.92477
32	1.63137	1.68021	1.93370	5.06747	1.26349	1.36586	9.75464	0.93667
33	1.63535	1.68358	1.93770	5.10781	1.26116	1.36333	9.73661	0.94779
34	1.63912	1.68676	1.94149	5.14814	1.26062	1.36275	9.73242	0.95811
35	1.64270	1.68976	1.94511	5.18847	1.26187	1.36410	9.74206	0.96766
36	1.64612	1.69260	1.94855	5.22881	1.26491	1.36739	9.76557	0.97644
37	1.64938	1.69529	1.95185	5.26914	1.26976	1.37264	9.80305	0.98451
38	1.65251	1.69784	1.95502	5.30947	1.27645	1.37986	9.85464	0.99192
39	1.65551	1.70028	1.95808	5.34981	1.28499	1.38910	9.92059	0.99874
40	1.65839	1.70262	1.96105	5.39014	1.29543	1.40038	10.00118	1.00506
41	1.66119	1.70487	1.96395	5.43048	1.30781	1.41376	10.09674	1.01099
42	1.66389	1.70704	1.96678	5.47081	1.32218	1.42930	10.20770	1.01666
43	1.66652	1.70916	1.96958	5.51115	1.33861	1.44706	10.33456	1.02220
44	1.66908	1.71124	1.97236	5.55148	1.35717	1.46712	10.47784	1.02776
45	1.67159	1.71330	1.97513	5.59181	1.37794	1.48958	10.63821	1.03352
46	1.67405	1.71536	1.97792	5.63215	1.40102	1.51453	10.81639	1.03967
47	1.67649	1.71744	1.98075	5.67249	1.42651	1.54208	11.01318	1.04641
48	1.67889	1.71955	1.98363	5.71282	1.45453	1.57237	11.22948	1.05396
49	1.73553	1.78660	2.06226	5.75315	1.48520	1.60553	11.46631	1.08828
50	1.79218	1.85366	2.14090	5.79349	1.51868	1.64172	11.72476	1.12260
51	1.84882	1.92071	2.21953	5.83382	1.55511	1.68111	12.00607	1.15692
52	1.90547	1.98777	2.29816	5.87416	1.59469	1.72389	12.31161	1.19124
53	1.96211	2.05483	2.37679	5.91449	1.63760	1.77027	12.64286	1.22556
54	2.01876	2.12189	2.45543	5.95482	1.68405	1.82049	13.00146	1.25988
55	2.07540	2.18894	2.53406	5.99516	1.73428	1.87478	13.38927	1.29420
56	2.13204	2.25600	2.61269	6.03550	1.78854	1.93344	13.80820	1.32852
57	2.18869	2.32306	2.69132	6.07583	1.84712	1.99677	14.26050	1.36283
58	2.24533	2.39011	2.76996	6.11616	1.91034	2.06511	14.74851	1.39715
59	2.30198	2.45717	2.84859	6.15650	1.97852	2.13881	15.27493	1.43147
60	2.35862	2.52422	2.92722	6.19683	2.05205	2.21830	15.84261	1.46579
61	2.41526	2.59128	3.00585	6.23717	2.13134	2.30401	16.45471	1.50011
62	2.47191	2.65834	3.08449	6.27750	2.21684	2.39644	17.11478	1.53443
63	2.52855	2.72539	3.16312	6.31784	2.30904	2.49611	17.82661	1.56875
64	2.58520	2.79245	3.24175	6.35817	2.40849	2.60362	18.59444	1.60307
65	2.64184	2.85951	3.32038	6.39851	2.51580	2.71962	19.42288	1.63739

**Table A-70**  
**Jefferson 1999 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	7.90266	8.76602	10.80094	12.20415	1.49247	1.94522	5.02410	14.87148
4	5.81147	6.48417	7.97582	10.03474	1.41696	1.84680	4.76991	12.56652
5	4.64511	5.19316	6.36285	8.70361	1.34645	1.75491	4.53256	10.85935
6	3.90437	4.36514	5.32214	7.74469	1.28058	1.66905	4.31082	9.57079
7	3.39345	3.79027	4.59725	6.99132	1.21901	1.58879	4.10353	8.58137
8	3.06705	3.41470	4.11744	6.43925	1.16141	1.51373	3.90965	7.80969
9	2.81470	3.12246	3.74514	5.95759	1.10751	1.44348	3.72820	7.19918
10	2.60958	2.88410	3.44334	5.52687	1.05704	1.37770	3.55831	6.70975
11	2.43883	2.68500	3.19300	5.13985	1.00976	1.31608	3.39915	6.31250
12	2.29386	2.51534	2.98129	4.79077	0.96545	1.25832	3.24997	5.98623
13	2.16870	2.36827	2.79922	4.47492	0.92389	1.20415	3.11007	5.71520
14	2.05909	2.23891	2.64033	4.18834	0.88490	1.15333	2.97882	5.48747
15	1.96191	2.12363	2.49988	3.92766	0.84830	1.10563	2.85561	5.29396
16	1.87481	2.01974	2.37430	3.69002	0.81393	1.06084	2.73991	5.12764
17	1.79600	1.92515	2.26085	3.47291	0.78164	1.01875	2.63122	4.98301
18	1.72409	1.83827	2.15742	3.27416	0.75129	0.97920	2.52906	4.85575
19	1.65797	1.75783	2.06235	3.09187	0.72276	0.94201	2.43300	4.74245
20	1.58994	1.68638	1.97836	2.92884	0.69592	0.90703	2.34266	4.64040
21	1.52777	1.62466	1.90380	2.78583	0.67067	0.87412	2.25766	4.54746
22	1.47093	1.56817	1.83564	2.65482	0.64690	0.84314	2.17765	4.46194
23	1.41871	1.51622	1.77305	2.53464	0.62453	0.81398	2.10233	4.38250
24	1.37053	1.46825	1.71531	2.42428	0.60346	0.78652	2.03140	4.30811
25	1.32593	1.42378	1.66183	2.32280	0.58361	0.76065	1.96460	4.23799
26	1.28447	1.38242	1.61213	2.22939	0.56491	0.73628	1.90166	4.17155
27	1.24582	1.34386	1.56581	2.14332	0.54730	0.71332	1.84236	4.10836
28	1.20969	1.30780	1.52252	2.06393	0.53070	0.69169	1.78648	4.04812
29	1.17582	1.27402	1.48198	1.99063	0.51505	0.67130	1.73382	3.99065
30	1.14398	1.24232	1.44394	1.92290	0.50031	0.65208	1.68420	3.93583
31	1.11400	1.21251	1.40819	1.86026	0.48642	0.63398	1.63743	3.88364
32	1.08569	1.18446	1.37454	1.80228	0.47333	0.61692	1.59336	3.83405
33	1.05892	1.15801	1.34284	1.74859	0.46100	0.60084	1.55185	3.78712
34	1.03356	1.13306	1.31294	1.69883	0.44938	0.58570	1.51275	3.74287
35	1.00949	1.10950	1.28471	1.65270	0.43844	0.57145	1.47593	3.70139
36	0.98660	1.08722	1.25804	1.60991	0.42815	0.55803	1.44127	3.66272
37	0.96480	1.06615	1.23283	1.57020	0.41846	0.54541	1.40867	3.62690
38	0.94402	1.04620	1.20898	1.53336	0.40936	0.53354	1.37802	3.59398
39	0.92417	1.02728	1.18639	1.49917	0.40080	0.52239	1.34922	3.56398
40	0.90519	1.00935	1.16500	1.46744	0.39277	0.51192	1.32219	3.53686
41	0.88701	0.99232	1.14471	1.43801	0.38524	0.50211	1.29684	3.51265
42	0.86959	0.97614	1.12546	1.41072	0.37819	0.49291	1.27309	3.49121
43	0.85285	0.96073	1.10716	1.38544	0.37159	0.48431	1.25088	3.47241
44	0.83677	0.94606	1.08976	1.36203	0.36543	0.47628	1.23014	3.45616
45	0.82128	0.93204	1.07317	1.34040	0.35969	0.46880	1.21081	3.44221
46	0.80636	0.91864	1.05733	1.32043	0.35435	0.46184	1.19283	3.43032
47	0.79194	0.90577	1.04217	1.30204	0.34939	0.45538	1.17615	3.42013
48	0.77820	0.89345	1.02764	1.28521	0.34481	0.44941	1.16073	3.41121
49	0.77631	0.89158	1.02536	1.27048	0.34059	0.44391	1.14651	3.41121
50	0.77452	0.88982	1.02321	1.25724	0.33671	0.43886	1.13347	3.41121
51	0.77283	0.88815	1.02118	1.24543	0.33318	0.43425	1.12157	3.41121
52	0.77123	0.88658	1.01927	1.23499	0.32997	0.43006	1.11076	3.41121
53	0.76972	0.88509	1.01746	1.22587	0.32708	0.42630	1.10103	3.41121
54	0.76829	0.88367	1.01574	1.21802	0.32450	0.42293	1.09235	3.41121
55	0.76693	0.88233	1.01411	1.21140	0.32222	0.41997	1.08468	3.41121
56	0.79111	0.91301	1.05406	1.20600	0.32024	0.41739	1.07802	3.52481
57	0.81536	0.94375	1.09408	1.20177	0.31855	0.41519	1.07234	3.63841
58	0.83967	0.97455	1.13418	1.19872	0.31716	0.41337	1.06764	3.75201
59	0.86403	1.00540	1.17435	1.19681	0.31604	0.41191	1.06388	3.86560
60	0.88844	1.03631	1.21458	1.19605	0.31521	0.41083	1.06108	3.97920
61	0.91291	1.06726	1.25486	1.19643	0.31465	0.41010	1.05921	4.09280
62	0.93742	1.09826	1.29521	1.19796	0.31438	0.40974	1.05828	4.20640
63	0.96197	1.12930	1.33560	1.20066	0.31438	0.40974	1.05828	4.32000
64	0.98656	1.16038	1.37605	1.20453	0.31465	0.41011	1.05922	4.43360
65	1.01119	1.19150	1.41654	1.20961	0.31521	0.41083	1.06108	4.54720



**Table A-71**  
**Jefferson 1999 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC
3	69.25053	78.46645	99.33272	121.25668	5.10315	5.57644	36.37282	156.88408
4	53.71642	60.88885	76.85718	110.78705	4.70313	5.13931	33.52165	125.11850
5	44.37029	50.22968	62.99904	101.44427	4.34236	4.74509	30.95029	102.19125
6	38.13132	43.08754	53.62140	93.09404	4.01657	4.38908	28.62819	85.27284
7	33.67336	37.97926	46.87941	85.61922	3.72199	4.06718	26.52856	72.53371
8	30.33087	34.15216	41.81781	78.91801	3.45530	3.77575	24.62772	62.76219
9	27.73280	31.18298	37.89058	72.90154	3.21356	3.51159	22.90471	55.13809
10	25.65614	28.81543	34.76280	67.49200	2.99418	3.27186	21.34103	49.09416
11	23.95862	26.88518	32.21771	62.62158	2.79485	3.05405	19.92036	44.23097
12	22.54529	25.28214	30.10905	58.23053	2.61355	2.85594	18.62811	40.26198
13	21.35030	23.92972	28.33479	54.26671	2.44846	2.67554	17.45146	36.97833
14	20.32660	22.77309	26.82169	50.68391	2.29797	2.51110	16.37889	34.22546
15	19.43970	21.77194	25.51590	47.44209	2.16067	2.36106	15.40024	31.88759
16	18.66365	20.89603	24.37704	44.50529	2.03527	2.22403	14.50646	29.87672
17	17.97871	20.12221	23.37433	41.84238	1.92064	2.09877	13.68943	28.12556
18	17.36948	19.43259	22.48381	39.42535	1.81577	1.98417	12.94196	26.58221
19	16.82379	18.81311	21.68684	37.22974	1.71975	1.87924	12.25756	25.20615
20	16.14680	18.15549	20.89400	35.23393	1.63177	1.78311	11.63054	23.96596
21	15.34986	17.34013	19.96114	33.41849	1.55112	1.69498	11.05567	22.83702
22	14.62458	16.59554	19.11110	31.76642	1.47714	1.61414	10.52837	21.80025
23	13.96159	15.91231	18.33281	30.26245	1.40925	1.53995	10.04449	20.84065
24	13.35313	15.28279	17.61716	28.89323	1.34693	1.47185	9.60030	19.94675
25	12.79266	14.70065	16.95656	27.64676	1.28971	1.40932	9.19246	19.10986
26	12.27470	14.16067	16.34474	26.51233	1.23717	1.35191	8.81799	18.32318
27	11.79461	13.65846	15.77652	25.48039	1.18894	1.29920	8.47418	17.58182
28	11.34840	13.19035	15.24736	24.54254	1.14466	1.25082	8.15861	16.88194
29	10.93267	12.75321	14.75358	23.69133	1.10404	1.20644	7.86910	16.22099
30	10.54445	12.34436	14.29195	22.92000	1.06681	1.16575	7.60369	15.59710
31	10.18120	11.96150	13.85971	22.22256	1.03270	1.12848	7.36061	15.00870
32	9.84065	11.60258	13.45446	21.59386	1.00151	1.09440	7.13829	14.45475
33	9.52083	11.26581	13.07410	21.02914	0.97303	1.06327	6.93530	13.93479
34	9.22000	10.94961	12.71676	20.52429	0.94708	1.03492	6.75033	13.44776
35	8.93660	10.65253	12.38079	20.07568	0.92350	1.00915	6.58228	12.99347
36	8.66924	10.37327	12.06469	19.68013	0.90216	0.98582	6.43012	12.57086
37	8.41668	10.11062	11.76713	19.33485	0.88290	0.96479	6.29290	12.17976
38	8.17780	9.86351	11.48686	19.03748	0.86564	0.94592	6.16983	11.81895
39	7.95159	9.63091	11.22273	18.78596	0.85025	0.92911	6.06020	11.48763
40	7.73713	9.41187	10.97368	18.57860	0.83667	0.91426	5.96335	11.18475
41	7.53358	9.20548	10.73872	18.41397	0.82480	0.90129	5.87874	10.90909
42	7.34018	9.01089	10.51686	18.29102	0.81457	0.89012	5.80589	10.65892
43	7.15620	8.82725	10.30723	18.20889	0.80595	0.88069	5.74438	10.43270
44	6.98099	8.65374	10.10889	18.16707	0.79886	0.87295	5.69388	10.22816
45	6.81392	8.48950	9.92100	18.16525	0.79328	0.86685	5.65411	10.04317
46	6.65440	8.33365	9.74264	18.20341	0.78917	0.86236	5.62484	9.87505
47	6.50186	8.18525	9.57289	18.28186	0.78652	0.85946	5.60591	9.72052
48	6.35574	8.04333	9.41084	18.40109	0.78530	0.85813	5.59723	9.57631
49	6.35574	8.04333	9.41084	18.56187	0.78551	0.85836	5.59875	9.57631
50	6.35574	8.04333	9.41084	18.76530	0.78716	0.86016	5.61046	9.57631
51	6.35574	8.04333	9.41084	19.01274	0.79024	0.86353	5.63243	9.57631
52	6.35574	8.04333	9.41084	19.30589	0.79478	0.86849	5.66480	9.57631
53	6.35574	8.04333	9.41084	19.64668	0.80080	0.87507	5.70774	9.57631
54	6.35574	8.04333	9.41084	20.03760	0.80834	0.88331	5.76147	9.57631
55	6.35574	8.04333	9.41084	20.48123	0.81744	0.89325	5.82630	9.57631
56	7.11889	9.15206	10.82368	20.98082	0.82814	0.90495	5.90260	11.88256
57	7.88203	10.26079	12.23653	21.53993	0.84052	0.91847	5.99079	14.18882
58	8.64518	11.36952	13.64937	22.16263	0.85463	0.93389	6.09137	16.49506
59	9.40832	12.47826	15.06222	22.85358	0.87056	0.95130	6.20492	18.80130
60	10.17147	13.58699	16.47504	23.61798	0.88840	0.97080	6.33210	21.10753
61	10.93462	14.69572	17.88786	24.46169	0.90826	0.99250	6.47367	23.41377
62	11.69776	15.80444	19.30069	25.39133	0.93026	1.01654	6.63045	25.71999
63	12.46091	16.91315	20.71352	26.41435	0.95453	1.04305	6.80340	28.02628
64	13.22406	18.02187	22.12636	27.53914	0.98121	1.07221	6.99358	30.33250
65	13.98720	19.13058	23.53918	28.77495	1.01047	1.10419	7.20217	32.63875

**Table A-72**  
**Jefferson 1999 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGCV	LDDV	LDDT	HDDV	MC
3	2.15834	2.24033	2.56535	3.95256	2.47250	2.67282	19.08861	0.90987
4	1.97714	2.05305	2.35790	3.99346	2.36837	2.56024	18.28467	0.87028
5	1.86796	1.94032	2.23363	4.03436	2.27184	2.45590	17.53944	0.83742
6	1.79484	1.86505	2.15105	4.07526	2.18235	2.35915	16.84851	0.81079
7	1.74239	1.81130	2.09238	4.11616	2.09936	2.26944	16.20779	0.78987
8	1.70290	1.77108	2.04869	4.15707	2.02239	2.18624	15.61361	0.77420
9	1.67208	1.73997	2.01503	4.19797	1.95102	2.10908	15.06258	0.76331
10	1.64736	1.71529	1.98843	4.23887	1.88484	2.03754	14.55163	0.75676
11	1.62709	1.69532	1.96697	4.27977	1.82349	1.97122	14.07799	0.75411
12	1.61018	1.67891	1.94939	4.32067	1.76664	1.90977	13.63913	0.75497
13	1.59586	1.66527	1.93479	4.36157	1.71400	1.85287	13.23272	0.75894
14	1.58360	1.65381	1.92254	4.40247	1.66529	1.80021	12.85667	0.76566
15	1.57299	1.64411	1.91217	4.44338	1.62027	1.75154	12.50905	0.77476
16	1.56373	1.63584	1.90332	4.48428	1.57870	1.70660	12.18814	0.78591
17	1.55558	1.62875	1.89571	4.52518	1.54038	1.66518	11.89232	0.79880
18	1.54838	1.62264	1.88915	4.56608	1.50513	1.62707	11.62017	0.81313
19	1.54195	1.61735	1.88344	4.60698	1.47278	1.59210	11.37039	0.82862
20	1.54388	1.61287	1.87882	4.64788	1.44317	1.56009	11.14178	0.84500
21	1.55310	1.62055	1.88822	4.68878	1.41616	1.53090	10.93330	0.86203
22	1.56151	1.62766	1.89688	4.72968	1.39164	1.50438	10.74395	0.87948
23	1.56923	1.63427	1.90489	4.77058	1.36948	1.48043	10.57289	0.89714
24	1.57634	1.64042	1.91234	4.81148	1.34959	1.45893	10.41933	0.91483
25	1.58292	1.64617	1.91927	4.85239	1.33188	1.43979	10.28259	0.93238
26	1.58902	1.65155	1.92575	4.89329	1.31627	1.42291	10.16208	0.94962
27	1.59471	1.65659	1.93181	4.93419	1.30269	1.40823	10.05724	0.96643
28	1.60002	1.66132	1.93749	4.97509	1.29108	1.39568	9.96763	0.98268
29	1.60500	1.66576	1.94283	5.01599	1.28140	1.38521	9.89286	0.99828
30	1.60968	1.66994	1.94786	5.05689	1.27359	1.37677	9.83259	1.01314
31	1.61410	1.67387	1.95261	5.09780	1.26763	1.37033	9.78658	1.02720
32	1.61828	1.67757	1.95710	5.13870	1.26349	1.36586	9.75464	1.04042
33	1.62223	1.68106	1.96136	5.17960	1.26116	1.36333	9.73661	1.05277
34	1.62599	1.68435	1.96540	5.22050	1.26062	1.36275	9.73242	1.06424
35	1.62958	1.68747	1.96926	5.26140	1.26187	1.36410	9.74206	1.07484
36	1.63300	1.69042	1.97295	5.30230	1.26491	1.36739	9.76557	1.08460
37	1.63629	1.69322	1.97649	5.34320	1.26976	1.37264	9.80305	1.09356
38	1.63945	1.69589	1.97991	5.38411	1.27645	1.37986	9.85464	1.10179
39	1.64249	1.69844	1.98322	5.42500	1.28499	1.38910	9.92059	1.10937
40	1.64544	1.70089	1.98644	5.46591	1.29543	1.40038	10.00118	1.11639
41	1.64829	1.70325	1.98960	5.50681	1.30781	1.41376	10.09674	1.12298
42	1.65107	1.70554	1.99271	5.54771	1.32218	1.42930	10.20770	1.12927
43	1.65379	1.70779	1.99579	5.58861	1.33861	1.44706	10.33456	1.13542
44	1.65646	1.71000	1.99887	5.62951	1.35717	1.46712	10.47784	1.14161
45	1.65909	1.71220	2.00196	5.67041	1.37794	1.48958	10.63821	1.14801
46	1.66168	1.71441	2.00510	5.71132	1.40102	1.51453	10.81639	1.15484
47	1.66426	1.71664	2.00830	5.75222	1.42651	1.54208	11.01318	1.16232
48	1.66683	1.71893	2.01159	5.79312	1.45453	1.57237	11.22948	1.17071
49	1.72328	1.78604	2.09163	5.83402	1.48520	1.60553	11.46631	1.20883
50	1.77973	1.85315	2.17167	5.87492	1.51868	1.64172	11.72476	1.24695
51	1.83618	1.92026	2.25172	5.91582	1.55511	1.68111	12.00607	1.28507
52	1.89263	1.98737	2.33176	5.95673	1.59469	1.72389	12.31161	1.32319
53	1.94908	2.05448	2.41181	5.99763	1.63760	1.77027	12.64286	1.36131
54	2.00553	2.12159	2.49185	6.03852	1.68405	1.82049	13.00146	1.39944
55	2.06198	2.18870	2.57189	6.07943	1.73428	1.87478	13.38927	1.43756
56	2.11843	2.25581	2.65194	6.12033	1.78854	1.93344	13.80820	1.47568
57	2.17488	2.32292	2.73198	6.16123	1.84712	1.99677	14.26050	1.51380
58	2.23133	2.39003	2.81202	6.20213	1.91034	2.06511	14.74851	1.55192
59	2.28778	2.45714	2.89207	6.24303	1.97852	2.13881	15.27493	1.59004
60	2.34423	2.52425	2.97211	6.28394	2.05205	2.21830	15.84261	1.62816
61	2.40068	2.59136	3.05216	6.32484	2.13134	2.30401	16.45471	1.66628
62	2.45713	2.65847	3.13220	6.36574	2.21684	2.39644	17.11478	1.70440
63	2.51358	2.72558	3.21224	6.40664	2.30904	2.49611	17.82661	1.74252
64	2.57003	2.79269	3.29229	6.44754	2.40849	2.60362	18.59444	1.78064
65	2.62648	2.85980	3.37233	6.48844	2.51580	2.71962	19.42288	1.81876

**Table A-73**  
**Orange 1990 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	16.36522	20.07785	26.96066	38.45732	1.54845	2.27708	8.05193	18.14835
4	11.99760	14.96574	19.95894	31.44411	1.47011	2.16187	7.64454	15.15611
5	9.50015	11.96073	15.82093	27.21115	1.39696	2.05430	7.26415	12.94488
6	7.88594	9.98272	13.08934	24.19000	1.32862	1.95380	6.90877	11.27915
7	6.75956	8.58747	11.16169	21.82797	1.26473	1.85985	6.57656	10.00233
8	6.00528	7.63803	9.84758	20.08206	1.20497	1.77198	6.26583	9.00804
9	5.42211	6.90142	8.83207	18.56328	1.14905	1.68974	5.97504	8.22247
10	4.95230	6.30807	8.01894	17.21089	1.09669	1.61274	5.70277	7.59344
11	4.56538	5.81993	7.35470	16.00076	1.04764	1.54060	5.44769	7.08342
12	4.24072	5.41087	6.80245	14.91383	1.00166	1.47299	5.20860	6.66492
13	3.96391	5.06237	6.33600	13.93447	0.95854	1.40958	4.98439	6.31754
14	3.72454	4.76098	5.93630	13.04974	0.91809	1.35009	4.77403	6.02588
15	3.51497	4.49674	5.58924	12.24868	0.88012	1.29426	4.57658	5.77818
16	3.32942	4.26210	5.28417	11.52190	0.84446	1.24182	4.39115	5.56539
17	3.16349	4.05130	5.01295	10.86131	0.81096	1.19255	4.21695	5.38041
18	3.01375	3.85989	4.76925	10.25983	0.77947	1.14625	4.05322	5.21770
19	2.87749	3.68439	4.54818	9.71131	0.74987	1.10271	3.89928	5.07287
20	2.75557	3.55198	4.37592	9.21262	0.72202	1.06177	3.75449	4.94244
21	2.64882	3.42765	4.21272	8.76012	0.69582	1.02324	3.61825	4.82366
22	2.55100	3.31277	4.06282	8.34617	0.67116	0.98698	3.49004	4.71434
23	2.46090	3.20599	3.92428	7.96706	0.64795	0.95285	3.36932	4.61279
24	2.37754	3.10627	3.79558	7.61945	0.62609	0.92070	3.25565	4.51769
25	2.30010	3.01280	3.67549	7.30038	0.60550	0.89042	3.14858	4.42802
26	2.22792	2.92493	3.56304	7.00722	0.58610	0.86189	3.04771	4.34304
27	2.16044	2.84216	3.45748	6.73762	0.56783	0.83502	2.95267	4.26219
28	2.09721	2.76412	3.35818	6.48946	0.55060	0.80969	2.86312	4.18509
29	2.03783	2.69049	3.26468	6.26086	0.53437	0.78582	2.77872	4.11152
30	1.98197	2.62103	3.17657	6.05012	0.51908	0.76333	2.69919	4.04132
31	1.92937	2.55556	3.09353	5.85571	0.50466	0.74214	2.62424	3.97445
32	1.87976	2.49390	3.01533	5.67628	0.49108	0.72216	2.55362	3.91089
33	1.83295	2.43591	2.94171	5.51059	0.47829	0.70335	2.48708	3.85072
34	1.78874	2.38148	2.87251	5.35753	0.46624	0.68563	2.42442	3.79394
35	1.74698	2.33045	2.80752	5.21609	0.45489	0.66894	2.36541	3.74068
36	1.70751	2.28273	2.74660	5.08537	0.44421	0.65323	2.30987	3.69100
37	1.67019	2.23819	2.68956	4.96456	0.43416	0.63846	2.25762	3.64494
38	1.63489	2.19670	2.63627	4.85293	0.42471	0.62456	2.20850	3.60255
39	1.60150	2.15814	2.58654	4.74980	0.41584	0.61151	2.16234	3.56387
40	1.56990	2.12236	2.54022	4.65458	0.40751	0.59926	2.11901	3.52886
41	1.53999	2.08922	2.49713	4.56672	0.39969	0.58777	2.07838	3.49752
42	1.51164	2.05855	2.45707	4.48574	0.39237	0.57701	2.04033	3.46971
43	1.48476	2.03020	2.41984	4.41118	0.38553	0.56694	2.00473	3.44525
44	1.45924	2.00395	2.38523	4.34265	0.37914	0.55754	1.97149	3.42403
45	1.43497	1.97958	2.35298	4.27980	0.37318	0.54878	1.94051	3.40574
46	1.41182	1.95685	2.32284	4.22230	0.36764	0.54063	1.91170	3.39007
47	1.38968	1.93548	2.29449	4.16985	0.36250	0.53307	1.88497	3.37656
48	1.36857	1.91513	2.26750	4.12172	0.35774	0.52608	1.86025	3.36471
49	1.36519	1.91130	2.26189	4.07415	0.35336	0.51964	1.83747	3.36471
50	1.36200	1.90770	2.25662	4.03139	0.34934	0.51373	1.81657	3.36471
51	1.35899	1.90430	2.25164	3.99323	0.34567	0.50833	1.79749	3.36471
52	1.35615	1.90109	2.24695	3.95947	0.34234	0.50343	1.78017	3.36471
53	1.35346	1.89806	2.24251	3.92995	0.33934	0.49902	1.76457	3.36471
54	1.35092	1.89519	2.23832	3.90452	0.33667	0.49509	1.75066	3.36471
55	1.34851	1.89247	2.23435	3.88307	0.33431	0.49161	1.73837	3.36471
56	1.42068	2.00593	2.37218	3.86549	0.33225	0.48859	1.72770	3.50784
57	1.49297	2.11952	2.51020	3.85171	0.33050	0.48602	1.71860	3.65096
58	1.56536	2.23324	2.64840	3.84167	0.32905	0.48389	1.71105	3.79409
59	1.63785	2.34706	2.78677	3.83531	0.32790	0.48219	1.70504	3.93722
60	1.71044	2.46100	2.92530	3.83263	0.32703	0.48092	1.70055	4.08034
61	1.78312	2.57504	3.06397	3.83362	0.32646	0.48007	1.69756	4.22347
62	1.85588	2.68916	3.20278	3.83829	0.32617	0.47965	1.69606	4.36660
63	1.92871	2.80338	3.34172	3.84669	0.32617	0.47965	1.69606	4.50972
64	2.00162	2.91768	3.48078	3.85885	0.32646	0.48007	1.69756	4.65285
65	2.07460	3.03205	3.61995	3.87486	0.32703	0.48092	1.70055	4.79597

**Table A-74**  
**Orange 1990 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	160.50500	206.65720	278.03979	451.13940	5.17379	6.17740	47.47118	155.99916
4	122.18382	158.15749	213.26076	412.18628	4.76823	5.69317	43.75005	124.40845
5	98.54799	127.52426	171.38861	377.42627	4.40247	5.25646	40.39407	101.58017
6	82.54097	106.53571	142.31389	346.35889	4.07217	4.86208	37.36345	84.71880
7	71.02190	91.37108	121.15186	318.54858	3.77351	4.50549	34.62312	72.01337
8	62.36624	79.98509	105.20551	293.61719	3.50312	4.18266	32.14229	62.26242
9	55.64566	71.17766	92.85538	271.23267	3.25804	3.89003	29.89355	54.65163
10	50.29033	64.19774	83.07066	251.10666	3.03562	3.62447	27.85277	48.61714
11	45.93120	58.55171	75.16635	232.98642	2.83354	3.38318	25.99857	43.76151
12	42.31882	53.90244	68.67122	216.64935	2.64972	3.16372	24.31204	39.79938
13	39.27885	50.01239	63.25208	201.90166	2.48235	2.96387	22.77634	36.52264
14	36.68587	46.70967	58.66750	188.57190	2.32978	2.78171	21.37651	33.77724
15	34.44745	43.86711	54.73917	176.51054	2.19058	2.61550	20.09924	31.44756
16	32.49417	41.38919	51.33322	165.58408	2.06344	2.46371	18.93275	29.44589
17	30.77292	39.20280	48.34752	155.67650	1.94722	2.32495	17.86642	27.70502
18	29.24261	37.25160	45.70320	146.68393	1.84090	2.19800	16.89088	26.17294
19	27.87091	35.49184	43.33896	138.51514	1.74355	2.08176	15.99769	24.80923
20	26.67302	34.28404	41.64082	131.08952	1.65436	1.97527	15.17935	23.58238
21	25.61615	33.13983	40.09088	124.33510	1.57259	1.87764	14.42907	22.46765
22	24.64937	32.07602	38.66946	118.18839	1.49759	1.78809	13.74087	21.44576
23	23.76033	31.08046	37.35732	112.59303	1.42876	1.70591	13.10934	20.50162
24	22.93903	30.14424	36.13939	107.49881	1.36557	1.63047	12.52962	19.62357
25	22.17734	29.26071	35.00381	102.86111	1.30756	1.56120	11.99734	18.80270
26	21.46870	28.42523	33.94131	98.64034	1.25430	1.49760	11.50861	18.03206
27	20.80768	27.63454	32.94485	94.80107	1.20539	1.43921	11.05989	17.30647
28	20.18983	26.88634	32.00870	91.31172	1.16050	1.38562	10.64803	16.62201
29	19.61148	26.17921	31.12865	88.14470	1.11932	1.33645	10.27019	15.97594
30	19.06950	25.51210	30.30125	85.27483	1.08157	1.29137	9.92379	15.36617
31	18.56126	24.88438	29.52380	82.68008	1.04700	1.25009	9.60654	14.79104
32	18.08449	24.29541	28.79410	80.34088	1.01537	1.21233	9.31638	14.24940
33	17.63718	23.74467	28.11032	78.23984	0.98650	1.17786	9.05146	13.74068
34	17.21756	23.23164	27.47069	76.36156	0.96019	1.14645	8.81006	13.26381
35	16.82405	22.75572	26.87386	74.69243	0.93629	1.11790	8.59073	12.81849
36	16.45514	22.31609	26.31830	73.22072	0.91464	1.09206	8.39213	12.40371
37	16.10953	21.91193	25.80273	71.93607	0.89512	1.06876	8.21305	12.01925
38	15.78588	21.54227	25.32561	70.82971	0.87762	1.04786	8.05243	11.66394
39	15.48298	21.20587	24.88533	69.89388	0.86202	1.02924	7.90934	11.33705
40	15.19967	20.90155	24.48042	69.12236	0.84825	1.01279	7.78294	11.03759
41	14.93478	20.62769	24.10912	68.50990	0.83621	0.99842	7.67251	10.76441
42	14.68713	20.38255	23.76929	68.05241	0.82585	0.98605	7.57743	10.51591
43	14.45557	20.16412	23.45911	67.74690	0.81710	0.97560	7.49716	10.29066
44	14.23884	19.97002	23.17599	67.59122	0.80992	0.96702	7.43125	10.08656
45	14.03567	19.79742	22.91759	67.58452	0.80426	0.96027	7.37934	9.90164
46	13.84458	19.64278	22.68063	67.72655	0.80010	0.95530	7.34114	9.73343
47	13.66401	19.50209	22.46169	68.01840	0.79740	0.95208	7.31644	9.57888
48	13.49224	19.37053	22.25706	68.46199	0.79617	0.95061	7.30511	9.43497
49	13.49224	19.37053	22.25706	69.06021	0.79638	0.95087	7.30709	9.43497
50	13.49224	19.37053	22.25706	69.81709	0.79805	0.95286	7.32237	9.43497
51	13.49224	19.37053	22.25706	70.73767	0.80118	0.95659	7.35105	9.43497
52	13.49224	19.37053	22.25706	71.82835	0.80578	0.96209	7.39330	9.43497
53	13.49224	19.37053	22.25706	73.09631	0.81189	0.96938	7.44933	9.43497
54	13.49224	19.37053	22.25706	74.55067	0.81953	0.97850	7.51946	9.43497
55	13.49224	19.37053	22.25706	76.20129	0.82875	0.98951	7.60408	9.43497
56	16.12979	23.64653	27.30432	78.06007	0.83961	1.00247	7.70365	11.70674
57	18.76730	27.92252	32.35161	80.14027	0.85215	1.01745	7.81875	13.97852
58	21.40486	32.19853	37.39890	82.45708	0.86646	1.03453	7.95002	16.25027
59	24.04240	36.47455	42.44618	85.02783	0.88261	1.05381	8.09822	18.52205
60	26.67996	40.75055	47.49347	87.87175	0.90070	1.07541	8.26421	20.79381
61	29.31752	45.02654	52.54074	91.01082	0.92084	1.09946	8.44897	23.06558
62	31.95508	49.30257	57.58804	94.46960	0.94314	1.12608	8.65359	25.33736
63	34.59264	53.57858	62.63531	98.27589	0.96774	1.15546	8.87931	27.60910
64	37.23021	57.85457	67.68260	102.46069	0.99479	1.18776	9.12752	29.88089
65	39.86774	62.13062	72.72989	107.05856	1.02446	1.22318	9.39976	32.15266

**Table A-75**  
**Orange 1990 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.54656	2.83224	3.15405	5.46546	2.82863	3.34837	39.93146	0.89918
4	2.38010	2.63850	2.97412	5.52202	2.70949	3.20734	38.24968	0.86005
5	2.27493	2.51902	2.86640	5.57858	2.59906	3.07662	36.69075	0.82758
6	2.20121	2.43806	2.79566	5.63513	2.49668	2.95542	35.24539	0.80126
7	2.14609	2.38017	2.74673	5.69169	2.40173	2.84304	33.90506	0.78059
8	2.10305	2.33750	2.71191	5.74825	2.31368	2.73881	32.66208	0.76510
9	2.06848	2.30560	2.68685	5.80480	2.23203	2.64215	31.50937	0.75434
10	2.04014	2.28169	2.66890	5.86136	2.15631	2.55252	30.44054	0.74786
11	2.01657	2.26394	2.65630	5.91792	2.08613	2.46944	29.44974	0.74525
12	1.99678	2.25109	2.64785	5.97448	2.02110	2.39246	28.53168	0.74610
13	1.98007	2.24217	2.64267	6.03103	1.96087	2.32117	27.68150	0.75002
14	1.96591	2.23647	2.64011	6.08759	1.90515	2.25521	26.89482	0.75666
15	1.95388	2.23343	2.63966	6.14415	1.85364	2.19423	26.16765	0.76565
16	1.94367	2.23258	2.64091	6.20070	1.80608	2.13794	25.49632	0.77668
17	1.93503	2.23354	2.64354	6.25726	1.76225	2.08605	24.87749	0.78942
18	1.92774	2.23600	2.64728	6.31382	1.72192	2.03831	24.30821	0.80357
19	1.92164	2.23967	2.65190	6.37038	1.68491	1.99450	23.78568	0.81888
20	1.91891	2.25364	2.66675	6.42693	1.65103	1.95440	23.30748	0.83506
21	1.92526	2.28229	2.69682	6.48349	1.62014	1.91782	22.87134	0.85189
22	1.93146	2.30943	2.72508	6.54004	1.59208	1.88461	22.47523	0.86914
23	1.93754	2.33516	2.75169	6.59660	1.56673	1.85460	22.11740	0.88660
24	1.94353	2.35959	2.77681	6.65316	1.54398	1.82767	21.79617	0.90408
25	1.94944	2.38278	2.80055	6.70971	1.52371	1.80368	21.51013	0.92142
26	1.95530	2.40480	2.82300	6.76627	1.50585	1.78254	21.25804	0.93846
27	1.96112	2.42569	2.84427	6.82283	1.49032	1.76415	21.03871	0.95507
28	1.96690	2.44551	2.86442	6.87938	1.47704	1.74844	20.85126	0.97113
29	1.97267	2.46428	2.88354	6.93595	1.46596	1.73532	20.69484	0.98654
30	1.97844	2.48207	2.90170	6.99250	1.45703	1.72475	20.56877	1.00123
31	1.98421	2.49891	2.91896	7.04906	1.45021	1.71668	20.47253	1.01513
32	1.99001	2.51485	2.93539	7.10561	1.44548	1.71107	20.40572	1.02819
33	1.99585	2.52993	2.95108	7.16217	1.44281	1.70791	20.36798	1.04040
34	2.00176	2.54421	2.96608	7.21873	1.44219	1.70718	20.35924	1.05173
35	2.00775	2.55775	2.98048	7.27529	1.44361	1.70887	20.37941	1.06221
36	2.01386	2.57061	2.99436	7.33184	1.44710	1.71299	20.42856	1.07185
37	2.02010	2.58287	3.00780	7.38840	1.45265	1.71957	20.50697	1.08071
38	2.02652	2.59460	3.02089	7.44496	1.46030	1.72862	20.61490	1.08884
39	2.03315	2.60589	3.03372	7.50151	1.47007	1.74018	20.75284	1.09633
40	2.04003	2.61683	3.04640	7.55807	1.48201	1.75432	20.92145	1.10327
41	2.04720	2.62753	3.05903	7.61462	1.49617	1.77108	21.12132	1.10978
42	2.05470	2.63808	3.07172	7.67119	1.51262	1.79055	21.35345	1.11600
43	2.06259	2.64862	3.08459	7.72774	1.53141	1.81280	21.61882	1.12208
44	2.07092	2.65927	3.09777	7.78430	1.55265	1.83793	21.91855	1.12819
45	2.07976	2.67016	3.11138	7.84085	1.57641	1.86606	22.25404	1.13451
46	2.08916	2.68143	3.12557	7.89741	1.60281	1.89732	22.62677	1.14126
47	2.09918	2.69325	3.14048	7.95397	1.63197	1.93184	23.03844	1.14866
48	2.10992	2.70578	3.15627	8.01053	1.66403	1.96978	23.49092	1.15695
49	2.20516	2.81816	3.29503	8.06709	1.69912	2.01132	23.98634	1.19462
50	2.30041	2.93055	3.43380	8.12364	1.73742	2.05666	24.52698	1.23230
51	2.39566	3.04293	3.57256	8.18020	1.77911	2.10600	25.11545	1.26997
52	2.49091	3.15532	3.71133	8.23676	1.82438	2.15960	25.75464	1.30764
53	2.58616	3.26771	3.85010	8.29331	1.87347	2.21770	26.44756	1.34531
54	2.68141	3.38009	3.98886	8.34986	1.92661	2.28061	27.19772	1.38299
55	2.77666	3.49248	4.12763	8.40643	1.98407	2.34863	28.00899	1.42066
56	2.87191	3.60487	4.26639	8.46298	2.04615	2.42212	28.88531	1.45833
57	2.96716	3.71725	4.40516	8.51954	2.11317	2.50145	29.83151	1.49601
58	3.06240	3.82964	4.54393	8.57610	2.18549	2.58706	30.85237	1.53368
59	3.15765	3.94203	4.68269	8.63266	2.26350	2.67940	31.95360	1.57135
60	3.25290	4.05441	4.82146	8.68921	2.34762	2.77897	33.14114	1.60902
61	3.34815	4.16680	4.96022	8.74577	2.43832	2.88635	34.42160	1.64670
62	3.44340	4.27918	5.09899	8.80232	2.53614	3.00213	35.80237	1.68437
63	3.53865	4.39157	5.23775	8.85888	2.64161	3.12699	37.29147	1.72204
64	3.63390	4.50396	5.37652	8.91544	2.75540	3.26168	38.89769	1.75972
65	3.72915	4.61634	5.51528	8.97200	2.87816	3.40700	40.63074	1.79739

**Table A-76**  
**Orange 1990 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	21.38345	25.05162	32.69345	52.22328	1.54845	2.27708	8.05193	19.62973
4	15.34181	18.25462	23.48007	40.77472	1.47011	2.16187	7.64454	16.65607
5	11.98903	14.39449	18.28543	34.38982	1.39696	2.05430	7.26415	14.45869
6	9.86681	11.91145	14.96210	30.12904	1.32862	1.95380	6.90877	12.80345
7	8.40825	10.18830	12.66679	26.96729	1.26473	1.85985	6.57656	11.53473
8	7.48632	9.06351	11.18588	24.83894	1.20497	1.77198	6.26583	10.54677
9	6.77525	8.19741	10.05038	23.02429	1.14905	1.68974	5.97504	9.76623
10	6.19894	7.50185	9.14204	21.42123	1.09669	1.61274	5.70277	9.14125
11	5.72111	6.93143	8.40058	19.99532	1.04764	1.54060	5.44769	8.63452
12	5.31722	6.45503	7.78459	18.72017	1.00166	1.47299	5.20860	8.21873
13	4.97015	6.05061	7.26478	17.57503	0.95854	1.40958	4.98439	7.87360
14	4.66755	5.70217	6.81990	16.54306	0.91809	1.35009	4.77403	7.58384
15	4.40034	5.39787	6.43418	15.61036	0.88012	1.29426	4.57658	7.33775
16	4.16168	5.12875	6.09579	14.76515	0.84446	1.24182	4.39115	7.12635
17	3.94632	4.88795	5.79562	13.99744	0.81096	1.19255	4.21695	6.94259
18	3.75022	4.67019	5.52667	13.29865	0.77947	1.14625	4.05322	6.78094
19	3.57017	4.47133	5.28342	12.66138	0.74987	1.10271	3.89928	6.63706
20	3.41422	4.31830	5.09267	12.08418	0.72202	1.06177	3.75449	6.50748
21	3.28668	4.17018	4.90801	11.56387	0.69582	1.02324	3.61825	6.38948
22	3.16966	4.03327	4.73858	11.08797	0.67116	0.98698	3.49004	6.28088
23	3.06174	3.90598	4.58220	10.65213	0.64795	0.95285	3.36932	6.17999
24	2.96176	3.78707	4.43712	10.25243	0.62609	0.92070	3.25565	6.08551
25	2.86876	3.67558	4.30195	9.88547	0.60550	0.89042	3.14858	5.99643
26	2.78197	3.57076	4.17557	9.54815	0.58610	0.86189	3.04771	5.91200
27	2.70073	3.47202	4.05709	9.23778	0.56783	0.83502	2.95267	5.83168
28	2.62450	3.37891	3.94578	8.95192	0.55060	0.80969	2.86312	5.75509
29	2.55282	3.29107	3.84107	8.68838	0.53437	0.78582	2.77872	5.68200
30	2.48530	3.20822	3.74249	8.44522	0.51908	0.76333	2.69919	5.61226
31	2.42160	3.13012	3.64964	8.22069	0.50466	0.74214	2.62424	5.54582
32	2.36145	3.05658	3.56220	8.01323	0.49108	0.72216	2.55362	5.48267
33	2.30460	2.98744	3.47989	7.82143	0.47829	0.70335	2.48708	5.42289
34	2.25081	2.92253	3.40247	7.64400	0.46624	0.68563	2.42442	5.36648
35	2.19990	2.86170	3.32972	7.47981	0.45489	0.66894	2.36541	5.31356
36	2.15168	2.80482	3.26143	7.32783	0.44421	0.65323	2.30987	5.26420
37	2.10600	2.75172	3.19739	7.18713	0.43416	0.63846	2.25762	5.21844
38	2.06268	2.70227	3.13744	7.05687	0.42471	0.62456	2.20850	5.17632
39	2.02161	2.65631	3.08136	6.93628	0.41584	0.61151	2.16234	5.13788
40	1.98263	2.61366	3.02898	6.82469	0.40751	0.59926	2.11901	5.10309
41	1.94562	2.57415	2.98008	6.72147	0.39969	0.58777	2.07838	5.07195
42	1.91045	2.53758	2.93447	6.62607	0.39237	0.57701	2.04033	5.04431
43	1.87699	2.50375	2.89191	6.53797	0.38553	0.56694	2.00473	5.02001
44	1.84513	2.47243	2.85219	6.45673	0.37914	0.55754	1.97149	4.99891
45	1.81471	2.44333	2.81503	6.38193	0.37318	0.54878	1.94051	4.98074
46	1.78561	2.41617	2.78015	6.31320	0.36764	0.54063	1.91170	4.96515
47	1.75769	2.39061	2.74726	6.25022	0.36250	0.53307	1.88497	4.95173
48	1.73105	2.36613	2.71568	6.19177	0.35774	0.52608	1.86025	4.93994
49	1.72490	2.35914	2.70530	6.13077	0.35336	0.51964	1.83747	4.93994
50	1.71910	2.35256	2.69553	6.07556	0.34934	0.51373	1.81657	4.93994
51	1.71364	2.34635	2.68632	6.02588	0.34567	0.50833	1.79749	4.93994
52	1.70849	2.34049	2.67763	5.98145	0.34234	0.50343	1.78017	4.93994
53	1.70362	2.33496	2.66943	5.94207	0.33934	0.49902	1.76457	4.93994
54	1.69901	2.32973	2.66168	5.90756	0.33667	0.49509	1.75066	4.93994
55	1.69465	2.32478	2.65434	5.87776	0.33431	0.49161	1.73837	4.93994
56	1.77326	2.45024	2.79664	5.85252	0.33225	0.48859	1.72770	5.08208
57	1.85208	2.57595	2.93931	5.83173	0.33050	0.48602	1.71860	5.22423
58	1.93109	2.70189	3.08230	5.81532	0.32905	0.48389	1.71105	5.36637
59	2.01030	2.82803	3.22561	5.80321	0.32790	0.48219	1.70504	5.50851
60	2.08967	2.95437	3.36922	5.79537	0.32703	0.48092	1.70055	5.65065
61	2.16920	3.08089	3.51309	5.79177	0.32646	0.48007	1.69756	5.79280
62	2.24889	3.20758	3.65723	5.79242	0.32617	0.47965	1.69606	5.93494
63	2.32872	3.33444	3.80160	5.79734	0.32617	0.47965	1.69606	6.07708
64	2.40867	3.46144	3.94619	5.80657	0.32646	0.48007	1.69756	6.21922
65	2.48876	3.58859	4.09100	5.82017	0.32703	0.48092	1.70055	6.36137

**Table A-77**  
**Orange 1990 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	196.60362	251.92902	327.04712	587.10937	5.17379	6.17740	47.47118	186.38023
4	149.49548	193.02988	250.73683	536.41699	4.76823	5.69317	43.75005	148.63791
5	120.42091	155.66597	201.39145	491.18018	4.40247	5.25646	40.39407	121.36864
6	100.72827	130.02255	167.12723	450.74902	4.07217	4.86208	37.36345	101.22960
7	86.55968	111.49210	142.19264	414.55688	3.77351	4.50549	34.62312	86.05582
8	75.91699	97.58977	123.40871	382.11084	3.50312	4.18266	32.14229	74.41142
9	67.65733	86.85005	108.86533	352.97998	3.25804	3.89003	29.89355	65.32314
10	61.07864	78.35237	97.34648	326.78760	3.03562	3.62447	27.85277	58.11731
11	55.72617	71.49017	88.04388	303.20581	2.83354	3.38318	25.99857	52.31920
12	51.29240	65.84856	80.40166	281.94482	2.64972	3.16372	24.31204	47.58792
13	47.56236	61.13472	74.02670	262.75269	2.48235	2.96387	22.77634	43.67490
14	44.38144	57.13667	68.63425	245.40591	2.32978	2.78171	21.37651	40.39612
15	41.63562	53.69751	64.01405	229.70952	2.19058	2.61550	20.09924	37.61351
16	39.23930	50.69913	60.00824	215.48994	2.06344	2.46371	18.93275	35.22238
17	37.12704	48.05150	56.49646	202.59627	1.94722	2.32495	17.86642	33.14241
18	35.24818	45.68521	53.38583	190.89345	1.84090	2.19800	16.89088	31.31152
19	33.56294	43.54648	50.60411	180.26256	1.74355	2.08176	15.99769	29.68150
20	32.08762	42.05478	48.60521	170.59892	1.65436	1.97527	15.17935	28.21471
21	30.78676	40.63150	46.76819	161.80876	1.57259	1.87764	14.42907	26.88161
22	29.59543	39.30284	45.08295	153.80949	1.49759	1.78809	13.74087	25.65930
23	28.49858	38.05429	43.52675	146.52773	1.42876	1.70591	13.10934	24.52966
24	27.48405	36.87532	42.08179	139.89815	1.36557	1.63047	12.52962	23.47888
25	26.54205	35.75850	40.73418	133.86275	1.30756	1.56120	11.99734	22.49637
26	25.66470	34.69881	39.47295	128.36981	1.25430	1.49760	11.50861	21.57375
27	24.84554	33.69293	38.28992	123.37341	1.20539	1.43921	11.05989	20.70502
28	24.07925	32.73888	37.17831	118.83243	1.16050	1.38562	10.64803	19.88542
29	23.36153	31.83560	36.13327	114.71085	1.11932	1.33645	10.27019	19.11174
30	22.68866	30.98244	35.15074	110.97607	1.08157	1.29137	9.92379	18.38152
31	22.05762	30.17924	34.22760	107.59924	1.04700	1.25009	9.60654	17.69279
32	21.46565	29.42577	33.36121	104.55505	1.01537	1.21233	9.31638	17.04422
33	20.91048	28.72177	32.54953	101.82072	0.98650	1.17786	9.05146	16.43509
34	20.38997	28.06708	31.79045	99.37636	0.96019	1.14645	8.81006	15.86419
35	19.90227	27.46111	31.08240	97.20418	0.93629	1.11790	8.59073	15.33112
36	19.44551	26.90308	30.42354	95.28893	0.91464	1.09206	8.39213	14.83470
37	19.01817	26.39214	29.81238	93.61716	0.89512	1.06876	8.21305	14.37465
38	18.61862	25.92719	29.24709	92.17731	0.87762	1.04786	8.05243	13.94960
39	18.24535	25.50665	28.72575	90.95938	0.86202	1.02924	7.90934	13.55864
40	17.89696	25.12901	28.24661	89.95534	0.84825	1.01279	7.78294	13.20059
41	17.57193	24.79224	27.80753	89.15829	0.83621	0.99842	7.67251	12.87406
42	17.26881	24.49393	27.40601	88.56290	0.82585	0.98605	7.57743	12.57712
43	16.98607	24.23138	27.03975	88.16531	0.81710	0.97560	7.49716	12.30805
44	16.72217	24.00134	26.70575	87.96275	0.80992	0.96702	7.43125	12.06431
45	16.47534	23.79985	26.40108	87.95403	0.80426	0.96027	7.37934	11.84354
46	16.24368	23.62190	26.12195	88.13884	0.80010	0.95530	7.34114	11.64273
47	16.02510	23.46190	25.86411	88.51869	0.79740	0.95208	7.31644	11.45822
48	15.81727	23.31299	25.62314	89.09590	0.79617	0.95061	7.30511	11.28636
49	15.81727	23.31299	25.62314	89.87450	0.79638	0.95087	7.30709	11.28636
50	15.81727	23.31299	25.62314	90.85945	0.79805	0.95286	7.32237	11.28636
51	15.81727	23.31299	25.62314	92.05750	0.80118	0.95659	7.35105	11.28636
52	15.81727	23.31299	25.62314	93.47691	0.80578	0.96209	7.39330	11.28636
53	15.81727	23.31299	25.62314	95.12701	0.81189	0.96938	7.44933	11.28636
54	15.81727	23.31299	25.62314	97.01971	0.81953	0.97850	7.51946	11.28636
55	15.81727	23.31299	25.62314	99.16779	0.82875	0.98951	7.60408	11.28636
56	19.00719	28.54762	31.49193	101.58679	0.83961	1.00247	7.70365	14.00399
57	22.19713	33.78230	37.36076	104.29393	0.85215	1.01745	7.81875	16.72162
58	25.38707	39.01695	43.22960	107.30902	0.86646	1.03453	7.95002	19.43922
59	28.57703	44.25163	49.09843	110.65456	0.88261	1.05381	8.09822	22.15686
60	31.76698	49.48631	54.96725	114.35567	0.90070	1.07541	8.26421	24.87447
61	34.95694	54.72093	60.83609	118.44084	0.92084	1.09946	8.44897	27.59212
62	38.14691	59.95564	66.70493	122.94211	0.94314	1.12608	8.65359	30.30971
63	41.33685	65.19029	72.57376	127.89555	0.96774	1.15546	8.87931	33.02734
64	44.52682	70.42494	78.44257	133.34163	0.99479	1.18776	9.12752	35.74498
65	47.71677	75.65964	84.31140	139.32526	1.02446	1.22318	9.39976	38.46262

**Table A-78**  
**Orange 1990 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.39964	2.68750	2.91848	4.92953	2.82863	3.34837	39.93146	0.81552
4	2.23507	2.49900	2.74255	4.98054	2.70949	3.20734	38.24968	0.78003
5	2.13218	2.38318	2.63717	5.03155	2.59906	3.07662	36.69075	0.75058
6	2.06082	2.30494	2.56782	5.08256	2.49668	2.95542	35.24539	0.72671
7	2.00797	2.24913	2.51962	5.13357	2.40173	2.84304	33.90506	0.70796
8	1.96711	2.20803	2.48503	5.18458	2.31368	2.73881	32.66208	0.69392
9	1.93456	2.17729	2.45983	5.23559	2.23203	2.64215	31.50937	0.68416
10	1.90808	2.15422	2.44143	5.28661	2.15631	2.55252	30.44054	0.67828
11	1.88622	2.13702	2.42813	5.33762	2.08613	2.46944	29.44974	0.67591
12	1.86798	2.12446	2.41877	5.38863	2.02110	2.39246	28.53168	0.67668
13	1.85268	2.11564	2.41250	5.43964	1.96087	2.32117	27.68150	0.68024
14	1.83977	2.10985	2.40871	5.49065	1.90515	2.25521	26.89482	0.68626
15	1.82886	2.10656	2.40690	5.54166	1.85364	2.19423	26.16765	0.69442
16	1.81964	2.10532	2.40671	5.59267	1.80608	2.13794	25.49632	0.70441
17	1.81187	2.10579	2.40782	5.64368	1.76225	2.08605	24.87749	0.71597
18	1.80533	2.10764	2.40998	5.69470	1.72192	2.03831	24.30821	0.72881
19	1.79987	2.11063	2.41299	5.74570	1.68491	1.99450	23.78568	0.74269
20	1.79773	2.12340	2.42573	5.79672	1.65103	1.95440	23.30748	0.75737
21	1.80466	2.15063	2.45349	5.84772	1.62014	1.91782	22.87134	0.77263
22	1.81132	2.17636	2.47950	5.89874	1.59208	1.88461	22.47523	0.78828
23	1.81778	2.20070	2.50393	5.94975	1.56673	1.85460	22.11740	0.80411
24	1.82404	2.22377	2.52692	6.00076	1.54398	1.82767	21.79617	0.81997
25	1.83015	2.24562	2.54860	6.05177	1.52371	1.80368	21.51013	0.83569
26	1.83611	2.26633	2.56906	6.10278	1.50585	1.78254	21.25804	0.85115
27	1.84195	2.28596	2.58839	6.15379	1.49032	1.76415	21.03871	0.86621
28	1.84768	2.30454	2.60668	6.20480	1.47704	1.74844	20.85126	0.88078
29	1.85332	2.32211	2.62399	6.25582	1.46596	1.73532	20.69484	0.89475
30	1.85888	2.33874	2.64041	6.30682	1.45703	1.72475	20.56877	0.90808
31	1.86437	2.35445	2.65598	6.35784	1.45021	1.71668	20.47253	0.92068
32	1.86982	2.36930	2.67078	6.40885	1.44548	1.71107	20.40572	0.93253
33	1.87524	2.38332	2.68488	6.45986	1.44281	1.70791	20.36798	0.94360
34	1.88064	2.39658	2.69834	6.51087	1.44219	1.70718	20.35924	0.95388
35	1.88606	2.40912	2.71123	6.56188	1.44361	1.70887	20.37941	0.96338
36	1.89151	2.42101	2.72361	6.61289	1.44710	1.71299	20.42856	0.97213
37	1.89702	2.43231	2.73557	6.66390	1.45265	1.71957	20.50697	0.98016
38	1.90263	2.44309	2.74719	6.71492	1.46030	1.72862	20.61490	0.98753
39	1.90835	2.45344	2.75853	6.76592	1.47007	1.74018	20.75284	0.99433
40	1.91423	2.46343	2.76970	6.81694	1.48201	1.75432	20.92145	1.00062
41	1.92030	2.47317	2.78078	6.86795	1.49617	1.77108	21.12132	1.00653
42	1.92661	2.48273	2.79186	6.91896	1.51262	1.79055	21.35345	1.01217
43	1.93320	2.49225	2.80305	6.96997	1.53141	1.81280	21.61882	1.01768
44	1.94011	2.50182	2.81445	7.02098	1.55265	1.83793	21.91855	1.02322
45	1.94740	2.51158	2.82617	7.07199	1.57641	1.86606	22.25404	1.02896
46	1.95512	2.52164	2.83834	7.12301	1.60281	1.89732	22.62677	1.03508
47	1.96334	2.53215	2.85107	7.17401	1.63197	1.93184	23.03844	1.04179
48	1.97211	2.54326	2.86449	7.22503	1.66403	1.96978	23.49092	1.04931
49	2.06070	2.64873	2.99011	7.27604	1.69912	2.01132	23.98634	1.08348
50	2.14930	2.75420	3.11574	7.32705	1.73742	2.05666	24.52698	1.11764
51	2.23789	2.85966	3.24136	7.37806	1.77911	2.10600	25.11545	1.15181
52	2.32649	2.96513	3.36699	7.42907	1.82438	2.15960	25.75464	1.18598
53	2.41509	3.07060	3.49262	7.48008	1.87347	2.21770	26.44756	1.22015
54	2.50368	3.17607	3.61824	7.53109	1.92661	2.28061	27.19772	1.25431
55	2.59228	3.28154	3.74387	7.58210	1.98407	2.34863	28.00899	1.28848
56	2.68087	3.38700	3.86950	7.63311	2.04615	2.42212	28.88531	1.32265
57	2.76947	3.49247	3.99512	7.68413	2.11317	2.50145	29.83151	1.35682
58	2.85807	3.59794	4.12075	7.73514	2.18549	2.58706	30.85237	1.39099
59	2.94666	3.70341	4.24638	7.78615	2.26350	2.67940	31.95360	1.42515
60	3.03526	3.80888	4.37200	7.83716	2.34762	2.77897	33.14114	1.45932
61	3.12386	3.91434	4.49763	7.88817	2.43832	2.88635	34.42160	1.49349
62	3.21246	4.01981	4.62325	7.93918	2.53614	3.00213	35.80237	1.52766
63	3.30105	4.12528	4.74888	7.99020	2.64161	3.12699	37.29147	1.56182
64	3.38965	4.23075	4.87451	8.04121	2.75540	3.26168	38.89769	1.59599
65	3.47824	4.33622	5.00013	8.09222	2.87816	3.40700	40.63074	1.63016



**Table A-79**  
**Orange 1990 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	22.38599	25.99295	33.87871	54.87627	1.54845	2.27708	8.05193	19.81187
4	15.99266	18.85020	24.18724	42.44878	1.47011	2.16187	7.64454	16.83884
5	12.46295	14.81957	18.76624	35.59772	1.39696	2.05430	7.26415	14.64192
6	10.23695	12.23830	15.31721	31.07457	1.32862	1.95380	6.90877	12.98703
7	8.71125	10.45264	12.94442	27.74797	1.26473	1.85985	6.57656	11.71859
8	7.75761	9.29733	11.43024	25.54736	1.20497	1.77198	6.26583	10.73085
9	7.02230	8.40905	10.27106	23.67860	1.14905	1.68974	5.97504	9.95049
10	6.42550	7.69597	9.34393	22.03038	1.09669	1.61274	5.70277	9.32566
11	5.92989	7.11146	8.58724	20.56598	1.04764	1.54060	5.44769	8.81904
12	5.51027	6.62352	7.95868	19.25763	1.00166	1.47299	5.20860	8.40335
13	5.14904	6.20954	7.42836	18.08342	0.95854	1.40958	4.98439	8.05831
14	4.83350	5.85306	6.97457	17.02583	0.91809	1.35009	4.77403	7.76861
15	4.55434	5.54192	6.58125	16.07019	0.88012	1.29426	4.57658	7.52259
16	4.30452	5.26692	6.23629	15.20445	0.84446	1.24182	4.39115	7.31123
17	4.07865	5.02103	5.93042	14.41819	0.81096	1.19255	4.21695	7.12752
18	3.87257	4.79882	5.65648	13.70252	0.77947	1.14625	4.05322	6.96591
19	3.68300	4.59604	5.40887	13.04985	0.74987	1.10271	3.89928	6.82206
20	3.51994	4.43941	5.21428	12.45923	0.72202	1.06177	3.75449	6.69251
21	3.38866	4.28709	5.02528	11.92770	0.69582	1.02324	3.61825	6.57454
22	3.26819	4.14628	4.85189	11.44158	0.67116	0.98698	3.49004	6.46597
23	3.15706	4.01536	4.69188	10.99635	0.64795	0.95285	3.36932	6.36511
24	3.05408	3.89307	4.54346	10.58805	0.62609	0.92070	3.25565	6.27065
25	2.95828	3.77840	4.40521	10.21316	0.60550	0.89042	3.14858	6.18159
26	2.86885	3.67059	4.27596	9.86854	0.58610	0.86189	3.04771	6.09718
27	2.78512	3.56904	4.15482	9.55140	0.56783	0.83502	2.95267	6.01688
28	2.70652	3.47328	4.04103	9.25926	0.55060	0.80969	2.86312	5.94031
29	2.63261	3.38293	3.93399	8.98990	0.53437	0.78582	2.77872	5.86724
30	2.56296	3.29771	3.83323	8.74132	0.51908	0.76333	2.69919	5.79751
31	2.49725	3.21737	3.73833	8.51174	0.50466	0.74214	2.62424	5.73109
32	2.43517	3.14172	3.64895	8.29957	0.49108	0.72216	2.55362	5.66796
33	2.37647	3.07058	3.56481	8.10335	0.47829	0.70335	2.48708	5.60818
34	2.32092	3.00379	3.48567	7.92180	0.46624	0.68563	2.42442	5.55179
35	2.26832	2.94119	3.41127	7.75374	0.45489	0.66894	2.36541	5.49889
36	2.21849	2.88264	3.34142	7.59813	0.44421	0.65323	2.30987	5.44953
37	2.17124	2.82797	3.27589	7.45402	0.43416	0.63846	2.25762	5.40378
38	2.12644	2.77704	3.21451	7.32054	0.42471	0.62456	2.20850	5.36167
39	2.08392	2.72969	3.15708	7.19693	0.41584	0.61151	2.16234	5.32324
40	2.04355	2.68573	3.10339	7.08248	0.40751	0.59926	2.11901	5.28847
41	2.00520	2.64500	3.05326	6.97657	0.39969	0.58777	2.07838	5.25732
42	1.96874	2.60728	3.00645	6.87862	0.39237	0.57701	2.04033	5.22969
43	1.93403	2.57237	2.96274	6.78812	0.38553	0.56694	2.00473	5.20539
44	1.90095	2.54002	2.92191	6.70460	0.37914	0.55754	1.97149	5.18430
45	1.86936	2.50995	2.88368	6.62765	0.37318	0.54878	1.94051	5.16613
46	1.83912	2.48188	2.84778	6.55689	0.36764	0.54063	1.91170	5.15055
47	1.81008	2.45544	2.81390	6.49197	0.36250	0.53307	1.88497	5.13713
48	1.78236	2.43010	2.78132	6.43159	0.35774	0.52608	1.86025	5.12534
49	1.77559	2.42240	2.76987	6.36792	0.35336	0.51964	1.83747	5.12534
50	1.76922	2.41516	2.75909	6.31023	0.34934	0.51373	1.81657	5.12534
51	1.76321	2.40833	2.74894	6.25821	0.34567	0.50833	1.79749	5.12534
52	1.75755	2.40188	2.73936	6.21163	0.34234	0.50343	1.78017	5.12534
53	1.75219	2.39579	2.73031	6.17023	0.33934	0.49902	1.76457	5.12534
54	1.74712	2.39003	2.72176	6.13384	0.33667	0.49509	1.75066	5.12534
55	1.74233	2.38458	2.71367	6.10228	0.33431	0.49161	1.73837	5.12534
56	1.82167	2.51155	2.85640	6.07541	0.33225	0.48859	1.72770	5.26744
57	1.90125	2.63879	2.99953	6.05311	0.33050	0.48602	1.71860	5.40955
58	1.98105	2.76627	3.14303	6.03530	0.32905	0.48389	1.71105	5.55165
59	2.06105	2.89398	3.28688	6.02190	0.32790	0.48219	1.70504	5.69375
60	2.14124	3.02191	3.43104	6.01286	0.32703	0.48092	1.70055	5.83585
61	2.22160	3.15004	3.57551	6.00816	0.32646	0.48007	1.69756	5.97796
62	2.30214	3.27836	3.72026	6.00780	0.32617	0.47965	1.69606	6.12006
63	2.38282	3.40686	3.86528	6.01180	0.32617	0.47965	1.69606	6.26216
64	2.46366	3.53552	4.01054	6.02021	0.32646	0.48007	1.69756	6.40426
65	2.54463	3.66434	4.15604	6.03308	0.32703	0.48092	1.70055	6.54636

**Table A-80**  
**Orange 1990 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDBGV	LDDV	LDDT	HDDV	MC
3	202.31938	259.22046	334.69409	604.71704	5.17379	6.17740	47.47118	190.70898
4	153.81865	198.63783	256.57251	552.50391	4.76823	5.69317	43.75005	152.09013
5	123.88393	160.18913	206.06198	505.91113	4.40247	5.25646	40.39407	124.18797
6	103.60904	133.79715	170.99123	464.26733	4.07217	4.86208	37.36345	103.58176
7	89.02205	114.72581	145.47107	426.98999	3.77351	4.50549	34.62312	88.05617
8	78.06561	100.41916	126.24669	393.57056	3.50312	4.18266	32.14229	76.14182
9	69.56287	89.36876	111.36261	363.56592	3.25804	3.89003	29.89355	66.84291
10	62.79092	80.62679	99.57411	336.58813	3.03562	3.62447	27.85277	59.47015
11	57.28143	73.56870	90.05374	312.29883	2.83354	3.38318	25.99857	53.53769
12	52.71779	67.76706	82.23260	290.40063	2.64972	3.16372	24.31204	48.69676
13	48.56280	62.92024	75.70836	270.63306	2.48235	2.96387	22.77634	44.69302
14	45.60461	58.80981	70.18954	252.76537	2.32978	2.78171	21.37651	41.33820
15	42.77847	55.27417	65.46101	236.59865	2.19058	2.61550	20.09924	38.49106
16	40.31203	52.19164	61.36119	221.95256	2.06344	2.46371	18.93275	36.04439
17	38.13783	49.46941	57.76697	208.67224	1.94722	2.32495	17.86642	33.91609
18	36.20377	47.03600	54.58321	196.61839	1.84090	2.19800	16.89088	32.04268
19	34.46892	44.83604	51.73605	185.66875	1.74355	2.08176	15.99769	30.37474
20	32.94972	43.29941	49.69131	175.71529	1.65436	1.97527	15.17935	28.87378
21	31.61021	41.83212	47.81070	166.66147	1.57259	1.87764	14.42907	27.50958
22	30.38330	40.46179	46.08540	158.42232	1.49759	1.78809	13.74087	26.25876
23	29.25356	39.17342	44.49220	150.92220	1.42876	1.70591	13.10934	25.10272
24	28.20845	37.95627	43.01289	144.09380	1.36557	1.63047	12.52962	24.02739
25	27.23793	36.80281	41.63321	137.87732	1.30756	1.56120	11.99734	23.02188
26	26.33391	35.70789	40.34201	132.21967	1.25430	1.49760	11.50861	22.07768
27	25.48975	34.66826	39.13080	127.07341	1.20539	1.43921	11.05989	21.18857
28	24.70003	33.68192	37.99278	122.39626	1.16050	1.38562	10.64803	20.34978
29	23.96030	32.74789	36.92287	118.15112	1.11932	1.33645	10.27019	19.55795
30	23.26677	31.86555	35.91702	114.30435	1.08157	1.29137	9.92379	18.81061
31	22.61632	31.03488	34.97194	110.82617	1.04700	1.25009	9.60654	18.10574
32	22.00620	30.25560	34.08496	107.69072	1.01537	1.21233	9.31638	17.44197
33	21.43399	29.52760	33.25401	104.87442	0.98650	1.17786	9.05146	16.81857
34	20.89755	28.85066	32.47696	102.35670	0.96019	1.14645	8.81006	16.23428
35	20.39497	28.22430	31.75211	100.11940	0.93629	1.11790	8.59073	15.68874
36	19.92435	27.64771	31.07765	98.14667	0.91464	1.09206	8.39213	15.18070
37	19.48407	27.12001	30.45206	96.42476	0.89512	1.06876	8.21305	14.70990
38	19.07253	26.64005	29.87340	94.94179	0.87762	1.04786	8.05243	14.27493
39	18.68810	26.20627	29.33972	93.68735	0.86202	1.02924	7.90934	13.87484
40	18.32938	25.81708	28.84927	92.65315	0.84825	1.01279	7.78294	13.50845
41	17.99480	25.47032	28.39983	91.83220	0.83621	0.99842	7.67251	13.17433
42	17.68286	25.16359	27.98882	91.21895	0.82585	0.98605	7.57743	12.87049
43	17.39195	24.89401	27.61392	90.80945	0.81710	0.97560	7.49716	12.59517
44	17.12051	24.65820	27.27203	90.60080	0.80992	0.96702	7.43125	12.34578
45	16.86671	24.45206	26.96017	90.59183	0.80426	0.96027	7.37934	12.11990
46	16.62857	24.27031	26.67441	90.78218	0.80010	0.95530	7.34114	11.91444
47	16.40390	24.10713	26.41046	91.17340	0.79740	0.95208	7.31644	11.72566
48	16.19026	23.95534	26.16376	91.76797	0.79617	0.95061	7.30511	11.54982
49	16.19026	23.95534	26.16376	92.56985	0.79638	0.95087	7.30709	11.54982
50	16.19026	23.95534	26.16376	93.58434	0.79805	0.95286	7.32237	11.54982
51	16.19026	23.95534	26.16376	94.81836	0.80118	0.95659	7.35105	11.54982
52	16.19026	23.95534	26.16376	96.28030	0.80578	0.96209	7.39330	11.54982
53	16.19026	23.95534	26.16376	97.97993	0.81189	0.96938	7.44933	11.54982
54	16.19026	23.95534	26.16376	99.92940	0.81953	0.97850	7.51946	11.54982
55	16.19026	23.95534	26.16376	102.14191	0.82875	0.98951	7.60408	11.54982
56	19.46852	29.34537	32.16336	104.63347	0.83961	1.00247	7.70365	14.33089
57	22.74680	34.73540	38.16301	107.42175	0.85215	1.01745	7.81875	17.11195
58	26.02507	40.12544	44.16266	110.52727	0.86646	1.03453	7.95002	19.89302
59	29.30336	45.51547	50.16232	113.97316	0.88261	1.05381	8.09822	22.67410
60	32.58165	50.90550	56.16196	117.78525	0.90070	1.07541	8.26421	25.45517
61	35.85994	56.29553	62.16156	121.99295	0.92084	1.09946	8.44897	28.23622
62	39.13824	61.68556	68.16124	126.62923	0.94314	1.12608	8.65359	31.01726
63	42.41652	67.07561	74.16087	131.73120	0.96774	1.15546	8.87931	33.79837
64	45.69481	72.46564	80.16049	137.34059	0.99479	1.18776	9.12752	36.57941
65	48.97308	77.85571	86.16016	143.50368	1.02446	1.22318	9.39976	39.36050

**Table A-81**  
**Orange 1990 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.38618	2.67396	2.89640	4.87756	2.82863	3.34837	39.93146	0.80703
4	2.22175	2.48592	2.72081	4.92803	2.70949	3.20734	38.24968	0.77191
5	2.11907	2.37043	2.61563	4.97851	2.59906	3.07662	36.69075	0.74277
6	2.04790	2.29244	2.54639	5.02898	2.49668	2.95542	35.24539	0.71915
7	1.99527	2.23681	2.49823	5.07945	2.40173	2.84304	33.90506	0.70060
8	1.95460	2.19585	2.46366	5.12993	2.31368	2.73881	32.66208	0.68670
9	1.92223	2.16522	2.43844	5.18040	2.23203	2.64215	31.50937	0.67704
10	1.89592	2.14221	2.41999	5.23087	2.15631	2.55252	30.44054	0.67122
11	1.87421	2.12506	2.40661	5.28135	2.08613	2.46944	29.44974	0.66888
12	1.85612	2.11252	2.39715	5.33182	2.02110	2.39246	28.53168	0.66964
13	1.84093	2.10369	2.39077	5.38229	1.96087	2.32117	27.68150	0.67316
14	1.82814	2.09789	2.38685	5.43277	1.90515	2.25521	26.89482	0.67912
15	1.81733	2.09456	2.38491	5.48324	1.85364	2.19423	26.16765	0.68719
16	1.80820	2.09328	2.38458	5.53371	1.80608	2.13794	25.49632	0.69708
17	1.80050	2.09368	2.38554	5.58419	1.76225	2.08605	24.87749	0.70852
18	1.79403	2.09548	2.38754	5.63466	1.72192	2.03831	24.30821	0.72123
19	1.78862	2.09839	2.39039	5.68513	1.68491	1.99450	23.78568	0.73496
20	1.78653	2.11104	2.40293	5.73561	1.65103	1.95440	23.30748	0.74949
21	1.79351	2.13812	2.43047	5.78608	1.62014	1.91782	22.87134	0.76459
22	1.80022	2.16372	2.45626	5.83655	1.59208	1.88461	22.47523	0.78007
23	1.80671	2.18792	2.48048	5.88702	1.56673	1.85460	22.11740	0.79574
24	1.81299	2.21085	2.50327	5.93750	1.54398	1.82767	21.79617	0.81143
25	1.81912	2.23258	2.52475	5.98797	1.52371	1.80368	21.51013	0.82700
26	1.82509	2.25316	2.54502	6.03844	1.50585	1.78254	21.25804	0.84229
27	1.83093	2.27266	2.56417	6.08892	1.49032	1.76415	21.03871	0.85720
28	1.83665	2.29111	2.58228	6.13939	1.47704	1.74844	20.85126	0.87161
29	1.84227	2.30857	2.59943	6.18987	1.46596	1.73532	20.69484	0.88544
30	1.84781	2.32508	2.61567	6.24034	1.45703	1.72475	20.56877	0.89863
31	1.85328	2.34069	2.63109	6.29081	1.45021	1.71668	20.47253	0.91110
32	1.85869	2.35543	2.64574	6.34128	1.44548	1.71107	20.40572	0.92283
33	1.86407	2.36935	2.65968	6.39176	1.44281	1.70791	20.36798	0.93378
34	1.86943	2.38250	2.67299	6.44223	1.44219	1.70718	20.35924	0.94396
35	1.87479	2.39495	2.68573	6.49271	1.44361	1.70887	20.37941	0.95336
36	1.88018	2.40674	2.69798	6.54318	1.44710	1.71299	20.42856	0.96201
37	1.88562	2.41795	2.70980	6.59365	1.45265	1.71957	20.50697	0.96996
38	1.89115	2.42864	2.72127	6.64413	1.46030	1.72862	20.61490	0.97726
39	1.89678	2.43890	2.73248	6.69460	1.47007	1.74018	20.75284	0.98398
40	1.90257	2.44880	2.74350	6.74507	1.48201	1.75432	20.92145	0.99021
41	1.90854	2.45844	2.75443	6.79554	1.49617	1.77108	21.12132	0.99606
42	1.91474	2.46791	2.76536	6.84602	1.51262	1.79055	21.35345	1.00164
43	1.92120	2.47733	2.77639	6.89649	1.53141	1.81280	21.61882	1.00709
44	1.92798	2.48680	2.78762	6.94697	1.55265	1.83793	21.91855	1.01257
45	1.93513	2.49644	2.79916	6.99744	1.57641	1.86606	22.25404	1.01825
46	1.94269	2.50639	2.81114	7.04791	1.60281	1.89732	22.62677	1.02431
47	1.95074	2.51678	2.82366	7.09838	1.63197	1.93184	23.03844	1.03095
48	1.95932	2.52775	2.83686	7.14886	1.66403	1.96978	23.49092	1.03839
49	2.04730	2.63256	2.96124	7.19933	1.69912	2.01132	23.98634	1.07220
50	2.13528	2.73737	3.08562	7.24981	1.73742	2.05666	24.52698	1.10601
51	2.22326	2.84219	3.21000	7.30028	1.77911	2.10600	25.11545	1.13983
52	2.31125	2.94700	3.33439	7.35076	1.82438	2.15960	25.75464	1.17364
53	2.39923	3.05181	3.45877	7.40123	1.87347	2.21770	26.44756	1.20745
54	2.48721	3.15662	3.58315	7.45170	1.92661	2.28061	27.19772	1.24126
55	2.57519	3.26144	3.70753	7.50217	1.98407	2.34863	28.00899	1.27507
56	2.66317	3.36625	3.83192	7.55264	2.04615	2.42212	28.88531	1.30889
57	2.75115	3.47106	3.95630	7.60312	2.11317	2.50145	29.83151	1.34270
58	2.83914	3.57588	4.08068	7.65359	2.18549	2.58706	30.85237	1.37651
59	2.92712	3.68069	4.20506	7.70407	2.26350	2.67940	31.95360	1.41032
60	3.01510	3.78550	4.32945	7.75454	2.34762	2.77897	33.14114	1.44414
61	3.10308	3.89031	4.45383	7.80501	2.43832	2.88635	34.42160	1.47795
62	3.19106	3.99513	4.57821	7.85548	2.53614	3.00213	35.80237	1.51176
63	3.27905	4.09994	4.70260	7.90596	2.64161	3.12699	37.29147	1.54557
64	3.36703	4.20475	4.82698	7.95643	2.75540	3.26168	38.89769	1.57939
65	3.45501	4.30957	4.95136	8.00691	2.87816	3.40700	40.63074	1.61320

**Table A-82**  
**Orange 1990 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	16.44852	20.18027	27.06001	38.70663	1.54845	2.27708	8.05193	18.18892
4	12.05597	15.03884	20.02505	31.63509	1.47011	2.16187	7.64454	15.19762
5	9.54535	12.01791	15.87048	27.37242	1.39696	2.05430	7.26415	12.98708
6	7.92310	10.02998	13.12928	24.33321	1.32862	1.95380	6.90877	11.32187
7	6.79135	8.62802	11.19546	21.95882	1.26473	1.85985	6.57656	10.04546
8	6.03406	7.67468	9.87832	20.20595	1.20497	1.77198	6.26583	9.05148
9	5.44860	6.93505	8.86051	18.68152	1.14905	1.68974	5.97504	8.26616
10	4.97693	6.33924	8.04548	17.32425	1.09669	1.61274	5.70277	7.63734
11	4.58843	5.84904	7.37964	16.10983	1.04764	1.54060	5.44769	7.12748
12	4.26243	5.43822	6.82601	15.01909	1.00166	1.47299	5.20860	6.70911
13	3.98445	5.08818	6.35834	14.03636	0.95854	1.40958	4.98439	6.36184
14	3.74406	4.78543	5.95755	13.14861	0.91809	1.35009	4.77403	6.07027
15	3.53356	4.51996	5.60951	12.34483	0.88012	1.29426	4.57658	5.82265
16	3.34719	4.28421	5.30355	11.61560	0.84446	1.24182	4.39115	5.60993
17	3.18050	4.07240	5.03150	10.95278	0.81096	1.19255	4.21695	5.42501
18	3.03005	3.88004	4.78704	10.34928	0.77947	1.14625	4.05322	5.26235
19	2.89315	3.70365	4.56526	9.79892	0.74987	1.10271	3.89928	5.11758
20	2.77069	3.57057	4.39250	9.29857	0.72202	1.06177	3.75449	4.98718
21	2.66354	3.44575	4.22894	8.84459	0.69582	1.02324	3.61825	4.86844
22	2.56535	3.33041	4.07871	8.42929	0.67116	0.98698	3.49004	4.75916
23	2.47491	3.22321	3.93988	8.04894	0.64795	0.95285	3.36932	4.65764
24	2.39123	3.12309	3.81090	7.70020	0.62609	0.92070	3.25565	4.56257
25	2.31350	3.02924	3.69055	7.38008	0.60550	0.89042	3.14858	4.47293
26	2.24104	2.94101	3.57787	7.08596	0.58610	0.86189	3.04771	4.38797
27	2.17330	2.85791	3.47209	6.81547	0.56783	0.83502	2.95267	4.30715
28	2.10982	2.77954	3.37259	6.56650	0.55060	0.80969	2.86312	4.23008
29	2.05020	2.70560	3.27889	6.33714	0.53437	0.78582	2.77872	4.15653
30	1.99413	2.63586	3.19060	6.12570	0.51908	0.76333	2.69919	4.08636
31	1.94131	2.57011	3.10740	5.93065	0.50466	0.74214	2.62424	4.01951
32	1.89151	2.50820	3.02903	5.75062	0.49108	0.72216	2.55362	3.95597
33	1.84451	2.44997	2.95527	5.58437	0.47829	0.70335	2.48708	3.89581
34	1.80012	2.39530	2.88592	5.43079	0.46624	0.68563	2.42442	3.83905
35	1.75819	2.34406	2.82080	5.28887	0.45489	0.66894	2.36541	3.78581
36	1.71855	2.29614	2.75975	5.15771	0.44421	0.65323	2.30987	3.73615
37	1.68107	2.25141	2.70258	5.03649	0.43416	0.63846	2.25762	3.69010
38	1.64563	2.20975	2.64917	4.92447	0.42471	0.62456	2.20850	3.64773
39	1.61210	2.17102	2.59933	4.82098	0.41584	0.61151	2.16234	3.60905
40	1.58036	2.13509	2.55290	4.72542	0.40751	0.59926	2.11901	3.57406
41	1.55031	2.10181	2.50970	4.63725	0.39969	0.58777	2.07838	3.54272
42	1.52185	2.07102	2.46954	4.55597	0.39237	0.57701	2.04033	3.51492
43	1.49485	2.04254	2.43221	4.48115	0.38553	0.56694	2.00473	3.49047
44	1.46921	2.01618	2.39751	4.41237	0.37914	0.55754	1.97149	3.46926
45	1.44482	1.99171	2.36517	4.34928	0.37318	0.54878	1.94051	3.45098
46	1.42157	1.96888	2.33493	4.29156	0.36764	0.54063	1.91170	3.43530
47	1.39933	1.94742	2.30650	4.23891	0.36250	0.53307	1.88497	3.42181
48	1.37812	1.92698	2.27942	4.19059	0.35774	0.52608	1.86025	3.40996
49	1.37470	1.92311	2.27375	4.14280	0.35336	0.51964	1.83747	3.40996
50	1.37148	1.91947	2.26842	4.09984	0.34934	0.51373	1.81657	3.40996
51	1.36844	1.91603	2.26339	4.06149	0.34567	0.50833	1.79749	3.40996
52	1.36556	1.91279	2.25864	4.02756	0.34234	0.50343	1.78017	3.40996
53	1.36285	1.90972	2.25416	3.99789	0.33934	0.49902	1.76457	3.40996
54	1.36028	1.90682	2.24992	3.97232	0.33667	0.49509	1.75066	3.40996
55	1.35784	1.90407	2.24591	3.95074	0.33431	0.49161	1.73837	3.40996
56	1.43019	2.01785	2.38387	3.93306	0.33225	0.48859	1.72770	3.55304
57	1.50266	2.13176	2.52203	3.91918	0.33050	0.48602	1.71860	3.69611
58	1.57523	2.24580	2.66037	3.90905	0.32905	0.48389	1.71105	3.83919
59	1.64791	2.35995	2.79888	3.90262	0.32790	0.48219	1.70504	3.98227
60	1.72068	2.47421	2.93755	3.89988	0.32703	0.48092	1.70055	4.12535
61	1.79354	2.58857	3.07637	3.90082	0.32646	0.48007	1.69756	4.26843
62	1.86649	2.70303	3.21532	3.90546	0.32617	0.47965	1.69606	4.41151
63	1.93951	2.81757	3.35441	3.91383	0.32617	0.47965	1.69606	4.55459
64	2.01261	2.93220	3.49362	3.92598	0.32646	0.48007	1.69756	4.69767
65	2.08577	3.04690	3.63295	3.94199	0.32703	0.48092	1.70055	4.84074

**Table A-83**  
**Orange 1990 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	161.28563	207.62244	279.11743	454.77832	5.17379	6.17740	47.47118	156.70073
4	122.77458	158.90141	214.08569	415.51147	4.76823	5.69317	43.75005	124.96797
5	99.02107	128.12468	172.04912	380.47119	4.40247	5.25646	40.39407	102.03722
6	82.93427	107.03677	142.86002	349.15308	4.07217	4.86208	37.36345	85.10016
7	71.35783	91.80028	121.61479	321.11865	3.77351	4.50549	34.62312	72.33774
8	62.65915	80.36058	105.60590	295.98584	3.50312	4.18266	32.14229	62.54314
9	55.90524	71.51190	93.20743	273.42065	3.25804	3.89003	29.89355	54.89825
10	50.52345	64.49962	83.38458	253.13232	3.03562	3.62447	27.85277	48.83673
11	46.14281	58.82765	75.44951	234.86594	2.83354	3.38318	25.99857	43.95937
12	42.51268	54.15723	68.92920	218.39708	2.64972	3.16372	24.31204	39.97951
13	39.45778	50.24962	63.48907	203.53041	2.48235	2.96387	22.77634	36.68805
14	36.85208	46.93210	58.88678	190.09309	2.32978	2.78171	21.37651	33.93033
15	34.60269	44.07684	54.94330	177.93451	2.19058	2.61550	20.09924	31.59021
16	32.63983	41.58783	51.52423	166.91986	2.06344	2.46371	18.93275	29.57959
17	30.91014	39.39163	48.52701	156.93237	1.94722	2.32495	17.86642	27.83086
18	29.37230	37.43159	45.87247	147.86726	1.84090	2.19800	16.89088	26.29190
19	27.99382	35.66377	43.49908	139.63254	1.74355	2.08176	15.99769	24.92204
20	26.78995	34.44987	41.79425	132.14702	1.65436	1.97527	15.17935	23.68961
21	25.72778	33.29968	40.23793	125.53810	1.57259	1.87764	14.42907	22.56982
22	24.75615	32.23018	38.81062	119.14180	1.49759	1.78809	13.74087	21.54332
23	23.86263	31.22920	37.49306	113.50133	1.42876	1.70591	13.10934	20.59488
24	23.03714	30.28775	36.27005	108.36600	1.36557	1.63047	12.52962	19.71281
25	22.27155	29.39922	35.12975	103.69089	1.30756	1.56120	11.99734	18.88821
26	21.55925	28.55893	34.06281	99.43605	1.25430	1.49760	11.50861	18.11404
27	20.89482	27.76361	33.06216	95.56584	1.20539	1.43921	11.05989	17.38513
28	20.27376	27.01097	32.12207	92.04836	1.16050	1.38562	10.64803	16.69756
29	19.69238	26.29964	31.23833	88.85577	1.11932	1.33645	10.27019	16.04852
30	19.14757	25.62852	30.40746	85.96277	1.08157	1.29137	9.92379	15.43595
31	18.63666	24.99704	29.62674	83.34706	1.04700	1.25009	9.60654	14.85819
32	18.15739	24.40451	28.89397	80.98900	1.01537	1.21233	9.31638	14.31408
33	17.70775	23.85049	28.20734	78.87100	0.98650	1.17786	9.05146	13.80302
34	17.28595	23.33441	27.56503	76.97757	0.96019	1.14645	8.81006	13.32398
35	16.89040	22.85570	26.96571	75.29498	0.93629	1.11790	8.59073	12.87662
36	16.51959	22.41353	26.40784	73.81143	0.91464	1.09206	8.39213	12.45995
37	16.17220	22.00706	25.89014	72.51640	0.89512	1.06876	8.21305	12.07374
38	15.84691	21.63536	25.41106	71.40114	0.87762	1.04786	8.05243	11.71682
39	15.54250	21.29716	24.96896	70.45770	0.86202	1.02924	7.90934	11.38844
40	15.25778	20.99127	24.56242	69.67996	0.84825	1.01279	7.78294	11.08763
41	14.99159	20.71605	24.18961	69.06259	0.83621	0.99842	7.67251	10.81322
42	14.74275	20.46979	23.84843	68.60138	0.82585	0.98605	7.57743	10.56360
43	14.51008	20.25041	23.53700	68.29343	0.81710	0.97560	7.49716	10.33734
44	14.29234	20.05554	23.25281	68.13649	0.80992	0.96702	7.43125	10.13232
45	14.08823	19.88234	22.99336	68.12975	0.80426	0.96027	7.37934	9.94658
46	13.89626	19.72720	22.75551	68.27290	0.80010	0.95530	7.34114	9.77761
47	13.71488	19.58611	22.53574	68.56712	0.79740	0.95208	7.31644	9.62237
48	13.54234	19.45416	22.33032	69.01427	0.79617	0.95061	7.30511	9.47781
49	13.54234	19.45416	22.33032	69.61734	0.79638	0.95087	7.30709	9.47781
50	13.54234	19.45416	22.33032	70.38028	0.79805	0.95286	7.32237	9.47781
51	13.54234	19.45416	22.33032	71.30832	0.80118	0.95659	7.35105	9.47781
52	13.54234	19.45416	22.33032	72.40779	0.80578	0.96209	7.39330	9.47781
53	13.54234	19.45416	22.33032	73.68599	0.81189	0.96938	7.44933	9.47781
54	13.54234	19.45416	22.33032	75.15211	0.81953	0.97850	7.51946	9.47781
55	13.54234	19.45416	22.33032	76.81601	0.82875	0.98951	7.60408	9.47781
56	16.19179	23.75055	27.39552	78.68979	0.83961	1.00247	7.70365	11.75990
57	18.84123	28.04692	32.46075	80.78676	0.85215	1.01745	7.81875	14.04200
58	21.49069	32.34331	37.52597	83.12225	0.86646	1.03453	7.95002	16.32407
59	24.14015	36.63971	42.59122	85.71373	0.88261	1.05381	8.09822	18.60617
60	26.78961	40.93607	47.65643	88.58061	0.90070	1.07541	8.26421	20.88826
61	29.43909	45.23244	52.72166	91.74503	0.92084	1.09946	8.44897	23.17035
62	32.08856	49.52884	57.78690	95.23175	0.94314	1.12608	8.65359	25.45244
63	34.73802	53.82521	62.85210	99.06868	0.96774	1.15546	8.87931	27.73453
64	37.38750	58.12158	67.91734	103.28726	0.99479	1.18776	9.12752	30.01662
65	40.03696	62.41801	72.98256	107.92224	1.02446	1.22318	9.39976	32.29869

**Table A-84**  
**Orange 1990 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	2.54138	2.82709	3.14568	5.44644	2.82863	3.34837	39.93146	0.89643
4	2.37499	2.63355	2.96591	5.50280	2.70949	3.20734	38.24968	0.85742
5	2.26990	2.51420	2.85828	5.55916	2.59906	3.07662	36.69075	0.82505
6	2.19627	2.43334	2.78760	5.61552	2.49668	2.95542	35.24539	0.79881
7	2.14122	2.37553	2.73870	5.67188	2.40173	2.84304	33.90506	0.77820
8	2.09827	2.33292	2.70389	5.72824	2.31368	2.73881	32.66208	0.76276
9	2.06377	2.30105	2.67883	5.78460	2.23203	2.64215	31.50937	0.75203
10	2.03549	2.27718	2.66087	5.84096	2.15631	2.55252	30.44054	0.74558
11	2.01198	2.25946	2.64825	5.89732	2.08613	2.46944	29.44974	0.74297
12	1.99225	2.24661	2.63977	5.95368	2.02110	2.39246	28.53168	0.74382
13	1.97559	2.23770	2.63456	6.01004	1.96087	2.32117	27.68150	0.74773
14	1.96147	2.23201	2.63196	6.06640	1.90515	2.25521	26.89482	0.75434
15	1.94948	2.22896	2.63146	6.12276	1.85364	2.19423	26.16765	0.76331
16	1.93931	2.22810	2.63266	6.17912	1.80608	2.13794	25.49632	0.77430
17	1.93070	2.22905	2.63524	6.23548	1.76225	2.08605	24.87749	0.78700
18	1.92344	2.23149	2.63893	6.29184	1.72192	2.03831	24.30821	0.80112
19	1.91736	2.23514	2.64350	6.34820	1.68491	1.99450	23.78568	0.81638
20	1.91466	2.24906	2.65828	6.40456	1.65103	1.95440	23.30748	0.83251
21	1.92103	2.27767	2.68826	6.46092	1.62014	1.91782	22.87134	0.84929
22	1.92725	2.30475	2.71644	6.51728	1.59208	1.88461	22.47523	0.86648
23	1.93334	2.33044	2.74298	6.57364	1.56673	1.85460	22.11740	0.88389
24	1.93934	2.35482	2.76803	6.63000	1.54398	1.82767	21.79617	0.90132
25	1.94526	2.37796	2.79169	6.68636	1.52371	1.80368	21.51013	0.91860
26	1.95113	2.39994	2.81408	6.74272	1.50585	1.78254	21.25804	0.93559
27	1.95694	2.42078	2.83527	6.79908	1.49032	1.76415	21.03871	0.95215
28	1.96273	2.44056	2.85536	6.85544	1.47704	1.74844	20.85126	0.96816
29	1.96849	2.45930	2.87441	6.91180	1.46596	1.73532	20.69484	0.98353
30	1.97425	2.47704	2.89251	6.96816	1.45703	1.72475	20.56877	0.99817
31	1.98002	2.49384	2.90971	7.02452	1.45021	1.71668	20.47253	1.01202
32	1.98581	2.50974	2.92608	7.08088	1.44548	1.71107	20.40572	1.02505
33	1.99163	2.52479	2.94171	7.13725	1.44281	1.70791	20.36798	1.03722
34	1.99752	2.53903	2.95666	7.19360	1.44219	1.70718	20.35924	1.04852
35	2.00350	2.55254	2.97101	7.24997	1.44361	1.70887	20.37941	1.05896
36	2.00958	2.56537	2.98483	7.30632	1.44710	1.71299	20.42856	1.06858
37	2.01580	2.57759	2.99822	7.36268	1.45265	1.71957	20.50697	1.07740
38	2.02219	2.58929	3.01126	7.41905	1.46030	1.72862	20.61490	1.08551
39	2.02879	2.60054	3.02404	7.47540	1.47007	1.74018	20.75284	1.09297
40	2.03563	2.61145	3.03667	7.53177	1.48201	1.75432	20.92145	1.09989
41	2.04276	2.62211	3.04924	7.58812	1.49617	1.77108	21.12132	1.10639
42	2.05022	2.63264	3.06188	7.64449	1.51262	1.79055	21.35345	1.11259
43	2.05807	2.64314	3.07469	7.70084	1.53141	1.81280	21.61882	1.11865
44	2.06635	2.65375	3.08780	7.75721	1.55265	1.83793	21.91855	1.12474
45	2.07513	2.66460	3.10135	7.81357	1.57641	1.86606	22.25404	1.13105
46	2.08447	2.67583	3.11547	7.86993	1.60281	1.89732	22.62677	1.13777
47	2.09444	2.68760	3.13031	7.92628	1.63197	1.93184	23.03844	1.14515
48	2.10510	2.70008	3.14601	7.98265	1.66403	1.96978	23.49092	1.15341
49	2.20011	2.81222	3.28431	8.03901	1.69912	2.01132	23.98634	1.19097
50	2.29513	2.92436	3.42261	8.09537	1.73742	2.05666	24.52698	1.22853
51	2.39014	3.03650	3.56092	8.15173	1.77911	2.10600	25.11545	1.26609
52	2.48515	3.14864	3.69922	8.20809	1.82438	2.15960	25.75464	1.30364
53	2.58017	3.26079	3.83752	8.26445	1.87347	2.21770	26.44756	1.34120
54	2.67518	3.37293	3.97583	8.32080	1.92661	2.28061	27.19772	1.37876
55	2.77020	3.48507	4.11413	8.37717	1.98407	2.34863	28.00899	1.41632
56	2.86521	3.59721	4.25243	8.43353	2.04615	2.42212	28.88531	1.45387
57	2.96022	3.70935	4.39074	8.48989	2.11317	2.50145	29.83151	1.49143
58	3.05524	3.82149	4.52904	8.54625	2.18549	2.58706	30.85237	1.52899
59	3.15025	3.93364	4.66734	8.60261	2.26350	2.67940	31.95360	1.56655
60	3.24527	4.04578	4.80565	8.65897	2.34762	2.77897	33.14114	1.60410
61	3.34028	4.15792	4.94395	8.71533	2.43832	2.88635	34.42160	1.64166
62	3.43530	4.27006	5.08225	8.77169	2.53614	3.00213	35.80237	1.67922
63	3.53031	4.38221	5.22056	8.82805	2.64161	3.12699	37.29147	1.71678
64	3.62532	4.49435	5.35886	8.88441	2.75540	3.26168	38.89769	1.75434
65	3.72034	4.60649	5.49716	8.94077	2.87816	3.40700	40.63074	1.79189

**Table A-85**  
**Orange 1996 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	8.06578	9.87281	12.16232	19.57239	1.63085	2.30749	6.08451	15.62037
4	5.94567	7.35146	9.02348	16.06790	1.54834	2.19074	5.77666	13.16975
5	4.74920	5.89902	7.20239	13.93181	1.47129	2.08173	5.48922	11.35471
6	3.98307	4.95604	6.01462	12.39843	1.39931	1.97989	5.22067	9.98472
7	3.45154	4.29604	5.18155	11.19579	1.33203	1.88468	4.96963	8.93278
8	3.10927	3.85909	4.62497	10.31035	1.26909	1.79563	4.73483	8.11234
9	2.84396	3.51816	4.19227	9.53874	1.21020	1.71230	4.51509	7.46325
10	2.62788	3.23987	3.84143	8.85001	1.15505	1.63427	4.30934	6.94289
11	2.44766	3.00731	3.55050	8.23230	1.10339	1.56117	4.11659	6.52054
12	2.29433	2.80903	3.30458	7.67616	1.05496	1.49266	3.93592	6.17365
13	2.16168	2.63707	3.09317	7.17390	1.00955	1.42840	3.76650	5.88549
14	2.04524	2.48567	2.90872	6.71907	0.96694	1.36812	3.60753	5.64338
15	1.94176	2.35059	2.74566	6.30619	0.92695	1.31153	3.45833	5.43764
16	1.84878	2.22866	2.59979	5.93060	0.88940	1.25840	3.31821	5.26081
17	1.76443	2.11744	2.46790	5.58825	0.85411	1.20847	3.18657	5.10704
18	1.68724	2.01504	2.34750	5.27559	0.82095	1.16155	3.06284	4.97174
19	1.61607	1.91999	2.23666	4.98954	0.78977	1.11744	2.94652	4.85128
20	1.54831	1.84255	2.14587	4.73184	0.76044	1.07595	2.83711	4.74278
21	1.48971	1.77693	2.06690	4.50230	0.73285	1.03691	2.73416	4.64397
22	1.43604	1.71671	1.99458	4.29216	0.70688	1.00016	2.63727	4.55304
23	1.38666	1.66117	1.92801	4.09954	0.68243	0.96557	2.54606	4.46858
24	1.34102	1.60972	1.86644	3.92276	0.65941	0.93299	2.46016	4.38949
25	1.29868	1.56188	1.80927	3.76035	0.63772	0.90231	2.37925	4.31494
26	1.25926	1.51725	1.75599	3.61098	0.61729	0.87340	2.30303	4.24430
27	1.22244	1.47551	1.70620	3.47346	0.59804	0.84617	2.23121	4.17711
28	1.18795	1.43638	1.65956	3.34673	0.57990	0.82050	2.16354	4.11307
29	1.15556	1.39963	1.61577	3.22985	0.56281	0.79632	2.09976	4.05197
30	1.12505	1.36507	1.57459	3.12196	0.54670	0.77352	2.03966	3.99369
31	1.09627	1.33254	1.53583	3.02229	0.53152	0.75205	1.98303	3.93820
32	1.06905	1.30188	1.49931	2.93016	0.51722	0.73181	1.92966	3.88547
33	1.04326	1.27297	1.46487	2.84495	0.50374	0.71274	1.87938	3.83558
34	1.01879	1.24569	1.43238	2.76609	0.49105	0.69478	1.83203	3.78853
35	0.99552	1.21995	1.40172	2.69309	0.47910	0.67787	1.78744	3.74443
36	0.97337	1.19565	1.37278	2.62549	0.46785	0.66195	1.74547	3.70332
37	0.95225	1.17269	1.34546	2.56287	0.45726	0.64698	1.70599	3.66524
38	0.93208	1.15100	1.31967	2.50488	0.44731	0.63290	1.66887	3.63024
39	0.91279	1.13051	1.29531	2.45116	0.43797	0.61968	1.63399	3.59834
40	0.89432	1.11113	1.27230	2.40143	0.42919	0.60726	1.60125	3.56951
41	0.87662	1.09279	1.25055	2.35541	0.42096	0.59562	1.57055	3.54376
42	0.85962	1.07543	1.23000	2.31284	0.41325	0.58471	1.54179	3.52097
43	0.84329	1.05898	1.21054	2.27351	0.40604	0.57451	1.51489	3.50098
44	0.82757	1.04335	1.19210	2.23723	0.39931	0.56498	1.48978	3.48370
45	0.81242	1.02849	1.17461	2.20379	0.39304	0.55610	1.46636	3.46888
46	0.79779	1.01431	1.15795	2.17305	0.38720	0.54785	1.44459	3.45623
47	0.78366	1.00073	1.14205	2.14486	0.38179	0.54019	1.42439	3.44539
48	0.77022	0.98776	1.12687	2.11903	0.37678	0.53310	1.40571	3.43592
49	0.76845	0.98590	1.12448	2.09519	0.37217	0.52658	1.38850	3.43592
50	0.76677	0.98415	1.12223	2.07376	0.36793	0.52059	1.37271	3.43592
51	0.76519	0.98249	1.12010	2.05464	0.36407	0.51512	1.35829	3.43592
52	0.76369	0.98092	1.11809	2.03774	0.36056	0.51016	1.34520	3.43592
53	0.76227	0.97943	1.11618	2.02296	0.35740	0.50569	1.33342	3.43592
54	0.76092	0.97802	1.11438	2.01024	0.35458	0.50170	1.32290	3.43592
55	0.75965	0.97668	1.11267	1.99953	0.35210	0.49818	1.31362	3.43592
56	0.78687	1.01826	1.16494	1.99076	0.34993	0.49512	1.30555	3.55669
57	0.81416	1.05991	1.21730	1.98390	0.34809	0.49251	1.29868	3.67747
58	0.84150	1.10161	1.26973	1.97892	0.34656	0.49035	1.29297	3.79825
59	0.86889	1.14337	1.32223	1.97580	0.34534	0.48863	1.28843	3.91902
60	0.89633	1.18517	1.37480	1.97453	0.34443	0.48734	1.28503	4.03980
61	0.92381	1.22703	1.42743	1.97511	0.34383	0.48648	1.28277	4.16058
62	0.95134	1.26893	1.48012	1.97755	0.34353	0.48605	1.28164	4.28135
63	0.97891	1.31087	1.53286	1.98186	0.34353	0.48605	1.28164	4.40213
64	1.00652	1.35286	1.58565	1.98807	0.34383	0.48648	1.28277	4.52291
65	1.03416	1.39487	1.63849	1.99622	0.34443	0.48734	1.28503	4.64368

**Table A-86**  
**Orange 1996 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	73.03479	94.59425	117.12764	220.02502	5.34957	6.15454	41.37212	156.24843
4	56.20416	72.81137	90.06990	201.02748	4.93024	5.67210	38.12904	124.61154
5	46.03207	59.46280	73.18532	184.07460	4.55205	5.23701	35.20430	101.77719
6	39.22365	50.46684	61.68011	168.92281	4.21052	4.84409	32.56302	84.92731
7	34.35237	44.01616	53.37903	155.35947	3.90172	4.48882	30.17480	72.23981
8	30.69841	39.18112	47.13885	143.19989	3.62215	4.16718	28.01268	62.50790
9	27.85883	35.43340	42.29811	132.28273	3.36874	3.87564	26.05284	54.91469
10	25.59036	32.45012	38.44710	122.46696	3.13876	3.61106	24.27428	48.89522
11	23.73740	30.02313	35.31882	113.62939	2.92981	3.37067	22.65836	44.05174
12	22.19594	28.01213	32.73219	105.66165	2.73975	3.15201	21.18849	40.09886
13	20.89374	26.31931	30.56036	98.46907	2.56669	2.95291	19.85011	36.82852
14	19.77916	24.87442	28.71198	91.96800	2.40894	2.77142	18.63011	34.08682
15	18.81418	23.62575	27.11986	86.08563	2.26501	2.60583	17.51695	31.75841
16	17.97040	22.53453	25.73354	80.75670	2.13355	2.45459	16.50032	29.75568
17	17.22606	21.57108	24.51453	75.92468	2.01338	2.31634	15.57101	28.01164
18	16.56424	20.71249	23.43298	71.53891	1.90345	2.18986	14.72080	26.47450
19	15.97164	19.94080	22.46559	67.55493	1.80279	2.07406	13.94234	25.10403
20	15.33006	19.25800	21.64192	63.93341	1.71057	1.96796	13.22913	23.86887
21	14.64037	18.47420	20.75430	60.63919	1.62602	1.87069	12.57524	22.74452
22	14.01250	17.75627	19.94467	57.64140	1.54847	1.78147	11.97547	21.71191
23	13.43832	17.09534	19.20232	54.91251	1.47730	1.69959	11.42508	20.75623
24	12.91109	16.48418	18.51854	52.42801	1.41197	1.62443	10.91983	19.86594
25	12.42518	15.91705	17.88620	50.16618	1.35199	1.55542	10.45594	19.03242
26	11.97588	15.38916	17.29942	48.10765	1.29691	1.49206	10.03000	18.24895
27	11.55920	14.89664	16.75340	46.23521	1.24635	1.43389	9.63893	17.51057
28	11.17174	14.43630	16.24408	44.53342	1.19993	1.38049	9.27999	16.81354
29	10.81059	14.00546	15.76809	42.98882	1.15736	1.33150	8.95069	16.15527
30	10.47324	13.60186	15.32260	41.58922	1.11832	1.28660	8.64880	15.53391
31	10.15751	13.22358	14.90514	40.32368	1.08257	1.24547	8.37231	14.94789
32	9.86150	12.86893	14.51365	39.18283	1.04987	1.20785	8.11943	14.39618
33	9.58353	12.53640	14.14630	38.15816	1.02002	1.17350	7.88854	13.87833
34	9.32213	12.22467	13.80147	37.24208	0.99282	1.14220	7.67815	13.39327
35	9.07598	11.93252	13.47774	36.42807	0.96810	1.11377	7.48700	12.94082
36	8.84389	11.65881	13.17378	35.71028	0.94572	1.08802	7.31392	12.51992
37	8.62483	11.40250	12.88844	35.08379	0.92554	1.06480	7.15785	12.13041
38	8.41784	11.16260	12.62059	34.54419	0.90744	1.04398	7.01786	11.77106
39	8.22204	10.93815	12.36916	34.08775	0.89131	1.02543	6.89316	11.44108
40	8.03664	10.72825	12.13320	33.71150	0.87707	1.00904	6.78300	11.13943
41	7.86093	10.53200	11.91175	33.41281	0.86462	0.99473	6.68676	10.86489
42	7.69421	10.34851	11.70381	33.18968	0.85391	0.98240	6.60389	10.61574
43	7.53589	10.17687	11.50852	33.04066	0.84486	0.97199	6.53394	10.39043
44	7.38534	10.01616	11.32489	32.96474	0.83744	0.96345	6.47649	10.18671
45	7.24203	9.86536	11.15201	32.96150	0.83159	0.95672	6.43126	10.00248
46	7.10538	9.72336	10.98883	33.03073	0.82728	0.95176	6.39796	9.83504
47	6.97487	9.58896	10.83427	33.17313	0.82450	0.94856	6.37643	9.68113
48	6.84997	9.46082	10.68723	33.38947	0.82322	0.94709	6.36656	9.53751
49	6.84997	9.46082	10.68723	33.68120	0.82344	0.94735	6.36828	9.53751
50	6.84997	9.46082	10.68723	34.05031	0.82517	0.94933	6.38160	9.53751
51	6.84997	9.46082	10.68723	34.49930	0.82840	0.95305	6.40660	9.53751
52	6.84997	9.46082	10.68723	35.03123	0.83316	0.95853	6.44342	9.53751
53	6.84997	9.46082	10.68723	35.64961	0.83947	0.96579	6.49225	9.53751
54	6.84997	9.46082	10.68723	36.35892	0.84738	0.97488	6.55337	9.53751
55	6.84997	9.46082	10.68723	37.16394	0.85691	0.98585	6.62712	9.53751
56	7.80345	11.03531	12.57627	38.07047	0.86813	0.99876	6.71390	11.83441
57	8.75693	12.60980	14.46530	39.08502	0.88110	1.01368	6.81421	14.13133
58	9.71042	14.18430	16.35431	40.21495	0.89590	1.03070	6.92861	16.42822
59	10.66390	15.75877	18.24333	41.46869	0.91260	1.04992	7.05777	18.72511
60	11.61738	17.33324	20.13234	42.85576	0.93130	1.07144	7.20243	21.02200
61	12.57087	18.90773	22.02138	44.38667	0.95212	1.09539	7.36346	23.31889
62	13.52435	20.48219	23.91039	46.07359	0.97518	1.12192	7.54179	25.61577
63	14.47784	22.05667	25.79942	47.92990	1.00062	1.15118	7.73851	27.91270
64	15.43131	23.63113	27.68846	49.97089	1.02859	1.18336	7.95483	30.20959
65	16.38478	25.20564	29.57751	52.21329	1.05927	1.21866	8.19210	32.50648



**Table A-87**  
**Orange 1996 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.07755	2.31366	2.55110	4.56843	2.74037	3.13502	27.83104	0.91266
4	1.90822	2.12667	2.35482	4.61571	2.62495	3.00298	26.65887	0.87295
5	1.80567	2.01373	2.23726	4.66298	2.51797	2.88059	25.57236	0.83999
6	1.73664	1.93815	2.15923	4.71026	2.41878	2.76712	24.56497	0.81327
7	1.68686	1.88416	2.10394	4.75753	2.32680	2.66189	23.63083	0.79230
8	1.64919	1.84386	2.06294	4.80480	2.24149	2.56430	22.76448	0.77658
9	1.61966	1.81282	2.03154	4.85208	2.16238	2.47380	21.96109	0.76565
10	1.59589	1.78838	2.00692	4.89935	2.08903	2.38988	21.21614	0.75908
11	1.57633	1.76881	1.98726	4.94663	2.02104	2.31210	20.52560	0.75643
12	1.55998	1.75297	1.97134	4.99390	1.95804	2.24002	19.88574	0.75729
13	1.54612	1.74003	1.95832	5.04118	1.89969	2.17327	19.29320	0.76127
14	1.53424	1.72941	1.94759	5.08845	1.84571	2.11151	18.74493	0.76801
15	1.52396	1.72065	1.93868	5.13573	1.79580	2.05442	18.23810	0.77713
16	1.51500	1.71342	1.93124	5.18300	1.74973	2.00172	17.77022	0.78832
17	1.50713	1.70744	1.92502	5.23028	1.70726	1.95313	17.33893	0.80125
18	1.50019	1.70251	1.91980	5.27755	1.66819	1.90844	16.94214	0.81563
19	1.49404	1.69845	1.91542	5.32482	1.63234	1.86741	16.57796	0.83116
20	1.49497	1.69740	1.91434	5.37210	1.59952	1.82987	16.24466	0.84759
21	1.50336	1.70903	1.92734	5.41937	1.56958	1.79563	15.94070	0.86467
22	1.51106	1.71987	1.93938	5.46664	1.54240	1.76453	15.66463	0.88217
23	1.51816	1.72998	1.95055	5.51392	1.51784	1.73643	15.41523	0.89989
24	1.52473	1.73946	1.96095	5.56119	1.49580	1.71122	15.19134	0.91764
25	1.53084	1.74835	1.97065	5.60847	1.47617	1.68876	14.99198	0.93524
26	1.53655	1.75670	1.97974	5.65574	1.45887	1.66897	14.81627	0.95253
27	1.54191	1.76456	1.98827	5.70302	1.44382	1.65175	14.66341	0.96939
28	1.54695	1.77196	1.99629	5.75029	1.43095	1.63703	14.53276	0.98569
29	1.55171	1.77894	2.00384	5.79757	1.42022	1.62475	14.42374	1.00134
30	1.55623	1.78551	2.01096	5.84484	1.41157	1.61485	14.33588	1.01624
31	1.56053	1.79171	2.01771	5.89212	1.40496	1.60730	14.26879	1.03035
32	1.56463	1.79757	2.02410	5.93939	1.40038	1.60205	14.22222	1.04361
33	1.56856	1.80310	2.03017	5.98667	1.39779	1.59909	14.19593	1.05600
34	1.57234	1.80834	2.03596	6.03394	1.39719	1.59840	14.18982	1.06751
35	1.57598	1.81329	2.04149	6.08122	1.39857	1.59998	14.20389	1.07814
36	1.57951	1.81800	2.04680	6.12849	1.40195	1.60384	14.23815	1.08793
37	1.58294	1.82249	2.05192	6.17576	1.40733	1.61000	14.29280	1.09692
38	1.58629	1.82677	2.05687	6.22304	1.41473	1.61847	14.36803	1.10517
39	1.58957	1.83088	2.06168	6.27031	1.42420	1.62930	14.46417	1.11277
40	1.59279	1.83485	2.06639	6.31759	1.43577	1.64254	14.58167	1.11981
41	1.59598	1.83870	2.07103	6.36486	1.44949	1.65824	14.72099	1.12642
42	1.59914	1.84247	2.07563	6.41214	1.46542	1.67646	14.88278	1.13274
43	1.60230	1.84618	2.08021	6.45941	1.48363	1.69729	15.06774	1.13891
44	1.60545	1.84988	2.08482	6.50669	1.50420	1.72083	15.27664	1.14511
45	1.60863	1.85359	2.08949	6.55396	1.52722	1.74716	15.51046	1.15153
46	1.61184	1.85736	2.09425	6.60123	1.55280	1.77643	15.77025	1.15838
47	1.61510	1.86123	2.09914	6.64851	1.58105	1.80875	16.05716	1.16589
48	1.61843	1.86522	2.10420	6.69578	1.61211	1.84427	16.37251	1.17430
49	1.67826	1.93975	2.19063	6.74306	1.64610	1.88317	16.71782	1.21254
50	1.73810	2.01428	2.27706	6.79033	1.68321	1.92561	17.09464	1.25078
51	1.79793	2.08881	2.36348	6.83761	1.72359	1.97181	17.50476	1.28901
52	1.85777	2.16334	2.44991	6.88488	1.76746	2.02199	17.95026	1.32725
53	1.91760	2.23787	2.53634	6.93216	1.81501	2.07640	18.43320	1.36549
54	1.97743	2.31240	2.62276	6.97943	1.86649	2.13529	18.95602	1.40373
55	2.03727	2.38693	2.70919	7.02670	1.92216	2.19898	19.52144	1.44196
56	2.09710	2.46146	2.79562	7.07398	1.98231	2.26779	20.13223	1.48020
57	2.15694	2.53598	2.88205	7.12125	2.04724	2.34207	20.79169	1.51844
58	2.21677	2.61051	2.96847	7.16853	2.11730	2.42222	21.50319	1.55668
59	2.27661	2.68504	3.05490	7.21580	2.19287	2.50867	22.27071	1.59492
60	2.33644	2.75957	3.14133	7.26308	2.27437	2.60190	23.09837	1.63315
61	2.39628	2.83410	3.22775	7.31035	2.36225	2.70244	23.99084	1.67139
62	2.45611	2.90863	3.31418	7.35763	2.45701	2.81085	24.95317	1.70963
63	2.51594	2.98316	3.40061	7.40490	2.55919	2.92775	25.99104	1.74787
64	2.57578	3.05769	3.48704	7.45218	2.66943	3.05386	27.11052	1.78610
65	2.63561	3.13221	3.57346	7.49945	2.78836	3.18992	28.31841	1.82434

**Table A-88**  
**Orange 1996 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	10.31728	11.65228	14.24642	26.68816	1.63085	2.30749	6.08451	17.48485
4	7.42737	8.47879	10.27952	20.96176	1.54834	2.19074	5.77666	15.06018
5	5.84154	6.70819	8.06758	17.73607	1.47129	2.08173	5.48922	13.26435
6	4.84606	5.58360	6.66340	15.56922	1.39931	1.97989	5.22067	11.90885
7	4.16555	4.80904	5.69733	13.95477	1.33203	1.88468	4.96963	10.86804
8	3.75835	4.31812	5.08448	12.87295	1.26909	1.79563	4.73483	10.05628
9	3.44266	3.93865	4.61232	11.94795	1.21020	1.71230	4.51509	9.41406
10	3.18252	3.63036	4.23060	11.12774	1.15505	1.63427	4.30934	8.89920
11	2.96282	3.37402	3.91504	10.39540	1.10339	1.56117	4.11659	8.48131
12	2.77346	3.15665	3.64916	9.73807	1.05496	1.49266	3.93592	8.13810
13	2.60742	2.96917	3.42139	9.14552	1.00955	1.42840	3.76650	7.85299
14	2.45967	2.80503	3.22341	8.60940	0.96694	1.36812	3.60753	7.61343
15	2.32654	2.65943	3.04909	8.12283	0.92695	1.31153	3.45833	7.40987
16	2.20524	2.52875	2.89380	7.67998	0.88940	1.25840	3.31821	7.23491
17	2.09368	2.41020	2.75401	7.27590	0.85411	1.20847	3.18657	7.08277
18	1.99019	2.30166	2.62699	6.90630	0.82095	1.16155	3.06284	6.94890
19	1.89349	2.20145	2.51059	6.56750	0.78977	1.11744	2.94652	6.82971
20	1.80753	2.11851	2.41429	6.26533	0.76044	1.07595	2.83711	6.72236
21	1.74129	2.04496	2.32740	6.00149	0.73285	1.03691	2.73416	6.62460
22	1.68046	1.97739	2.24783	5.75991	0.70688	1.00016	2.63727	6.53463
23	1.62433	1.91500	2.17459	5.53841	0.68243	0.96557	2.54606	6.45106
24	1.57231	1.85715	2.10686	5.33502	0.65941	0.93299	2.46016	6.37281
25	1.52391	1.80329	2.04397	5.14805	0.63772	0.90231	2.37925	6.29905
26	1.47872	1.75300	1.98538	4.97595	0.61729	0.87340	2.30303	6.22916
27	1.43638	1.70591	1.93062	4.81735	0.59804	0.84617	2.23121	6.16268
28	1.39659	1.66173	1.87932	4.67106	0.57990	0.82050	2.16354	6.09931
29	1.35911	1.62020	1.83115	4.53596	0.56281	0.79632	2.09976	6.03886
30	1.32370	1.58111	1.78586	4.41109	0.54670	0.77352	2.03966	5.98120
31	1.29019	1.54428	1.74320	4.29556	0.53152	0.75205	1.98303	5.92629
32	1.25839	1.50956	1.70299	4.18859	0.51722	0.73181	1.92966	5.87413
33	1.22817	1.47679	1.66505	4.08949	0.50374	0.71274	1.87938	5.82476
34	1.19939	1.44586	1.62922	3.99760	0.49105	0.69478	1.83203	5.77821
35	1.17195	1.41666	1.59538	3.91235	0.47910	0.67787	1.78744	5.73458
36	1.14572	1.38907	1.56340	3.83323	0.46785	0.66195	1.74547	5.69390
37	1.12064	1.36302	1.53317	3.75977	0.45726	0.64698	1.70599	5.65622
38	1.09660	1.33839	1.50459	3.69154	0.44731	0.63290	1.66887	5.62159
39	1.07353	1.31511	1.47754	3.62818	0.43797	0.61968	1.63399	5.59003
40	1.05137	1.29309	1.45195	3.56932	0.42919	0.60726	1.60125	5.56151
41	1.03005	1.27226	1.42772	3.51468	0.42096	0.59562	1.57055	5.53603
42	1.00951	1.25253	1.40475	3.46395	0.41325	0.58471	1.54179	5.51348
43	0.98970	1.23383	1.38297	3.41689	0.40604	0.57451	1.51489	5.49370
44	0.97056	1.21607	1.36229	3.37327	0.39931	0.56498	1.48978	5.47660
45	0.95205	1.19916	1.34262	3.33289	0.39304	0.55610	1.46636	5.46194
46	0.93412	1.18302	1.32385	3.29555	0.38720	0.54785	1.44459	5.44943
47	0.91673	1.16756	1.30590	3.26110	0.38179	0.54019	1.42439	5.43870
48	0.90023	1.15276	1.28870	3.22924	0.37678	0.53310	1.40571	5.42933
49	0.89712	1.14948	1.28440	3.19887	0.37217	0.52658	1.38850	5.42933
50	0.89419	1.14640	1.28036	3.17141	0.36793	0.52059	1.37271	5.42933
51	0.89143	1.14348	1.27655	3.14670	0.36407	0.51512	1.35829	5.42933
52	0.88881	1.14073	1.27294	3.12462	0.36056	0.51016	1.34520	5.42933
53	0.88634	1.13813	1.26954	3.10507	0.35740	0.50569	1.33342	5.42933
54	0.88400	1.13566	1.26631	3.08795	0.35458	0.50170	1.32290	5.42933
55	0.88178	1.13332	1.26326	3.07318	0.35210	0.49818	1.31362	5.42933
56	0.90945	1.17727	1.31631	3.06071	0.34993	0.49512	1.30555	5.54882
57	0.93722	1.22132	1.36951	3.05047	0.34809	0.49251	1.29868	5.66832
58	0.96510	1.26548	1.42284	3.04242	0.34656	0.49035	1.29297	5.78782
59	0.99307	1.30974	1.47631	3.03652	0.34534	0.48863	1.28843	5.90732
60	1.02112	1.35409	1.52989	3.03277	0.34443	0.48734	1.28503	6.02682
61	1.04925	1.39853	1.58358	3.03114	0.34383	0.48648	1.28277	6.14632
62	1.07746	1.44304	1.63738	3.03165	0.34353	0.48605	1.28164	6.26582
63	1.10574	1.48762	1.69128	3.03430	0.34353	0.48605	1.28165	6.38532
64	1.13409	1.53228	1.74527	3.03912	0.34383	0.48648	1.28277	6.50482
65	1.16249	1.57701	1.79935	3.04614	0.34443	0.48734	1.28503	6.62432

**Table A-89**  
**Orange 1996 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	78.91254	105.28067	129.27179	281.31274	5.34957	6.15454	41.37212	189.88757
4	60.64514	81.02525	99.33899	257.02368	4.93024	5.67210	38.12904	151.43947
5	49.58607	66.08408	80.60179	235.34908	4.55205	5.23701	35.20430	123.68912
6	42.17747	55.98958	67.81389	215.97662	4.21052	4.84409	32.56302	103.21158
7	36.87505	48.74559	58.58150	198.63522	3.90172	4.48882	30.17480	87.79254
8	32.89783	43.31776	51.64101	183.08858	3.62215	4.16718	28.01268	75.96541
9	29.80782	39.11475	46.25876	169.13042	3.36874	3.87564	26.05284	66.73746
10	27.34023	35.77370	41.97928	156.58046	3.13876	3.61106	24.27428	59.42204
11	25.32552	33.05983	38.50519	145.28113	2.92981	3.37067	22.65836	53.53583
12	23.65024	30.81454	35.63457	135.09398	2.73975	3.15201	21.18849	48.73187
13	22.23557	28.92709	33.22585	125.89789	2.56669	2.95291	19.85011	44.75746
14	21.02510	27.31779	31.17703	117.58595	2.40894	2.77142	18.63011	41.42548
15	19.97739	25.92798	29.41310	110.06502	2.26501	2.60583	17.51695	38.59578
16	19.06134	24.71361	27.87773	103.25169	2.13355	2.45459	16.50032	36.16190
17	18.25323	23.64102	26.52795	97.07372	2.01338	2.31634	15.57101	34.04236
18	17.53459	22.68427	25.33046	91.46628	1.90345	2.18986	14.72080	32.17430
19	16.89088	21.82304	24.25928	86.37254	1.80279	2.07406	13.94234	30.50876
20	16.20415	21.07423	23.36333	81.74223	1.71057	1.96796	13.22913	29.00766
21	15.47488	20.22530	22.40579	77.53041	1.62602	1.87069	12.57524	27.64119
22	14.81060	19.44560	21.53194	73.69756	1.54847	1.78147	11.97547	26.38632
23	14.20276	18.72575	20.73021	70.20851	1.47730	1.69959	11.42508	25.22485
24	13.64428	18.05817	19.99127	67.03198	1.41197	1.62443	10.91983	24.14290
25	13.12925	17.43681	19.30745	64.14009	1.35199	1.55542	10.45594	23.12994
26	12.65272	16.85690	18.67245	61.50816	1.29691	1.49206	10.03000	22.17780
27	12.21055	16.31451	18.08119	59.11417	1.24635	1.43389	9.63893	21.28044
28	11.79918	15.80649	17.52936	56.93832	1.19993	1.38049	9.27999	20.43335
29	11.41560	15.33025	17.01340	54.96350	1.15736	1.33150	8.95069	19.63338
30	11.05719	14.88360	16.53033	53.17401	1.11832	1.28660	8.64880	18.87823
31	10.72171	14.46473	16.07764	51.55597	1.08257	1.24547	8.37231	18.16605
32	10.40717	14.07202	15.65307	50.09735	1.04987	1.20785	8.11943	17.49556
33	10.11185	13.70405	15.25476	48.78725	1.02002	1.17350	7.88854	16.86621
34	9.83421	13.35953	14.88101	47.61600	0.99282	1.14220	7.67815	16.27675
35	9.57288	13.03727	14.53033	46.57520	0.96810	1.11377	7.48700	15.72689
36	9.32664	12.73613	14.20133	45.65750	0.94572	1.08802	7.31392	15.21537
37	9.09439	12.45505	13.89278	44.85648	0.92554	1.06480	7.15785	14.74200
38	8.87512	12.19302	13.60350	44.16658	0.90744	1.04398	7.01786	14.30529
39	8.66793	11.94899	13.33234	43.58302	0.89131	1.02543	6.89316	13.90426
40	8.47197	11.72199	13.07827	43.10194	0.87707	1.00904	6.78300	13.53767
41	8.28648	11.51102	12.84024	42.72008	0.86462	0.99473	6.68676	13.20402
42	8.11072	11.31505	12.61717	42.43475	0.85391	0.98240	6.60389	12.90123
43	7.94403	11.13299	12.40809	42.24423	0.84486	0.97199	6.53394	12.62742
44	7.78575	10.96374	12.21190	42.14716	0.83744	0.96345	6.47649	12.37984
45	7.63526	10.80601	12.02757	42.14301	0.83159	0.95672	6.43126	12.15594
46	7.49193	10.65838	11.85390	42.23154	0.82728	0.95176	6.39796	11.95245
47	7.35515	10.51927	11.68964	42.41357	0.82450	0.94856	6.37643	11.76541
48	7.22430	10.38688	11.53353	42.69017	0.82322	0.94709	6.36656	11.59086
49	7.22430	10.38688	11.53353	43.06319	0.82344	0.94735	6.36828	11.59086
50	7.22430	10.38688	11.53353	43.53510	0.82517	0.94933	6.38160	11.59086
51	7.22430	10.38688	11.53353	44.10918	0.82840	0.95305	6.40660	11.59086
52	7.22430	10.38688	11.53353	44.78929	0.83316	0.95853	6.44342	11.59086
53	7.22430	10.38688	11.53353	45.57993	0.83947	0.96579	6.49225	11.59086
54	7.22430	10.38688	11.53353	46.48680	0.84738	0.97488	6.55337	11.59086
55	7.22430	10.38688	11.53353	47.51607	0.85691	0.98585	6.62712	11.59086
56	8.26681	12.18626	13.62818	48.67511	0.86813	0.99876	6.71390	14.38227
57	9.30932	13.98565	15.72283	49.97224	0.88110	1.01368	6.81421	17.17369
58	10.35183	15.78502	17.81744	51.41693	0.89590	1.03070	6.92861	19.96509
59	11.39433	17.58438	19.91208	53.01994	0.91260	1.04992	7.05777	22.75648
60	12.43684	19.38373	22.00671	54.79330	0.93130	1.07144	7.20243	25.54788
61	13.47935	21.18312	24.10138	56.75072	0.95212	1.09539	7.36346	28.33928
62	14.52186	22.98248	26.19601	58.90750	0.97518	1.12192	7.54179	31.13068
63	15.56436	24.78186	28.29066	61.28091	1.00062	1.15118	7.73851	33.92212
64	16.60686	26.58122	30.38530	63.89043	1.02859	1.18336	7.95483	36.71355
65	17.64935	28.38063	32.47998	66.75742	1.05927	1.21866	8.19210	39.50494

**Table A-90**  
**Orange 1996 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.07417	2.29602	2.50853	4.35446	2.74037	3.13502	27.83104	0.82775
4	1.90313	2.10865	2.31168	4.39952	2.62495	3.00298	26.65887	0.79173
5	1.79976	1.99562	2.19377	4.44458	2.51797	2.88059	25.57236	0.76184
6	1.73034	1.92005	2.11548	4.48964	2.41878	2.76712	24.56497	0.73761
7	1.68041	1.86611	2.05994	4.53470	2.32680	2.66189	23.63083	0.71858
8	1.64271	1.82584	2.01868	4.57976	2.24149	2.56430	22.76448	0.70433
9	1.61322	1.79483	1.98701	4.62482	2.16238	2.47380	21.96109	0.69442
10	1.58953	1.77038	1.96209	4.66988	2.08903	2.38988	21.21614	0.68845
11	1.57008	1.75079	1.94211	4.71494	2.02104	2.31210	20.52560	0.68605
12	1.55384	1.73488	1.92585	4.76000	1.95804	2.24002	19.88574	0.68683
13	1.54010	1.72185	1.91247	4.80507	1.89969	2.17327	19.29320	0.69044
14	1.52833	1.71111	1.90135	4.85012	1.84571	2.11151	18.74493	0.69655
15	1.51816	1.70221	1.89204	4.89518	1.79580	2.05442	18.23810	0.70483
16	1.50930	1.69481	1.88420	4.94024	1.74973	2.00172	17.77022	0.71498
17	1.50152	1.68864	1.87756	4.98531	1.70726	1.95313	17.33893	0.72671
18	1.49466	1.68351	1.87191	5.03037	1.66819	1.90844	16.94214	0.73974
19	1.48857	1.67923	1.86710	5.07543	1.63234	1.86741	16.57796	0.75383
20	1.48965	1.67782	1.86541	5.12049	1.59952	1.82987	16.24466	0.76873
21	1.49828	1.68912	1.87787	5.16554	1.56958	1.79563	15.94070	0.78422
22	1.50618	1.69962	1.88936	5.21060	1.54240	1.76453	15.66463	0.80010
23	1.51346	1.70942	1.90000	5.25567	1.51784	1.73643	15.41523	0.81617
24	1.52018	1.71858	1.90989	5.30072	1.49580	1.71122	15.19134	0.83226
25	1.52642	1.72715	1.91910	5.34578	1.47617	1.68876	14.99198	0.84822
26	1.53223	1.73520	1.92771	5.39084	1.45887	1.66897	14.81627	0.86391
27	1.53767	1.74276	1.93577	5.43591	1.44382	1.65175	14.66341	0.87920
28	1.54278	1.74986	1.94333	5.48097	1.43095	1.63703	14.53276	0.89398
29	1.54759	1.75655	1.95044	5.52603	1.42022	1.62475	14.42374	0.90817
30	1.55213	1.76284	1.95714	5.57109	1.41157	1.61485	14.33588	0.92169
31	1.55643	1.76877	1.96347	5.61615	1.40496	1.60730	14.26879	0.93449
32	1.56052	1.77435	1.96946	5.66121	1.40038	1.60205	14.22222	0.94652
33	1.56442	1.77963	1.97514	5.70627	1.39779	1.59909	14.19593	0.95775
34	1.56815	1.78461	1.98054	5.75133	1.39719	1.59840	14.18982	0.96819
35	1.57173	1.78932	1.98569	5.79639	1.39857	1.59998	14.20389	0.97783
36	1.57518	1.79379	1.99063	5.84145	1.40195	1.60384	14.23815	0.98671
37	1.57851	1.79803	1.99536	5.88651	1.40733	1.61000	14.29280	0.99486
38	1.58174	1.80207	1.99993	5.93157	1.41473	1.61847	14.36803	1.00235
39	1.58488	1.80594	2.00437	5.97663	1.42420	1.62930	14.46417	1.00924
40	1.58795	1.80966	2.00868	6.02169	1.43577	1.64254	14.58167	1.01563
41	1.59096	1.81326	2.01292	6.06675	1.44949	1.65824	14.72099	1.02162
42	1.59392	1.81677	2.01709	6.11181	1.46542	1.67646	14.88278	1.02735
43	1.59686	1.82021	2.02123	6.15687	1.48363	1.69729	15.06774	1.03294
44	1.59977	1.82362	2.02537	6.20193	1.50420	1.72083	15.27664	1.03857
45	1.60268	1.82704	2.02954	6.24699	1.52722	1.74716	15.51046	1.04439
46	1.60560	1.83048	2.03377	6.29206	1.55280	1.77643	15.77025	1.05061
47	1.60854	1.83400	2.03809	6.33711	1.58105	1.80875	16.05716	1.05741
48	1.61151	1.83762	2.04253	6.38217	1.61211	1.84427	16.37251	1.06504
49	1.67075	1.91090	2.12605	6.42723	1.64610	1.88317	16.71782	1.09972
50	1.72998	1.98419	2.20957	6.47230	1.68321	1.92561	17.09464	1.13440
51	1.78922	2.05747	2.29310	6.51735	1.72359	1.97181	17.50476	1.16908
52	1.84845	2.13075	2.37662	6.56242	1.76746	2.02199	17.95026	1.20376
53	1.90769	2.20404	2.46014	6.60747	1.81501	2.07640	18.43320	1.23844
54	1.96692	2.27732	2.54367	6.65253	1.86649	2.13529	18.95602	1.27313
55	2.02616	2.35060	2.62719	6.69760	1.92216	2.19898	19.52144	1.30781
56	2.08539	2.42389	2.71072	6.74265	1.98231	2.26779	20.13223	1.34249
57	2.14463	2.49717	2.79424	6.78772	2.04724	2.34207	20.79169	1.37717
58	2.20386	2.57045	2.87777	6.83278	2.11730	2.42222	21.50319	1.41185
59	2.26310	2.64374	2.96129	6.87784	2.19287	2.50867	22.27071	1.44653
60	2.32234	2.71702	3.04482	6.92290	2.27437	2.60190	23.09837	1.48121
61	2.38157	2.79030	3.12834	6.96796	2.36225	2.70244	23.99084	1.51589
62	2.44081	2.86359	3.21187	7.01302	2.45701	2.81085	24.95317	1.55057
63	2.50004	2.93687	3.29539	7.05808	2.55919	2.92775	25.99104	1.58525
64	2.55928	3.01015	3.37892	7.10314	2.66943	3.05386	27.11052	1.61993
65	2.61851	3.08343	3.46244	7.14820	2.78836	3.18992	28.31841	1.65460

**Table A-91**  
**Orange 1996 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	10.82364	12.02822	14.71333	28.14445	1.63085	2.30749	6.08451	17.71013
4	7.75513	8.70718	10.55371	21.89783	1.54834	2.19074	5.77666	15.28720
5	6.07957	6.86602	8.25136	18.42136	1.47129	2.08173	5.48922	13.49264
6	5.03152	5.70189	6.79742	16.11180	1.39931	1.97989	5.22067	12.13811
7	4.31702	4.90276	5.80096	14.40676	1.33203	1.88468	4.96963	11.09804
8	3.89537	4.40139	5.17597	13.28492	1.26909	1.79563	4.73483	10.28686
9	3.56842	4.01463	4.69543	12.32947	1.21020	1.71230	4.51509	9.64510
10	3.29832	3.70072	4.30720	11.48341	1.15505	1.63427	4.30934	9.13061
11	3.06962	3.43996	3.98646	10.72872	1.10339	1.56117	4.11659	8.71302
12	2.87197	3.21907	3.71641	10.05175	1.05496	1.49266	3.93592	8.37006
13	2.69818	3.02877	3.48525	9.44172	1.00955	1.42840	3.76650	8.08514
14	2.54313	2.86236	3.28450	8.88989	0.96694	1.36812	3.60753	7.84576
15	2.40303	2.71491	3.10789	8.38906	0.92695	1.31153	3.45833	7.64235
16	2.27505	2.58272	2.95071	7.93317	0.88940	1.25840	3.31821	7.46751
17	2.15703	2.46296	2.80936	7.51708	0.85411	1.20847	3.18657	7.31548
18	2.04727	2.35344	2.68105	7.13638	0.82095	1.16155	3.06284	7.18170
19	1.94447	2.25243	2.56358	6.78723	0.78977	1.11744	2.94652	7.06260
20	1.85425	2.16847	2.46609	6.47657	0.76044	1.07595	2.83711	6.95532
21	1.78641	2.09324	2.37736	6.20659	0.73285	1.03691	2.73416	6.85763
22	1.72410	2.02411	2.29610	5.95938	0.70688	1.00016	2.63727	6.76773
23	1.66656	1.96027	2.22130	5.73270	0.68243	0.96557	2.54606	6.68422
24	1.61322	1.90104	2.15212	5.52456	0.65941	0.93299	2.46016	6.60603
25	1.56356	1.84589	2.08788	5.33317	0.63772	0.90231	2.37925	6.53232
26	1.51717	1.79438	2.02801	5.15699	0.61729	0.87340	2.30303	6.46247
27	1.47368	1.74614	1.97206	4.99460	0.59804	0.84617	2.23121	6.39605
28	1.43280	1.70086	1.91963	4.84477	0.57990	0.82050	2.16354	6.33272
29	1.39426	1.65828	1.87039	4.70638	0.56281	0.79632	2.09976	6.27232
30	1.35784	1.61819	1.82409	4.57842	0.54670	0.77352	2.03966	6.21469
31	1.32334	1.58041	1.78047	4.46001	0.53152	0.75205	1.98303	6.15983
32	1.29060	1.54478	1.73933	4.35034	0.51722	0.73181	1.92966	6.10769
33	1.25946	1.51114	1.70051	4.24869	0.50374	0.71274	1.87938	6.05837
34	1.22979	1.47938	1.66385	4.15440	0.49105	0.69478	1.83203	6.01185
35	1.20148	1.44938	1.62920	4.06689	0.47910	0.67787	1.78744	5.96824
36	1.17441	1.42104	1.59644	3.98564	0.46785	0.66195	1.74547	5.92760
37	1.14850	1.39424	1.56546	3.91016	0.45726	0.64698	1.70599	5.88995
38	1.12366	1.36892	1.53615	3.84002	0.44731	0.63290	1.66887	5.85534
39	1.09980	1.34496	1.50840	3.77484	0.43797	0.61968	1.63399	5.82380
40	1.07687	1.32230	1.48213	3.71426	0.42919	0.60726	1.60125	5.79530
41	1.05480	1.30084	1.45724	3.65798	0.42096	0.59562	1.57055	5.76984
42	1.03352	1.28051	1.43364	3.60569	0.41325	0.58471	1.54179	5.74730
43	1.01299	1.26122	1.41124	3.55715	0.40604	0.57451	1.51489	5.72754
44	0.99314	1.24290	1.38996	3.51211	0.39931	0.56498	1.48978	5.71046
45	0.97393	1.22545	1.36969	3.47038	0.39304	0.55610	1.46636	5.69580
46	0.95531	1.20879	1.35036	3.43176	0.38720	0.54785	1.44459	5.68330
47	0.93723	1.19280	1.33185	3.39607	0.38179	0.54019	1.42439	5.67258
48	0.92009	1.17751	1.31410	3.36300	0.37678	0.53310	1.40571	5.66321
49	0.91668	1.17390	1.30936	3.33126	0.37217	0.52658	1.38850	5.66321
50	0.91345	1.17051	1.30489	3.30251	0.36793	0.52059	1.37271	5.66321
51	0.91041	1.16730	1.30068	3.27660	0.36407	0.51512	1.35829	5.66321
52	0.90754	1.16427	1.29670	3.25341	0.36056	0.51016	1.34520	5.66321
53	0.90482	1.16141	1.29295	3.23282	0.35740	0.50569	1.33342	5.66321
54	0.90224	1.15870	1.28939	3.21473	0.35458	0.50170	1.32290	5.66321
55	0.89980	1.15613	1.28602	3.19907	0.35210	0.49818	1.31362	5.66321
56	0.92746	1.20033	1.33910	3.18576	0.34993	0.49512	1.30555	5.78263
57	0.95523	1.24465	1.39233	3.17475	0.34809	0.49251	1.29868	5.90204
58	0.98311	1.28909	1.44573	3.16598	0.34656	0.49035	1.29297	6.02145
59	1.01108	1.33364	1.49926	3.15942	0.34534	0.48863	1.28843	6.14087
60	1.03916	1.37829	1.55292	3.15506	0.34443	0.48734	1.28503	6.26028
61	1.06732	1.42303	1.60671	3.15288	0.34383	0.48648	1.28277	6.37969
62	1.09557	1.46786	1.66061	3.15288	0.34353	0.48605	1.28164	6.49911
63	1.12389	1.51277	1.71462	3.15508	0.34353	0.48605	1.28165	6.61852
64	1.15229	1.55776	1.76874	3.15948	0.34383	0.48648	1.28277	6.73794
65	1.18075	1.60282	1.82295	3.16613	0.34443	0.48734	1.28503	6.85735

**Table A-92**  
**Orange 1996 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	79.82375	106.95935	131.13460	289.30444	5.34957	6.15454	41.37212	194.60548
4	61.33325	82.31403	100.75856	264.32544	4.93024	5.67210	38.12904	155.20212
5	50.13673	67.12263	81.73732	242.03500	4.55205	5.23701	35.20430	126.76227
6	42.63525	56.85583	68.75327	222.11227	4.21052	4.84409	32.56302	105.77592
7	37.26616	49.48752	59.37863	204.27824	3.90172	4.48882	30.17480	89.97379
8	33.23894	43.96678	52.33116	188.28993	3.62215	4.16718	28.01268	77.85281
9	30.11018	39.69241	46.86615	173.93521	3.36874	3.87564	26.05284	68.39557
10	27.61179	36.29526	42.52109	161.02875	3.13876	3.61106	24.27428	60.89841
11	25.57204	33.53638	38.99403	149.40840	2.92981	3.37067	22.65836	54.86598
12	23.87605	31.25429	36.07985	138.93185	2.73975	3.15201	21.18849	49.94267
13	22.44394	29.33624	33.63475	129.47452	2.56669	2.95291	19.85011	45.86946
14	21.21863	27.70110	31.55513	120.92648	2.40894	2.77142	18.63011	42.45474
15	20.15808	26.28908	29.76477	113.19180	2.26501	2.60583	17.51695	39.55469
16	19.23083	25.05531	28.20645	106.18497	2.13355	2.45459	16.50032	37.06035
17	18.41284	23.96555	26.83652	99.83147	2.01338	2.31634	15.57101	34.88818
18	17.68536	22.99335	25.62117	94.06477	1.90345	2.18986	14.72080	32.97368
19	17.03374	22.11801	24.53400	88.82629	1.80279	2.07406	13.94234	31.26677
20	16.34003	21.35895	23.62715	84.06439	1.71057	1.96796	13.22913	29.72838
21	15.60461	20.49989	22.65910	79.73296	1.62602	1.87069	12.57524	28.32794
22	14.93470	19.71063	21.77560	75.79126	1.54847	1.78147	11.97547	27.04189
23	14.32164	18.98166	20.96495	72.20306	1.47730	1.69959	11.42508	25.85158
24	13.75832	18.30533	20.21773	68.93628	1.41197	1.62443	10.91983	24.74275
25	13.23878	17.67558	19.52618	65.96227	1.35199	1.55542	10.45594	23.70462
26	12.75804	17.08762	18.88397	63.25554	1.29691	1.49206	10.03000	22.72881
27	12.31192	16.53749	18.28595	60.79349	1.24635	1.43389	9.63893	21.80917
28	11.89686	16.02209	17.72775	58.55591	1.19993	1.38049	9.27999	20.94101
29	11.50980	15.53883	17.20583	56.52496	1.15736	1.33150	8.95069	20.12117
30	11.14814	15.08552	16.71716	54.68460	1.11832	1.28660	8.64880	19.34727
31	10.80961	14.66037	16.25919	53.02065	1.08257	1.24547	8.37231	18.61740
32	10.49221	14.26178	15.82968	51.52058	1.04987	1.20785	8.11943	17.93024
33	10.19420	13.88832	15.42676	50.17323	1.02002	1.17350	7.88854	17.28528
34	9.91405	13.53872	15.04868	48.96873	0.99282	1.14220	7.67815	16.68115
35	9.65038	13.21181	14.69397	47.89836	0.96810	1.11377	7.48700	16.11763
36	9.40195	12.90642	14.36122	46.95459	0.94572	1.08802	7.31392	15.59341
37	9.16765	12.62151	14.04919	46.13081	0.92554	1.06480	7.15785	15.10828
38	8.94649	12.35604	13.75669	45.42131	0.90744	1.04398	7.01786	14.66071
39	8.73753	12.10898	13.48256	44.82117	0.89131	1.02543	6.89316	14.24973
40	8.53994	11.87933	13.22575	44.32643	0.87707	1.00904	6.78300	13.87402
41	8.35293	11.66608	12.98521	43.93367	0.86462	0.99473	6.68676	13.53209
42	8.17576	11.46815	12.75984	43.64030	0.85391	0.98240	6.60389	13.22177
43	8.00777	11.28448	12.54865	43.44438	0.84486	0.97199	6.53394	12.94116
44	7.84828	11.11388	12.35054	43.34454	0.83744	0.96345	6.47649	12.68743
45	7.69668	10.95507	12.16444	43.34023	0.83159	0.95672	6.43126	12.45796
46	7.55230	10.80655	11.98915	43.43132	0.82728	0.95176	6.39796	12.24942
47	7.41455	10.66669	11.82339	43.61847	0.82450	0.94856	6.37643	12.05773
48	7.28276	10.53363	11.66587	43.90292	0.82322	0.94709	6.36656	11.87885
49	7.28276	10.53363	11.66587	44.28656	0.82344	0.94735	6.36828	11.87885
50	7.28276	10.53363	11.66587	44.77190	0.82517	0.94933	6.38160	11.87885
51	7.28276	10.53363	11.66587	45.36227	0.82840	0.95305	6.40660	11.87885
52	7.28276	10.53363	11.66587	46.06169	0.83316	0.95853	6.44342	11.87885
53	7.28276	10.53363	11.66587	46.87482	0.83947	0.96579	6.49225	11.87885
54	7.28276	10.53363	11.66587	47.80746	0.84738	0.97488	6.55337	11.87885
55	7.28276	10.53363	11.66587	48.86594	0.85691	0.98585	6.62712	11.87885
56	8.33914	12.36852	13.79248	50.05792	0.86813	0.99876	6.71390	14.73961
57	9.39553	14.20342	15.91908	51.39188	0.88110	1.01368	6.81421	17.60037
58	10.45191	16.03830	18.04567	52.87762	0.89590	1.03070	6.92861	20.46112
59	11.50830	17.87317	20.17226	54.52620	0.91260	1.04992	7.05777	23.32188
60	12.56468	19.70804	22.29886	56.34993	0.93130	1.07144	7.20243	26.18262
61	13.62107	21.54294	24.42548	58.36295	0.95212	1.09539	7.36346	29.04340
62	14.67745	23.37782	26.55206	60.58099	0.97518	1.12192	7.54179	31.90413
63	15.73383	25.21271	28.67868	63.02187	1.00062	1.15118	7.73851	34.76495
64	16.79019	27.04758	30.80527	65.70544	1.02859	1.18336	7.95483	37.62569
65	17.84657	28.88251	32.93192	68.65395	1.05927	1.21866	8.19210	40.48648

**Table A-93**  
**Orange 1996 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	2.07422	2.29469	2.50486	4.35463	2.74037	3.13502	27.83104	0.81914
4	1.90299	2.10725	2.30793	4.37948	2.62495	3.00298	26.65887	0.78349
5	1.79953	1.99419	2.18997	4.42434	2.51797	2.88059	25.57236	0.75391
6	1.73006	1.91861	2.11163	4.46919	2.41878	2.76712	24.56497	0.72993
7	1.68010	1.86466	2.05605	4.51405	2.32680	2.66189	23.63083	0.71110
8	1.64239	1.82440	2.01476	4.55891	2.24149	2.56430	22.76448	0.69700
9	1.61291	1.79338	1.98306	4.60376	2.16238	2.47380	21.96109	0.68719
10	1.58922	1.76893	1.95811	4.64862	2.08903	2.38988	21.21614	0.68129
11	1.56977	1.74932	1.93809	4.69347	2.02104	2.31210	20.52560	0.67891
12	1.55354	1.73341	1.92179	4.73833	1.95804	2.24002	19.88574	0.67968
13	1.53981	1.72036	1.90837	4.78318	1.89969	2.17327	19.29320	0.68326
14	1.52805	1.70960	1.89721	4.82804	1.84571	2.11151	18.74493	0.68930
15	1.51788	1.70068	1.88786	4.87289	1.79580	2.05442	18.23810	0.69750
16	1.50903	1.69326	1.87998	4.91775	1.74973	2.00172	17.77022	0.70754
17	1.50126	1.68708	1.87330	4.96260	1.70726	1.95313	17.33893	0.71914
18	1.49440	1.68192	1.86761	5.00746	1.66819	1.90844	16.94214	0.73204
19	1.48832	1.67762	1.86275	5.05231	1.63234	1.86741	16.57796	0.74599
20	1.48941	1.67617	1.86101	5.09717	1.59952	1.82987	16.24466	0.76073
21	1.49806	1.68744	1.87341	5.14202	1.56958	1.79563	15.94070	0.77606
22	1.50598	1.69791	1.88485	5.18687	1.54240	1.76453	15.66463	0.79177
23	1.51327	1.70768	1.89545	5.23173	1.51784	1.73643	15.41523	0.80768
24	1.52001	1.71680	1.90529	5.27658	1.49580	1.71122	15.19134	0.82360
25	1.52627	1.72535	1.91445	5.32144	1.47617	1.68876	14.99198	0.83940
26	1.53209	1.73336	1.92301	5.36629	1.45887	1.66897	14.81627	0.85492
27	1.53754	1.74089	1.93103	5.41115	1.44382	1.65175	14.66341	0.87005
28	1.54265	1.74797	1.93855	5.45600	1.43095	1.63703	14.53276	0.88468
29	1.54746	1.75463	1.94562	5.50086	1.42022	1.62475	14.42374	0.89872
30	1.55201	1.76089	1.95228	5.54572	1.41157	1.61485	14.33588	0.91210
31	1.55631	1.76679	1.95857	5.59057	1.40496	1.60730	14.26879	0.92477
32	1.56040	1.77236	1.96452	5.63542	1.40038	1.60205	14.22222	0.93667
33	1.56430	1.77760	1.97016	5.68028	1.39779	1.59909	14.19593	0.94779
34	1.56803	1.78256	1.97553	5.72514	1.39719	1.59840	14.18982	0.95811
35	1.57160	1.78725	1.98064	5.76999	1.39857	1.59998	14.20389	0.96766
36	1.57504	1.79169	1.98554	5.81485	1.40195	1.60384	14.23815	0.97644
37	1.57836	1.79591	1.99024	5.85970	1.40733	1.61000	14.29280	0.98451
38	1.58158	1.79993	1.99478	5.90456	1.41473	1.61847	14.36803	0.99192
39	1.58471	1.80377	1.99917	5.94941	1.42420	1.62930	14.46417	0.99874
40	1.58776	1.80747	2.00346	5.99427	1.43577	1.64254	14.58167	1.00506
41	1.59076	1.81105	2.00765	6.03912	1.44949	1.65824	14.72099	1.01099
42	1.59370	1.81453	2.01178	6.08398	1.46542	1.67646	14.88278	1.01666
43	1.59662	1.81795	2.01588	6.12883	1.48363	1.69729	15.06774	1.02220
44	1.59951	1.82134	2.01998	6.17369	1.50420	1.72083	15.27664	1.02776
45	1.60239	1.82472	2.02410	6.21854	1.52722	1.74716	15.51046	1.03352
46	1.60528	1.82813	2.02828	6.26340	1.55280	1.77643	15.77025	1.03967
47	1.60819	1.83162	2.03254	6.30825	1.58105	1.80875	16.05716	1.04641
48	1.61114	1.83520	2.03692	6.35311	1.61211	1.84427	16.37251	1.05396
49	1.67032	1.90838	2.12018	6.39796	1.64610	1.88317	16.71782	1.08828
50	1.72951	1.98155	2.20344	6.44282	1.68321	1.92561	17.09464	1.12260
51	1.78870	2.05472	2.28670	6.48767	1.72359	1.97181	17.50476	1.15692
52	1.84789	2.12790	2.36996	6.53253	1.76746	2.02199	17.95026	1.19124
53	1.90708	2.20107	2.45322	6.57738	1.81501	2.07640	18.43320	1.22556
54	1.96627	2.27425	2.53648	6.62224	1.86649	2.13529	18.95602	1.25988
55	2.02546	2.34742	2.61974	6.66709	1.92216	2.19898	19.52144	1.29420
56	2.08465	2.42060	2.70299	6.71195	1.98231	2.26779	20.13223	1.32852
57	2.14384	2.49377	2.78625	6.75681	2.04724	2.34207	20.79169	1.36284
58	2.20303	2.56695	2.86951	6.80166	2.11730	2.42222	21.50319	1.39715
59	2.26222	2.64012	2.95277	6.84652	2.19287	2.50867	22.27071	1.43147
60	2.32141	2.71329	3.03603	6.89137	2.27437	2.60190	23.09837	1.46579
61	2.38060	2.78647	3.11929	6.93622	2.36225	2.70244	23.99084	1.50011
62	2.43979	2.85964	3.20255	6.98108	2.45701	2.81085	24.95317	1.53443
63	2.49898	2.93282	3.28581	7.02594	2.55919	2.92775	25.99104	1.56875
64	2.55817	3.00599	3.36907	7.07079	2.66943	3.05386	27.11052	1.60307
65	2.61736	3.07917	3.45233	7.11565	2.78836	3.18992	28.31841	1.63739

**Table A-94  
Orange 1996 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	8.09843	9.91441	12.20480	19.69952	1.63085	2.30749	6.08451	15.67231
4	5.96803	7.38071	9.05202	16.16609	1.54834	2.19074	5.77666	13.22277
5	4.76626	5.92170	7.22388	14.01510	1.47129	2.08173	5.48922	11.40853
6	3.99695	4.97468	6.03195	12.47258	1.39931	1.97989	5.22067	10.03915
7	3.46333	4.31197	5.19617	11.26365	1.33203	1.88468	4.96963	8.98767
8	3.12012	3.87363	4.63834	10.37471	1.26909	1.79563	4.73483	8.16759
9	2.85408	3.53160	4.20466	9.60024	1.21020	1.71230	4.51509	7.51879
10	2.63738	3.25238	3.85298	8.90902	1.15505	1.63427	4.30934	6.99866
11	2.45661	3.01899	3.56131	8.28910	1.10339	1.56117	4.11659	6.57649
12	2.30278	2.81998	3.31470	7.73101	1.05496	1.49266	3.93592	6.22976
13	2.16968	2.64734	3.10267	7.22699	1.00955	1.42840	3.76650	5.94172
14	2.05283	2.49531	2.91765	6.77057	0.96694	1.36812	3.60753	5.69971
15	1.94896	2.35964	2.75404	6.35625	0.92695	1.31153	3.45833	5.49407
16	1.85561	2.23716	2.60765	5.97935	0.88940	1.25840	3.31821	5.31731
17	1.77090	2.12541	2.47527	5.63580	0.85411	1.20847	3.18657	5.16361
18	1.69338	2.02250	2.35440	5.32204	0.82095	1.16155	3.06284	5.02837
19	1.62188	1.92696	2.24310	5.03498	0.78977	1.11744	2.94652	4.90796
20	1.55389	1.84918	2.15201	4.77639	0.76044	1.07595	2.83711	4.79951
21	1.49516	1.78341	2.07290	4.54612	0.73285	1.03691	2.73416	4.70074
22	1.44137	1.72304	2.00046	4.33529	0.70688	1.00016	2.63727	4.60985
23	1.39187	1.66737	1.93377	4.14204	0.68243	0.96557	2.54606	4.52543
24	1.34613	1.61579	1.87210	3.96469	0.65941	0.93299	2.46016	4.44638
25	1.30369	1.56782	1.81483	3.80175	0.63772	0.90231	2.37925	4.37186
26	1.26417	1.52308	1.76146	3.65188	0.61729	0.87340	2.30303	4.30125
27	1.22725	1.48122	1.71158	3.51391	0.59804	0.84617	2.23121	4.23410
28	1.19267	1.44199	1.66485	3.38677	0.57990	0.82050	2.16354	4.17008
29	1.16019	1.40514	1.62098	3.26949	0.56281	0.79632	2.09976	4.10901
30	1.12960	1.37049	1.57973	3.16124	0.54670	0.77352	2.03966	4.05075
31	1.10074	1.33786	1.54090	3.06124	0.53152	0.75205	1.98303	3.99528
32	1.07344	1.30711	1.50430	2.96879	0.51722	0.73181	1.92966	3.94258
33	1.04758	1.27812	1.46980	2.88329	0.50374	0.71274	1.87938	3.89271
34	1.02303	1.25076	1.43725	2.80416	0.49105	0.69478	1.83203	3.84568
35	0.99969	1.22495	1.40653	2.73090	0.47910	0.67787	1.78744	3.80160
36	0.97747	1.20057	1.37753	2.66306	0.46785	0.66195	1.74547	3.76051
37	0.95628	1.17754	1.35015	2.60022	0.45726	0.64698	1.70599	3.72245
38	0.93604	1.15579	1.32430	2.54201	0.44731	0.63290	1.66887	3.68746
39	0.91669	1.13523	1.29989	2.48810	0.43797	0.61968	1.63399	3.65557
40	0.89816	1.11579	1.27682	2.43818	0.42919	0.60726	1.60125	3.62676
41	0.88039	1.09740	1.25503	2.39199	0.42096	0.59562	1.57055	3.60102
42	0.86334	1.07999	1.23442	2.34926	0.41325	0.58471	1.54179	3.57824
43	0.84694	1.06348	1.21492	2.30978	0.40604	0.57451	1.51489	3.55826
44	0.83116	1.04781	1.19644	2.27335	0.39931	0.56498	1.48978	3.54099
45	0.81595	1.03290	1.17889	2.23978	0.39304	0.55610	1.46636	3.52617
46	0.80127	1.01867	1.16219	2.20891	0.38720	0.54785	1.44459	3.51353
47	0.78708	1.00504	1.14625	2.18060	0.38179	0.54019	1.42439	3.50270
48	0.77359	0.99203	1.13103	2.15466	0.37678	0.53310	1.40571	3.49322
49	0.77179	0.99015	1.12861	2.13071	0.37217	0.52658	1.38850	3.49322
50	0.77010	0.98838	1.12633	2.10918	0.36793	0.52059	1.37271	3.49322
51	0.76850	0.98670	1.12418	2.08997	0.36407	0.51512	1.35829	3.49322
52	0.76699	0.98511	1.12214	2.07298	0.36056	0.51016	1.34520	3.49322
53	0.76555	0.98361	1.12022	2.05813	0.35740	0.50569	1.33342	3.49322
54	0.76419	0.98218	1.11839	2.04535	0.35458	0.50170	1.32290	3.49322
55	0.76290	0.98083	1.11666	2.03457	0.35210	0.49818	1.31362	3.49322
56	0.79014	1.02248	1.16897	2.02575	0.34993	0.49512	1.30555	3.61395
57	0.81745	1.06420	1.22136	2.01884	0.34809	0.49251	1.29868	3.73467
58	0.84481	1.10597	1.27382	2.01382	0.34656	0.49035	1.29297	3.85539
59	0.87223	1.14780	1.32635	2.01066	0.34534	0.48863	1.28843	3.97612
60	0.89969	1.18967	1.37896	2.00936	0.34443	0.48734	1.28503	4.09684
61	0.92720	1.23160	1.43162	2.00992	0.34383	0.48648	1.28277	4.21757
62	0.95475	1.27357	1.48434	2.01234	0.34353	0.48605	1.28164	4.33829
63	0.98234	1.31559	1.53712	2.01664	0.34353	0.48605	1.28165	4.45901
64	1.00997	1.35764	1.58995	2.02285	0.34383	0.48648	1.28277	4.57974
65	1.03763	1.39974	1.64283	2.03099	0.34443	0.48734	1.28503	4.70046



**Table A-95**  
**Orange 1996 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	73.16412	94.82648	117.39648	221.66283	5.34957	6.15454	41.37212	157.04646
4	56.30194	72.99001	90.27531	202.52385	4.93024	5.67210	38.12904	125.24799
5	46.11034	59.60681	73.34967	185.44482	4.55205	5.23701	35.20430	102.29706
6	39.28868	50.58696	61.81601	170.18016	4.21052	4.84409	32.56302	85.36110
7	34.40791	44.11900	53.49426	156.51591	3.90172	4.48882	30.17480	72.60880
8	30.74683	39.27106	47.23856	144.26584	3.62215	4.16718	28.01268	62.82718
9	27.90173	35.51340	42.38582	133.26738	3.36874	3.87564	26.05284	55.19521
10	25.62886	32.52234	38.52528	123.37856	3.13876	3.61106	24.27428	49.14497
11	23.77234	30.08911	35.38937	114.47517	2.92981	3.37067	22.65836	44.27676
12	22.22794	28.07300	32.79646	106.44817	2.73975	3.15201	21.18849	40.30370
13	20.92326	26.37595	30.61942	99.20204	2.56669	2.95291	19.85011	37.01662
14	19.80656	24.92747	28.76660	92.65256	2.40894	2.77142	18.63011	34.26093
15	18.83978	23.67575	27.17067	86.72641	2.26501	2.60583	17.51695	31.92058
16	17.99442	22.58185	25.78108	81.35782	2.13355	2.45459	16.50032	29.90767
17	17.24866	21.61601	24.55919	76.48985	2.01338	2.31634	15.57101	28.15468
18	16.58559	20.75531	23.47508	72.07143	1.90345	2.18986	14.72080	26.60977
19	15.99186	19.98167	22.50540	68.05777	1.80279	2.07406	13.94234	25.23225
20	15.34929	19.29742	21.68011	64.40929	1.71057	1.96796	13.22913	23.99080
21	14.65873	18.51221	20.79092	61.09059	1.62602	1.87069	12.57524	22.86066
22	14.03007	17.79294	19.97987	58.07047	1.54847	1.78147	11.97547	21.82280
23	13.45514	17.13071	19.23618	55.32123	1.47730	1.69959	11.42508	20.86220
24	12.92722	16.51833	18.55118	52.81827	1.41197	1.62443	10.91983	19.96739
25	12.44067	15.95002	17.91768	50.53958	1.35199	1.55542	10.45594	19.12962
26	11.99078	15.42099	17.32982	48.46574	1.29691	1.49206	10.03000	18.34216
27	11.57353	14.92739	16.78279	46.57935	1.24635	1.43389	9.63893	17.60001
28	11.18555	14.46601	16.27251	44.86491	1.19993	1.38049	9.27999	16.89940
29	10.82391	14.03418	15.79562	43.30882	1.15736	1.33150	8.95069	16.23779
30	10.48609	13.62964	15.34928	41.89880	1.11832	1.28660	8.64880	15.61325
31	10.16993	13.25048	14.93103	40.62386	1.08257	1.24547	8.37231	15.02424
32	9.87351	12.89499	14.53879	39.47452	1.04987	1.20785	8.11943	14.46971
33	9.59516	12.56169	14.17075	38.44220	1.02002	1.17350	7.88854	13.94921
34	9.33339	12.24925	13.82527	37.51932	0.99282	1.14220	7.67815	13.46168
35	9.08691	11.95645	13.50093	36.69923	0.96810	1.11377	7.48700	13.00692
36	8.85451	11.68214	13.19641	35.97609	0.94572	1.08802	7.31392	12.58387
37	8.63516	11.42529	12.91055	35.34492	0.92554	1.06480	7.15785	12.19237
38	8.42789	11.18490	12.64222	34.80133	0.90744	1.04398	7.01786	11.83118
39	8.23184	10.96003	12.39035	34.34149	0.89131	1.02543	6.89316	11.49952
40	8.04621	10.74975	12.15399	33.96243	0.87707	1.00904	6.78300	11.19633
41	7.87029	10.55319	11.93217	33.66153	0.86462	0.99473	6.68676	10.92039
42	7.70338	10.36942	11.72390	33.43672	0.85391	0.98240	6.60389	10.66996
43	7.54486	10.19756	11.52830	33.28661	0.84486	0.97199	6.53394	10.44351
44	7.39415	10.03666	11.34440	33.21011	0.83744	0.96345	6.47649	10.23874
45	7.25068	9.88571	11.17126	33.20683	0.83159	0.95672	6.43126	10.05357
46	7.11388	9.74358	11.00785	33.27660	0.82728	0.95176	6.39796	9.88528
47	6.98324	9.60908	10.85308	33.42004	0.82450	0.94856	6.37643	9.73058
48	6.85821	9.48085	10.70586	33.63797	0.82322	0.94709	6.36656	9.58622
49	6.85821	9.48085	10.70586	33.93192	0.82344	0.94735	6.36828	9.58622
50	6.85821	9.48085	10.70586	34.30376	0.82517	0.94933	6.38160	9.58622
51	6.85821	9.48085	10.70586	34.75612	0.82840	0.95305	6.40660	9.58622
52	6.85821	9.48085	10.70586	35.29199	0.83316	0.95853	6.44342	9.58622
53	6.85821	9.48085	10.70586	35.91499	0.83947	0.96579	6.49225	9.58622
54	6.85821	9.48085	10.70586	36.62955	0.84738	0.97488	6.55337	9.58622
55	6.85821	9.48085	10.70586	37.44058	0.85691	0.98585	6.62712	9.58622
56	7.81365	11.06021	12.59942	38.35387	0.86813	0.99876	6.71390	11.89486
57	8.76909	12.63957	14.49299	39.37595	0.88110	1.01368	6.81421	14.20351
58	9.72453	14.21893	16.38654	40.51428	0.89590	1.03070	6.92861	16.51213
59	10.67998	15.79829	18.28009	41.77737	0.91260	1.04992	7.05777	18.82077
60	11.63542	17.37761	20.17365	43.17474	0.93130	1.07144	7.20243	21.12938
61	12.59086	18.95697	22.06721	44.71706	0.95212	1.09539	7.36346	23.43802
62	13.54630	20.53630	23.96075	46.41653	0.97518	1.12192	7.54179	25.74661
63	14.50175	22.11565	25.85431	48.28667	1.00062	1.15118	7.73851	28.05528
64	15.45719	23.69499	27.74788	50.34283	1.02859	1.18336	7.95483	30.36389
65	16.41261	25.27437	29.64146	52.60194	1.05927	1.21866	8.19210	32.67253

**Table A-96**  
**Orange 1996 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	2.07760	2.31315	2.54971	4.55963	2.74037	3.13502	27.83104	0.90987
4	1.90820	2.12614	2.35340	4.60681	2.62495	3.00298	26.65887	0.87028
5	1.80561	2.01319	2.23582	4.65399	2.51797	2.88059	25.57236	0.83742
6	1.73656	1.93761	2.15779	4.70118	2.41878	2.76712	24.56497	0.81079
7	1.68677	1.88362	2.10248	4.74836	2.32680	2.66189	23.63083	0.78987
8	1.64910	1.84332	2.06147	4.79554	2.24149	2.56430	22.76448	0.77420
9	1.61957	1.81228	2.03007	4.84273	2.16238	2.47380	21.96109	0.76331
10	1.59579	1.78783	2.00543	4.88991	2.08903	2.38988	21.21614	0.75676
11	1.57624	1.76827	1.98576	4.93709	2.02104	2.31210	20.52560	0.75411
12	1.55989	1.75243	1.96984	4.98428	1.95804	2.24002	19.88574	0.75497
13	1.54603	1.73948	1.95680	5.03146	1.89969	2.17327	19.29320	0.75894
14	1.53415	1.72886	1.94605	5.07864	1.84571	2.11151	18.74493	0.76566
15	1.52388	1.72009	1.93713	5.12583	1.79580	2.05442	18.23810	0.77476
16	1.51492	1.71285	1.92968	5.17301	1.74973	2.00172	17.77022	0.78591
17	1.50706	1.70687	1.92344	5.22019	1.70726	1.95313	17.33893	0.79880
18	1.50012	1.70193	1.91821	5.26738	1.66819	1.90844	16.94214	0.81313
19	1.49397	1.69786	1.91381	5.31456	1.63234	1.86741	16.57796	0.82862
20	1.49490	1.69681	1.91270	5.36175	1.59952	1.82987	16.24466	0.84500
21	1.50331	1.70842	1.92570	5.40893	1.56958	1.79563	15.94070	0.86203
22	1.51101	1.71924	1.93771	5.45611	1.54240	1.76453	15.66463	0.87948
23	1.51812	1.72935	1.94886	5.50329	1.51784	1.73643	15.41523	0.89714
24	1.52470	1.73882	1.95924	5.55048	1.49580	1.71122	15.19134	0.91483
25	1.53081	1.74770	1.96893	5.59766	1.47617	1.68876	14.99198	0.93238
26	1.53653	1.75604	1.97800	5.64484	1.45887	1.66897	14.81627	0.94962
27	1.54189	1.76389	1.98651	5.69203	1.44382	1.65175	14.66341	0.96643
28	1.54693	1.77128	1.99451	5.73921	1.43095	1.63703	14.53276	0.98268
29	1.55170	1.77824	2.00204	5.78639	1.42022	1.62475	14.42374	0.99828
30	1.55622	1.78480	2.00916	5.83358	1.41157	1.61485	14.33588	1.01314
31	1.56052	1.79100	2.01588	5.88076	1.40496	1.60730	14.26879	1.02720
32	1.56462	1.79684	2.02226	5.92794	1.40038	1.60205	14.22222	1.04042
33	1.56855	1.80237	2.02832	5.97513	1.39779	1.59909	14.19593	1.05277
34	1.57232	1.80759	2.03410	6.02231	1.39719	1.59840	14.18982	1.06424
35	1.57597	1.81254	2.03962	6.06950	1.39857	1.59998	14.20389	1.07484
36	1.57949	1.81724	2.04491	6.11668	1.40195	1.60384	14.23815	1.08460
37	1.58292	1.82172	2.05001	6.16386	1.40733	1.61000	14.29280	1.09356
38	1.58626	1.82599	2.05495	6.21104	1.41473	1.61847	14.36803	1.10179
39	1.58954	1.83010	2.05975	6.25822	1.42420	1.62930	14.46417	1.10937
40	1.59276	1.83406	2.06445	6.30541	1.43577	1.64254	14.58167	1.11639
41	1.59594	1.83790	2.06907	6.35259	1.44949	1.65824	14.72099	1.12298
42	1.59909	1.84166	2.07365	6.39978	1.46542	1.67646	14.88278	1.12927
43	1.60224	1.84536	2.07822	6.44696	1.48363	1.69729	15.06774	1.13543
44	1.60539	1.84905	2.08282	6.49414	1.50420	1.72083	15.27664	1.14161
45	1.60856	1.85275	2.08747	6.54132	1.52722	1.74716	15.51046	1.14801
46	1.61176	1.85651	2.09221	6.58851	1.55280	1.77643	15.77025	1.15484
47	1.61501	1.86036	2.09708	6.63569	1.58105	1.80875	16.05716	1.16232
48	1.61832	1.86435	2.10212	6.68288	1.61211	1.84427	16.37251	1.17071
49	1.67814	1.93883	2.18845	6.73006	1.64610	1.88317	16.71782	1.20883
50	1.73796	2.01332	2.27477	6.77725	1.68321	1.92561	17.09464	1.24695
51	1.79777	2.08781	2.36110	6.82443	1.72359	1.97181	17.50476	1.28507
52	1.85759	2.16229	2.44743	6.87161	1.76746	2.02199	17.95026	1.32319
53	1.91741	2.23678	2.53376	6.91880	1.81501	2.07640	18.43320	1.36131
54	1.97722	2.31127	2.62008	6.96597	1.86649	2.13529	18.95602	1.39943
55	2.03704	2.38576	2.70641	7.01316	1.92216	2.19898	19.52144	1.43756
56	2.09686	2.46025	2.79274	7.06034	1.98231	2.26779	20.13223	1.47568
57	2.15668	2.53473	2.87907	7.10753	2.04724	2.34207	20.79169	1.51380
58	2.21649	2.60922	2.96540	7.15471	2.11730	2.42222	21.50319	1.55192
59	2.27631	2.68371	3.05172	7.20189	2.19287	2.50867	22.27071	1.59004
60	2.33613	2.75820	3.13805	7.24908	2.27437	2.60190	23.09837	1.62816
61	2.39595	2.83269	3.22438	7.29626	2.36225	2.70244	23.99084	1.66628
62	2.45576	2.90717	3.31071	7.34345	2.45701	2.81085	24.95317	1.70440
63	2.51558	2.98166	3.39704	7.39063	2.55919	2.92775	25.99104	1.74252
64	2.57540	3.05615	3.48337	7.43781	2.66943	3.05386	27.11052	1.78064
65	2.63521	3.13064	3.56969	7.48500	2.78836	3.18992	28.31841	1.81877

**Table A-97**  
**Orange 1999 Time Period 1 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	6.81999	8.37767	9.98759	14.64454	1.39423	1.92004	5.47708	15.09826
4	5.01593	6.20014	7.37832	12.02657	1.32369	1.82290	5.19997	12.75028
5	4.01012	4.96638	5.88832	10.42763	1.25782	1.73219	4.94122	11.01126
6	3.37153	4.17431	4.92683	9.27876	1.19629	1.64745	4.69948	9.69866
7	2.93115	3.62402	4.25702	8.37737	1.13876	1.56823	4.47350	8.69077
8	2.65143	3.26416	3.81422	7.71524	1.08496	1.49414	4.26214	7.90469
9	2.43506	2.98406	3.47045	7.13803	1.03461	1.42480	4.06434	7.28279
10	2.25892	2.75556	3.19154	6.62247	0.98747	1.35987	3.87913	6.78423
11	2.11204	2.56467	2.95997	6.15975	0.94330	1.29904	3.70562	6.37956
12	1.98711	2.40197	2.76393	5.74288	0.90190	1.24203	3.54299	6.04721
13	1.87906	2.26092	2.59515	5.36613	0.86307	1.18857	3.39048	5.77111
14	1.78425	2.13681	2.44771	5.02470	0.82665	1.13841	3.24739	5.53914
15	1.70003	2.02619	2.31723	4.71452	0.79246	1.09132	3.11308	5.34202
16	1.62439	1.92646	2.20042	4.43213	0.76035	1.04711	2.98694	5.17260
17	1.55582	1.83564	2.09479	4.17450	0.73019	1.00557	2.86845	5.02527
18	1.49312	1.75218	1.99838	3.93899	0.70184	0.96652	2.75708	4.89563
19	1.43535	1.67489	1.90966	3.72333	0.67518	0.92982	2.65236	4.78022
20	1.37582	1.60643	1.83089	3.52958	0.65011	0.89529	2.55387	4.67626
21	1.32188	1.54759	1.76179	3.35803	0.62652	0.86280	2.46121	4.58159
22	1.27254	1.49372	1.69863	3.20093	0.60432	0.83223	2.37399	4.49447
23	1.22720	1.44416	1.64062	3.05690	0.58342	0.80344	2.29188	4.41355
24	1.18536	1.39839	1.58710	2.92467	0.56373	0.77634	2.21456	4.33777
25	1.14660	1.35594	1.53753	2.80316	0.54519	0.75081	2.14173	4.26635
26	1.11057	1.31646	1.49147	2.69136	0.52773	0.72675	2.07312	4.19866
27	1.07697	1.27963	1.44853	2.58840	0.51127	0.70409	2.00847	4.13429
28	1.04554	1.24518	1.40840	2.49348	0.49576	0.68273	1.94755	4.07293
29	1.01606	1.21291	1.37082	2.40591	0.48115	0.66261	1.89014	4.01439
30	0.98835	1.18261	1.33556	2.32503	0.46738	0.64364	1.83604	3.95855
31	0.96223	1.15413	1.30241	2.25029	0.45440	0.62577	1.78506	3.90538
32	0.93756	1.12731	1.27120	2.18117	0.44217	0.60893	1.73702	3.85486
33	0.91422	1.10204	1.24180	2.11720	0.43065	0.59307	1.69176	3.80706
34	0.89209	1.07819	1.21406	2.05797	0.41980	0.57812	1.64914	3.76198
35	0.87107	1.05567	1.18787	2.00311	0.40958	0.56405	1.60900	3.71973
36	0.85108	1.03439	1.16312	1.95227	0.39997	0.55081	1.57122	3.68034
37	0.83203	1.01425	1.13972	1.90516	0.39092	0.53835	1.53568	3.64385
38	0.81385	0.99519	1.11757	1.86148	0.38241	0.52663	1.50226	3.61032
39	0.79647	0.97713	1.09659	1.82100	0.37442	0.51563	1.47087	3.57975
40	0.77984	0.96001	1.07671	1.78348	0.36692	0.50530	1.44140	3.55213
41	0.76391	0.94376	1.05785	1.74874	0.35988	0.49561	1.41376	3.52746
42	0.74862	0.92831	1.03995	1.71657	0.35329	0.48653	1.38787	3.50563
43	0.73392	0.91362	1.02293	1.68681	0.34713	0.47805	1.36366	3.48647
44	0.71979	0.89963	1.00673	1.65932	0.34137	0.47012	1.34105	3.46992
45	0.70617	0.88627	0.99129	1.63396	0.33601	0.46273	1.31997	3.45572
46	0.69303	0.87349	0.97654	1.61060	0.33102	0.45586	1.30037	3.44361
47	0.68034	0.86123	0.96241	1.58915	0.32639	0.44949	1.28220	3.43322
48	0.66825	0.84949	0.94888	1.56950	0.32211	0.44359	1.26538	3.42414
49	0.66659	0.84772	0.94678	1.55172	0.31817	0.43816	1.24988	3.42414
50	0.66503	0.84606	0.94480	1.53575	0.31455	0.43318	1.23567	3.42414
51	0.66355	0.84448	0.94292	1.52150	0.31125	0.42863	1.22269	3.42414
52	0.66215	0.84299	0.94116	1.50890	0.30825	0.42450	1.21091	3.42414
53	0.66082	0.84158	0.93948	1.49788	0.30555	0.42078	1.20030	3.42414
54	0.65957	0.84024	0.93790	1.48841	0.30314	0.41746	1.19083	3.42414
55	0.65838	0.83898	0.93640	1.48042	0.30101	0.41453	1.18248	3.42414
56	0.67886	0.86858	0.97278	1.47388	0.29916	0.41198	1.17522	3.53985
57	0.69939	0.89824	1.00923	1.46877	0.29759	0.40981	1.16903	3.65557
58	0.71998	0.92795	1.04575	1.46507	0.29628	0.40802	1.16389	3.77129
59	0.74061	0.95772	1.08234	1.46274	0.29524	0.40658	1.15981	3.88701
60	0.76129	0.98754	1.11898	1.46180	0.29446	0.40551	1.15675	4.00273
61	0.78201	1.01740	1.15567	1.46223	0.29394	0.40480	1.15471	4.11845
62	0.80278	1.04731	1.19242	1.46406	0.29368	0.40444	1.15370	4.23416
63	0.82358	1.07725	1.22922	1.46727	0.29368	0.40444	1.15370	4.34988
64	0.84441	1.10723	1.26606	1.47191	0.29394	0.40480	1.15471	4.46560
65	0.86528	1.13725	1.30294	1.47799	0.29446	0.40551	1.15675	4.58132

**Table A-98**  
**Orange 1999 Time Period 1 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	60.15308	75.44315	91.86813	155.38524	4.92597	5.54844	38.83043	157.27240
4	46.70027	58.52783	71.13190	141.96884	4.53984	5.11351	35.78664	125.42819
5	38.60870	48.26567	58.35326	129.99646	4.19160	4.72126	33.04153	102.44420
6	33.20796	41.38815	49.70869	119.29601	3.87712	4.36704	30.56255	85.48389
7	29.34911	36.46886	43.49449	109.71735	3.59277	4.04676	28.32106	72.71323
8	26.45569	32.78351	38.82927	101.13002	3.33533	3.75679	26.29175	62.91756
9	24.20656	29.92461	35.20944	93.42017	3.10198	3.49396	24.45235	55.27458
10	22.40866	27.64526	32.32620	86.48810	2.89022	3.25544	22.78304	49.21570
11	20.93884	25.78725	29.97980	80.24686	2.69781	3.03872	21.26636	44.34048
12	19.71497	24.24437	28.03558	74.61993	2.52281	2.84160	19.88680	40.36165
13	18.68008	22.94292	26.39949	69.54041	2.36345	2.66210	18.63063	37.06985
14	17.79350	21.82996	25.00407	64.94926	2.21819	2.49849	17.48560	34.31021
15	17.02536	20.86664	23.79974	60.79503	2.08565	2.34920	16.44081	31.96652
16	16.35324	20.02385	22.74931	57.03166	1.96461	2.21286	15.48665	29.95068
17	15.76005	19.27925	21.82439	53.61922	1.85396	2.08823	14.61441	28.19521
18	15.23244	18.61560	21.00296	50.52193	1.75272	1.97421	13.81644	26.64801
19	14.75993	18.01936	20.26781	47.70834	1.66004	1.86981	13.08580	25.26854
20	14.16202	17.38702	19.52237	45.15076	1.57512	1.77416	12.41640	24.02528
21	13.45162	16.60548	18.64270	42.82434	1.49727	1.68647	11.80269	22.89355
22	12.80521	15.89162	17.84122	40.70724	1.42586	1.60603	11.23976	21.85470
23	12.21441	15.23644	17.10745	38.78001	1.36032	1.53222	10.72318	20.89223
24	11.67228	14.63261	16.43283	37.02548	1.30017	1.46446	10.24898	19.99611
25	11.17299	14.07411	15.81020	35.42812	1.24493	1.40225	9.81359	19.15715
26	10.71164	13.55594	15.23362	33.97435	1.19422	1.34513	9.41381	18.36855
27	10.28408	13.07392	14.69816	32.65202	1.14766	1.29268	9.04677	17.62534
28	9.88674	12.62455	14.19961	31.45018	1.10492	1.24454	8.70988	16.92372
29	9.51657	12.20486	13.73442	30.35936	1.06571	1.20038	8.40081	16.26115
30	9.17093	11.81229	13.29955	29.37094	1.02977	1.15989	8.11746	15.63571
31	8.84752	11.44466	12.89239	28.47725	0.99685	1.12281	7.85796	15.04585
32	8.54433	11.10002	12.51065	27.67154	0.96674	1.08890	7.62061	14.49053
33	8.25958	10.77667	12.15234	26.94788	0.93925	1.05793	7.40391	13.96928
34	7.99171	10.47310	11.81569	26.30096	0.91420	1.02972	7.20645	13.48105
35	7.73934	10.18793	11.49914	25.72607	0.89144	1.00409	7.02704	13.02563
36	7.50122	9.91991	11.20127	25.21916	0.87083	0.98087	6.86460	12.60197
37	7.27624	9.66792	10.92080	24.77672	0.85225	0.95994	6.71811	12.20991
38	7.06340	9.43090	10.65658	24.39566	0.83558	0.94117	6.58673	11.84820
39	6.86180	9.20787	10.40749	24.07330	0.82073	0.92445	6.46968	11.51606
40	6.67063	8.99793	10.17256	23.80757	0.80762	0.90967	6.36629	11.21243
41	6.48912	8.80021	9.95084	23.59663	0.79616	0.89676	6.27596	10.93609
42	6.31661	8.61388	9.74141	23.43906	0.78629	0.88565	6.19818	10.68531
43	6.15246	8.43811	9.54343	23.33383	0.77796	0.87627	6.13252	10.45853
44	5.99608	8.27212	9.35606	23.28024	0.77112	0.86857	6.07861	10.25347
45	5.84693	8.11508	9.17849	23.27791	0.76574	0.86250	6.03615	10.06802
46	5.70448	7.96611	9.00987	23.32684	0.76177	0.85803	6.00490	9.89949
47	5.56824	7.82432	8.84934	23.42737	0.75921	0.85515	5.98470	9.74458
48	5.43773	7.68871	8.69607	23.58012	0.75803	0.85382	5.97543	9.60001
49	5.43773	7.68871	8.69607	23.78618	0.75824	0.85405	5.97705	9.60001
50	5.43773	7.68871	8.69607	24.04688	0.75983	0.85584	5.98955	9.60001
51	5.43773	7.68871	8.69607	24.36395	0.76280	0.85919	6.01301	9.60001
52	5.43773	7.68871	8.69607	24.73961	0.76719	0.86413	6.04757	9.60001
53	5.43773	7.68871	8.69607	25.17632	0.77300	0.87068	6.09340	9.60001
54	5.43773	7.68871	8.69607	25.67725	0.78028	0.87888	6.15076	9.60001
55	5.43773	7.68871	8.69607	26.24576	0.78906	0.88877	6.21998	9.60001
56	6.08250	8.75778	9.98078	26.88597	0.79939	0.90040	6.30143	11.91197
57	6.72727	9.82686	11.26549	27.60243	0.81133	0.91386	6.39558	14.22393
58	7.37203	10.89593	12.55020	28.40042	0.82496	0.92920	6.50296	16.53589
59	8.01680	11.96501	13.83492	29.28584	0.84033	0.94652	6.62418	18.84782
60	8.66157	13.03409	15.11963	30.26538	0.85756	0.96592	6.75996	21.15977
61	9.30634	14.10316	16.40433	31.34657	0.87673	0.98752	6.91109	23.47173
62	9.95111	15.17224	17.68901	32.53790	0.89796	1.01143	7.07846	25.78365
63	10.59587	16.24129	18.97372	33.84883	0.92139	1.03782	7.26309	28.09561
64	11.24064	17.31036	20.25842	35.29021	0.94714	1.06683	7.46613	30.40759
65	11.88541	18.37943	21.54312	36.87387	0.97539	1.09864	7.68882	32.71953

**Table A-99**  
**Orange 1999 Time Period 1 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	1.86125	2.11459	2.41124	4.10438	2.35405	2.64792	22.51224	0.91266
4	1.70488	1.93846	2.21589	4.14685	2.25491	2.53640	21.56410	0.87295
5	1.61067	1.83239	2.09886	4.18933	2.16300	2.43302	20.68524	0.83999
6	1.54759	1.76153	2.02108	4.23180	2.07780	2.33718	19.87039	0.81327
7	1.50234	1.71091	1.96580	4.27427	1.99878	2.24830	19.11475	0.79230
8	1.46826	1.67303	1.92463	4.31674	1.92551	2.16588	18.41400	0.77658
9	1.44167	1.64373	1.89290	4.35921	1.85755	2.08944	17.76411	0.76565
10	1.42034	1.62049	1.86781	4.40169	1.79454	2.01856	17.16154	0.75908
11	1.40284	1.60169	1.84756	4.44416	1.73613	1.95286	16.60295	0.75643
12	1.38824	1.58627	1.83095	4.48663	1.68201	1.89198	16.08539	0.75729
13	1.37588	1.57345	1.81715	4.52910	1.63189	1.83561	15.60609	0.76127
14	1.36529	1.56271	1.80557	4.57158	1.58551	1.78344	15.16259	0.76800
15	1.35612	1.55362	1.79575	4.61405	1.54265	1.73522	14.75263	0.77713
16	1.34811	1.54590	1.78736	4.65652	1.50307	1.69071	14.37416	0.78832
17	1.34106	1.53929	1.78015	4.69899	1.46659	1.64967	14.02528	0.80125
18	1.33482	1.53360	1.77392	4.74147	1.43303	1.61192	13.70432	0.81563
19	1.32927	1.52870	1.76849	4.78394	1.40222	1.57727	13.40974	0.83116
20	1.33100	1.52451	1.76375	4.82641	1.37403	1.54556	13.14013	0.84759
21	1.33896	1.53183	1.77225	4.86888	1.34832	1.51664	12.89425	0.86467
22	1.34623	1.53862	1.78008	4.91135	1.32497	1.49037	12.67095	0.88217
23	1.35289	1.54494	1.78734	4.95383	1.30387	1.46664	12.46921	0.89989
24	1.35903	1.55083	1.79408	4.99630	1.28494	1.44534	12.28811	0.91764
25	1.36470	1.55633	1.80035	5.03877	1.26807	1.42638	12.12684	0.93524
26	1.36996	1.56149	1.80621	5.08124	1.25321	1.40966	11.98471	0.95253
27	1.37486	1.56633	1.81169	5.12372	1.24028	1.39512	11.86107	0.96939
28	1.37945	1.57088	1.81684	5.16619	1.22923	1.38268	11.75538	0.98569
29	1.38374	1.57515	1.82167	5.20866	1.22001	1.37231	11.66721	1.00134
30	1.38777	1.57917	1.82623	5.25113	1.21258	1.36395	11.59613	1.01624
31	1.39157	1.58296	1.83053	5.29361	1.20691	1.35757	11.54187	1.03035
32	1.39517	1.58654	1.83459	5.33608	1.20297	1.35314	11.50420	1.04361
33	1.39858	1.58991	1.83845	5.37855	1.20074	1.35064	11.48293	1.05600
34	1.40182	1.59309	1.84212	5.42102	1.20023	1.35006	11.47799	1.06751
35	1.40491	1.59611	1.84561	5.46350	1.20141	1.35139	11.48936	1.07814
36	1.40786	1.59897	1.84896	5.50597	1.20431	1.35466	11.51709	1.08793
37	1.41069	1.60168	1.85217	5.54844	1.20893	1.35985	11.56129	1.09692
38	1.41341	1.60428	1.85526	5.59091	1.21530	1.36701	11.62214	1.10517
39	1.41603	1.60676	1.85826	5.63338	1.22343	1.37616	11.69991	1.11277
40	1.41856	1.60915	1.86119	5.67586	1.23337	1.38734	11.79495	1.11981
41	1.42102	1.61146	1.86405	5.71833	1.24516	1.40060	11.90765	1.12642
42	1.42341	1.61371	1.86687	5.76080	1.25884	1.41599	12.03851	1.13274
43	1.42575	1.61592	1.86967	5.80328	1.27448	1.43358	12.18813	1.13891
44	1.42804	1.61810	1.87246	5.84575	1.29215	1.45346	12.35711	1.14511
45	1.43029	1.62028	1.87528	5.88822	1.31193	1.47571	12.54624	1.15153
46	1.43252	1.62247	1.87813	5.93070	1.33390	1.50042	12.75638	1.15838
47	1.43473	1.62470	1.88104	5.97316	1.35817	1.52772	12.98847	1.16589
48	1.43693	1.62698	1.88402	6.01564	1.38485	1.55773	13.24356	1.17430
49	1.48499	1.69047	1.95871	6.05811	1.41405	1.59058	13.52287	1.21254
50	1.53306	1.75397	2.03340	6.10059	1.44593	1.62643	13.82767	1.25077
51	1.58112	1.81746	2.10808	6.14305	1.48062	1.66545	14.15943	1.28901
52	1.62919	1.88095	2.18277	6.18553	1.51829	1.70783	14.51978	1.32725
53	1.67725	1.94444	2.25746	6.22800	1.55915	1.75379	14.91044	1.36549
54	1.72532	2.00793	2.33214	6.27047	1.60337	1.80353	15.33336	1.40373
55	1.77338	2.07143	2.40683	6.31295	1.65119	1.85732	15.79071	1.44196
56	1.82145	2.13492	2.48152	6.35542	1.70286	1.91544	16.28476	1.48020
57	1.86951	2.19841	2.55620	6.39789	1.75864	1.97818	16.81819	1.51844
58	1.91757	2.26190	2.63089	6.44036	1.81882	2.04588	17.39374	1.55668
59	1.96564	2.32539	2.70558	6.48283	1.88374	2.11890	18.01456	1.59491
60	2.01371	2.38889	2.78026	6.52531	1.95374	2.19764	18.68405	1.63315
61	2.06177	2.45238	2.85495	6.56778	2.02923	2.28255	19.40594	1.67139
62	2.10983	2.51587	2.92964	6.61025	2.11063	2.37412	20.18439	1.70963
63	2.15790	2.57936	3.00433	6.65273	2.19842	2.47286	21.02390	1.74787
64	2.20597	2.64285	3.07901	6.69520	2.29311	2.57937	21.92943	1.78610
65	2.25403	2.70635	3.15370	6.73767	2.39528	2.69429	22.90645	1.82434

**Table A-100**  
**Orange 1999 Time Period 2 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
3	8.69306	9.90410	11.69469	19.79456	1.39423	1.92004	5.47708	17.03685
4	6.22242	7.13827	8.38794	15.54404	1.32369	1.82290	5.19997	14.71378
5	4.88471	5.62290	6.57157	13.14640	1.25782	1.73219	4.94122	12.99319
6	4.05320	4.67284	5.43087	11.53511	1.19629	1.64745	4.69948	11.69449
7	3.48893	4.02443	4.65185	10.33474	1.13876	1.56823	4.47350	10.69729
8	3.15761	3.62152	4.16492	9.53389	1.08496	1.49414	4.26214	9.91954
9	2.90159	3.31108	3.79052	8.84891	1.03461	1.42480	4.06434	9.30423
10	2.69075	3.05893	3.48765	8.24089	0.98747	1.35987	3.87913	8.81096
11	2.51278	2.84927	3.23697	7.69745	0.94330	1.29904	3.70562	8.41058
12	2.35948	2.67147	3.02545	7.20912	0.90190	1.24203	3.54299	8.08175
13	2.22513	2.51813	2.84400	6.76840	0.86307	1.18857	3.39048	7.80858
14	2.10566	2.38391	2.68608	6.36915	0.82665	1.13841	3.24739	7.57906
15	1.99808	2.26493	2.54688	6.00633	0.79246	1.09132	3.11308	7.38403
16	1.90014	2.15823	2.42279	5.67565	0.76035	1.04711	2.98694	7.21641
17	1.81013	2.06157	2.31105	5.37346	0.73019	1.00557	2.86845	7.07064
18	1.72672	1.97322	2.20953	5.09663	0.70184	0.96652	2.75708	6.94237
19	1.64885	1.89179	2.11652	4.84244	0.67518	0.92982	2.65236	6.82819
20	1.57498	1.81884	2.03332	4.61690	0.65011	0.89529	2.55387	6.72533
21	1.51501	1.75376	1.95804	4.42213	0.62652	0.86280	2.46121	6.63166
22	1.46003	1.69412	1.88922	4.24373	0.60432	0.83223	2.37399	6.54547
23	1.40937	1.63920	1.82600	4.08009	0.58342	0.80344	2.29188	6.46540
24	1.36250	1.58841	1.76767	3.92977	0.56373	0.77634	2.21456	6.39043
25	1.31896	1.54127	1.71364	3.79152	0.54519	0.75081	2.14173	6.31976
26	1.27838	1.49738	1.66342	3.66420	0.52773	0.72675	2.07312	6.25279
27	1.24042	1.45639	1.61661	3.54683	0.51127	0.70409	2.00847	6.18911
28	1.20482	1.41802	1.57285	3.43849	0.49576	0.68273	1.94755	6.12839
29	1.17133	1.38203	1.53185	3.33838	0.48115	0.66261	1.89014	6.07047
30	1.13975	1.34823	1.49336	3.24579	0.46738	0.64364	1.83604	6.01523
31	1.10990	1.31641	1.45717	3.16007	0.45440	0.62577	1.78506	5.96262
32	1.08163	1.28645	1.42308	3.08066	0.44217	0.60893	1.73702	5.91264
33	1.05479	1.25818	1.39094	3.00702	0.43065	0.59307	1.69176	5.86534
34	1.02927	1.23150	1.36060	2.93868	0.41980	0.57812	1.64914	5.82074
35	1.00496	1.20630	1.33192	2.87523	0.40958	0.56405	1.60900	5.77894
36	0.98175	1.18247	1.30480	2.81629	0.39997	0.55081	1.57122	5.73996
37	0.95958	1.15992	1.27912	2.76150	0.39092	0.53835	1.53568	5.70387
38	0.93835	1.13857	1.25479	2.71057	0.38241	0.52663	1.50226	5.67069
39	0.91800	1.11833	1.23171	2.66321	0.37442	0.51563	1.47087	5.64045
40	0.89846	1.09915	1.20982	2.61917	0.36692	0.50530	1.44140	5.61312
41	0.87967	1.08094	1.18901	2.57822	0.35988	0.49561	1.41376	5.58871
42	0.86159	1.06363	1.16923	2.54016	0.35329	0.48653	1.38787	5.56710
43	0.84416	1.04717	1.15040	2.50479	0.34713	0.47805	1.36366	5.54815
44	0.82733	1.03148	1.13244	2.47195	0.34137	0.47012	1.34105	5.53178
45	0.81107	1.01651	1.11530	2.44149	0.33601	0.46273	1.31997	5.51772
46	0.79533	1.00218	1.09890	2.41328	0.33102	0.45586	1.30037	5.50574
47	0.78007	0.98842	1.08317	2.38718	0.32639	0.44949	1.28220	5.49546
48	0.76556	0.97521	1.06805	2.36306	0.32211	0.44359	1.26538	5.48648
49	0.76266	0.97209	1.06429	2.34070	0.31817	0.43816	1.24988	5.48648
50	0.75992	0.96916	1.06075	2.32049	0.31455	0.43318	1.23567	5.48648
51	0.75734	0.96639	1.05742	2.30229	0.31125	0.42863	1.22269	5.48648
52	0.75490	0.96378	1.05427	2.28604	0.30825	0.42450	1.21091	5.48648
53	0.75259	0.96130	1.05129	2.27164	0.30555	0.42078	1.20030	5.48648
54	0.75041	0.95896	1.04848	2.25904	0.30314	0.41746	1.19083	5.48648
55	0.74834	0.95674	1.04581	2.24816	0.30101	0.41453	1.18248	5.48648
56	0.74683	0.98741	1.08219	2.23897	0.29916	0.41198	1.17522	5.60097
57	0.78902	1.01818	1.11871	2.23142	0.29759	0.40981	1.16903	5.71546
58	0.80950	1.04904	1.15534	2.22549	0.29628	0.40802	1.16389	5.82995
59	0.83007	1.08001	1.19209	2.22114	0.29524	0.40658	1.15981	5.94444
60	0.85072	1.11105	1.22894	2.21836	0.29446	0.40551	1.15675	6.05894
61	0.87144	1.14218	1.26589	2.21716	0.29394	0.40480	1.15471	6.17343
62	0.89224	1.17339	1.30293	2.21751	0.29368	0.40444	1.15370	6.28792
63	0.91310	1.20466	1.34006	2.21946	0.29368	0.40444	1.15370	6.40241
64	0.93402	1.23600	1.37726	2.22299	0.29394	0.40480	1.15471	6.51690
65	0.95500	1.26741	1.41455	2.22814	0.29446	0.40551	1.15675	6.63139

**Table A-101**  
**Orange 1999 Time Period 2 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	62.61629	81.13483	98.87320	193.31950	4.92597	5.54844	38.83043	191.10464
4	48.56506	62.90717	76.48650	176.62779	4.53984	5.11351	35.78664	152.41014
5	40.10384	51.80154	62.63905	161.73257	4.19160	4.72126	33.04153	124.48190
6	34.45326	44.34381	53.25270	148.41982	3.87712	4.36704	30.56255	103.87308
7	30.41533	39.00670	46.49948	136.50270	3.59277	4.04676	28.32106	88.35526
8	27.38797	35.01003	41.42891	125.81897	3.33533	3.75679	26.29175	76.45233
9	25.03539	31.91270	37.49583	116.22693	3.10198	3.49396	24.45235	67.16521
10	23.15544	29.44650	34.36491	107.60254	2.89022	3.25544	22.78304	59.80290
11	21.61916	27.43900	31.81883	99.83759	2.69781	3.03872	21.26636	53.87892
12	20.34039	25.77428	29.71078	92.83698	2.52281	2.84160	19.88680	49.04420
13	19.25945	24.37173	27.93820	86.51735	2.36345	2.66210	18.63063	45.04433
14	18.33363	23.17342	26.42738	80.80540	2.21819	2.49849	17.48560	41.69101
15	17.53160	22.13675	25.12421	75.63693	2.08565	2.34920	16.44081	38.84315
16	16.82983	21.22978	23.98808	70.95483	1.96461	2.21286	15.48665	36.39363
17	16.21039	20.42813	22.98799	66.70930	1.85396	2.08823	14.61441	34.26057
18	15.65930	19.71286	22.09993	62.85587	1.75272	1.97421	13.81644	32.38051
19	15.16554	19.06921	21.30511	59.35541	1.66004	1.86981	13.08580	30.70428
20	14.54869	18.40160	20.51736	56.17346	1.57512	1.77416	12.41640	29.19357
21	13.82151	17.58488	19.59692	53.27910	1.49727	1.68647	11.80269	27.81837
22	13.15952	16.83734	18.75797	50.64514	1.42586	1.60603	11.23976	26.55544
23	12.55418	16.14975	17.98953	48.24744	1.36032	1.53222	10.72318	25.38651
24	11.99842	15.51462	17.28267	46.06454	1.30017	1.46446	10.24898	24.29762
25	11.48631	14.92582	16.62990	44.07722	1.24493	1.40225	9.81359	23.27820
26	11.01288	14.37837	16.02509	42.26857	1.19422	1.34513	9.41381	22.31993
27	10.57392	13.86814	15.46313	40.62338	1.14766	1.29268	9.04677	21.41684
28	10.16583	13.39170	14.93964	39.12813	1.10492	1.24454	8.70988	20.56432
29	9.78553	12.94615	14.45100	37.77103	1.06571	1.20038	8.40081	19.75920
30	9.43035	12.52902	13.99408	36.54131	1.02977	1.15989	8.11746	18.99921
31	9.09799	12.13821	13.56621	35.42940	0.99685	1.12281	7.85796	18.28247
32	8.78640	11.77186	13.16504	34.42702	0.96674	1.08890	7.62061	17.60771
33	8.49380	11.42831	12.78856	33.52667	0.93925	1.05793	7.40391	16.97432
34	8.21862	11.10609	12.43493	32.72183	0.91420	1.02972	7.20645	16.38107
35	7.95945	10.80388	12.10258	32.00658	0.89144	1.00409	7.02704	15.82769
36	7.71503	10.52041	11.79004	31.37593	0.87083	0.98087	6.86460	15.31289
37	7.48423	10.25456	11.49601	30.82547	0.85225	0.95994	6.71811	14.83649
38	7.26605	10.00527	11.21927	30.35138	0.83558	0.94117	6.58673	14.39698
39	7.05955	9.77151	10.95868	29.95035	0.82073	0.92445	6.46968	13.99338
40	6.86390	9.55233	10.71322	29.61975	0.80762	0.90967	6.36629	13.62444
41	6.67833	9.34681	10.48189	29.35728	0.79616	0.89676	6.27596	13.28865
42	6.50212	9.15402	10.26372	29.16124	0.78629	0.88565	6.19818	12.98392
43	6.33463	8.97305	10.05780	29.03033	0.77796	0.87627	6.13252	12.70835
44	6.17523	8.80298	9.86323	28.96364	0.77112	0.86857	6.07861	12.45919
45	6.02334	8.64281	9.67911	28.96077	0.76574	0.86250	6.03615	12.23385
46	5.87839	8.49147	9.50452	29.02164	0.76177	0.85803	6.00490	12.02906
47	5.73983	8.34782	9.33849	29.14670	0.75921	0.85515	5.98470	11.84082
48	5.60713	8.21057	9.18008	29.33675	0.75803	0.85382	5.97543	11.66515
49	5.60713	8.21057	9.18008	29.59312	0.75824	0.85405	5.97705	11.66515
50	5.60713	8.21057	9.18008	29.91743	0.75983	0.85584	5.98955	11.66515
51	5.60713	8.21057	9.18008	30.31194	0.76280	0.85919	6.01301	11.66515
52	5.60713	8.21057	9.18008	30.77928	0.76719	0.86413	6.04757	11.66515
53	5.60713	8.21057	9.18008	31.32262	0.77300	0.87068	6.09340	11.66515
54	5.60713	8.21057	9.18008	31.94585	0.78028	0.87888	6.15076	11.66515
55	5.60713	8.21057	9.18008	32.65315	0.78906	0.88877	6.21998	11.66515
56	6.29199	9.40630	10.58273	33.44966	0.79939	0.90040	6.30143	14.47445
57	6.97686	10.60203	11.98536	34.34103	0.81133	0.91386	6.39558	17.28375
58	7.66173	11.79776	13.38801	35.33383	0.82496	0.92920	6.50296	20.09303
59	8.34660	12.99349	14.79065	36.43542	0.84033	0.94652	6.62418	22.90234
60	9.03147	14.18921	16.19327	37.65408	0.85756	0.96592	6.75996	25.71162
61	9.71634	15.38494	17.59590	38.99922	0.87673	0.98752	6.91109	28.52095
62	10.40121	16.58066	18.99852	40.48140	0.89796	1.01143	7.07846	31.33022
63	11.08608	17.77637	20.40117	42.11241	0.92139	1.03782	7.26309	34.13954
64	11.77095	18.97208	21.80379	43.90564	0.94714	1.06683	7.46613	36.94885
65	12.45582	20.16782	23.20642	45.87590	0.97539	1.09864	7.68882	39.75815

**Table A-102**  
**Orange 1999 Time Period 2 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	1.87607	2.12034	2.40347	3.99184	2.35405	2.64792	22.51224	0.82775
4	1.71765	1.94285	2.20646	4.03315	2.25491	2.53640	21.56410	0.79173
5	1.62230	1.83604	2.08842	4.07446	2.16300	2.43302	20.68524	0.76184
6	1.55852	1.76473	2.00994	4.11577	2.07780	2.33718	19.87039	0.73761
7	1.51282	1.71381	1.95412	4.15707	1.99878	2.24830	19.11475	0.71858
8	1.47845	1.67572	1.91249	4.19838	1.92551	2.16588	18.41400	0.70432
9	1.45165	1.64626	1.88037	4.23969	1.85755	2.08944	17.76411	0.69442
10	1.43018	1.62287	1.85491	4.28100	1.79454	2.01856	17.16154	0.68845
11	1.41258	1.60395	1.83431	4.32231	1.73613	1.95286	16.60295	0.68605
12	1.39791	1.58840	1.81737	4.36362	1.68201	1.89198	16.08539	0.68683
13	1.38550	1.57546	1.80325	4.40492	1.63189	1.83561	15.60609	0.69044
14	1.37487	1.56460	1.79135	4.44623	1.58551	1.78344	15.16259	0.69655
15	1.36567	1.55539	1.78121	4.48754	1.54265	1.73522	14.75263	0.70483
16	1.35764	1.54753	1.77251	4.52885	1.50307	1.69071	14.37416	0.71498
17	1.35058	1.54079	1.76499	4.57016	1.46659	1.64967	14.02528	0.72671
18	1.34432	1.53498	1.75845	4.61146	1.43303	1.61192	13.70432	0.73974
19	1.33874	1.52994	1.75272	4.65277	1.40222	1.57727	13.40974	0.75383
20	1.34057	1.52551	1.74757	4.69408	1.37403	1.54556	13.14013	0.76873
21	1.34870	1.53268	1.75575	4.73539	1.34832	1.51664	12.89425	0.78422
22	1.35611	1.53933	1.76329	4.77669	1.32497	1.49037	12.67095	0.80010
23	1.36291	1.54550	1.77025	4.81800	1.30387	1.46664	12.46921	0.81617
24	1.36916	1.55125	1.77670	4.85931	1.28494	1.44534	12.28811	0.83226
25	1.37494	1.55661	1.78270	4.90062	1.26807	1.42638	12.12684	0.84822
26	1.38029	1.56163	1.78829	4.94192	1.25321	1.40966	11.98471	0.86391
27	1.38527	1.56633	1.79351	4.98323	1.24028	1.39512	11.86107	0.87920
28	1.38992	1.57074	1.79841	5.02454	1.22923	1.38268	11.75538	0.89398
29	1.39427	1.57489	1.80300	5.06585	1.22001	1.37231	11.66721	0.90817
30	1.39835	1.57878	1.80731	5.10715	1.21258	1.36395	11.59613	0.92169
31	1.40219	1.58244	1.81138	5.14847	1.20691	1.35757	11.54187	0.93449
32	1.40582	1.58589	1.81522	5.18977	1.20297	1.35314	11.50420	0.94652
33	1.40924	1.58914	1.81886	5.23108	1.20074	1.35064	11.48293	0.95775
34	1.41249	1.59221	1.82231	5.27239	1.20023	1.35006	11.47799	0.96819
35	1.41558	1.59510	1.82560	5.31370	1.20141	1.35139	11.48936	0.97783
36	1.41852	1.59785	1.82874	5.35500	1.20431	1.35466	11.51709	0.98671
37	1.42133	1.60045	1.83174	5.39631	1.20893	1.35985	11.56129	0.99486
38	1.42403	1.60293	1.83462	5.43762	1.21530	1.36701	11.62214	1.00234
39	1.42661	1.60530	1.83741	5.47892	1.22343	1.37616	11.69991	1.00924
40	1.42910	1.60757	1.84012	5.52024	1.23337	1.38734	11.79495	1.01563
41	1.43151	1.60976	1.84276	5.56154	1.24516	1.40060	11.90765	1.02162
42	1.43384	1.61189	1.84534	5.60285	1.25884	1.41599	12.03851	1.02735
43	1.43611	1.61396	1.84790	5.64416	1.27448	1.43358	12.18813	1.03294
44	1.43832	1.61601	1.85043	5.68547	1.29215	1.45346	12.35711	1.03857
45	1.44048	1.61804	1.85297	5.72677	1.31193	1.47571	12.54624	1.04439
46	1.44260	1.62008	1.85552	5.76808	1.33390	1.50042	12.75638	1.05060
47	1.44470	1.62214	1.85811	5.80939	1.35817	1.52772	12.98847	1.05741
48	1.44677	1.62424	1.86076	5.85070	1.38485	1.55773	13.24356	1.06504
49	1.44999	1.62754	1.93426	5.89201	1.41405	1.59058	13.52287	1.09972
50	1.54320	1.75083	2.00776	5.93332	1.44593	1.62643	13.82767	1.13440
51	1.59142	1.81413	2.08126	5.97462	1.48062	1.66545	14.15943	1.16908
52	1.63964	1.87743	2.15476	6.01593	1.51829	1.70783	14.51978	1.20376
53	1.68786	1.94072	2.22826	6.05724	1.55915	1.75379	14.91044	1.23844
54	1.73608	2.00402	2.30176	6.09854	1.60337	1.80353	15.33336	1.27313
55	1.78430	2.06731	2.37526	6.13985	1.65119	1.85732	15.79071	1.30781
56	1.83251	2.13061	2.44876	6.18116	1.70286	1.91544	16.28476	1.34249
57	1.88073	2.19390	2.52226	6.22247	1.75864	1.97818	16.81819	1.37717
58	1.92895	2.25720	2.59576	6.26378	1.81882	2.04588	17.39374	1.41185
59	1.97717	2.32050	2.66926	6.30509	1.88374	2.11890	18.01456	1.44653
60	2.02539	2.38379	2.74276	6.34639	1.95374	2.19764	18.68405	1.48121
61	2.07360	2.44709	2.81626	6.38770	2.02923	2.28255	19.40594	1.51588
62	2.12182	2.51039	2.88976	6.42901	2.11063	2.37412	20.18439	1.55056
63	2.17004	2.57368	2.96326	6.47032	2.19842	2.47286	21.02390	1.58524
64	2.21826	2.63698	3.03676	6.51163	2.29311	2.57937	21.92943	1.61992
65	2.26647	2.70027	3.11026	6.55293	2.39528	2.69429	22.90645	1.65460



**Table A-103**  
**Orange 1999 Time Period 3 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	9.12400	10.23935	12.08553	20.87469	1.39423	1.92004	5.47708	17.27048
4	6.49641	7.33745	8.61455	16.23972	1.32369	1.82290	5.19997	14.94908
5	5.08085	5.75782	6.72161	13.65629	1.25782	1.73219	4.94122	13.22972
6	4.20425	4.77216	5.53901	11.93909	1.19629	1.64745	4.69948	11.93196
7	3.61111	4.10187	4.73452	10.67141	1.13876	1.56823	4.47350	10.93547
8	3.26789	3.69010	4.23774	9.84102	1.08496	1.49414	4.26214	10.15828
9	3.00268	3.37354	3.85659	9.13351	1.03461	1.42480	4.06434	9.54341
10	2.78374	3.11666	3.54845	8.50630	0.98747	1.35987	3.87913	9.05048
11	2.59847	2.90326	3.29359	7.94619	0.94330	1.29904	3.70562	8.65039
12	2.43847	2.72248	3.07871	7.44313	0.90190	1.24203	3.54299	8.32179
13	2.29788	2.56671	2.89452	6.98923	0.86307	1.18857	3.39048	8.04882
14	2.17253	2.43054	2.73435	6.57809	0.82665	1.13841	3.24739	7.81947
15	2.05935	2.30996	2.59330	6.20441	0.79246	1.09132	3.11308	7.62458
16	1.95606	2.20195	2.46767	5.86373	0.76035	1.04711	2.98694	7.45708
17	1.86088	2.10421	2.35466	5.55230	0.73019	1.00557	2.86845	7.31141
18	1.77246	2.01498	2.25208	5.26686	0.70184	0.96652	2.75708	7.18324
19	1.68971	1.93284	2.15821	5.00460	0.67518	0.92982	2.65236	7.06913
20	1.61242	1.85899	2.07400	4.77257	0.65011	0.89529	2.55387	6.96635
21	1.55115	1.79253	1.99724	4.57337	0.62652	0.86280	2.46121	6.87275
22	1.49494	1.73160	1.92707	4.39089	0.60432	0.83223	2.37399	6.78661
23	1.44313	1.67549	1.86259	4.22350	0.58342	0.80344	2.29188	6.70661
24	1.39517	1.62358	1.80310	4.06973	0.56373	0.77634	2.21456	6.63169
25	1.35061	1.57539	1.74798	3.92827	0.54519	0.75081	2.14173	6.56107
26	1.30905	1.53050	1.69674	3.79798	0.52773	0.72675	2.07312	6.49415
27	1.27015	1.48857	1.64897	3.67783	0.51127	0.70409	2.00847	6.43051
28	1.23366	1.44931	1.60430	3.56691	0.49576	0.68273	1.94755	6.36984
29	1.19931	1.41247	1.56245	3.46439	0.48115	0.66261	1.89014	6.31196
30	1.16690	1.37786	1.52315	3.36954	0.46738	0.64364	1.83604	6.25675
31	1.13626	1.34528	1.48618	3.28170	0.45440	0.62577	1.78506	6.20419
32	1.10721	1.31458	1.45136	3.20028	0.44217	0.60893	1.73702	6.15424
33	1.07963	1.28561	1.41852	3.12476	0.43065	0.59307	1.69176	6.10698
34	1.05339	1.25826	1.38750	3.05465	0.41980	0.57812	1.64914	6.06241
35	1.02837	1.23241	1.35818	2.98952	0.40958	0.56405	1.60900	6.02063
36	1.00449	1.20797	1.33043	2.92898	0.39997	0.55081	1.57122	5.98169
37	0.98165	1.18483	1.30415	2.87269	0.39092	0.53835	1.53568	5.94562
38	0.95977	1.16291	1.27924	2.82033	0.38241	0.52663	1.50226	5.91246
39	0.93878	1.14213	1.25561	2.77160	0.37442	0.51563	1.47087	5.88224
40	0.91862	1.12242	1.23317	2.72626	0.36692	0.50530	1.44140	5.85494
41	0.89923	1.10371	1.21184	2.68408	0.35988	0.49561	1.41376	5.83054
42	0.88055	1.08591	1.19155	2.64483	0.35329	0.48653	1.38787	5.80895
43	0.86254	1.06898	1.17222	2.60833	0.34713	0.47805	1.36366	5.79002
44	0.84514	1.05284	1.15378	2.57441	0.34137	0.47012	1.34105	5.77365
45	0.82831	1.03742	1.13617	2.54292	0.33601	0.46273	1.31997	5.75961
46	0.81202	1.02267	1.11931	2.51371	0.33102	0.45586	1.30037	5.74763
47	0.79621	1.00849	1.10314	2.48666	0.32639	0.44949	1.28220	5.73736
48	0.78118	0.99487	1.08758	2.46161	0.32211	0.44359	1.26538	5.72838
49	0.77799	0.99145	1.08343	2.43827	0.31817	0.43816	1.24988	5.72838
50	0.77498	0.98821	1.07953	2.41712	0.31455	0.43318	1.23567	5.72838
51	0.77214	0.98517	1.07585	2.39806	0.31125	0.42863	1.22269	5.72838
52	0.76946	0.98229	1.07238	2.38100	0.30825	0.42450	1.21091	5.72838
53	0.76692	0.97957	1.06909	2.36585	0.30555	0.42078	1.20030	5.72838
54	0.76452	0.97699	1.06599	2.35254	0.30314	0.41746	1.19083	5.72838
55	0.76225	0.97455	1.06304	2.34102	0.30101	0.41453	1.18248	5.72838
56	0.78244	1.00529	1.09935	2.33122	0.29916	0.41198	1.17522	5.84279
57	0.80273	1.03614	1.13579	2.32311	0.29759	0.40981	1.16903	5.95720
58	0.82313	1.06710	1.17237	2.31665	0.29628	0.40802	1.16389	6.07161
59	0.84363	1.09817	1.20907	2.31182	0.29524	0.40658	1.15981	6.18602
60	0.86421	1.12933	1.24589	2.30861	0.29446	0.40551	1.15675	6.30043
61	0.88487	1.16058	1.28282	2.30699	0.29394	0.40480	1.15471	6.41484
62	0.90562	1.19191	1.31984	2.30698	0.29368	0.40444	1.15370	6.52925
63	0.92643	1.22332	1.35697	2.30858	0.29368	0.40444	1.15370	6.64366
64	0.94732	1.25481	1.39418	2.31181	0.29394	0.40480	1.15471	6.75807
65	0.96827	1.28636	1.43147	2.31668	0.29446	0.40551	1.15675	6.87248

**Table A-104**  
**Orange 1999 Time Period 3 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	63.00316	82.04381	99.93172	198.36649	4.92597	5.54844	38.83043	195.85036
4	48.85794	63.60597	77.29393	181.23901	4.53984	5.11351	35.78664	156.19496
5	40.33868	52.36557	63.28503	165.95491	4.19160	4.72126	33.04153	127.57315
6	34.64890	44.81520	53.78700	152.29462	3.87712	4.36704	30.56255	106.45255
7	30.58284	39.41141	46.95274	140.06639	3.59277	4.04676	28.32106	90.54939
8	27.53447	35.36504	41.82124	129.10376	3.33533	3.75679	26.29175	78.35088
9	25.16565	32.22963	37.84108	119.26123	3.10198	3.49396	24.45235	68.83313
10	23.27283	29.73355	34.67288	110.41173	2.89022	3.25544	22.78304	61.28801
11	21.72610	27.70215	32.09668	102.44408	2.69781	3.03872	21.26636	55.21689
12	20.43872	26.01794	29.96393	95.26067	2.52281	2.84160	19.88680	50.26215
13	19.35052	24.59921	28.17072	88.77605	2.36345	2.66210	18.63063	46.16290
14	18.41855	23.38721	26.64244	82.91495	2.21819	2.49849	17.48560	42.72630
15	17.61121	22.33878	25.32430	77.61162	2.08565	2.34920	16.44081	39.80771
16	16.90479	21.42154	24.17517	72.80725	1.96461	2.21286	15.48665	37.29742
17	16.28120	20.61073	23.16368	68.45090	1.85396	2.08823	14.61441	35.11136
18	15.72643	19.88721	22.26550	64.49684	1.75272	1.97421	13.81644	33.18462
19	15.22933	19.23598	21.46162	60.90503	1.66004	1.86981	13.08580	31.46677
20	14.60951	18.56277	20.66762	57.63997	1.57512	1.77416	12.41640	29.91858
21	13.87970	17.74049	19.74117	54.67003	1.49727	1.68647	11.80269	28.50917
22	13.21527	16.98766	18.89665	51.96735	1.42586	1.60603	11.23976	27.21489
23	12.60765	16.29495	18.12311	49.50708	1.36032	1.53222	10.72318	26.01691
24	12.04975	15.65489	17.41147	47.26714	1.30017	1.46446	10.24898	24.90102
25	11.53563	15.06133	16.75427	45.22792	1.24493	1.40225	9.81359	23.85626
26	11.06031	14.50928	16.14529	43.37207	1.19422	1.34513	9.41381	22.87419
27	10.61956	13.99463	15.57944	41.68393	1.14766	1.29268	9.04677	21.94870
28	10.20979	13.51393	15.05228	40.14969	1.10492	1.24454	8.70988	21.07498
29	9.82791	13.06432	14.56019	38.75716	1.06571	1.20038	8.40081	20.24988
30	9.47124	12.64333	14.10004	37.49529	1.02977	1.15989	8.11746	19.47104
31	9.13747	12.24889	13.66912	36.35434	0.99685	1.12281	7.85796	18.73647
32	8.82457	11.87913	13.26511	35.32579	0.96674	1.08890	7.62061	18.04494
33	8.53074	11.53240	12.88595	34.40196	0.93925	1.05793	7.40391	17.39584
34	8.25441	11.20727	12.52984	33.57610	0.91420	1.02972	7.20645	16.78786
35	7.99418	10.90238	12.19516	32.84218	0.89144	1.00409	7.02704	16.22073
36	7.74877	10.61648	11.88046	32.19507	0.87083	0.98087	6.86460	15.69316
37	7.51707	10.34845	11.58443	31.63023	0.85225	0.95994	6.71811	15.20492
38	7.29805	10.09723	11.30584	31.14377	0.83558	0.94117	6.58673	14.75449
39	7.09078	9.86178	11.04356	30.73228	0.82073	0.92445	6.46968	14.34087
40	6.89442	9.64114	10.79653	30.39305	0.80762	0.90967	6.36629	13.96277
41	6.70821	9.43439	10.56378	30.12373	0.79616	0.89676	6.27596	13.61865
42	6.53143	9.24057	10.34429	29.92259	0.78629	0.88565	6.19818	13.30635
43	6.36341	9.05877	10.13719	29.78825	0.77796	0.87627	6.13252	13.02394
44	6.20354	8.88804	9.94152	29.71979	0.77112	0.86857	6.07861	12.76859
45	6.05122	8.72738	9.75642	29.71684	0.76574	0.86250	6.03615	12.53765
46	5.90587	8.57565	9.58092	29.77927	0.76177	0.85803	6.00490	12.32778
47	5.76694	8.43168	9.41406	29.90761	0.75921	0.85515	5.98470	12.13486
48	5.63389	8.29417	9.25486	30.10265	0.75803	0.85382	5.97543	11.95483
49	5.63389	8.29417	9.25486	30.36569	0.75824	0.85405	5.97705	11.95483
50	5.63389	8.29417	9.25486	30.69850	0.75983	0.85584	5.98955	11.95483
51	5.63389	8.29417	9.25486	31.10330	0.76280	0.85919	6.01301	11.95483
52	5.63389	8.29417	9.25486	31.58282	0.76719	0.86413	6.04757	11.95483
53	5.63389	8.29417	9.25486	32.14034	0.77300	0.87068	6.09340	11.95483
54	5.63389	8.29417	9.25486	32.77986	0.78028	0.87888	6.15076	11.95483
55	5.63389	8.29417	9.25486	33.50562	0.78906	0.88877	6.21998	11.95483
56	6.32508	9.51012	10.67560	34.32297	0.79939	0.90040	6.30143	14.83390
57	7.01627	10.72607	12.09633	35.23759	0.81133	0.91386	6.39558	17.71295
58	7.70747	11.94203	13.51706	36.25630	0.82496	0.92920	6.50296	20.59200
59	8.39866	13.15799	14.93780	37.38664	0.84033	0.94652	6.62418	23.47105
60	9.08986	14.37394	16.35851	38.63713	0.85756	0.96592	6.75996	26.35011
61	9.78105	15.58989	17.77924	40.01738	0.87673	0.98752	6.91109	29.22920
62	10.47225	16.80583	19.19995	41.53822	0.89796	1.01143	7.07846	32.10825
63	11.16344	18.02176	20.62068	43.21185	0.92139	1.03782	7.26309	34.98734
64	11.85463	19.23772	22.04141	45.05190	0.94714	1.06683	7.46613	37.86641
65	12.54583	20.45367	23.46213	47.07356	0.97539	1.09864	7.68882	40.74545

**Table A-105**  
**Orange 1999 Time Period 3 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	1.87781	2.12123	2.40314	3.98210	2.35405	2.64792	22.51224	0.81913
4	1.71917	1.94358	2.20593	4.02331	2.25491	2.53640	21.56410	0.78349
5	1.62369	1.83668	2.08777	4.06452	2.16300	2.43302	20.68524	0.75391
6	1.55984	1.76531	2.00921	4.10573	2.07780	2.33718	19.87039	0.72993
7	1.51409	1.71436	1.95332	4.14693	1.99878	2.24830	19.11475	0.71110
8	1.47968	1.67624	1.91165	4.18814	1.92551	2.16588	18.41400	0.69700
9	1.45286	1.64675	1.87948	4.22935	1.85755	2.08944	17.76411	0.68719
10	1.43137	1.62335	1.85398	4.27055	1.79454	2.01856	17.16154	0.68129
11	1.41376	1.60441	1.83335	4.31176	1.73613	1.95286	16.60295	0.67891
12	1.39908	1.58885	1.81637	4.35297	1.68201	1.89198	16.08539	0.67968
13	1.38666	1.57590	1.80222	4.39418	1.63189	1.83561	15.60609	0.68326
14	1.37602	1.56501	1.79028	4.43538	1.58551	1.78344	15.16259	0.68930
15	1.36682	1.55579	1.78011	4.47659	1.54265	1.73522	14.75263	0.69750
16	1.35878	1.54792	1.77138	4.51780	1.50307	1.69071	14.37416	0.70754
17	1.35172	1.54116	1.76383	4.55900	1.46659	1.64967	14.02528	0.71914
18	1.34545	1.53534	1.75725	4.60021	1.43303	1.61192	13.70432	0.73204
19	1.33988	1.53028	1.75150	4.64142	1.40222	1.57727	13.40974	0.74598
20	1.34171	1.52583	1.74630	4.68263	1.37403	1.54556	13.14013	0.76073
21	1.34986	1.53299	1.75446	4.72383	1.34832	1.51664	12.89425	0.77606
22	1.35729	1.53962	1.76197	4.76504	1.32497	1.49037	12.67095	0.79177
23	1.36410	1.54578	1.76890	4.80625	1.30387	1.46664	12.46921	0.80768
24	1.37036	1.55151	1.77532	4.84745	1.28494	1.44534	12.28811	0.82360
25	1.37615	1.55686	1.78129	4.88866	1.26807	1.42638	12.12684	0.83940
26	1.38151	1.56187	1.78686	4.92987	1.25321	1.40966	11.98471	0.85492
27	1.38650	1.56656	1.79206	4.97107	1.24028	1.39512	11.86107	0.87005
28	1.39116	1.57095	1.79693	5.01228	1.22923	1.38268	11.75538	0.88468
29	1.39551	1.57508	1.80150	5.05349	1.22001	1.37231	11.66721	0.89872
30	1.39960	1.57896	1.80579	5.09469	1.21258	1.36395	11.59613	0.91210
31	1.40344	1.58261	1.80984	5.13590	1.20691	1.35757	11.54187	0.92477
32	1.40707	1.58605	1.81366	5.17711	1.20297	1.35314	11.50420	0.93667
33	1.41050	1.58929	1.81728	5.21832	1.20074	1.35064	11.48293	0.94779
34	1.41375	1.59234	1.82071	5.25952	1.20023	1.35006	11.47799	0.95811
35	1.41684	1.59523	1.82397	5.30073	1.20141	1.35139	11.48936	0.96766
36	1.41978	1.59796	1.82709	5.34194	1.20431	1.35466	11.51709	0.97644
37	1.42259	1.60056	1.83007	5.38314	1.20893	1.35985	11.56129	0.98451
38	1.42528	1.60302	1.83294	5.42435	1.21530	1.36701	11.62214	0.99191
39	1.42786	1.60538	1.83571	5.46556	1.22343	1.37616	11.69991	0.99874
40	1.43035	1.60764	1.83839	5.50677	1.23337	1.38734	11.79495	1.00506
41	1.43275	1.60982	1.84101	5.54797	1.24516	1.40060	11.90765	1.01099
42	1.43508	1.61193	1.84358	5.58918	1.25884	1.41599	12.03851	1.01666
43	1.43734	1.61400	1.84611	5.63039	1.27448	1.43358	12.18813	1.02219
44	1.43954	1.61603	1.84862	5.67160	1.29215	1.45346	12.35711	1.02776
45	1.44170	1.61805	1.85113	5.71280	1.31193	1.47571	12.54624	1.03352
46	1.44381	1.62007	1.85366	5.75401	1.33390	1.50042	12.75638	1.03967
47	1.44589	1.62212	1.85622	5.79521	1.35817	1.52772	12.98847	1.04641
48	1.44795	1.62420	1.85883	5.83642	1.38485	1.55773	13.24356	1.05396
49	1.449619	1.62749	1.93222	5.87763	1.41405	1.59058	13.52287	1.08828
50	1.54444	1.75078	2.00562	5.91884	1.44593	1.62643	13.82767	1.12260
51	1.59268	1.81406	2.07902	5.96004	1.48062	1.66545	14.15943	1.15692
52	1.64092	1.87735	2.15242	6.00125	1.51829	1.70783	14.51978	1.19124
53	1.68916	1.94063	2.22582	6.04246	1.55915	1.75379	14.91044	1.22556
54	1.73740	2.00392	2.29922	6.08366	1.60337	1.80353	15.33336	1.25988
55	1.78564	2.06721	2.37262	6.12487	1.65119	1.85732	15.79071	1.29420
56	1.83388	2.13050	2.44602	6.16608	1.70286	1.91544	16.28476	1.32852
57	1.88212	2.19378	2.51941	6.20729	1.75864	1.97818	16.81819	1.36284
58	1.93037	2.25707	2.59281	6.24849	1.81882	2.04588	17.39374	1.39715
59	1.97861	2.32036	2.66621	6.28970	1.88374	2.11890	18.01456	1.43147
60	2.02685	2.38364	2.73961	6.33091	1.95374	2.19764	18.68405	1.46579
61	2.07509	2.44693	2.81301	6.37212	2.02923	2.28255	19.40594	1.50011
62	2.12333	2.51022	2.88641	6.41332	2.11063	2.37412	20.18439	1.53443
63	2.17157	2.57350	2.95981	6.45453	2.19842	2.47286	21.02390	1.56875
64	2.21981	2.63679	3.03321	6.49574	2.29311	2.57937	21.92943	1.60307
65	2.26805	2.70008	3.10661	6.53695	2.39528	2.69429	22.90645	1.63739

**Table A-106  
Orange 1999 Time Period 4 VOC Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HDBGV	LDDV	LDDT	HDDV	MC
3	6.84573	8.41039	10.02070	14.73378	1.39423	1.92004	5.47708	15.15242
4	5.03313	6.22260	7.40018	12.09479	1.32369	1.82290	5.19997	12.80548
5	4.02301	4.98352	5.90455	10.48512	1.25782	1.73219	4.94122	11.06722
6	3.38188	4.18823	4.93977	9.32974	1.19629	1.64745	4.69948	9.75519
7	2.93986	3.63583	4.26785	8.42391	1.13876	1.56823	4.47350	8.74776
8	2.65944	3.27493	3.82411	7.75942	1.08496	1.49414	4.26214	7.96202
9	2.44255	2.99403	3.47961	7.18030	1.03461	1.42480	4.06434	7.34040
10	2.26595	2.76485	3.20007	6.66307	0.98747	1.35987	3.87913	6.84205
11	2.11867	2.57334	2.96794	6.19889	0.94330	1.29904	3.70562	6.43757
12	1.99337	2.41010	2.77139	5.78071	0.90190	1.24203	3.54299	6.10536
13	1.88498	2.26854	2.60214	5.40278	0.86307	1.18857	3.39048	5.82939
14	1.78986	2.14396	2.45426	5.06028	0.82665	1.13841	3.24739	5.59751
15	1.70535	2.03290	2.32337	4.74914	0.79246	1.09132	3.11308	5.40048
16	1.62944	1.93275	2.20617	4.46587	0.76035	1.04711	2.98694	5.23113
17	1.56060	1.84153	2.10016	4.20742	0.73019	1.00557	2.86845	5.08387
18	1.49764	1.75770	2.00338	3.97117	0.70184	0.96652	2.75708	4.95428
19	1.43963	1.68003	1.91431	3.75481	0.67518	0.92982	2.65236	4.83892
20	1.37992	1.61132	1.83531	3.56047	0.65011	0.89529	2.55387	4.73501
21	1.32589	1.55236	1.76611	3.38843	0.62652	0.86280	2.46121	4.64039
22	1.27646	1.49838	1.70286	3.23089	0.60432	0.83223	2.37399	4.55330
23	1.23103	1.44873	1.64476	3.08645	0.58342	0.80344	2.29188	4.47242
24	1.18911	1.40286	1.59116	2.95385	0.56373	0.77634	2.21456	4.39668
25	1.15028	1.36032	1.54152	2.83198	0.54519	0.75081	2.14173	4.32528
26	1.11417	1.32076	1.49539	2.71986	0.52773	0.72675	2.07312	4.25763
27	1.08050	1.28385	1.45238	2.61661	0.51127	0.70409	2.00847	4.19328
28	1.04901	1.24933	1.41220	2.52142	0.49576	0.68273	1.94755	4.13195
29	1.01947	1.21698	1.37456	2.43358	0.48115	0.66261	1.89014	4.07344
30	0.99169	1.18661	1.33923	2.35247	0.46738	0.64364	1.83604	4.01762
31	0.96551	1.15806	1.30603	2.27750	0.45440	0.62577	1.78506	3.96447
32	0.94079	1.13118	1.27478	2.20817	0.44217	0.60893	1.73702	3.91398
33	0.91739	1.10585	1.24532	2.14401	0.43065	0.59307	1.69176	3.86620
34	0.89520	1.08194	1.21754	2.08460	0.41980	0.57812	1.64914	3.82114
35	0.87413	1.05937	1.19130	2.02956	0.40958	0.56405	1.60900	3.77890
36	0.85408	1.03803	1.16651	1.97856	0.39997	0.55081	1.57122	3.73953
37	0.83498	1.01784	1.14306	1.93129	0.39092	0.53835	1.53568	3.70306
38	0.81675	0.99874	1.12087	1.88747	0.38241	0.52663	1.50226	3.66954
39	0.79932	0.98063	1.09985	1.84686	0.37442	0.51563	1.47087	3.63899
40	0.78265	0.96346	1.07993	1.80921	0.36692	0.50530	1.44140	3.61138
41	0.76667	0.94717	1.06104	1.77434	0.35988	0.49561	1.41376	3.58672
42	0.75133	0.93169	1.04309	1.74206	0.35329	0.48653	1.38787	3.56489
43	0.73659	0.91696	1.02604	1.71220	0.34713	0.47805	1.36366	3.54575
44	0.72241	0.90293	1.00980	1.68461	0.34137	0.47012	1.34105	3.52921
45	0.70875	0.88953	0.99433	1.65915	0.33601	0.46273	1.31997	3.51501
46	0.69557	0.87672	0.97954	1.63570	0.33102	0.45586	1.30037	3.50290
47	0.68283	0.86442	0.96538	1.61416	0.32639	0.44949	1.28220	3.49252
48	0.67070	0.85265	0.95182	1.59444	0.32211	0.44359	1.26538	3.48344
49	0.66902	0.85086	0.94969	1.57659	0.31817	0.43816	1.24988	3.48344
50	0.66744	0.84918	0.94769	1.56055	0.31455	0.43318	1.23567	3.48344
51	0.66595	0.84759	0.94580	1.54623	0.31125	0.42863	1.22269	3.48344
52	0.66453	0.84608	0.94401	1.53357	0.30825	0.42450	1.21091	3.48344
53	0.66320	0.84466	0.94232	1.52251	0.30555	0.42078	1.20030	3.48344
54	0.66193	0.84330	0.94072	1.51298	0.30314	0.41746	1.19083	3.48344
55	0.66072	0.84202	0.93920	1.50495	0.30101	0.41453	1.18248	3.48344
56	0.68121	0.87166	0.97560	1.49838	0.29916	0.41198	1.17522	3.59911
57	0.70175	0.90136	1.01206	1.49323	0.29759	0.40981	1.16903	3.71477
58	0.72234	0.93111	1.04860	1.48949	0.29628	0.40802	1.16389	3.83044
59	0.74298	0.96092	1.08519	1.48715	0.29524	0.40658	1.15981	3.94611
60	0.76366	0.99077	1.12185	1.48618	0.29446	0.40551	1.15675	4.06178
61	0.78439	1.02067	1.15856	1.48660	0.29394	0.40480	1.15471	4.17745
62	0.80516	1.05062	1.19532	1.48841	0.29368	0.40444	1.15370	4.29311
63	0.82597	1.08060	1.23213	1.49161	0.29368	0.40444	1.15370	4.40878
64	0.84682	1.11062	1.26898	1.49624	0.29394	0.40480	1.15471	4.52445
65	0.86769	1.14068	1.30588	1.50232	0.29446	0.40551	1.15675	4.64011

**Table A-107**  
**Orange 1999 Time Period 4 CO Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HdGV	LDDV	LDDT	HDDV	MC
3	60.20644	75.56445	92.02715	156.39586	4.92597	5.54844	38.83043	158.07491
4	46.74068	58.62119	71.25366	142.89224	4.53984	5.11351	35.78664	126.06819
5	38.64110	48.34106	58.45076	130.84196	4.19160	4.72126	33.04153	102.96693
6	33.23494	41.45117	49.78931	120.07191	3.87712	4.36704	30.56255	85.92006
7	29.37221	36.52298	43.56284	110.43095	3.59277	4.04676	28.32106	73.08427
8	26.47588	32.83099	38.88837	101.78780	3.33533	3.75679	26.29175	63.23857
9	24.22452	29.96701	35.26140	94.02779	3.10198	3.49396	24.45235	55.55663
10	22.42484	27.68369	32.37253	87.05066	2.89022	3.25544	22.78304	49.46678
11	20.95358	25.82248	30.02158	80.76880	2.69781	3.03872	21.26636	44.56671
12	19.72852	24.27702	28.07364	75.10527	2.52281	2.84160	19.88680	40.56757
13	18.69264	22.97340	26.43446	69.99271	2.36345	2.66210	18.63063	37.25903
14	17.80519	21.85863	25.03642	65.37170	2.21819	2.49849	17.48560	34.48524
15	17.03632	20.89375	23.82985	61.19043	2.08565	2.34920	16.44081	32.12961
16	16.36357	20.04959	22.77748	57.40259	1.96461	2.21286	15.48665	30.10352
17	15.76981	19.30377	21.85085	53.96796	1.85396	2.08823	14.61441	28.33908
18	15.24169	18.63904	21.02792	50.85051	1.75272	1.97421	13.81644	26.78397
19	14.76872	18.04178	20.29143	48.01863	1.66004	1.86981	13.08580	25.39746
20	14.17040	17.40869	19.54501	45.44443	1.57512	1.77416	12.41640	24.14789
21	13.45964	16.62640	18.66440	43.10287	1.49727	1.68647	11.80269	23.01036
22	12.81289	15.91182	17.86205	40.97202	1.42586	1.60603	11.23976	21.95670
23	12.22177	15.25595	17.12749	39.03224	1.36032	1.53222	10.72318	20.99884
24	11.67935	14.65145	16.45212	37.26631	1.30017	1.46446	10.24898	20.09814
25	11.17978	14.09230	15.82880	35.65855	1.24493	1.40225	9.81359	19.25490
26	10.71817	13.57350	15.25157	34.19533	1.19422	1.34513	9.41381	18.46227
27	10.29036	13.09088	14.71550	32.86440	1.14766	1.29268	9.04677	17.71526
28	9.89278	12.64093	14.21637	31.65474	1.10492	1.24454	8.70988	17.01007
29	9.52240	12.22069	13.75064	30.55682	1.06571	1.20038	8.40081	16.34412
30	9.17655	11.82759	13.31527	29.56197	1.02977	1.15989	8.11746	15.71549
31	8.85295	11.45946	12.90762	28.66246	0.99685	1.12281	7.85796	15.12263
32	8.54957	11.11436	12.52543	27.85150	0.96674	1.08890	7.62061	14.56446
33	8.26465	10.79058	12.16670	27.12315	0.93925	1.05793	7.40391	14.04056
34	7.99663	10.48660	11.82966	26.47203	0.91420	1.02972	7.20645	13.54984
35	7.74411	10.20107	11.51275	25.89340	0.89144	1.00409	7.02704	13.09209
36	7.50585	9.93273	11.21453	25.38319	0.87083	0.98087	6.86460	12.66627
37	7.28074	9.68043	10.93376	24.93787	0.85225	0.95994	6.71811	12.27221
38	7.06779	9.44315	10.66924	24.55432	0.83558	0.94117	6.58673	11.90866
39	6.86609	9.21990	10.41989	24.22989	0.82073	0.92445	6.46968	11.57482
40	6.67481	9.00976	10.18472	23.96242	0.80762	0.90967	6.36629	11.26965
41	6.49322	8.81187	9.96278	23.75012	0.79616	0.89676	6.27596	10.99190
42	6.32063	8.62540	9.75315	23.59151	0.78629	0.88565	6.19818	10.73983
43	6.15640	8.44952	9.55500	23.48560	0.77796	0.87627	6.13252	10.51189
44	5.99996	8.28345	9.36746	23.43166	0.77112	0.86857	6.07861	10.30579
45	5.85075	8.12634	9.18974	23.42931	0.76574	0.86250	6.03615	10.11940
46	5.70825	7.97733	9.02099	23.47856	0.76177	0.85803	6.00490	9.95001
47	5.57196	7.83549	8.86034	23.57974	0.75921	0.85515	5.98470	9.79430
48	5.44140	7.69985	8.70695	23.73349	0.75803	0.85382	5.97543	9.64900
49	5.44140	7.69985	8.70695	23.94089	0.75824	0.85405	5.97705	9.64900
50	5.44140	7.69985	8.70695	24.20328	0.75983	0.85584	5.98955	9.64900
51	5.44140	7.69985	8.70695	24.52242	0.76280	0.85919	6.01301	9.64900
52	5.44140	7.69985	8.70695	24.90051	0.76719	0.86413	6.04757	9.64900
53	5.44140	7.69985	8.70695	25.34006	0.77300	0.87068	6.09340	9.64900
54	5.44140	7.69985	8.70695	25.84425	0.78028	0.87888	6.15076	9.64900
55	5.44140	7.69985	8.70695	26.41646	0.78906	0.88877	6.21998	9.64900
56	6.08704	8.77163	9.99433	27.06084	0.79939	0.90040	6.30143	11.97275
57	6.73267	9.84340	11.28169	27.78195	0.81133	0.91386	6.39558	14.29651
58	7.37831	10.91518	12.56906	28.58513	0.82496	0.92920	6.50296	16.62025
59	8.02395	11.98697	13.85644	29.47632	0.84033	0.94652	6.62418	18.94402
60	8.66958	13.05874	15.14381	30.46223	0.85756	0.96592	6.75996	21.26776
61	9.31522	14.13052	16.43117	31.55045	0.87673	0.98752	6.91109	23.59149
62	9.96086	15.20230	17.71851	32.74953	0.89796	1.01143	7.07846	25.91524
63	10.60650	16.27406	19.00587	34.06898	0.92139	1.03782	7.26309	28.23901
64	11.25213	17.34583	20.29324	35.51974	0.94714	1.06683	7.46613	30.56276
65	11.89777	18.41760	21.58061	37.11369	0.97539	1.09864	7.68882	32.88649

**Table A-108**  
**Orange 1999 Time Period 4 NOX Emission Rates (grams/mile)**

Speed	LDGV	LDGT1	LDGT2	HGV	LDDV	LDDT	HDDV	MC
3	1.86196	2.11495	2.41114	4.09885	2.35405	2.64792	22.51224	0.90987
4	1.70551	1.93876	2.21572	4.14126	2.25491	2.53640	21.56410	0.87028
5	1.61125	1.83266	2.09864	4.18368	2.16300	2.43302	20.68524	0.83742
6	1.54813	1.76178	2.02083	4.22609	2.07780	2.33718	19.87039	0.81079
7	1.50286	1.71114	1.96553	4.26851	1.99878	2.24830	19.11475	0.78987
8	1.46878	1.67325	1.92434	4.31092	1.92551	2.16588	18.41400	0.77420
9	1.44217	1.64395	1.89260	4.35334	1.85755	2.08944	17.76411	0.76331
10	1.42083	1.62070	1.86749	4.39575	1.79454	2.01856	17.16154	0.75676
11	1.40333	1.60190	1.84723	4.43817	1.73613	1.95286	16.60295	0.75411
12	1.38872	1.58647	1.83061	4.48058	1.68201	1.89198	16.08539	0.75497
13	1.37636	1.57365	1.81680	4.52300	1.63189	1.83561	15.60609	0.75894
14	1.36577	1.56290	1.80520	4.56541	1.58551	1.78344	15.16259	0.76566
15	1.35659	1.55381	1.79537	4.60783	1.54265	1.73522	14.75263	0.77476
16	1.34858	1.54607	1.78697	4.65025	1.50307	1.69071	14.37416	0.78591
17	1.34154	1.53946	1.77975	4.69266	1.46659	1.64967	14.02528	0.79880
18	1.33530	1.53377	1.77350	4.73507	1.43303	1.61192	13.70432	0.81313
19	1.32974	1.52886	1.76807	4.77749	1.40222	1.57727	13.40974	0.82862
20	1.33148	1.52466	1.76331	4.81990	1.37403	1.54556	13.14013	0.84500
21	1.33945	1.53198	1.77180	4.86232	1.34832	1.51664	12.89425	0.86203
22	1.34672	1.53876	1.77962	4.90473	1.32497	1.49037	12.67095	0.87948
23	1.35338	1.54508	1.78687	4.94715	1.30387	1.46664	12.46921	0.89714
24	1.35952	1.55096	1.79360	4.98956	1.28494	1.44534	12.28811	0.91483
25	1.36520	1.55646	1.79986	5.03198	1.26807	1.42638	12.12684	0.93238
26	1.37047	1.56162	1.80571	5.07439	1.25321	1.40966	11.98471	0.94962
27	1.37537	1.56645	1.81118	5.11681	1.24028	1.39512	11.86107	0.96643
28	1.37996	1.57099	1.81632	5.15922	1.22923	1.38268	11.75538	0.98268
29	1.38425	1.57526	1.82115	5.20164	1.22001	1.37231	11.66721	0.99828
30	1.38829	1.57928	1.82569	5.24405	1.21258	1.36395	11.59613	1.01314
31	1.39210	1.58307	1.82998	5.28647	1.20691	1.35757	11.54187	1.02720
32	1.39569	1.58663	1.83404	5.32888	1.20297	1.35314	11.50420	1.04042
33	1.39910	1.59000	1.83789	5.37130	1.20074	1.35064	11.48293	1.05277
34	1.40234	1.59318	1.84155	5.41371	1.20023	1.35006	11.47799	1.06424
35	1.40543	1.59619	1.84504	5.45613	1.20141	1.35139	11.48936	1.07484
36	1.40838	1.59905	1.84838	5.49854	1.20431	1.35466	11.51709	1.08460
37	1.41121	1.60176	1.85158	5.54096	1.20893	1.35985	11.56129	1.09356
38	1.41393	1.60435	1.85467	5.58338	1.21530	1.36701	11.62214	1.10179
39	1.41655	1.60683	1.85766	5.62579	1.22343	1.37616	11.69991	1.10937
40	1.41908	1.60921	1.86058	5.66821	1.23337	1.38734	11.79495	1.11639
41	1.42154	1.61152	1.86343	5.71062	1.24516	1.40060	11.90765	1.12298
42	1.42393	1.61377	1.86624	5.75304	1.25884	1.41599	12.03851	1.12927
43	1.42626	1.61597	1.86903	5.79545	1.27448	1.43358	12.18813	1.13542
44	1.42855	1.61814	1.87182	5.83787	1.29215	1.45346	12.35711	1.14161
45	1.43080	1.62032	1.87462	5.88028	1.31193	1.47571	12.54624	1.14801
46	1.43303	1.62251	1.87746	5.92270	1.33390	1.50042	12.75638	1.15484
47	1.43523	1.62473	1.88036	5.96511	1.35817	1.52772	12.98847	1.16232
48	1.43742	1.62701	1.88334	6.00753	1.38485	1.55773	13.24356	1.17071
49	1.48550	1.69050	1.95798	6.04994	1.41405	1.59058	13.52287	1.20883
50	1.53357	1.75399	2.03263	6.09236	1.44593	1.62643	13.82767	1.24695
51	1.58165	1.81748	2.10728	6.13477	1.48062	1.66545	14.15943	1.28507
52	1.62972	1.88096	2.18193	6.17719	1.51829	1.70783	14.51978	1.32319
53	1.67780	1.94445	2.25658	6.21960	1.55915	1.75379	14.91044	1.36131
54	1.72587	2.00794	2.33123	6.26202	1.60337	1.80353	15.33336	1.39943
55	1.77395	2.07143	2.40588	6.30443	1.65119	1.85732	15.79071	1.43755
56	1.82202	2.13492	2.48053	6.34685	1.70286	1.91544	16.28476	1.47568
57	1.87010	2.19841	2.55518	6.38926	1.75864	1.97818	16.81819	1.51380
58	1.91817	2.26190	2.62983	6.43168	1.81882	2.04588	17.39374	1.55192
59	1.96625	2.32539	2.70448	6.47410	1.88374	2.11890	18.01456	1.59004
60	2.01432	2.38888	2.77913	6.51651	1.95374	2.19764	18.68405	1.62816
61	2.06240	2.45237	2.85378	6.55893	2.02923	2.28255	19.40594	1.66628
62	2.11047	2.51586	2.92843	6.60134	2.11063	2.37412	20.18439	1.70440
63	2.15855	2.57935	3.00308	6.64376	2.19842	2.47286	21.02390	1.74252
64	2.20662	2.64284	3.07773	6.68617	2.29311	2.57937	21.92943	1.78064
65	2.25469	2.70632	3.15238	6.72859	2.39528	2.69429	22.90645	1.81876

**Table A-109**  
**1990 JOHRTS Diurnal Rates**

Hardin 1990 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
6.95	10.73	14.72	39.10	0.00	0.00	0.00	29.50
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
14.71	19.91	19.97	40.64	0.00	0.00	0.00	0.00
Jefferson 1990 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
7.35	10.94	14.73	37.38	0.00	0.00	0.00	29.53
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
15.39	20.17	19.99	39.37	0.00	0.00	0.00	0.00
Orange 1990 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
7.65	12.31	16.38	38.96	0.00	0.00	0.00	29.51
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
15.87	22.22	21.54	40.56	0.00	0.00	0.00	0.00

**Table A-110**  
**1996 JOHRTS Diurnal Rates**

Hardin 1996 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1.67	2.81	4.83	26.81	0.00	0.00	0.00	11.77
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
6.86	8.57	10.11	33.63	0.00	0.00	0.00	0.00
Jefferson 1996 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1.79	2.74	5.16	21.57	0.00	0.00	0.00	11.77
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
6.99	8.50	10.35	30.34	0.00	0.00	0.00	0.00
Orange 1996 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1.72	2.84	5.02	25.77	0.00	0.00	0.00	11.77
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
6.92	8.63	10.25	33.00	0.00	0.00	0.00	0.00



**Table A-111**  
**1999 JOHRTS Diurnal Rates**

Hardin 1999 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1.36	2.41	3.40	22.22	0.00	0.00	0.00	11.77
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
6.02	7.63	8.16	29.96	0.00	0.00	0.00	0.00
Jefferson 1999 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1.49	2.24	3.68	16.92	0.00	0.00	0.00	11.77
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
6.25	7.35	8.40	26.18	0.00	0.00	0.00	0.00
Orange 1999 Diurnal Emission rates in grams							
Weighted Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1.35	2.23	3.43	20.62	0.00	0.00	0.00	11.77
Multiple Diurnal							
LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
5.94	7.29	8.11	28.74	0.00	0.00	0.00	0.00

