Carbon Monoxide State Implementation Plan

Las Vegas Valley Nonattainment Area

Clark County, Nevada

August 2000

Department of Comprehensive Planning

Clark County Board of Commissioners

Acknowledgements

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RESOLUTION OF THE CLARK COUNTY BOARD OF COMMISSIONERS
TO ADOPT
THE LAS VEGAS VALLEY CARBON MONOXIDE STATE IMPLEMENTATION PLAN

WHEREAS, although significant progress has been made in reducing ambient carbon monoxide concentrations, the Las Vegas Valley continues to be classified as serious nonattainment for carbon monoxide by the U.S. Environmental Protection Agency (EPA); and

WHEREAS, the 1990 Clean Air Act Amendments require the preparation and submittal of a State Implementation Plan which addresses carbon monoxide pollution; and

WHEREAS, the Clark County Board of County Commissioners has been designated by the Governor of the State of Nevada as the lead agency for air quality planning and is responsible for preparing State Implementation Plans for nonattainment pollutants; and

WHEREAS, the Las Vegas Valley Carbon Monoxide State Implementation Plan has been developed to reduce carbon monoxide air pollution to levels below national ambient health standards;

NOW, THEREFORE, BE IT RESOLVED that the Clark County Board of Commissioners adopt the Las Vegas Valley Carbon Monoxide Plan (Plan) in an effort to improve air quality and to attain and maintain the carbon monoxide National Ambient Air Quality Standards by December 31, 2000, as required by the 1990 Clean Air Act Amendments; and

NOW, THEREFORE, BE IT FURTHER RESOLVED that the Clark County Board of Commissioners request that the U.S. EPA, as part of the plan's approval, review and approve clean burning gasoline as a control measure as required by Section 211(c)(4)(C) of the Clean Air Act Amendments; and

NOW, THEREFORE, BE IT FURTHER RESOLVED that the Clark County Board of Commissioners, as the lead agency for air quality planning, commit to the U.S. EPA to monitor the emission reductions associated with the Plan's control measures and remedy in a timely fashion any shortfall for the purpose of complying with state implementation plan control measure requirements of the Act. The Board further commits to preparing and submitting a plan revision to the U.S. EPA that quantifies the actual benefits of the contingency measures contained in the plan, within one year of the release date of pending applicable guidance protocols and models.

PASSED, ADOPTED AND APPROVED this 1st day of August, 2000.

ATTEST:

Shirley B Parraguirre
SHIRLEY B. PARRAGUIRRE
County Clerk

CLARK COUNTY
BOARD OF COMMISSIONERS

By: Bruce Woodbury
BRUCE L. WOODBURY, Chairman

PREFACE

On September 21, 1999, the Clark County Board of Commissioners adopted the *Las Vegas Valley Non-attainment Area Carbon Monoxide Air Quality Implementation Plan*. Following the plan's adoption and submittal, the U.S. Environmental Protection Agency, Region IX, expressed concerns about several problematic areas that resulted in the emissions budget being found as inadequate. EPA also raised issues that affected the approvability of the plan. This revised plan has been prepared in response to these concerns so that the U.S. EPA can find Clark County's Carbon Monoxide State Implementation Plan acceptable and approve it.

This document is similar to the September 1999, Carbon Monoxide Air Quality Implementation Plan with the exception that additional clarification, documentation and technical analyses have been incorporated. In general, the changes are focused on control measures, contingency measures and future year modeling. More specifically, additional discussion and changes have been made to the following control measures: Voluntary Transportation Demand Management/ Transportation Control Measure (page 4-4), the Cleaner Burning Gasoline program (page 4-2), the Alternative Fuel Vehicle Program (page 4-8), and Inspection/Maintenance Technician Training and Certification (page 4-7). With respect to contingency measures, a new set of measures has been identified which include: On-Board Diagnostic testing, lowering of emission testing cutpoints and on-road remote sensing of vehicles to identify high emitting vehicles (page 7-3). The final change relates to conducting additional micro-scale hot spot modeling for future years for the purpose of validating the future year emission budgets (page 6-7 and Appendix E).

By addressing these concerns and incorporating these changes into a revised plan, it is now possible for the U.S. EPA to make an adequacy determination on the emission budget and ultimately approve this plan. Clark County is committed to working with the EPA to gain approval of this plan and to attainment the carbon monoxide standard as expeditiously as possible.

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Glossary of Acronyms

ADT	Average Daily Trips
AQD	Air Quality Division
CAAA	Clean Air Act Amendment
CAL3QHC	Microscale Dispersion Model (based on California Line Source Model)
CO	Carbon Monoxide
DCP	Department of Comprehensive Planning
DTIM	Direct Travel Impact Model
EPA	Environmental Protection Agency
FRM	Federal Reference Method
I/M	Inspection and Maintenance
LVACTS	Las Vegas Area Computer Traffic System
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
PPM	Parts Per Million
RTC	Regional Transportation Commission
SLAMS	State and Local Air Monitoring Station
TCM	Transportation Control Measure
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
RTP	Regional Transportation Plan
UAM	Urban Airshed Model

Glossary of Acronyms - Continued

VMT	Vehicle Miles Traveled
TRANPLAN	Network based travel Demand Model which Estimates Vehicle Miles Traveled
MOBILE5a/5b	Revised EPA Vehicle Emission Factor Model

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Chapter One - Plan Introduction

1.1 INTRODUCTION

The 1990 Clean Air Act Amendments (CAAA) redefined the national air pollution abatement framework and established ambitious policies to carry out air quality planning and control activities. The requirements mandated by the CAAA affect the Las Vegas Valley in many ways. Two National Ambient Air Quality Standards (NAAQS) have been established for carbon monoxide. The 1-hour standard has a maximum allowable concentration of 35 parts per million (ppm). The 8-hour standard is a maximum average of 9 ppm over an 8-hour period. Areas that violate one or both of the ambient standards more than two times in a two-year period are classified as non-attainment areas for carbon monoxide.

Previously, portions of the Valley violated the NAAQS for carbon monoxide (CO) during the winter months. The number and severity of the CO violations caused the U.S. Environmental Protection Agency (EPA) to designate the Valley as a Moderate nonattaiment area on November 15, 1990. Moderate nonattainment areas were required to implement emission control measures as “expeditiously as practicable” in order to attain the CO NAAQS by December 31, 1995. The Clean Air Act requires that moderate nonattainment areas implement the following controls:

1. An oxygenated gasoline program during the winter months that require gasoline to contain no less than 2.7% oxygen by weight;

2. An enhanced vehicle inspection and maintenance program meeting the Clean Air Act’s criteria;

3. Forecasts of vehicle miles traveled (VMT) in the region, procedures for annual updates and reports attesting to the accuracy of the forecasts, and estimates of actual VMT based on traffic counts on area roadways;

4. Contingency measures that must be implemented if actual VMT exceeds forecasted VMT or if the area fails to attain the standard by the applicable date; and

5. Transportation control measures necessary to demonstrate attainment of the standard (section 187(b)(2)).

Clark County implemented the above listed controls and made great strides towards attaining the NAAQS for carbon monoxide but, due to the phenomenal growth the valley experienced during this decade, it fell short of meeting the NAAQS by the applicable date of December 31, 1995.

Improved carbon monoxide levels, attributed to the implementation of the aforementioned control measures, resulted in Clark County being granted a one-year extension to demonstrate compliance with the NAAQS. However, the Las

Vegas Valley was not successful in achieving compliance by December 31, 1996. The CAAA requires that the area be “bumped“ up, or be reclassified as a “serious” nonattainment for carbon monoxide.

The notice of violation reclassifying the area was published in the Federal Register on November 3rd, 1997. A deadline of May 1999 (18 months from the notice publication date) is set by the CAAA for submission of a control strategy implementation plan demonstrating attainment of the NAAQS for Carbon Monoxide by December 31, 2000. This document represents such a plan in fulfillment of sections 107 and 110 of the CAAA.

1.2 PROBLEM STATEMENT

The Las Vegas Valley has been reclassified as a serious nonattainment area for CO air pollution after failing to attain the standard by the extended CAAA deadline of December 31, 1996. Although the Valley has never exceeded the 1-hour standard, the 8-hour standard was being exceeded at least once per year on a seasonal basis. During the winter months local inversions stagnate air masses and trap pollutants. The overnight buildup of pollutants causes exceedance violations of the CO 8-hour air quality standard in a limited area surrounding the Sunrise Acres monitoring station.

While the East Charleston station recorded 10 exceedances during the 1991-1992 winter season, the number of exceedances was reduced to 1 in 1995, 3 in 1996, 1 in 1997, and 2 in 1998. This downtrend is the direct result of the implementation of CO control measures. The East Charleston (recently relocated and re-named Sunrise Acres) monitoring site is adjacent to converging major transportation corridors named the “Five Points” where three state highways intersect. Additionally, the site is located in a topographic bowl where air pollution often collects. In the 1996 season, the highest 8-hour average CO concentration also occurred in the “Five Points” area and measured 10.2 parts per million.

As mentioned above, the Las Vegas Valley is required to attain the standard by December 31, 2000. The CAAA requires serious non-attainment areas to meet all the requirements for moderate areas listed previously, in addition to implementing the following measures:

1. Gasoline sold during winter months must contain a level of oxygen as necessary, in combination with other measures, to provide for attainment of the standard. EPA may waive this requirement if the area demonstrates that the revision is not necessary to provide for attainment of the CO standard by the applicable attainment date and maintenance of the standard thereafter.

2. Mandatory employer-based travel reduction program for employers of 100 or more people that requires each employer to increase average vehicle

occupancy for commute trips by at least 25% over the regional average. However, this requirement can be avoided if the area can show that such a program is not needed to demonstrate attainment of the standard or that a comparable emission reduction is achieved by other measures.

3. An economic incentive program containing fees and marketable permits if emission reduction milestones are not met by December 31, 2000.

4. Beginning in 1997, regional transportation plans must specifically describe the transportation system for future horizon years. This requires the Regional Transportation Commission Board to approve specific projects and programs for 2000, 2010, 2020.

1.3 PHYSICAL DESCRIPTION

The Las Vegas Valley Nonattainment Area, which coincides, with Hydrographic Basin 212, is illustrated in Figure 1-1. This area includes the City of Las Vegas, the City of North Las Vegas, and the City of Henderson. The remainder constitutes unincorporated areas of Clark County. The Las Vegas Valley airshed extends in a northwest-southeast direction bounded by the Spring Mountains to the west; the Pintwater, Desert, Sheep, and Las Vegas Mountains to the north; and Frenchman Mountain to the east. The McCullough Range and Big Spring Range close the airshed to the south. The airshed covers approximately 500 square miles. The Valley drains toward the south and then easterly through Las Vegas Wash to Lake Mead. The upper boundaries of the alluvial apron occur at approximately 4500 feet and are marked by a noticeable change in slope. The lower boundaries of the apron are less well defined due to massive sedimentation on the valley floor, but occur at an average elevation of approximately 2500 feet. The basin lowland levels of the Las Vegas Valley range from 1800 to 2500 feet. Figure 1-2 provides a three dimensional topographical perspective of the Las Vegas Valley modeling domain.

1.4 CLIMATOLOGICAL SETTING

The Las Vegas Valley is situated on the edge of the Mojave Desert and experiences an arid climate typical of the southern Mojave Desert. Due to the "rain shadow" effect of the Sierra Nevada Range and Spring Mountains to the west, moisture associated with storms originating in the Pacific Ocean rarely reaches the Valley. Dry air masses move over the valley resulting in clear to partly cloudy skies with 85 percent sunshine for an average year.

Temperatures range from an average daily maximum in July of approximately 104 degrees to an average daily maximum in January of approximately 56 degrees. Average daily minimums range from 33 degrees in January to 75 degrees in July. Winters are generally mild and summers are hot.

Surface meteorology in the Las Vegas Valley is generally characterized by prevailing southwesterly winds with monthly average wind speeds ranging from 7 to 11 miles per hour. Lower wind speeds are prevalent during the winter months with a windy season throughout much of the spring. Winds in excess of 40 miles per hour are infrequent. During these events, periods of wind gusts, blowing sand and dust are prevalent. In addition to prevailing winds, a pattern of local winds, generated by local topography and temperature, also affect the Valley. During the day, as the air mass is heated, wind directions are generally upslope and in a westerly gradient. At night, the wind direction is reversed and cool air drawn from the higher elevations drains to the lower Valley. Figure 1-3 displays the evening wind drainage patterns of the Las Vegas Valley.

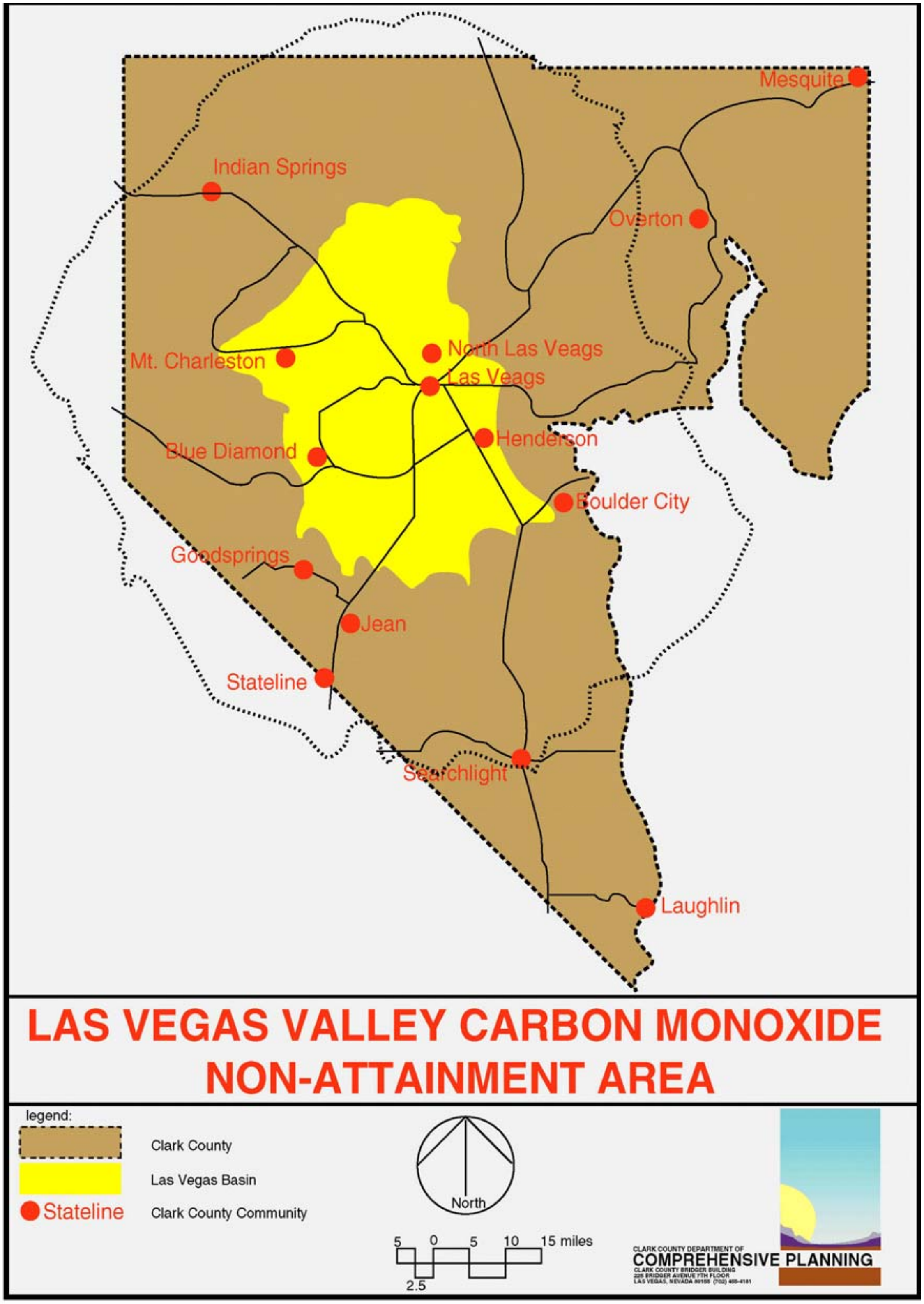
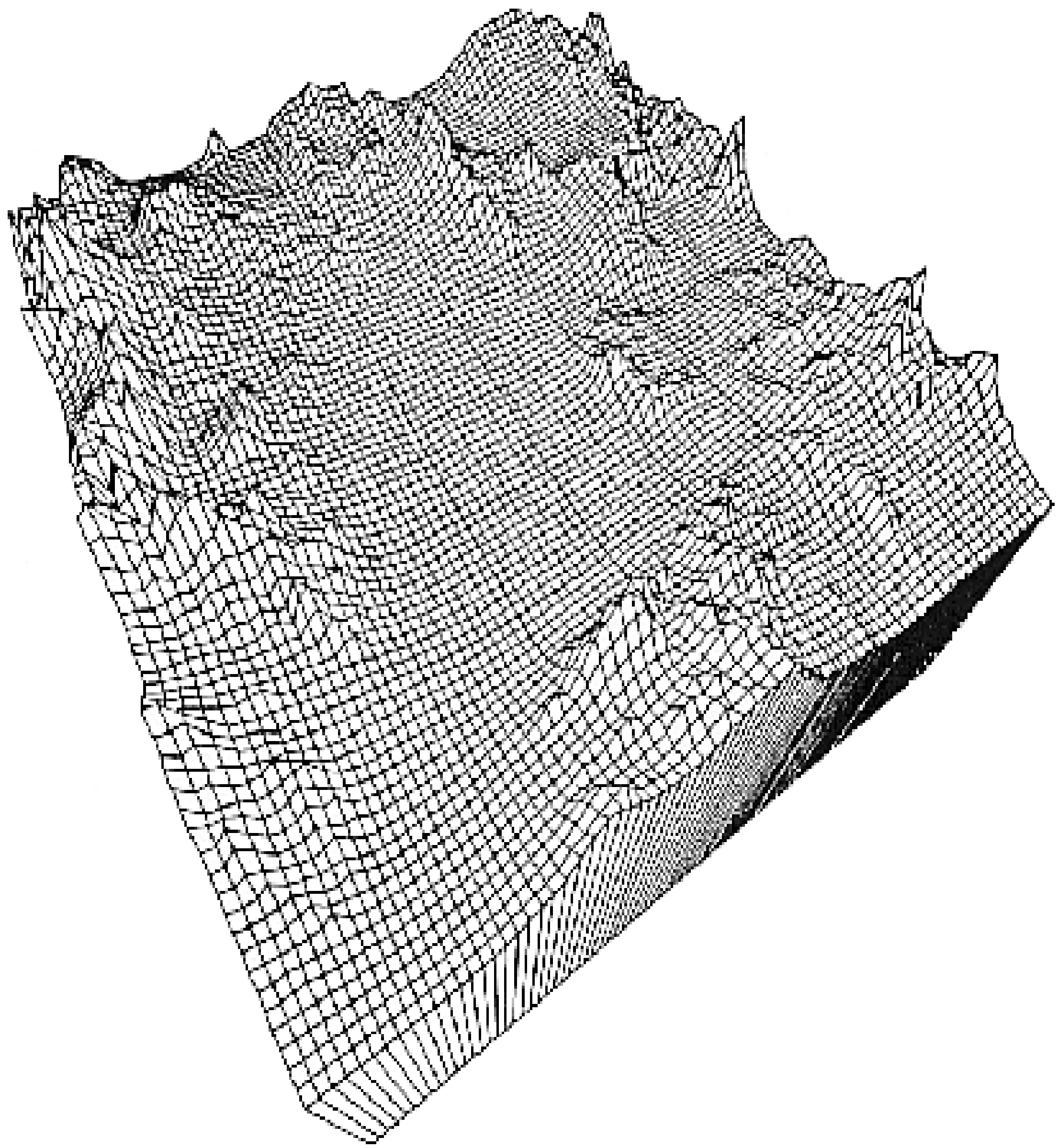


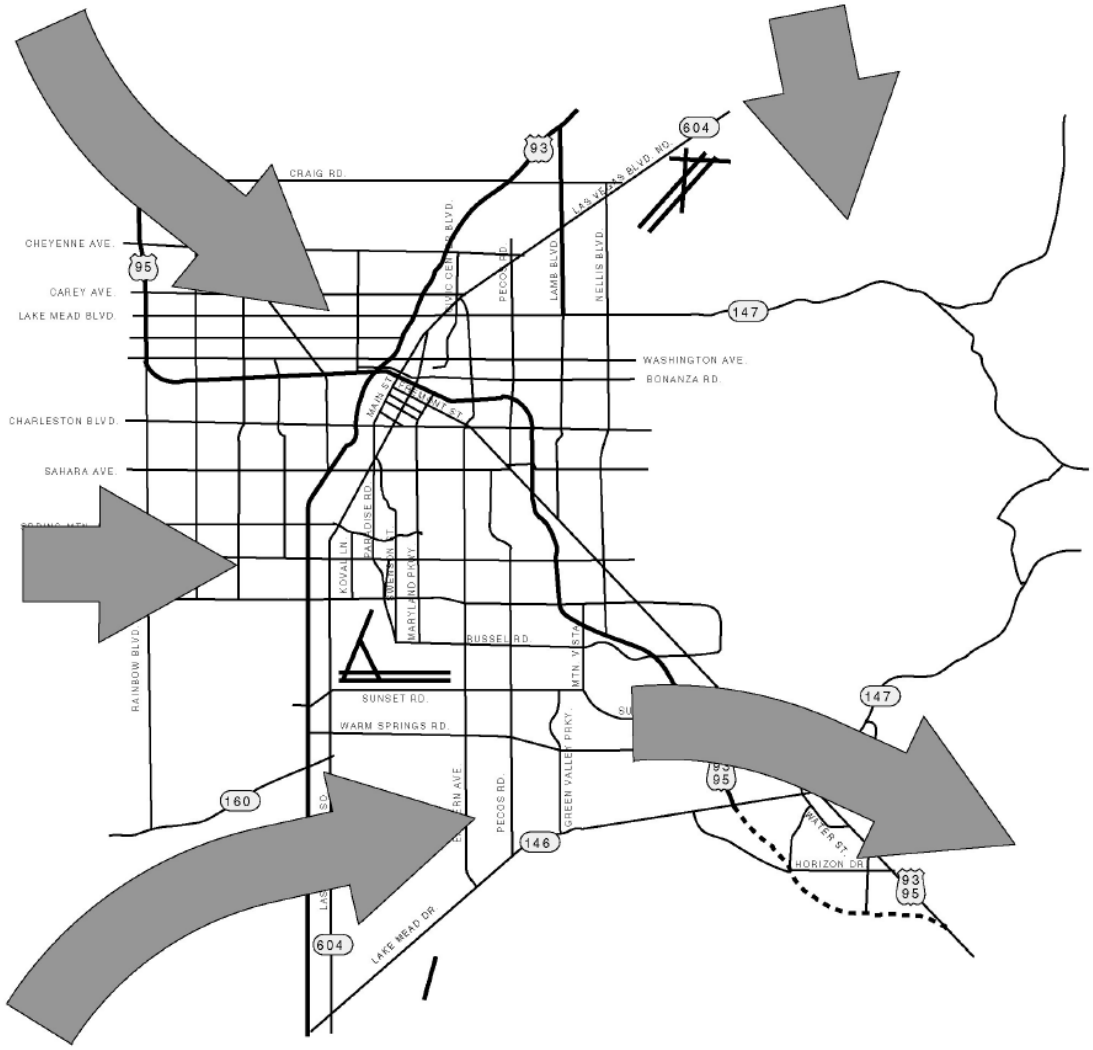
FIGURE 1-1

(.......) The dotted line around the non-attainment area (Basin 212) represents a 25-mile zone to consider sources that may contribute CO emissions.

FIGURE 1-2

THREE-DIMENSIONAL PERSPECTIVE OF THE LAS VEGAS VALLEY
MODELING DOMAIN AS VIEWED FROM THE SOUTHWEST





LAS VEGAS VALLEY CARBON MONOXIDE WIND DRAINAGE PATTERNS

Legend:

Wind Flow Direction

North

0 1 2 3 4 miles

CLARK COUNTY DEPARTMENT OF
COMPREHENSIVE PLANNING
CLARK COUNTY BRIDGER BUILDING
225 BRIDGER AVENUE 7TH FLOOR
LAS VEGAS, NEVADA 89155 (702) 455-4181

FIGURE 1-3

1.5 FOCUS OF THIS PLAN

The remainder of this document consists of seven chapters, each addressing a specific topic. These chapters are briefly summarized below:

Chapter 2, "Carbon Monoxide Monitoring Network and Trends in Air Quality," provides information on the monitoring network and CO air quality trends.

Chapter 3, "Emission Inventory Summary," presents the 1996 base year emissions inventory for stationary, area, and mobile sources (on- and off-road) as required under the 1990 CAAA.

Chapter 4, "Control Measures," introduces and describes the control strategies, which will result in reducing CO emissions and lead to attainment status.

Chapter 5, "Air Quality Modeling," describes the modeling process for the 1996 base case utilizing the Urban Airshed Model including the preparation of inputs and the model's performance.

Chapter 6, "Demonstration of Attainment," describes the modeling analysis demonstrating attainment of the NAAQS and summarizes the CO concentrations with recommended control measures.

Chapter 7, "Additional Requirements of the 1990 Clean Air Act Amendments," presents forecasts of vehicle miles traveled (VMT) and identifies the agencies responsible for preparing VMT tracking reports. Contingency measures which will be enacted if actual VMT counts exceed projected VMT are also discussed.

Chapter 8, "SIP Commitments / Implementation", discusses the implementation of control measures, monitoring progress, emissions budget, maintaining attainment once it is achieved and concludes with a brief discussion on areas/issues to receive additional study.

The Appendices are divided into four sections. Appendix A contains the "1996 base year Carbon Monoxide Emission Inventory for the Las Vegas Valley Nonattainment Area". Appendix B consists of the "Transportation Control Measure Analysis Report" and associated data. Appendix C accommodates modeling documentation including the attainment demonstration, emission reduction calculations and associated costs. Appendix D contains regulations and policies associated with the control measures documenting the enforceability of these control measures. Appendix E consists of additional technical support documentation for the control measures and supplemental modeling analyses that support the future year emission budgets.

Chapter Two- Monitoring Network and Trends in Air Quality

2.1 INTRODUCTION

This chapter provides some background about carbon monoxide (CO) air pollution and a brief summary of the Las Vegas Valley CO monitoring network as of July 1999. In addition, this chapter provides a discussion of the trends in air quality for CO over the past several years. The CO sampling program indicates that air quality is improving. The reasons for these positive developments in recent years are briefly discussed.

2.2 BACKGROUND

Carbon monoxide occurs in the atmosphere as the result of incomplete combustion of fuels. In Las Vegas, as in other urban areas, motor vehicles are the major source of CO emissions, comprising approximately 88 percent of total daily emissions and even more in the late afternoon and evening hours when exceedences of the standard are usually recorded. For more details on the sources of CO emissions and a breakdown of contribution by category refer to Chapter 3 of this document.

Carbon monoxide is a colorless, odorless, and tasteless gas. CO enters the body through the lungs, where it is absorbed by the bloodstream and then combines with hemoglobin in the red blood cells. Hemoglobin is the compound in the red blood cells that normally picks up oxygen from the lungs and carries it to the tissues. When CO binds with hemoglobin, it forms a compound called carboxyhemoglobin (COHb). COHb diminishes the blood's capacity to carry oxygen. Hemoglobin has more affinity for CO than oxygen. Furthermore, once attached it does not dissociate from the hemoglobin as readily as oxygen does at the tissue level. As a result, with continued exposure to CO, COHb levels will continue to increase in the bloodstream and the amount of oxygen being distributed throughout the body is reduced.

At greatest risk from CO exposure are individuals with cardiovascular disease, chronic obstructive pulmonary disease, pregnant women, and children. Even healthy individuals can experience adverse effects from CO exposure, such as reduced ability to concentrate. CO exposures in higher altitude areas present a greater risk because of the inherently low-oxygen atmosphere.

Blood laden with CO can weaken heart contractions, lowering the blood volume being distributed to the body. A life-threatening situation exists in-patients with heart disease, which are unable to compensate for the loss of oxygen. The millions of people in the U.S. that have a condition known as angina pectoris (characterized by brief, spasmodic attacks of chest pain due to reduced blood flow to heart muscles) may also be more sensitive to exposure to CO.

CO also affects the central nervous system by depriving it of oxygen. Studies of automobile drivers reveal that exposure to CO can impair a driver's judgement and ability to respond rapidly to emergency traffic situations.

In order to protect public health and the environment, the U.S. Environmental Protection Agency (EPA) established specific standards for CO in 1971. The most stringent standard of 9 parts-per-million (PPM) is averaged over a rolling 8-hour period, while the maximum allowable hourly concentration is 35 PPM. EPA is mandated by the Clean Air Act to review the standard every 5 years. EPA has periodically reviewed the CO standards and has made no changes to the current standards.

2.3 MONITORING NETWORK

The U.S. EPA has established ambient air quality monitoring requirements and standards for State and Local Air Monitoring Stations (SLAMS) and for National Air Monitoring Stations (NAMS). These requirements and standards provide for operating schedules, data quality assurance, and for the design and siting of CO samplers. Table 2-1 below provides some details about the monitoring sites. Each of the air quality monitoring stations utilizes a Dasibi Carbon Monoxide Analyzer (Model 3003) which employs the Gas Filter Correlation technique. The monitoring schedule is continuous.

The Carbon Monoxide air-monitoring network in the Las Vegas Valley has evolved into a system of 15 monitoring sites (see Table 2-1). There are 7 SLAMS sites, 4 NAMS sites, and 4 special purpose monitoring sites. The Air Quality Division (AQD) of the Clark County Health District operates and administers the air-monitoring program. The system is governed by a set of quality assurance and quality control procedures approved by the EPA and is subject to periodic performance audits by the EPA. Quarterly air quality monitoring reports are being prepared and submitted to the EPA. Carbon monoxide sampling locations are identified in Figure 2-1 below.

TABLE 2-1

LAS VEGAS VALLEY CARBON MONOXIDE MONITORING SITE DESCRIPTIONS

SITE NAME	ADDRESS	TYPE*	ELEVATION
Boulder City	1005 Industrial & US95	APCD	2391'
City Center	559 N. 7th Street	NAMS	2020'
Craig Road	4701 Mitchell Street	SLAMS	1919'
Crestwood	1300 Pauline Way	NAMS	1958'
East Flamingo	210 E. Flamingo	SLAMS	2017'
East Sahara	4001 E. Sahara Ave.	SLAMS	1692'
Health District	625 Shadow Lane	SLAMS	1935'
Green Valley	248 Arroyo Grande	APCD	2010'
S.East Valley	545 Lake Mead Dr.	SLAMS	1870'
Winterwood	5483 Club House Dr.	SLAMS	1708'
Paul Meyer	4525 New Forest Dr.	APCD	2309'
Pittman	1137 Boulder Highway	APCD	1699'
S. L.V. Blvd	3799 South L.V. Blvd.	NAMS	2079'
Sunrise Acres	2501 S. Sunrise Ave.	NAMS	1889'
J. D. Smith	1301B East Tonopah	SLAMS	1775'

* Notes: AQD = Air Quality Division Special Purpose (monitoring) Location
Source: Clark County Health District (July, 1998)

Figure 2-1 Las Vegas Valley Carbon Monoxide Monitoring Sites

2.4 TRENDS IN CARBON MONOXIDE AIR QUALITY

An exceedence of the 1-hour CO national standard (35-PPM) has never been recorded within the Las Vegas Valley. Exceedence events are limited to the 8-hour national standard (9-PPM). During the past several years, the Las Vegas Valley has experienced a substantial improvement in CO air quality. On an annual basis, there has been a trend towards a reduction in the number of exceedence events and a reduction in the intensity of CO concentrations. Figures 2-2 & 2-3 below illustrate this improving CO picture graphically.

Apart from a winter season with fewer inversions, annual reductions in exceedence events and CO concentrations are attributed to the following:

1) Improved motor vehicle emission control technology and the continued displacement of older and poorly maintained vehicles;

2) The wintertime oxygenated gasoline program;

3) Reduced Reid Vapor Pressure (RVP) in gasoline;

4) Requirements for annual vehicle smog tests for motor vehicles, including medium and heavy duty gasoline vehicles;

5) The computerized traffic signal management program; and

6) The use of the east leg freeway and other roadway improvements.

During 1997 and 1998, the Las Vegas Valley experienced only four unhealthful days and three exceedence days. In 1999, there were no unhealthful or exceedence days recorded in the Valley. These unhealthful and exceedence days were recorded at the Sunrise Acres (old East Charleston) station. None of the other monitoring stations reported any unhealthful episodes or exceedences during these same periods. A day is classified as “unhealthful” when monitoring data indicate that carbon monoxide levels are above 100 on the pollution standard index (PSI). The PSI, also known as the air quality index (AQI), was developed by the EPA in 1976 to provide accurate, timely, and easily understandable information about daily levels of air pollution. A PSI level of 100 was set to equal the national ambient air quality standard (NAAQS) for a given regulated pollutant. The PSI scale is divided into the following ranges, which are in turn attributed to the following health levels:

0 - 50	Good
51 - 100	Moderate
101 - 200	Unhealthful
201 - 300	Very unhealthful
≥ 300	Hazardous

In the case of the Las Vegas Valley's air monitoring system, operated by the AQD, a PSI of 113 (9.5 PPM for an 8-hour average) or above would translate into an exceedence of the NAAQS.

FIGURE 2-2

LAS VEGAS VALLEY
CARBON MONOXIDE AIR QUALITY TRENDS - UNHEALTHY DAYS

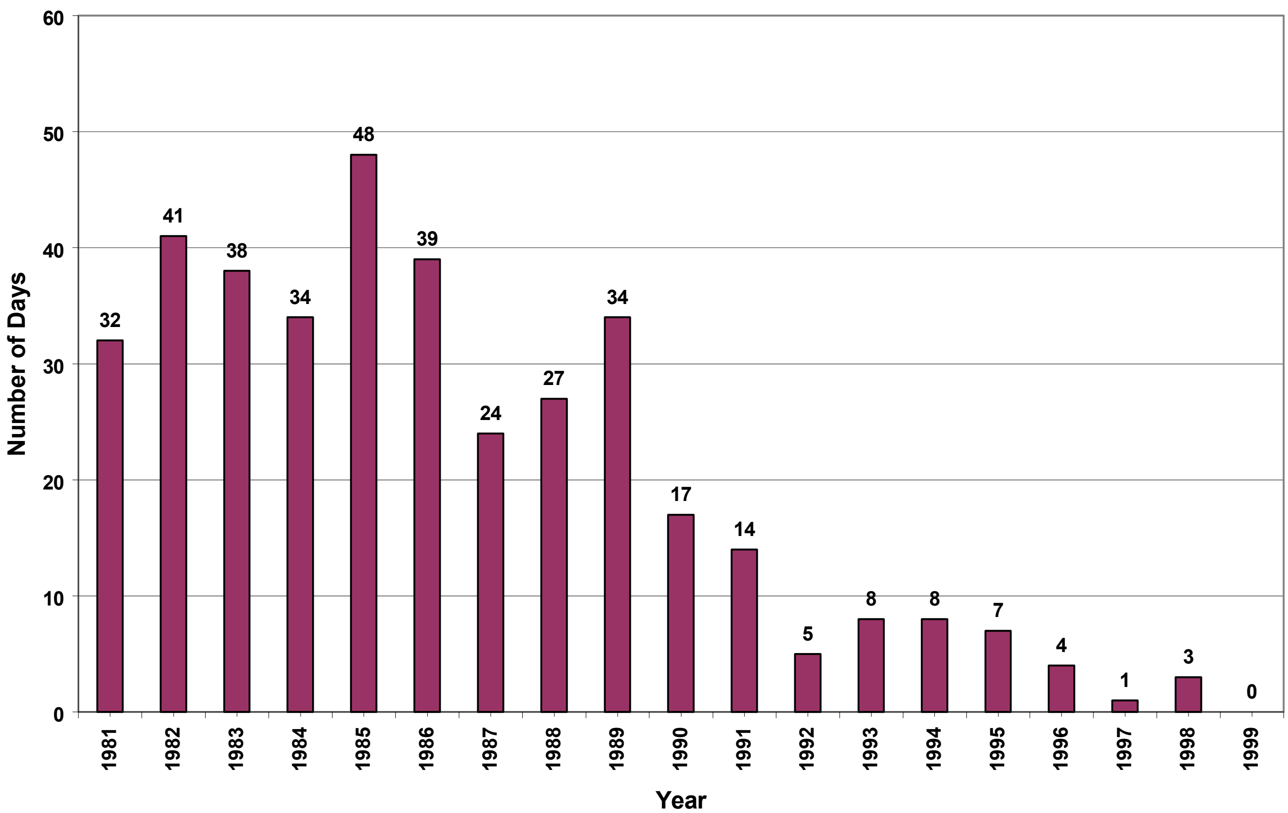
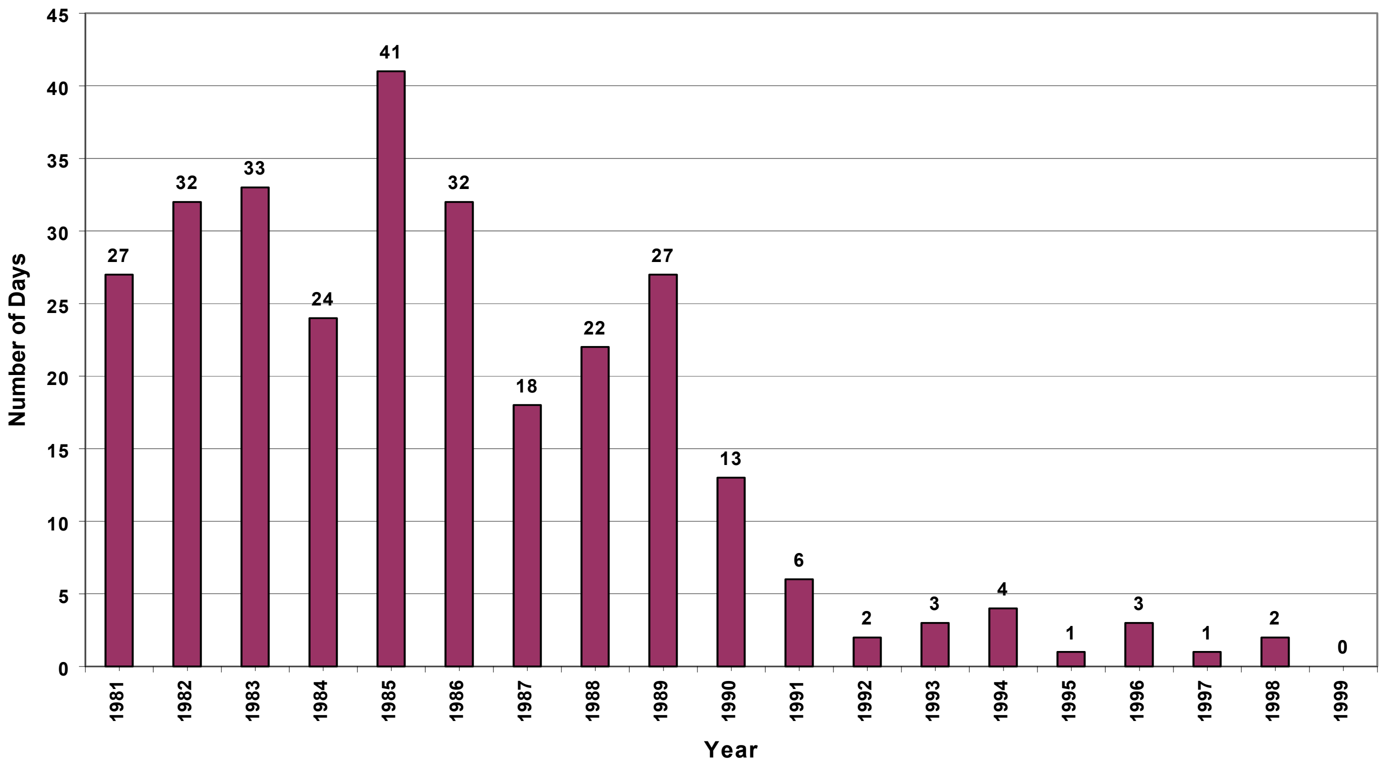


FIGURE 2-3

LAS VEGAS VALLEY
CARBON MONOXIDE AIR QUALITY TRENDS - EXCEEDENCE DAYS



Chapter Three - Emissions Inventory Summary

3.1 INTRODUCTION

The CAAA require that all nonattainment areas prepare a base year inventory that is comprehensive, accurate, and current with respect to actual emissions in the area [Section 182(a)(1)]. The peak season and modeling inventories are based on this inventory. This section summarizes the 1996 base year CO inventory for the Las Vegas Valley Nonattainment Area. The inventory addresses CO emissions from the following four major type categories: stationary point sources, area sources, on-road mobile sources, and non-road mobile sources. The intent of this section is to provide a brief overview of the source categories and the associated methodologies employed to estimate emissions. More detailed information pertaining to the inventory can be found in the "Carbon Monoxide Emission Inventory for the Las Vegas Valley Nonattainment Area," contained in Appendix A.

The Clark County Department of Comprehensive Planning (DCP) is the agency responsible for preparing and submitting the Clark County, Las Vegas Valley Nonattainment Area 1996 base year CO emissions inventory. The DCP is also responsible for coordinating and supervising the completion of each part of the inventory. Several other local agencies contributed information necessary for preparing emissions estimates. These agencies include the AQD, Clark County Regional Transportation Commission (RTC), Clark County Department of Aviation, and the Clark County Fire Department. Additional information sources included the Nevada Department of Transportation, U.S. Forest Service, and Southwest Gas Corporation.

The point source inventory was prepared primarily from a mail survey by the AQD. Survey results were supplemented by information obtained through personal contacts during compliance inspections. VMT data necessary to calculate on-road mobile source emissions was provided by the RTC. The DCP ran the MOBILE5b model to determine vehicle emission factors from on-road mobile sources. Table 3-1 below contains demographic information for Clark County.

Table 3-1

Demographic Data Used in Developing Emission Inventories and to Project Activity Levels for Non-attainment Area*

January	Population	Employment	V M T
1996	1,037,844	493,213	22,469,020
2000	1,269,600	609,400	24,929,485
2010	1,790,700	859,500	38,022,330
2020	2,406,500	1,115,100	57,492,333

* Data is based on Regional Transportation Commission 1997 Estimates / Projections

3.2 EMISSIONS SUMMARY

The results of the Las Vegas Valley 1996 base year CO emissions inventory for stationary point and area sources, on-road mobile sources, and non-road mobile sources categories are tabulated in this section. The biogenics category has been omitted, as it is not applicable to carbon monoxide emissions. Table 3-2 below contains a detailed listing of average daily, CO season emissions by source category. Large stationary sources at the periphery of the nonattainment area (State Hydrographic Basin No. 212) have also been included in the inventory.

TABLE 3-2

1996 CARBON MONOXIDE EMISSION SUMMARY
-Average Daily CO Season Emission-

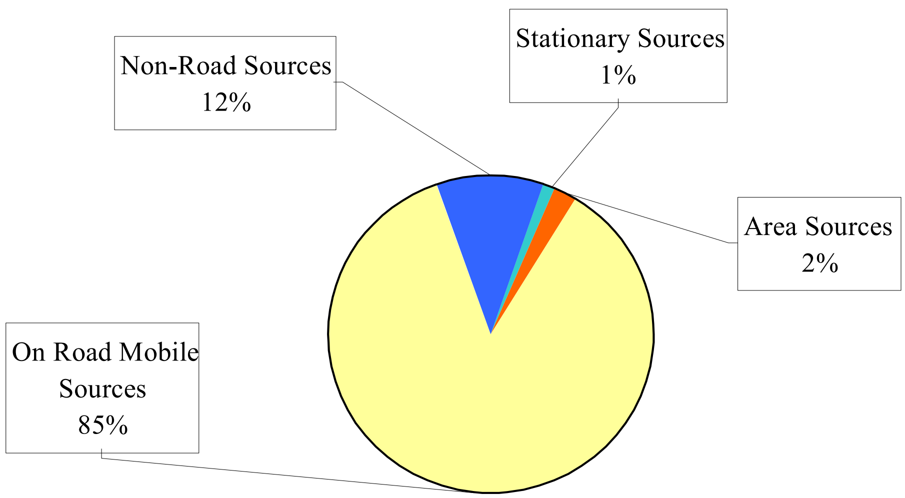
SOURCE CATEGORIES	Emissions (Tons/Day)		Emission (Percent)
STATIONARY POINT SOURCES			
Titanium Metals	2.92		0.61
Kerr McGee-BMI	0.24		0.05
Chemical Lime Co. Apex	0.82		0.17
Bonanza Materials	0.28		0.06
James Hardie Gypsum	0.55		0.11
Southern Nevada Paving	0.55		0.11
Pabco Cogeneration/NCA 2	0.55		0.11
Georgia Pacific@Apex/NCA 1	0.62		0.13
Point Source Total	6.53		1.36
AREA SOURCES			
Small Stationary	2.7		0.56
Boiler Emissions	0.38		0.08
Fireplaces	2.12		0.44
Structural Fires	0.64		0.13
Vehicular Fires	0.05		0.01
Brush Fires	1.26		0.26
Residential Natural Gas	0.31		0.06
Commercial Natural Gas	0.09		0.02
Industrial Natural Gas	0.32		0.07
Electrical Utility Generation	0.56		0.12
Cigarette Smoking	0.04		0.01
Area Source Total	8.47		1.8
NON-ROAD MOBILE SOURCES			
County Airports	36.4		7.6
Nellis Air Force Base	2.86		0.6
Locomotive Emissions	0.23		0.05
Lawn & Garden Equipment	3.57		0.75
Construction Equipment	9.77		2.04
MC & Recreation Equipment	5.9		1.23
Non-Road Total	58.73		12.3
ON-ROAD MOBILE SOURCE	405.4		84.61
GRAND TOTAL	479.13		100

3.3 TOTAL ANNUAL EMISSIONS

Total average annual CO emissions associated with the Las Vegas Valley Nonattainment Area for the 1996 base year are 479.1 tons per day. Figure 3-1 depicts the relative magnitude of annual contribution by each source category and indicates that the percent contributions of emissions by source category are consistent on both a seasonal and annual basis.

Figure 3-1

1996 Annual CO Emissions by Source



Chapter Four – Control Measures

4.1 INTRODUCTION

About 86 percent of the CO emissions in the Las Vegas Valley in 1996 were produced by on-road motor vehicles. Non-road mobile sources contributed about 11 percent. Stationary, point, and area sources accounted for the remaining 3 percent of the total emissions. This chapter presents the control measures being implemented in order to attain the CO NAAQS. The identified control measures are those which are considered to offer the most potential for reducing carbon monoxide emissions. Particular attention is given to control measures for on-road motor vehicles. The Lima & Associates report (Appendix B, Section 1) contains additional information and calculations on the costs and emission reductions of some of these control measures. This chapter concludes with a discussion on off-road mobile sources, area sources, and stationary sources control measures contained in the 1995 Carbon Monoxide Air Quality Implementation Plan for the Las Vegas Valley Nonattainment Area. These control measures have previously been implemented.

4.2 CARBON MONOXIDE CONTROL MEASURES

Regulations and resolutions in support of the control measures necessary for attainment have already been adopted and became effective at the end of 1999 (Appendix D). Control measures and programs from previous plans which are listed later in this chapter, serve as the foundation upon which additional measures will be added to show attainment of the standard. When fully implemented by the end of the year 2000, the proposed control measures discussed below, along with all the control measures implemented to date, will reduce CO emissions from on-road motor vehicles by over 22 percent from 1996 levels. The control measures outlined in this section are sufficient to ensure attainment and maintenance of the CO NAAQS by the designated attainment date, and target the largest contributing source category, mobile sources. Contingency measures, which will be implemented if VMT estimates are exceeded or if needed to attain and/or maintain the federal standard, are addressed in Chapter 7 of this document. Table 4-1 below summarizes the three primary control measures relied upon in demonstrating attainment with the CO NAAQS. Each control measure is listed along with its estimated reduction benefit; adoption date; and the agency responsible for its implementation, enforcement, and monitoring.

4.2.1 On-Road Mobile Sources

On-road motor vehicles include passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles, and motorcycles. Proposed strategies for reducing CO emissions from on-road motor vehicles include Cleaner Burning Gasoline (CBG) for the winter season, some voluntary Traffic Control Measures / Trip Demand Management (TCM/TDM) programs, Vehicle Inspection Maintenance Program Technician Training and Certification and an Alternative

Fuels Program (AFP) for government fleets. Table 4-1 identifies these federally enforceable and voluntary mobile source CO control measures and their anticipated emission reductions by the end of the year 2000. The remainder of this chapter summarizes these control measures, including their effectiveness and implementation.

TABLE 4-1

RECOMMENDED CARBON MONOXIDE CONTROL
MEASURES TO REDUCE ON-ROAD MOBILE SOURCE EMISSIONS

Control Measure	Year 2000 Emission Reduction	Adoption Date	Responsible Agency
Clean Burning Gasoline	9.8%	1999	Health District
Voluntary Transportation Control Measures / Transportation Demand Management	0.08%	1999/Ongoing	RTC
Technician Training and Certification	2.95%	1988	DMV&PS
Alternative Fuels Program for Government Fleets	0.12%	1991/Ongoing	NDEP/Govt. Entities
Combined Effect of Controls	12.2%		

4.2.1.1 Cleaner Burning Gasoline (CBG)

The Clark County District Board of Health is the governing board responsible for promulgating regulations for a Cleaner Burning Gasoline program and the Clark County Health District Air Quality Division (AQD) is the agency responsible for administering their implementation. This authority is vested in the Health District through Chapter 445B of the Nevada Revised Statutes (NRS 445B). The AQD is also responsible for administering the existing oxygenated fuels program.

CBG is a low sulfur and low aromatic fuel. Sulfur and aromatics in fuel adhere to manifolds, piping, and catalytic converters reducing the efficiency of air pollution control devices. It has been shown that reducing sulfur and aromatic levels in gasolines increases catalytic converter effectivness, resulting in lower CO, as well as other air emissions. On April 22, 1999, the Clark County District Board of Health adopted section 54 of the Air Pollution Control Regulations to implement the CBG program starting November 1, 1999 to March 31, 2000 and each such winter season thereafter. Under this program compliance can be achieved by one of two methods: a flat limit of 40 ppm by weight for sulfur and 25 percent for aromatics; or a maximum sulfur limit of 80 ppm by weight and 30 percent for aromatics with averages not exceeding 30 ppm and 22 percent respectively.

Adoption of the aforementioned limits will lower CO emissions from gasoline powered motor vehicles in the Las Vegas Valley by approximately 31.9 tons per day, or by 9.8% above and beyond the benefits provided by existing control measures (RVP, 3.5% oxygenated fuel, etc.). The current State and local regulations for Reid Vapor Pressure of 9 psi and oxygen content of 3.5% by weight will not change. It is estimated that consumers would pay between 2 and 5 cents more per gallon for this improvement for a total annual cost to the public of about 15 million dollars. The cost effectiveness for this much needed CO emission reduction will average about $1,225 per ton of CO reduced. CBG can satisfy all eight acceptance criteria constituting applicable State and Federal requirements for the adoption of a fuel control measure. These criteria include the following: practicality, reasonableness, reliability, its necessity for attainment, effectiveness, safety, cost effectiveness, and availability of technology. Table 4-2 summarizes how the acceptance criteria are met for CBG as a CO emission control measure.

The AQD is also responsible for monitoring and enforcing the Cleaner Burning Gasoline program. Nearly all gasoline delivered to the Valley is refined in Southern California. Compliance inspections on CBG primarily targets the refiners and shippers. The Health District has contracted with the California Air Resources Board (CARB) to sample and track the wintertime clean burning gasoline shipments at the refinery. CARB has had this monitoring and tracking program in place for many years to insure compliance with their own state fuel requirements. Additionally, the Nevada Department of Agriculture's Bureau of Weights and Measures conducts random sampling at gasoline stations and informs the Health District when testing indicates non-compliance with the regulations. Annual reports summarizing the winter season gasoline programs will be provided to the EPA at the conclusion of the applicable time period. Section 54 of the Air Pollution Control Regulations provides additional detailed information on testing, record keeping and enforcement of the Cleaner Burning Gasoline program. A copy of this regulation can be found in Appendix D, Section 1, along with a report on the 1999 –2000 Wintertime Cleaner Burning Gasoline Program.

TABLE 4-2

ACCEPTANCE CRITERIA FOR "CBG" AS A CO CONTROL MEASURE

ACCEPTANCE CRITERION	HOW CRITERION IS MET
Effectiveness	EPA's CO Complex Model estimates that emissions can be reduce by 9.8% or 31.9 tons per day. This makes CBG an effective control measure.
Safety	The procedure for safe handling, transporting and dispensing conventional gasoline will apply to this reformulated gasoline.
Cost Effectiveness	$1,225 per ton of CO reduced is within the acceptable range of other existing cost effective control measures.
Availability of Technology	Presently, the fuel is refined in the State of California at a rate of 38 million gallons per day. Informal advice by California Energy officials indicates that additional local demand here of 1.5 million gallons per day will not jeopardize overall supply conditions.
Practicality	The common use of reformulated gasoline in several other states suggests that CBG is practical.
Reasonableness	The common use of reformulated gasoline in several other states suggests that CBG is reasonable.
Reliability	Substantial emission testing by vehicle manufacturers and petroleum marketers document reliability of CBG as a CO control measure.
Necessary for Attainment	It is shown in Chapter 6 of this document that CBG is a necessary control measure for demonstrating attainment.

4.2.1.2 Transportation Control Measures / Travel Demand Management (TCM/TDM)

The 1990 CAAA requires that consideration be given to the implementation of TCMs for the purposes of reducing motor vehicle emissions and offsetting growth in vehicle miles traveled (VMT). As a serious CO nonattainment area, the Las Vegas Valley is required to evaluate and implement (if practical) those TCMs referenced in Section 187(b)(2) referencing Section 182(d)(1)(A) and (B) with the focus of reducing carbon monoxide emissions. Section 108(f) of the CAAA also requires that plans evaluate and implement such measures as necessary to demonstrate attainment of the CO standard, in combination with other measures.

The CAAA sections referenced above allow the Las Vegas Valley and other serious CO nonattainment areas to be exempt from the stated requirements if certain conditions are met. These sections contain language that is interpreted to mean that the SIP needs only to contain those TCMs that are necessary to demonstrate attainment. This section of the document contains the rationale for the selected TCMs, benefits and criteria for their selection.

In developing this plan, a Carbon Monoxide Transportation Control Measure Analysis was conducted by Lima and Associates. A copy of this document is contained in Appendix B, Section 1. The intent of this study was to identify those transportation control measures that showed the greatest potential in reducing carbon monoxide emissions in the Valley. Based on this study's findings, the following measures are being implemented as voluntary control measures: employer based commuter incentive programs, telecommuting and area wide ridesharing programs.

According to EPAs policy on Voluntary Mobile Source Emission Reduction Programs (VMEPs), reflected in a memorandum dated October 24, 1997, from Richard D. Wilson, " Voluntary mobile source measures have the potential to contribute, in a cost-effective manner, emission reductions needed for progress toward attainment and maintenance of the NAAQS." Furthermore this guidance states, "EPA believes that SIP credit is appropriate for voluntary mobile source measures where we have confidence that the measures can achieve emission reductions." Under this policy, credit for VMEPs are limited to 3% of the total projected future year emissions reductions required to attain the NAAQS.

The VMEP control measures, consisting of employer based commuter incentive programs, telecommuting and an area wide ridesharing program, are being recommended for implementation by this plan. The Transportation Demand Management Division of the Clark County's Regional Transportation Commission will be responsible for implementing, managing and monitoring this program. Through adoption of the TIP (FY 1998-2000), the implementation of TDM strategy is prioritized. Funding in the amount of $911,000 for these programs have been derived from Congestion Mitigation Air Quality (CMAQ) funds. On June 10, 1999, the Regional Transportation Commission of Clark County adopted Resolution No. 177 which established guidelines for administering the CAT MATCH commuter services program including the commuter incentive program, Club Ride. A copy of this resolution can be found in Appendix D, Section 2. Portions of the CAT MATCH program, which include employer based commuter incentives and area wide ridesharing programs, became operational in July, 1999. The voluntary TCM/TDM programs considered for implementation are estimated to achieve approximately 0.3 tons per day of emission reductions by the year 2000 at an estimated cost of $42,500 per ton of CO reduced. The reduction attributed to this measure is 0.08% of the amount necessary to attain the NAAQS. This value does not exceed the 3% maximum credit that is allowed to be claimed by EPA's VMEP policy guidance. As participation increases in the Cat Match program it is estimated that the resulting emission benefit in 2010 and 2020 will be 1.8 and 2.3 tons per day, respectively. A commitment to remedy any emission reduction shortfall is backed by separate resolutions from the Clark County Board of Commissions and the Regional Transportation Commission. A copy of the RTC resolution is contained in Appendix D, Section 9.

Table 4-3 below addresses the eight acceptance criteria discussed for the voluntary TCM/TDM control measures that will be implemented. Additional supporting information related to this measure can be found in Appendix E, Section 2.

TABLE 4-3

ACCEPTANCE CRITERIA FOR TCM/TDM AS A CO CONTROL MEASURE

ACCEPTANCE CRITERION	HOW CRITERION IS MET
Effectiveness	An analysis conducted by Clark County and the RTC indicate that the voluntary TCM/TDM program can reduce mobile source emissions by 0.08% or 0.3 tons per day.
Safety	The selected TCM/TDM elements of the Cat Match Program are considered safe with no other further implications or risks.
Cost Effectiveness	The cost effectiveness of these measures are higher than other proposed measures but are lower than others previously considered and rejected.
Availability of Technology	This test is not applicable.
Practicality	The implementation of these measures in other areas suggests that they are practical.
Reasonableness	These measures are considered reasonable when considered against other TCMs.
Reliability	Program elements may be difficult to administer across all segments of the population in a service based economy.
Necessary for Attainment	It is shown in Chapter 6 of this document that TCM/TDM programs are necessary for demonstrating attainment.

4.2.1.3 Technician Training and Certification

The State's Motor Vehicle Inspection/Maintenance (I/M) Program requires that inspectors be licensed. The training and certification procedures were established to comply with 40 CFR 51.367. The requirements for a certified inspector in Nevada's I/M program are verified training, including a course approved by the Department of Motor Vehicles and Public Safety (DMV & PS), a written and practical testing program and a separate certification process. In general terms inspector training will cover: purpose and goals of enhanced I/M, emission control devices, configuration and inspection, test procedures and rationale. The I/M program also consists of training and licensing of class 2 inspectors that conforms to the requirements set forth in 40 CFR 51.369. Under this requirement, a license is required to be a certified repair technician in order to perform work or service on vehicle emission components. Additional information about these requirements are delineated in NAC 445B.485 through 445B.5084 as well as the State of Nevada's *State Implementation Plan for an Enhanced Program for the Inspection and Maintenance of Motor Vehicles for Las Vegas Valley and Boulder City, Nevada* (March 1996).

The DMV & PS is the agency responsible for implementing and monitoring the State's Motor Vehicle I/M Program including the Inspector Training and Certification programs. As specified in NRS 445B.765 and 445B.810, it is also the responsibility of DMV to prepare annual reports on the program and to submit them to the U.S. EPA in July of each year to comply with the provisions of 40 CFR 51.366. Additional information on the Inspection Maintenance Program can be found in the Inspection Maintenance State Implementation Plan referenced above.

The carbon monoxide emission reduction benefit from this control measure was derived from the Mobile5b model. This was accomplished by setting the I/M control flag record equal to 6 (IMFLAG = 6) and including a value of 2 in the third position of the corresponding input record. Setting these parameters in this fashion, the model applies the benefits of technician training and certification to the emission factors. A second model run was made keeping the inputs identical with the exception of not including the benefits of technician training. The resulting values from these two runs were then compared to determine the resulting benefit. The result of this analysis indicates that technician training and certification will provide a 2.95 % reduction in carbon monoxide emissions. Table 4-4 provides additional information on the acceptance criteria for technician training and certification as a control measure.

TABLE 4-4

ACCEPTANCE CRITERIA FOR TECHNICAIN TRAINING
AND CERTIFICATION AS A CO CONTROL MEASURE

ACCEPTANCE CRITERION	HOW CRITERION IS MET
Effectiveness	An analysis conducted by Clark County utilizing the MOBILE model showed this program can reduce mobile source emissions by 2.95% or 10.4 tons per day.
Safety	Training and certification is safe and can improve work place safety.
Cost Effectiveness	Training and certification are estimated to have a cost effectiveness of $115 per ton of CO reduced and is the most cost effective measure.
Availability of Technology	This test is not applicable.
Practicality	The implementation of this measure in other areas suggests it is practical.
Reasonableness	Improving the effectiveness of emissions testing and repairs is a reasonable control measure.
Reliability	Training and Certification is administered by DMV & PS. This program has a high degree of reliability in reducing mobile source emissions.
Necessary for Attainment	It is shown in Chapter 6 that Technician Training and Certification is necessary for demonstrating attainment.

4.2.1.4 Alternative Fuels Program

The Energy Policy Act of 1992 (EPACT) contains a number of titles that deal with the use and acquisition of alternative fuel vehicles. Realizing that this Act is currently in the process of being amended, the final version should serve to further accelerate the acquisition and use of alternative fuel vehicles along with increasing fleet applicability. In the absence of applicable federal requirements, the State of Nevada has adopted an even more aggressive approach towards acquisition / conversion of fleets. Nevada's program is more aggressive by having an earlier implementation date and by including municipal fleets early in the implementation of the program.

The Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, is the agency responsible for administering the alternative fuels program. NRS 486A requires all governmental fleets in Clark County to acquire and utilize clean alternative fuels vehicles. Starting in 1995, 10 percent of government fleets new vehicle purchases were required to be alternative fuels vehicles. This percentage increases to 90 percent in fiscal year 2001 and each year thereafter. Nearly all fleets have chosen to acquire natural gas vehicles and presently there are over 1,400 alternative fuel vehicles operating in the Valley. As vehicles are replaced through attrition, this number will further increase along with the use of the cleaner fuel. Through the cooperative efforts of governmental agencies, eight natural gas fueling facilities have been strategically located in the Las Vegas area. Additional information pertaining to this control measure can be found in Appendix E, Section 4.

It is estimated that the alternative fuel program in Clark County, Nevada will benefit CO emission reduction in the year 2000 by about 0.12%, or 0.4 tons per day at an estimated cost of about $4,000 per ton. This cost effectiveness based on the Phoenix Arizona Program. Clark County's estimates are substantially higher averaging $80,000 per ton of CO reduced. Table 4-5 enumerates the acceptance criteria for alternative fuels and presents arguments for the alternative fuel program as a primary control measure.

In order to realize the maximum benefits of the alternative fuel control measure, entities will need to gain the support of private fleets through the Clean Cities initiative and possibly changes to the Energy Policy Act (EPACT) by providing more refueling facilities and unlimited public access to existing facilities. The most benefits of this control measure can be realized when dedicated vehicles are utilized because they are designed to operate efficiently on alternative fuels resulting in less CO pollution even though they may lack the advantages of longer range and the option of regular fuel that the dual-fuel fleet would afford.

TABLE 4-5

ACCEPTANCE CRITERIA FOR THE ALTERNATIVE FUELS PROGRAM
AS A CO CONTROL MEASURE

ACCEPTANCE CRITERION	HOW CRITERION IS MET
Effectiveness	An analysis conducted by Clark County indicates that the government fleets alternative fuels program can reduce mobile source emissions by 0.12% or 0.4 tons per day.
Safety	Alternative fuel programs have been proven to be safe throughout the country.
Cost Effectiveness*	At $4,000 per ton of CO emission reduced, alternative fuels are considered as having an average cost effectiveness in comparison to other measures.
Availability of Technology	Alternative fuel technology has been in place for a while. Numerous vehicle manufacturers are providing a variety of “clean” alternative fuel vehicles.
Practicality	The use of alternative fuel vehicles in other areas suggest that it is practical. Additionally, most government fleets are currently attaining a 90% acquisition rate.
Reasonableness	This measure is considered reasonable.
Reliability	Alternative fuels burn cleaner than gasoline in combustion engines this reliably reducing air pollution.
Necessary for Attainment	It is shown in Chapter 6 that the Alternative Fuel Program is necessary for demonstrating attainment.

*Cost Effectiveness value based on Phoenix Arizona’s program. Clark County estimates of the cost effectiveness is substantially higher averaging $80,000 per ton of CO reduced.

4.3 Off-Road Mobile Sources

The only direct proactive controls affecting the off-road sources, mobile and otherwise, are the Wintertime Cleaner Burning Gasoline and the Oxygenated Fuels programs. Since this category contributes only about 11% of the total CO emissions for the valley, further controlling these emissions would not be cost effective, nor practical. If in the future, control technology, cleaner fuels, or effective inspection programs became feasible, they will be incorporated into the SIP.

4.4 Stationary Point and Area Sources

It is estimated that these source categories contribute only about 3% of the total CO emissions for the valley. As stationary sources are not a significant contributor to CO levels, contributing only 1.39% of total emissions, the provisions of Section 187 (c) are not applicable to the Las Vegas Valley Nonattainment Area. Other than current controls required by the new source performance standards (NSPS) and New Source Review (NSR) on major sources of pollution, no additional controls are warranted.

4.5 Previously Adopted Control Measures

Previously adopted control measures from the 1995 Moderate Area Carbon Monoxide Plan continue to assist in air quality improvement efforts. This section highlights those measures that were adopted and implemented and which continue to provide for CO emission reductions.

Although fleet turn-over does not meet all required criteria of a federally enforceable control measure, its effects in the Las Vegas Valley are significant. Nevada Department of Taxation records indicate that approximately 60,000 new vehicles are purchased annually. With total vehicle registrations increasing a modest 5 percent a year, the Las Vegas fleet has been experiencing a 14 percent increase in new model year vehicles over the past three years. Since new cars emit pollution at a lower rate, the portion of newer vehicles comprising the Las Vegas fleet can lead to a significant reduction in mobile source carbon monoxide emissions.

Lower Reid Vapor Pressure (RVP) was adopted as a control in the 1995 Moderate Area Carbon Monoxide Implementation Plan and continues to reduce CO emissions from fuel combustion in motor vehicles. The Nevada State Department of Business and Industry, Department of Agriculture was granted the authority to regulate the RVP by Chapter 590 of the Nevada Revised Statutes and Chapter 590 of the Nevada Administrative Code (NAC). Adopted by the Department of Agriculture, these regulations (NAC 590.065) lowered the RVP limit of gasoline from 11.0 psi to 9.0 psi with no waiver for ethanol blended fuel. The Department of Agriculture is the responsible agency for enforcing NAC 590.065 which limits the vapor pressure of gasoline. Inspectors conduct approximately 88 random inspections per month. Analyses on gasoline samples from gasoline stations are conducted by chemists in the Department's laboratory. Results of each test are recorded in a database and monthly reports are prepared for the Division of Weights and Measures, the Bureau Chief, and Administrator of the Department of Agriculture.

The 1995 Moderate Area Plan also contained 2.7% oxygenated fuels as a control measure. Since adopting these regulations, the Clark County District Board of Health amended its regulations on September 27, 1997, to require that all fuel sold in Clark County during the winter season (October 1 to March 31) contain 3.5% oxygenate by weight. Due to the higher oxygenate mandate, ethanol is being used in lieu of MTBE to meet this requirement. The 3.5% oxygenate by weight control measure continues to provide cost-effective emissions reductions within the non-attainment area. The AQD is responsible for monitoring and enforcing this control measure.

The State's Motor Vehicle Inspection Maintenance program, administered by the Department of Motor Vehicles and Public Safety, is also responsible for reducing carbon monoxide. Through the use of the MOBILE model, it has been estimated that this program is currently providing a 16.8 percent reduction of CO emissions.

Table 4-5 below contains previously adopted and implemented controls (specified in the 1995 Carbon Monoxide AQIP) listed with their adoption date.

TABLE 4-6

PREVIOUSLY ADOPTED ENFORCEABLE
CARBON MONOXIDE CONTROL MEASURES

Control Measure	Adoption Date
Oxygenate Fuels	1991/1995
Reduced RVP Gasoline	1995
Motor Vehicle Inspection/ Maintenance Program	1978
Fleet Turnover	1967

4.6 Summary Of Primary Carbon Monoxide Control Measures

The primary CO control measures discussed in the previous sections of this Chapter are summarized below in Table 4-7 with their emission benefit estimates for the attainment and future years along with the cost effectiveness. Contingency measures are discussed in Chapter 7 of this document.

TABLE 4-7

PRIMARY CONTROL MEASURES, BENEFITS AND COST EFFECTIVENESS

		2000		2010		2020	
Control Measure	Cost Effectiveness ($/ton)	CO Benefit (TPD)	CO Benefit (percent)	CO Benefit (TPD)	CO Benefit (percent)	CO Benefit (TPD)	CO Benefit (percent)
Technician Training	$ 115	10.42	2.95%	15.71	3.9%	23.89	4.1%
CBG	$ 1,225	31.92	9.8%	53.96	13.95%	96.55	17.3%
Alternative Fuels	$ 4,000	0.415	0.12%	1.12	0.28%	1.37	0.24%
Cat Match TDM/TCM	$ 42,500	0.295	0.08%	1.82	0.45%	2.33	0.40%
TOTALS		43.1	12.2%	72.6	18.1%	124.1	21.3%

Chapter 5 - Air Quality Modeling

5.1 INTRODUCTION

5.2 BASE CASE SCENARIO MODELING

5.3 CARBON MONOXIDE EPISODE SELECTION AND DESIGN VALUE

5.4 ASSESSMENT OF UAM MODEL PERFORMANCE

5.1 INTRODUCTION

This chapter summarizes the modeling performed to establish an estimate of the amount of emission reduction needed to achieve attainment of the 8-hour average NAAQS for CO in the Las Vegas serious nonattainment area. Detailed technical documentation of the modeling can be found in Appendix C.

Serious CO non-attainment areas, such as the Las Vegas Valley Air Basin, are required by the 1990 CAAA to utilize EPA approved models to demonstrate attainment. The Urban Air-shed Model (UAM), an urban-scale, three-dimensional, grid-type, numerical simulation model which incorporates a condensed photochemical kinetics mechanism for urban atmospheres and the CAL3QHC, a micro-scale roadway intersection model are the current models of choice for attainment demonstration. Since EPA has identified the UAM and CAL3QHC as effective tools for evaluating the effectiveness of emission control programs needed to attain and maintain the CO national standard, these two models were selected for the attainment demonstration, in compliance with the CAAA requirements.

The overall modeling system - comprised of transportation (TRANPLAN), emissions (MOBILE5b), and air quality models (UAM) - is initially used to replicate historic CO high pollution episodes in order to establish base case simulations. Each base case simulation relies on a wide variety of input data, including meteorological data and inventories of estimated emissions from all significant sources of CO. Air quality modeling with the UAM is performed initially utilizing a set of inputs for a historic episode with elevated CO concentrations, and the results are evaluated to determine the performance of the modeling system. Once the modeling system has been evaluated and determined to perform within prescribed levels, the same meteorological inputs and a projected emissions inventory are used to simulate the impact of future emission scenarios.

Details regarding the protocol followed in the air quality modeling program for the Las Vegas Valley are provided in the report entitled “Modeling Protocol for the Las Vegas Valley Carbon Monoxide Urban Air-shed Model Update Project” dated September 11, 1996 (see Appendix C, Section 1). The modeling protocol report as well as technical support for the modeling program was provided by ENVIRON International Corporation (ENVIRON). This chapter summarizes the results of air quality modeling for the 1996 base case scenario. A comprehensive report of the application of the UAM to the 1996 base case scenario is provided in a memorandum from ENVIRON describing the base case design value selection and scaling (October 27, 1998 - see Appendix C, Section 4). EPA’s approval was obtained on the episode selection and scaling approach before the actual attainment demonstration modeling was performed. The employed scaling approach is defined and explained in details in the above referenced memorandum of October 27, 1998, Appendix C.

5.2 BASE CASE SCENARIO MODELING

The key tasks accomplished in the air quality modeling program for the base case scenario were:

(a) Selection of the CO episode to be modeled;
(b) Preparation of meteorological, air quality and emission inventory data files; and
(c) Application of the UAM and assessment of model performance.

The base case included the existing Inspection and Maintenance (I/M) program, the 3.5% oxygenated fuel program, low Reid Vapor Pressure gasoline (9 psi), and other existing control measures that are in place or mandated by the Clean Air Act (CAA).

5.3 CARBON MONOXIDE EPISODE SELECTION AND DESIGN VALUE

In selecting an appropriate episode for UAM modeling of the Las Vegas Valley area, the ten highest ambient air quality measurements of 8-hour CO concentrations were selected based on peak 1- and 8-hour average CO concentrations above 8 PPM and 5.5 PPM, respectively in accordance with current modeling guidelines. Meteorological conditions were not the sole basis for selecting these periods, nor were the overall CO patterns throughout the Las Vegas Valley. These top ten elevated CO episodes are listed in Table 5-1 below, along with the magnitude of peak hourly CO (evening and morning) and peak 8-hour CO at East Charleston (EC) and Sunrise Acres (SA). Table 5-1 also lists the time span of the peak 8-hour average at SA.

Note that the highest 8-hour CO concentration occurs on December 8-9, 1996 and on December 19-20, 1996 both of which coincide with the highest morning hourly CO of all episodes in the table. On December 8-9 and December 19-20 of 1996, both evening and morning peaks are evident, with generally lower CO levels across midnight ranging between 5-7 PPM. On December 4-5, however, only a short-lived evening peak occurs, and on January 9-10, 1997 concentrations between the evening and morning peaks dip to 2 PPM. This indicates that sharp hourly peaks are not necessarily conducive to high 8-hour CO, and that the maintenance of moderate to high CO levels overnight is more likely to lead to exceedences of the 8-hour standard. Considering these characteristics, the top two elevated CO episodes from the analysis are December 8-9 and 19-20, 1996. The third ranked episode is December 18-19 based solely on peak 8-hour CO at both EC and SA over 7 PPM.

The first two episodes (Dec 8-9 & Dec. 19-20) were isolated for further study and analysis as the result of extensive monitoring and meteorological data gathering efforts conducted as part of a detailed Carbon Monoxide study for the Las Vegas Valley [The Las Vegas Valley Carbon Monoxide Urban Airshed Model Update

Project - Phase II: UAM Base Case and Sensitivity Applications, Emery et al., July 1998 - (Appendix C, Section 3)].

As discussed in an October 27 memorandum to EPA (Appendix C), the selected episode was December 8-9, 1996. This selection along with the employment of a scaling factor that resulted in a maximum predicted concentration of 11.2 PPM were discussed with and approved by EPA Region IX. Figure 5-1 displays the UAM carbon monoxide concentrations for the selected episode of December 8-9, 1996.

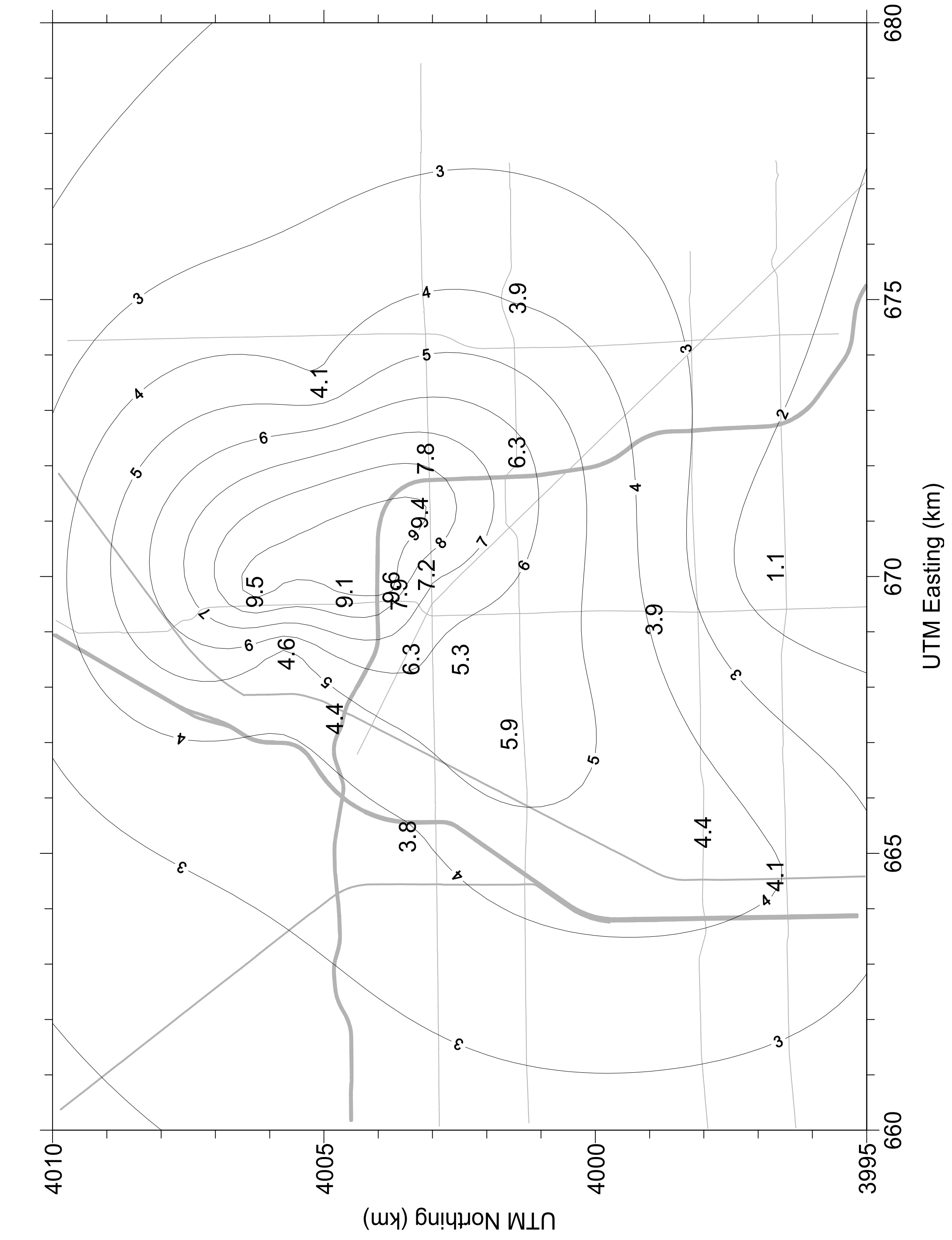
Table 5-1

List of Highest 10 CO Episodes Based on Peak 1- and 8-hour Average CO Concentrations. Values Reported are for East Charleston (EC) and Sunrise Acres (SA). Peak 8-hour Period is Given for SA.

Episode		PM peak hourly		AM peak hourly		Peak 8-hour		Peak 8-hour Period
		EC	**SA**	**EC**	**SA**	**EC**	**SA**	
1996	Dec 2-3	7.1	6.9	6.3	8.4	5.6	5.8	1900-0200
	Dec 3-4	8.7	9.0	7.6	9.4	6.2	6.9	1800-0100
	Dec 4-5	10.5	9.5	3.5	2.5	6.7	6.7	1800-0100
	Dec 8-9	8.2	8.8	10.4	11.8	7.2	7.9	2000-0300
	Dec 18-19	8.8	8.5	8.2	9.1	7.2	7.4	1900-0200
	Dec 19-20	8.3	8.3	10.4	10.8	7.9	8.0	0100-0800
	Dec 25-26	6.5	7.1	8.1	9.2	5.8	6.2	0200-0900
1997	Jan 9-10	9.8	11.1	9.2	7.8	6.7	7.0	1800-0100
	Jan 18-19	7.5	8.2	5.9	5.9	5.8	6.6	2000-0300
	Jan 19-20	6.9	7.3	7.9	8.9	6.3	6.7	0100-0800

Figure 5-1

Analysis of Maximum 8-hour CO Concentration Measurements (PPM)
In Central Las Vegas on December 8-9, 1996.



5.4 ASSESSMENT OF UAM MODEL PERFORMANCE

Data inputs for the UAM were developed using available air quality, meteorological, and emissions inventory data. Emissions inventory data for the selected carbon monoxide episode was derived from the “1996 Carbon Monoxide Emissions Inventory” discussed in Chapter 3 of this document. Both graphical and statistical measures of model performance were conducted. Statistical measures of model performance show numbers well within acceptable performance ranges established by the EPA in “Guidelines for Regulatory Application of the Urban Airshed Model for Areawide Carbon Monoxide, Volume I and II” dated March 1992. Table 5-2 below summarizes the resulting model performance statistics.

Table 5-2

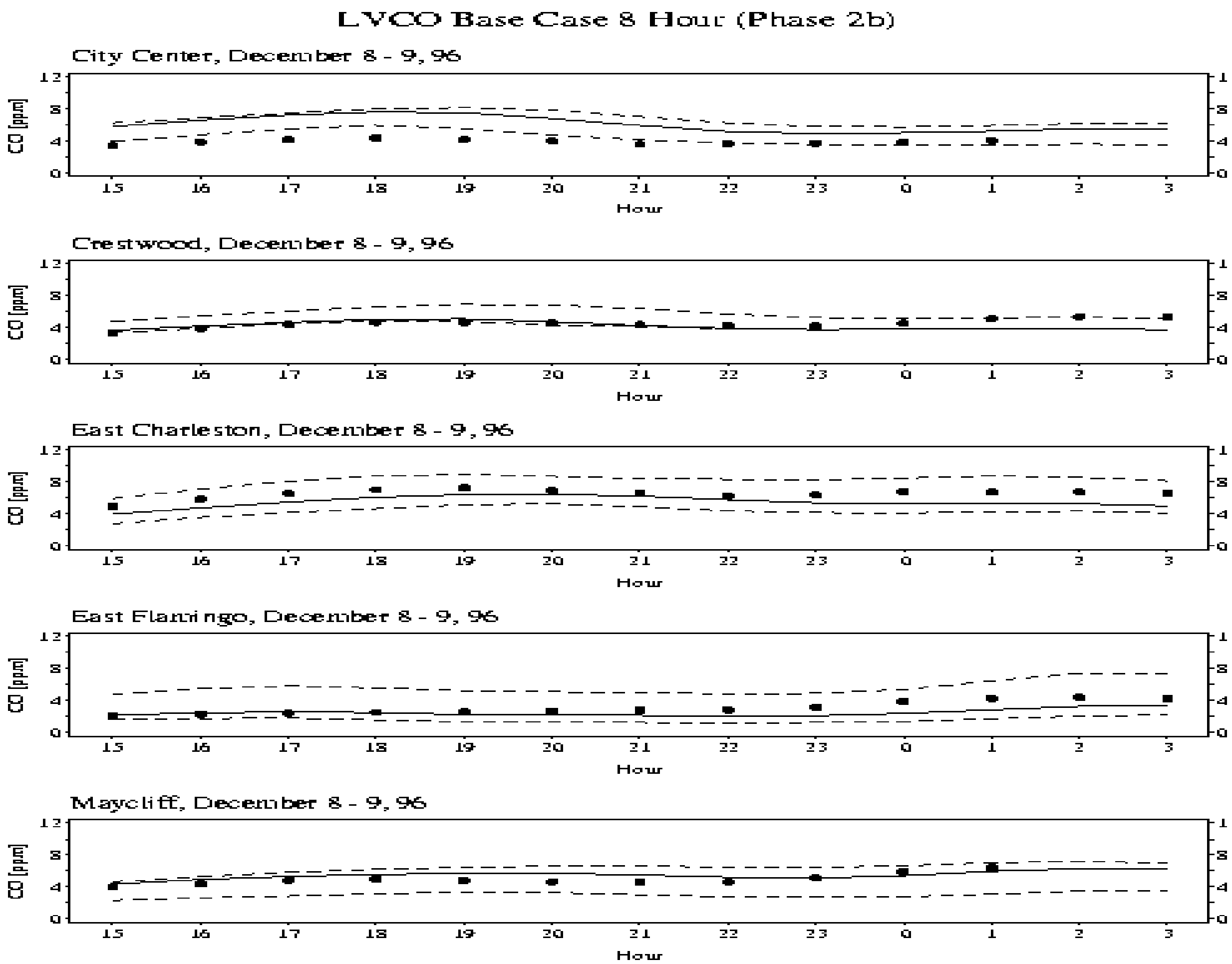
Model Performance Statistics for December 8-9, 1996
Comparing Scaled UAM 8-hour Average CO Concentrations
with Measurements from all Sites Operated During the Field Study.

Peak 8-hour Measurement	9.6 ppm at Marnell Field
Statistical Measure	**Revised Run (Phase IIb) CO scaled by 1.14**
Unpaired Peak (ppm)	11.2
Paired Peak (ppm)	9.6
UPPA (%)	17
PPA (%)	0
PPA Timing Error (hr)	0
Bias in Peaks (%)	3
Error in Peaks (%)	14
Timing Bias (hr)	-1
Timing Error (hr)	3
Overall Bias (%)	1
Overall Error (%)	17

Graphical representation is illustrated in a sample time series plot in Figure 5-2. For the complete set of time series plots, the reader is referred to Appendix C, Section 3. These time series plots show that model results agree well in timing at all monitored site locations. Based on model performance statistics, the time series plots, and meteorological conditions, EPA Region IX concurred that the December 8-9 modeling episode was representative of high CO concentrations in the Las Vegas Valley and therefore should be used for attainment demonstration purposes.

Figure 5-2

Graphs Comparing Observed CO Concentrations (large dots) and UAM Predicted Concentrations (solid line) at a Corresponding Site. The Dashed Lines Represent the Minimum and Maximum Predicted CO Concentrations with the Surrounding Nine-cells Around Each Site.



Chapter Six – Demostration of Attainment

6.1 INTRODUCTION

6.2 2000 BASE YEAR (NO ACTION SCENARIO) PROJECTIONS

6.3 UAM ATTAINMENT DEMONSTRATION

6.4 CAL3QHC ROADWAY INTERSECTION MODELING

6.5 MICRO-SCALE ANALYSIS FOR AIRPORTS

6.1 INTRODUCTION

Air quality modeling is an integral part of the air quality planning process to achieve attainment of the NAAQS. This chapter summarizes the application of the UAM and CAL3QHC models in the demonstration of attainment of the CO NAAQS by December 31, 2000. The primary purpose for conducting UAM area-wide and CAL3QHC roadway intersection modeling is to demonstrate the effectiveness of control strategies in attaining the 8-hour average NAAQS for CO (EPA/SYSAPP-92/045a, pg 49). The attainment demonstration should consist of the following four parts:

1. Development of the attainment-year base case emission inventory; this inventory reflects the net effect of existing required controls and growth projections for all source categories;
2. Development of future-year emission strategies;
3. Performing attainment year model simulations to assess control strategies; and
4. Using results from both the UAM and CAL3QHC modeling to demonstrate attainment.

With respect to utilizing the UAM area-wide model to demonstrate attainment, the estimated 8-hour average concentrations must be below the 9.0-ppm standard. EPA also recommends that the CAL3QHC model be applied to intersections at potential hot-spot locations. The hot-spot modeling analysis entails combining concentrations from the UAM with those derived from the CAL3QHC micro-scale model.

This chapter concludes with a discussion about a micro-scale analysis, which was conducted on the airport facilities in the Las Vegas Valley. The purpose of this analysis is two fold: 1) to incorporate updated emission estimates from the Clark County airports into the plan and the attainment demonstration, and 2) to establish future years emission budgets for airport sources as a means to facilitate future conformity determinations.

6.2 2000 BASE YEAR (NO ACTION SCENARIO) PROJECTIONS

To initiate attainment demonstration modeling, a future year CO emission inventory representative of the year 2000, without any control measures, was prepared for future year application of the UAM. This projected inventory is the basis for evaluating the potential CO reductions from a variety of proposed control measures. The development of the base case (no action scenario) future year projected inventory followed EPA guidance contained in the document titled “Procedures for Preparing Emission Projections” (EPA-450/4-91-019). Per EPA guidance, these emissions reflect current regulations, or any regulations that will be in effect prior to the year 2000, and the anticipated effects of any controls mandated by the 1990 CAAA. Two approaches were used to develop the Las

Vegas 1996 and 2000 base year inventories. The 1990 base inventory was used as the basis for projecting the 1996 and 2000 background inventories utilizing Bureau of Economic Analysis growth factors and local data for stationary, area, and non-road sources. The on-road mobile source inventory was derived utilizing MOBILE5b containing inputs representative of 1996 and 2000 conditions. Additional information pertaining to the projected future year emission inventory can be found in the modeling documentation contained in Appendix C, Section 4 and Appendix E, Section 5.

The mobile source emissions were combined with the emissions from other sources and run through the Urban Airshed Model for a selected episode. Table 6-1 depicts the 1996 base year emission inventory, the 2000 base year (uncontrolled, no action scenario) emission inventories used in the modeling analysis along with the 2000 controlled emission inventory.

Table 6-1

1996 & 2000 BASE YEARS CARBON MONOXIDE MODELING
EMISSIONS FOR THE LAS VEGAS NON-ATTAINMENT AREA

SOURCE CATEGORIES	1996 Base Emissions (Tons/Day)	2000 Uncontrolled Emissions (Tons/Day)	2000 Controlled Emissions (Tons/Day)
Bonanza Materials	0.28	0.28	0.28
James Hardie Gypsum	0.55	0.55	0.55
Southern Nevada Paving	0.55	0.55	0.55
Pabco Cogeneration	0.55	0.55	0.55
Georgia Pacific	0.62	0.62	0.62
Total Point Sources	**6.53**	**6.53**	**6.53**
AREA SOURCES			
Small Stationary	2.7	3.08	3.08
Boiler Emissions	0.38	0.43	0.43
Fireplaces	2.12	2.59	2.59
Structural Fires	0.64	0.78	0.78
Vehicular Fires	0.05	0.06	0.06
Brush Fires	1.26	1.54	1.54
Residential NG Combustion	0.31	0.34	0.34
Commercial NG Combustion	0.09	0.10	0.10
Industrial NG Combustion	0.32	0.36	0.36
Electrical Utility NG	0.56	0.63	0.63
Cigarette Smoking	0.04	0.05	0.05
Total Area Sources	**8.47**	**9.96**	**9.96**
NON-ROAD MOBILE SOURCES			
County Airports	36.4	40.4	40.4
Nellis AFB	2.86	2.86	2.86
Locomotive Emissions	0.23	0.23	0.23
Lawn and Garden Equipment	3.57	3.52	3.52
MC & Recreation Equipment	5.9	5.86	5.86
Construction Equipment	9.77	7.61	7.61
Total Non-Road Sources	**58.73**	**60.48**	**60.48**
ON-ROAD MOBILE SOURCES[1]	405.4	353.23	310.18
GRAND TOTAL	**479.13**	**430.20**	**387.15**

6.3 UAM ATTAINMENT DEMONSTRATION

The 1996 and 2000 base conditions reflect changes to the roadway network that either were completed, or will be be completed under the latest RTC Fiscal Year 1998-2000 Transportation Improvement Program (TIP). Thus, changes in VMT, speed and vehicle occupancy rates are included in the base scenarios. Likewise, CO emission reductions associated with existing control measures (oxygenated fuel program, low RVP, and the smog check program) and regulatory measures for stationary, area, and non-road mobile source categories, as discussed in Chapter 4, are also incorporated in the base condition modeling.

To demonstrate attainment of the CO NAAQS, the results from the UAM modeling analyses must indicate that maximum concentrations greater than 9.0 PPM will not occur. Demonstration of attainment by December 31, 2000 was accomplished by modeling the mobile source control measures introduced in Chapter 4 and depicted in Table 6-2 below. Mobile source emission factors and traffic volumes were then input into the DTIM2 (Direct Travel Impact Model) and then input into the EPS2 model to calculate total area-wide uncontrolled emissions. Next, the UAM was run to determine the effects of the control measures. Consequently, the UAM results indicated that the proposed control measures provide sufficient reductions and that the maximum concentration on the attainment date would be 8.1 PPM.

Additionally, to validate the UAM attainment demonstration, the micro-scale hot-spot analysis combines the results from the roadway intersection modeling and the area-wide modeling and should show no predicted 8-hour maximum concentrations greater than 9.0 PPM. Of the three-modeled intersections, the East Charleston/Eastern intersection has the highest predicted CO concentrations (see Section 6.4 below). It is shown later that this plan results in sufficient emission reductions such that the intersection falls below the 8-hour CO NAAQS of 9.0 PPM at 8.3 PPM. This value is below the attainment threshold of 9.0 PPM, therefore, attainment is demonstrated. A more complete description of the UAM CO modeling performed for the Las Vegas Valley is provided in following documents: *The Las Vegas Valley Carbon Monoxide Urban Airshed Model Update Project - Phase II: Modeling to Demonstrate Attainment of the Carbon Monoxide Standard* (contained in Appendix C, Section 4) and the *Supplemental Urban Airshed Modeling Analysis for the Las Vegas Valley Carbon Monoxide Attainment Demonstration* (contained in Appendix E, Section 5).

It is important to mention that the attainment demonstration is considered as being conservative as it does not include the benefits of On-Board Diagnostics (OBD) programs and Tier II motor vehicle technology. At present, the benefit of reduce CO emissions are unquantifiable, but are expected to yield significant reductions in future years.

TABLE 6-2

PROPOSED ENFORCEABLE CO CONTROL MEASURES

Control Measure	Year 2000 Emission Reduction	Adoption Date	Responsible Agency
Clean Burning Gasoline	9.8%	1999	Health District
Voluntary Transportation Control Measures / Transportation Demand Management	0.08%	1999/Ongoing	RTC
Technician Training and Certification	2.95%	1988	DMV&PS
Alternative Fuels Program for Government Fleets	0.12%	1991/Ongoing	NDEP/Govt. Entities
Combined Effect of Controls	12.2%		

Combined effects of controls are not cumulative

Table 6-3 below depicts the maximum ambient concentrations resulting from the UAM modeling runs.

Table 6-3

MAXIMUM VALLEY WIDE PREDICTED UAM CONCENTRATIONS

Run	Controls	1996	2000	2010	2020
		(ppm)	(ppm)	(ppm)	(ppm)
Base Case		11.2	9.1	8.7	10.5
Control Case	CBG, Technician Training, Alternative Fuels, TCM/TDM	N/A	8.1	7.2	8.5

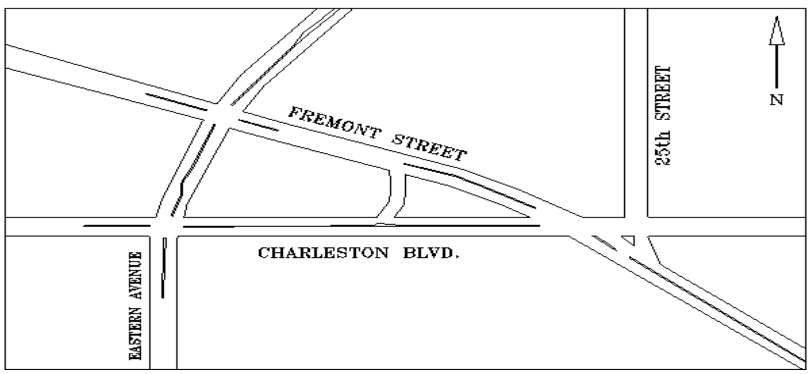
6.4 CAL3QHC ROADWAY INTERSECTION MODELING

As previously indicated the EPA recommends that a micro-scale “hot-spot” analysis also be conducted as part of the attainment demonstration. Typically, three intersections having high traffic volumes, poor levels of service, and being in close proximity to the monitoring station recording exceedences are the basic selection criteria for this analysis (EPA 454/R92-005, pg. 3). As such, the intersections referred to as the “5 points” were selected to be modeled to meet the micro-scale and attainment demonstration modeling requirements.

The three intersections which comprise the “5 points” include: East Charleston and Eastern, East Charleston and Fremont, and Eastern and Fremont and are located approximately one half mile southwest of the Sunrise Acres monitoring station. A location map depicting the configuration of “5 points” is provided below in Figure 6-1.

Figure 6-1

CAL3QHC INTERSECTION LOCATION MAP



The modeling approach involved estimating 8-hour “running” average CO concentrations at the three intersections for the 2000-attainment year. The 8-hour running average was calculated by the following method:

(1) Modeling hourly concentrations over a 24-hour period using the CAL3QHC microscale model;

(2) Combining micro-scale concentrations with background or neighborhood CO concentration generated from the UAM; and

(3) Calculating a “running” average of concentrations over the highest continual eight hours.

In the CAL3QHC modeling, an array of receptors is placed around each selected intersection in accordance with EPA guidance. In the UAM modeling, an average concentration is estimated for each one square mile grid cell. The UAM "background" component for a given intersection is obtained by computing a weighted average of the concentrations from the four nearest UAM grid cells. To combine the UAM and CAL3QHC modeling results, hourly concentration estimates from each model are summed, and then 8-hour running averages are computed. Predicted CAL3QHC and UAM combined maximum 8-hour CO concentrations for the three roadway intersections are provided in Table 6-4 below. For detailed information on the CAL3QHC analysis, the reader is referred to the document titled "Micro-scale Hot Spot Modeling with CAL3QHC for the Las Vegas Carbon Monoxide SIP, contained in Appendix E, Section 6.

The predicted and combined maximum CO concentrations at the three roadway intersections all were within the 8-hour national standard of 9.0 PPM. The predicted values support the contention that the existing and proposed control measures will result in the Las Vegas Valley reaching attainment of the CO NAAQS by the prescribed date of December 31, 2000. For additional details, the reader is referred to Appendix E, Sections 5 and 6, Supplemental UAM Modeling Documentation.

Table 6-4

MAXIMUM PREDICTED 8-HOUR CARBON MONOXIDE CONCENTRATIONS FOR HOT SPOT INTERSECTIONS

	2000		**2010**		**2020**	
Intersections	Maximum UAM (ppm)	Maximum UAM+CAL3Q (ppm)	Maximum UAM (ppm)	Maximum UAM+CAL3Q (ppm)	Maximum UAM (ppm)	Maximum UAM+CAL3Q (ppm)
Charleston/Eastern	5.9	8.3	5.2	7.3	5.7	7.6
Charleston/Fremont	5.9	6.7	5.2	5.9	5.7	6.4
Eastern/Fremont	5.9	7.6	5.2	6.6	5.7	7.4

6.5 MICRO-SCALE ANALYSIS FOR AIRPORTS

Towards the conclusion of the modeling analysis in 1999, updated emission estimates from civilian airports and related support activities became available. These new emission estimates were higher than values previously quantified and reported. It was also postulated that contributions from airport sources could be better represented, both in magnitude and timing/location with models other than the UAM, leading to a more accurate representation of air quality in the vicinity of airports. To reduce all uncertainties related to higher, updated emission estimates and potential modeling limitations of the UAM, a separate modeling analysis was conducted utilizing the Emissions and Dispersion Modeling System (EDMS).

The EDMS was developed specifically for airport emission analyses and is approved by the EPA. EDMS is a combined emissions and dispersion model for assessing air quality at civilian and military airfields. The model was developed by the Federal Aviation Administration (FAA) in cooperation with the United States Air Force (USAF). The primary aspects of the model include the development of an inventory of emissions generated by sources within and around an airport, and the calculation of pollutant concentrations in the surrounding environment.

EDMS performs dispersion analyses by incorporating previously developed dispersion models (PAL2 and CALINE3-both EPA validated for the various sources of emissions). These earlier models have many known assumptions and limitations regarding their application. Assumptions used in the dispersion analysis module include: a simple or relatively flat terrain, conservation of mass (i.e., negligible chemical breakdown of original substance), and steady state atmospheric conditions over the averaging period of one hour. Additionally, Gaussian dispersion algorithms used by EDMS are limited to transport distances of less than 50 kilometers and do not consider complex aerodynamic effects such as downwash from buildings. Pollutants currently included in EDMS for dispersion analyses are carbon monoxide (CO), oxides of nitrogen (NOx), oxides of sulfur (SOx), and particulate matter less than 10 microns in diameter (PM-10).

As illustrated in a protocol submitted to the EPA, Region IX (see Appendix C), this section summarizes the results from modeling CO at three Clark County airports within the Las Vegas Valley using EDMS. The resulting concentrations from EDMS are added to UAM predicted "background" concentrations to provide a total CO concentration field for each scenario modeled, much the same way micro-scale intersection modeling is performed as described by EPA's CO modeling guidance (EPA, 1992).

The total 8-hour average CO concentrations at the individual receptors are then rank-ordered to show the highest resulting concentrations, at which point an attainment/maintenance evaluation can be made. A more complete and detailed description of the methodology used to model the atmospheric dispersion of airport-related CO emissions is provided in the report *"Carbon Monoxide Emissions Inventories and Dispersion Modeling, McCarran International, North Las Vegas, and Henderson Executive Airports"* prepared by Ricondo & Associates , 1999 (see Appendix C, Section 8).

Table 6-5 below depicts the EDMS/UAM results. All predicted future year 8-hour CO levels are below the standard, except for one McCarran receptor in 2020 (9.07 ppm). The EDMS concentration at that point is only 0.17 ppm and the UAM component is 8.90 ppm. The future year UAM control strategy reported by Emery at al. (1999) indicate that adoption of one primary control measure (such as Cleaner Burning Gasoline) would reduce overall peak UAM concentrations from 10.8 ppm to 9.1 ppm, about a 16% reduction. Applying this same 16%

reduction to the UAM background concentration at the EDMS receptor would reduce the 8.90 ppm value to 7.50 ppm (8.90 ppm X .84 = 7.50 ppm). Even assuming that this control measure has no effect on McCarran sources, the 9.07 ppm peak in Table 6-5 reduces to 7.67 as a result of the CBG control measure (7.50 ppm + 0.17 ppm = 7.67 ppm). Therefore, this analysis shows attainment in 2000 and maintenance in 2010 and 2020 with the adoption of the primary CO control measures.

Table 6-5

MAXIMUM 8-HOUR CARBON MONOXIDE CONCENTRATIONS (PPM)
FROM COUNTY OPERATED AIRPORTS FOR FOUR MODELING YEARS
(BASE CASE ESTIMATES ASSUME NO ADDITIONAL CONTROLS ON MOTOR VEHICLES)

Airport	Scenario	Receptor	EDMS CO Airports	UAM CO Uncontrolled	Total CO Uncontrolled
McCarren Airport	1996 Base	277	0.00	9.64	9.64
	2000 Base	277	0.01	8.66	8.67
	2010 Base	277	0.01	8.06	8.07
	2020 Base	1599	0.17	8.90	9.07
North Las Vegas Airport	1996 Base	801	0.00	8.89	8.89
	2000 Base	801	0.00	7.54	7.54
	2010 Base	801	0.00	7.03	7.03
	2020 Base	801	0.01	8.27	8.28
Henderson Airport	1996 Base	92	0.14	0.43	0.57
	2000 Base	92	0.19	0.39	0.58
	2010 Base	204	0.04	0.51	0.55
	2020 Base	181	0.09	1.08	1.17

The results of this airport micro-scale analysis serve to ensure that projected increased emissions from this source category can be accommodated within the Valley's Carbon Monoxide airshed without jeopardizing attainment or maintenance of the CO NAAQS.

Chapter Seven - Additional Requirements of the 1990 CAAA

7.1 INTRODUCTION

This section addresses requirements applicable to non-attainment areas set forth by the 1990 CAAA. The VMT Tracking Program is first discussed and includes VMT projections and contingency measures that will be implemented should either actual VMT exceed projected VMT or if attainment of the federal CO standard is not reached. Also contained in this section is a brief discussion of annual VMT tracking and reporting.

Both sections 172(c)(9) and 187(a)(3) of the 1990 CAAA require contingency measures to be implemented in the event the area fails to reach attainment by the specified attainment date. Such measures shall be included in the SIP revision to take effect automatically without further action by the State or EPA. The trigger for such measures is an official finding by EPA that the area failed to attain the CO standard by the applicable attainment date. Section 187(a)(3) also requires the Las Vegas Valley to implement contingency measures if any estimate of actual VMT or any updated VMT forecast for the area contained in an annual report for any year prior to attainment exceeds the number predicted in the most recent VMT forecast, within a specified margin of error.

7.2 VMT TRACKING PROGRAMS

7.2.1 VMT Projections

Section 187(a)(2)(A) of the 1990 CAAA requires CO non-attainment areas to forecast VMT for each year prior to the attainment year. The first set of projections contained in this plan serves to satisfy this requirement. In addition, the accuracy of the VMT forecasts will be tracked through annual reports that present estimates of actual VMT for the preceding year and updates of the VMT forecasts for subsequent years. A deviation from the forecasted VMT of a given percentage will cause implementation of contingency measures to offset either excess VMT or CO emissions due to the additional VMT. These percentages are 5 percent in 1999, 4 percent in 2000, and 3 percent in 2001 and subsequent years. The cumulative VMT growth cannot be greater than or equal to 5 percent above the VMT forecast used as the basis for attainment demonstration. Annual VMT tracking reports containing the estimated and actual reported VMT for each year is due in September of each year and will be submitted by the RTC.

The RTC is responsible for preparing VMT forecasts. The Nevada Department of Transportation has the responsibility of estimating actual VMT in conjunction with the Highway Performance Monitoring System and reporting these values to the Federal Highway Administration. The DCP will work with the RTC to prepare the annual VMT tracking reports. The VMT projections for future years were derived using the Las Vegas Regional Transportation Model developed and maintained by the RTC. Table 7-1 contains VMT forecasts for each year prior to the 2000 attainment year as well as for the horizon years beyond 2000. Note that average daily VMT will decline after the year 2020 due to the assumption that highways will saturate with traffic and will exceed their capacities resulting in commuters selecting alternate modes of travel like mass transit, ride sharing, and other modes.

TABLE 7-1

AVERAGE DAILY VMT ESTIMATES AND FORECASTS BY FUNCTIONAL CATEGORY AND BY YEAR*

Segment	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Ext. Connector	640,605	682,315	724,024	765,734	800,857	835,981	871,105	906,229	941,353	976,477	1,011,600
Fwy Ramps	69,247	79,803	90,359	100,916	104,915	108,914	112,913	116,912	120,912	124,911	128,910
Minor Arterial	7,469,945	7,627,173	7,784,400	7,941,628	8,313,494	8,685,360	9,057,227	9,429,093	9,800,959	10,172,825	10,544,691
Major Arterial	3,655,885	3,706,998	3,758,111	3,809,224	3,923,028	4,036,831	4,150,635	4,264,438	4,378,242	4,492,045	4,605,849
Ramps	267,724	277,203	286,683	296,162	311,904	327,646	343,388	359,130	374,872	390,614	406,356
Interstate	3,825,711	3,910,446	3,995,180	4,079,915	4,249,168	4,418,422	4,587,675	4,756,929	4,926,182	5,095,435	5,264,689
Freeway	1,202,253	1,361,497	1,520,741	1,679,985	1,849,208	2,018,432	2,187,655	2,356,878	2,526,102	2,695,325	2,864,548
Expressway	214,097	240,631	267,164	293,698	299,422	305,147	310,871	316,595	322,319	328,043	333,767
Collector	2,776,775	2,981,164	3,185,553	3,389,942	3,693,134	3,996,327	4,299,519	4,602,711	4,905,904	5,209,096	5,512,288
Local	2,185,695	2,255,455	2,325,216	2,394,976	2,498,849	2,602,721	2,706,594	2,810,466	2,914,339	3,018,211	3,122,084
Intrazonal Trips	100,028	103,487	106,947	110,406	114,910	119,414	123,918	128,422	132,927	137,431	141,935
Public Transit	61,054	63,003	64,951	66,900	79,880	92,860	105,840	118,820	131,800	144,780	157,760
VMT Totals	22,469,020	23,289,175	24,109,330	24,929,485	26,238,770	27,548,054	28,857,339	30,166,623	31,475,908	32,785,192	34,094,477

Segment	2010	2011	2013	2015	2020	2021	2022	2023	2024	2025	2030
Ext. Connector	1,116,972	1,152,480	1,223,495	1,294,511	1,472,049	1,477,261	1,482,472	1,487,684	1,492,896	1,498,107	1,524,166
Fwy Ramps	140,908	145,306	154,104	162,901	184,895	183,557	182,219	180,880	179,542	178,203	171,511
Minor Arterial	11,660,290	12,112,245	13,016,155	13,920,065	16,179,840	16,122,155	16,064,470	16,006,784	15,949,099	15,891,414	15,602,988
Major Arterial	4,947,259	5,148,238	5,550,196	5,952,154	6,957,048	6,911,219	6,865,390	6,819,561	6,773,731	6,727,902	6,498,757
Ramps	453,583	473,322	512,800	552,278	650,973	646,539	642,104	637,670	633,235	628,801	606,628
Interstate	5,772,449	5,952,793	6,313,481	6,674,170	7,575,890	7,543,749	7,511,608	7,479,467	7,447,326	7,415,185	7,254,480
Freeway	3,372,218	3,613,678	4,096,597	4,579,517	5,786,816	5,731,012	5,675,208	5,619,404	5,563,601	5,507,797	5,228,778
Expressway	350,939	359,350	376,172	392,995	435,050	435,495	435,939	436,384	436,829	437,274	439,498
Collector	6,421,865	7,018,499	8,211,766	9,405,033	12,388,200	12,417,274	12,446,347	12,475,421	12,504,495	12,533,569	12,678,937
Local	3,433,701	3,627,784	4,015,949	4,404,114	5,374,527	5,359,132	5,343,737	5,328,342	5,312,947	5,297,552	5,220,577
Intrazonal Trips	155,447	168,867	195,706	222,546	289,645	288,815	287,986	287,156	286,326	285,497	281,348
Public Transit	196,700	196,770	196,910	197,050	197,400	197,470	197,540	197,610	197,680	197,750	198,100
VMT Totals	38,022,330	39,969,331	43,863,331	47,757,332	57,492,333	57,313,677	57,135,020	56,956,363	56,777,707	56,599,050	55,705,767

* Estimates for 1997, 2000, 2010, 2020, and 2030 are based on RTC's TRANPLAN runs
Other values have been interpolated.

7.2.2 Contingency Measures

Section 187(a)(3) of the 1990 CAAA requires that contingency measures be included in the attainment plan. These measures are required to be implemented if a non-attainment area fails to attain the federal standard by the designated attainment date. Additionally, a deviation from the projected VMT of more than 3% will also trigger implementation of contingency measures to offset excess VMT and associated mobile source CO emissions (U.S. EPA, 1992).

If sufficient emission reductions needed to attain the federal CO air quality standard are not achieved as anticipated, or if actual VMT exceed projected VMT by 3%, the contingency measures listed in Table 7-2 below will be implemented according to the severity of ambient exceedance or VMT increase. EPA guidance does not mandate a specific reduction level that contingency measures must achieve. However, EPA considers measures that offset one year VMT growth to be an appropriate guideline. For the Clark County nonattainment area, annualized VMT growth from 2000 to 2005 is 5 percent. At a minimum, contingency measures should provide CO emission reductions to counteract the effect of one year's growth in VMT, or at least to offset the emissions caused by the incremental increase in VMT forecasted in Table 7-1 above.

TABLE 7-2

CONTINGENCY MEASURES

MEASURE	AGENCY RESPONSIBLE FOR IMPLEMENTATION	IMPLEMENTATION TRIGGER
On Board Diagnostics II (OBDII) Testing	Department of Motor Vehicles & Public Safety	9.5 ppm – 11 ppm exceedance 3% - 5% VMT increase
Lower I/M Program Cutpoints	Department of Motor Vehicles & Public Safety	11 ppm – 15 ppm exceedance 5% - 10% VMT increase
On Road Remote Sensing	Department of Motor Vehicles & Public Safety	11 ppm – 15 ppm exceedance 5% - 10% VMT increase

The contingency measures selected do have the potential to significantly reduce CO emissions. Due to the limitations of existing models to quantify the emission reductions from these programs, accurately quantifying the actual reduction is problematic. With respect to On Board Diagnostics II (OBDII) testing, the EPA's MOBILE6 model would be the appropriate tool to use in determining the effectiveness of this measure. Unfortunately, this model is still in the process of development. Based on EPA's draft document titled, *Determination of CO Basic Emission Rates, OBD and I/M Effects for Tier I and Later LDVs and LDTs* (EPA420-P-99-017), OBDII testing has significant potential to reduce CO emissions. Until the official release of MOBILE6, it is not possible to quantify the benefits from this contingency measure. EPA has indicated that Clark County could use the Cold CO model to quantify this benefit. However, this model uses assumptions that are not consistent with the MOBILE5 model used in the SIP.

Lowering the cutpoints associated with the State's Vehicle Inspection/ Maintenance Program will also result in reduced emissions as vehicles will have to meet more stringent testing standards. The MOBILE model is the appropriate tool to utilize for estimating the benefits attributed to lowering the cutpoints. The limitations prohibiting the use of this model at this time is the fact that only one data set of cutpoints, for a two-speed I/M test, is available. Based on conversations with EPA's OTAQ Division, it may be possible for additional data sets to be developed. Once new data sets are developed, it will then be possible to run the MOBILE model to estimate the effects of lower I/M program cutpoints. Clark County is committed to working with EPA, Region IX and OTAQ on this issue and will incorporate this analysis in a future SIP revision.

On-road Remote Sensing of high emitting vehicles is another contingency measure that has the potential to reduce CO emissions. EPA has developed draft guidance (EPA420-P-98-007) and a utility program that works in conjunction with the MOBILE model to estimate the effects of remote sensing. Although the focus of this guidance is predominately on clean screening, it also looks at the application of remote sensing to identify high emitting vehicles. Clark County attempted to seek authorization from OTAQ on the use of this draft guidance and utility program to estimate the emission reduction benefit. Because of the draft status of the guidance and the inability to obtain authorization to use the draft utility program, it is not possible to provide a defensible emission reduction for this contingency measure. It is important to mention that Clark County's analysis using the RSD utility program indicates that a 1.3% reduction in mobile source emissions.

As indicated above, it is not possible to quantify the emission reductions and effectiveness of the contingency measures at this time. From a qualitative perspective however, these contingency measures will be effective at reducing emissions upon their implementation and should provide ample reduction to offset emissions associated with a 5 percent growth in VMT. Related to all the contingency measures specified above, Clark County will prepare and submit a SIP revision that quantifies the actual benefits of these contingency measures, within one year of the release date of MOBILE6 (or its successor), guidance and applicable models. This commitment will be contained in the Clark County Board of Commissioners resolution adopting this plan. Should the contingency measure analysis indicate that the proposed contingency measures do not provide ample reductions, the SIP revision will include additional contingency measures.

EPA expects that actions needed for full implementation of contingency measures occur within 60 days after EPA notifies the area of its failure to attain. EPA has also concluded that, to be beneficial, contingency measures must be fully implemented within 12 months after EPA's findings (Technical Support Document to Aid States with the Development of Carbon Monoxide SIPs, EPA - July 1992). Legislation and regulations currently exist in NRS 445B and NAC 445B, respectively, that allow for changes to the cutpoints in the I/M program and to allow for on-road remote sensing to be conducted. The Nevada Department of Environmental Protection is proceeding with regulation changes that will require OBDII testing be incorporated into the existing I/M program. It is anticipated that the State Environmental Commission will adopt these regulation changes by July, 2000. With the adoption of these regulations, these contingency measures will be able to be implemented in a timely manner, without further action. Appendix E, Section 8, also contains a discussion on other potential contingency measures and the reasons why each was not selected.

7.2.3 Annual VMT Tracking

Annual reports updating VMT forecasts and presenting VMT estimates for the previous year are required under Section 187(a)(2). As previously stated, the DCP will work with the RTC to prepare annual VMT tracking reports. These annual reports will contain estimates of actual VMT in the previous year, forecasts of VMT in future years, and verification that supplemental (contingency) control measures are being implemented if actual VMT estimates for previous years exceed earlier forecasts. Annual VMT tracking reports will be submitted to the EPA in September of each year beginning in the year 2000 and following EPA reporting guidelines. A resolution adopted on July 13, 1995 by the Regional Transportation Commission committing to preparing and submitting an annual VMT tracking report is contained in Appendix D, Section 8.

7.3 OTHER CONTROL MEASURES

Future monitoring data will indicate the amount of progress being made towards attainment. Should this data reveal that additional steps are necessary to reach attainment by December 31, 2000, steps will be taken to further program activities of the insurance measures contained in Table 7-3 below.

TABLE 7-3

OTHER CONTROL MEASURES

MEASURE	RESPONSIBLE AGENCY
Voluntary Vehicle Repair Program	Clark County, DMV & PS
Smoking Vehicle Telephone Hotline	DMV & PS

Chapter Eight –Implementation/SIP Commitments

8.1 IMPLEMENTATION

8.2 SIP IMPLEMENTATION, MONITORING AND REPORTING

8.3 MAINTENANCE

8.4 MOBILE SOURCES EMISSIONS BUDGET

8.5 ADDITIONAL COMMITMENTS TO INSURE CONFORMITY

8.1 IMPLEMENTATION

Implementation of the control measures specified in Chapter 6 is necessary for the Valley to attain the CO NAAQS. The responsibility for implementing these control measures lies with the following governmental entities: the Clark County Health District, Air Pollution Control Division; the Nevada Department of Conservation and Natural Resources, Division of Environmental Protection; and the Clark County Regional Transportation Commission. Each of these entities has adequate personnel, funding and authority to implement their respective measure of the proposed primary control measures.

On April 22, 1999, the Clark County District Board of Health adopted Section 54, Cleaner Burning Gasoline, to the Air Pollution Control Regulations. The Regional Transportation Commission, at their June 10, 1999, meeting, adopted Resolution No. 177. The adoption of this resolution establishes TDM program guidelines to mitigate traffic congestion and directs the RTC's TDM Division to implement and monitor this program. Chapter 486A, of the Nevada Revised Statutes mandates alternative fuel vehicle acquisition, fuel usage and reporting requirements applicable to all governmental vehicles based in nonattainment areas. The Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, via this legislation, is the agency responsible for administering this program.

Additionally, the Nevada State Environmental Commission adopted a resolution on April 9, 1999, committing to adopting appropriate emission reduction measures as necessary to insure that ambient air quality standards can be achieved and maintained in the Las Vegas Valley. This action by the Commission serves to further insure that attainment will occur by December 31, 2000. Copies of regulations and resolutions mentioned above can be found in Appendix D.

Table 8-1 summarizes the implementation status of the primary control measures along with information on the agency responsible for implementing the respective control measure.

TABLE 8-1

CONTROL MEASURE IMPLEMENTATION STATUS

Control Measure	Implementation Date	Responsible Agency
Clean Burning Gasoline	1999	Health District
Voluntary TCM/TDM Program	1999/Ongoing	RTC
Technician Training/Certification	1988	DMV&PS
Alternative Fuels Program for Government Fleets	1991/Ongoing	NDEP/Govt. Entities

8.2 SIP IMPLEMENTATION, MONITORING AND REPORTING

This plan provides direction for attaining the national CO standard. To insure that attainment is reached, the progress associated with implementation of controls and the resulting emission reductions must be monitored. In doing so, monitoring will indicate if implementation is on schedule or if implementation needs to be accelerated. This responsibility will be shared by the Clark County Health District AQD, the State of Nevada Department of Environmental Protection, the Clark County Regional Transportation Commission and the Clark County Department of Comprehensive Planning. Monitoring will also assist in determining the effectiveness of control measures. VMT will be monitored through an annual VMT tracking report. This annual report will serve as the vehicle by which monitoring / tracking of controls are reported to the EPA. Ambient air quality data will continue to be monitored through the monitoring network described in Chapter 2 of this document. This network will continue to be operated in accordance with the federal requirements of 40 CFR Part 58 and quarterly reports will continue to be prepared and submitted to the EPA by the AQD. The Las Vegas Valley Air Quality Planning Committee will continue to insure intergovernmental coordination, consensus building, and monitoring functions.

8.3 MAINTENANCE

The EPA requires that implementation plans also provide for the maintenance of the standard after it has been attained. Since the primary source of CO is the on-road mobile sources category, VMT projections for five years past the demonstration date have been forecasted (Table 8-2). These VMT projections will be utilized in conjunction with the Mobile-UAM Modeling system as part of monitoring the effectiveness of control measures past the year 2000. It is anticipated that additional modeling will be a requirement of maintenance plan submittals for areas seeking redesignation.

VMT contingency measures will be triggered after the year 2000 in the event actual VMTs exceed forecasts. The Las Vegas Valley Air Quality Implementation Plan will remain in effect following the attainment date until superseded by approval of a CO Maintenance Plan.

TABLE 8-2

VMT ESTIMATES FOR MONITORING AND MAINTENANCE

Road Segment	2000	2001	2002	2003	2004	2005
External Connector	765,734	800,857	835,981	871,105	906,229	941,353
Freeway System Ramps	100,916	104,915	108,914	112,913	116,912	120,912
Minor Arterial	7,941,628	8,313,494	8,685,360	9,057,227	9,429,093	9,800,959
Major Arterial	3,809,224	3,923,028	4,036,831	4,150,635	4,264,438	4,378,242
Ramp	296,162	311,904	327,646	343,388	359,130	374,872
Interstate	4,079,915	4,249,168	4,418,422	4,587,675	4,756,929	4,926,182
Freeway	1,679,985	1,849,208	2,018,432	2,187,655	2,356,878	2,526,102
Expressway	293,698	299,422	305,147	310,871	316,595	322,319
Collector	3,389,942	3,693,134	3,996,327	4,299,519	4,602,711	4,905,904
Local	2,394,976	2,498,849	2,602,721	2,706,594	2,810,466	2,914,339
Intrazonal Trips	110,406	114,910	119,414	123,918	128,422	132,927
Public Transit	66,900	79,880	92,860	105,840	118,820	131,800
Daily Average Total	24,929,486	26,238,770	27,548,054	28,857,339	30,166,623	31,475,908

8.4 MOBILE SOURCES EMISSIONS BUDGET

Under the conformity provisions of the Clean Air Act, Section 176(c)(2)(A) requires regional transportation plans and programs to show that "emissions expected from implementation of plans and programs are consistent with estimates from motor vehicles and necessary emission reductions contained in the applicable implementation plan." On November 24, 1993 EPA issued regulations defining how the provisions of 176(c) will work, including defining mobile vehicle emission budgets in applicable SIPs. EPA conformity rule defines motor vehicle emissions budgets as:

> *".... the explicit or implicit identification of the motor vehicle-related portions of the projected emission inventory used to demonstrate reasonable further progress milestones, attainment, or maintenance for a particular year specified in the SIP."*

The motor vehicle emissions budget therefore establishes a cap on motor vehicle-related emissions which cannot be exceeded by predicted transportation system emissions in the future. The emissions budget applies as a ceiling on emissions in the year for which it is defined and for all subsequent years until another year for which a different budget is defined or until a SIP revision modifies the budget.

Without a clearly indicated intent otherwise expressed in the SIP, the SIP's estimate of future transportation network emissions used in the milestone or attainment demonstration is the motor vehicle emissions budget. The SIP may also specify emissions budgets for subareas of the region, provided the SIP includes a demonstration that the subregional emissions budget, when combined with all other portions of the emissions inventory, will result in attainment and/or maintenance of the standard.

The emissions analysis for conformity determinations must include emissions from the entire transportation network within the nonattainment area. Likewise, if the transportation and air quality modeling domains extend beyond the nonattainment area, the budget applies for the portion only within the nonattainment area boundary. In the case of Las Vegas, the nonattainment area encompasses both the air quality modeling domain (UAM) and the transportation planning domain.

EPA's conformity rule requires that air quality implementation plans contain an emissions budget. The emissions budget reflects the portion of emissions, by source category and year, which can be accommodated in the airshed without exceeding the NAAQS. The emissions budgets also reflect the effects that control measures will have in future years.

Table 8-3 below provides a breakdown of the Las Vegas Valley Nonattainment Area's attainment and future horizon year's emission budgets.

TABLE 8-3

LAS VEGAS VALLEY PEAK SEASON EMISSION BUDGETS
by Source Category

Source Category	1996 (Tons/Day)	2000 (Tons/Day)	2010 (Tons/Day)	2020 (Tons/Day)
On-road Motor Vehicles*	405.4	310.2	329.5	457.4
Area Sources	8.5	9.9	15.3	19.4
Point Sources	6.5	6.5	6.5	6.5
Non-road Sources excl. County Airports	22.3	20.1	18.2	19.3
County Airports	36.4	40.4	55.6	77.1
Total Budget	479.1	387.2	425.2	579.7
Maximum Predicted CO Concentration (ppm)	11.2	8.1	7.2	8.5

* On-Road Mobile Sources Budgets are adjusted for the Month of December (adjustment factor = 1.021)

8.5 ADDITIONAL COMMITMENTS TO INSURE CONFORMITY

The ability for Transportation Improvement Programs and Regional Transportation Plans to demonstrate conformity with this Air Quality Plan in future years is of utmost importance to State and local governmental agencies. To insure that a positive conformity determination can be made on the aforementioned transportation documents, this section constitutes an implementation plan commitment to promulgate regulations as provided for in the U.S. Environmental Protection Agency's Transportation Conformity Rule (40 CFR 51.452).

Contained in the 1995 Carbon Monoxide Air Quality Implementation Plan, the commitment to remote sensing of 90% of all vehicles in the Las Vegas Valley by 2011 was made by the Nevada Department of Motor Vehicles and Public Safety (DMV&PS). This commitment is carried forward with this plan so that an additional 5% emission reduction will take place.

The additional commitment constitutes a control measure that will insure a positive conformity determination. Additionally, the Nevada State Environmental Commission adopted a Resolution at their meeting on April 9, 1999, committing to "adopting appropriate emission reduction measures as necessary to ensure that ambient air quality standards can be achieved and maintained in the Las Vegas Valley, and conformity between the Transportation Improvement Program and the State Implementation Plan can be demonstrated". This commitment by the State Environmental Commission will provide additional emission reductions. A copy of the resolution and the commitment letter from Nevada DMV&PS is located in Appendix D, Section 7.

References

1. Bohning, S. 1998. Letter to Clete Kus, Clark County Department of Comprehensive Planning, from the U.S. Environmental Protection Agency, Region IX, San Francisco, CA (October 27, 1998).

2. Bowen, J.L. and R.T. Egami. 1994. “Clark County Carbon Monoxide Hotspot Study”, Final report prepared for the Clark County Health District, DRI Document NO. 6460-684-4010.1F1, Nov. 10, 1994.

3. BRW and SAI. 1992. “Las Vegas Air Quality Implementation Plan Update, Phase II: Carbon Monoxide Modeling and Attainment Demonstration.” Prepared for the Clark County Department of Comprehensive Planning, by BRW, Inc., San Diego, CA and Systems Applications, Inc., San Rafael, CA.

4. CCDCP. 2000. Supplemental Urban Airshed Modeling Analysis for the Las Vegas Valley Carbon Monoxide Attainment Demonstration.

5. CCDCP. 2000. Microscale Hot Spot Modeling with the CAL3HC for the Las Vegas CO SIP.

6. DRI, STI, and ENVIRON. 1996. “Modeling Protocol for the Las Vegas Valley Carbon Monoxide Urban Airshed Modeling Project – Phase II: Field Data Collection.” Prepared for the Clark County Department of Comprehensive Planning, by the Desert Research Institute, Reno, NV., Sonoma Technology, Inc., Santa Rosa, CA, and ENVIRON International Corp., Novato, California.

7. Egami, D., J. Bowen, P. Roberts, S. Reyes, T. Dye, C. Emery, D. Souten. 1998. “The Las Vegas Valley Carbon Monoxide Urban Airshed Model Update Project – Phase II: Field Data Collection.” Prepared for the Clark County Department of Comprehensive Planning, by the Desert Research Institute, Reno, NV, Sonoma Technology, Inc., Santa Rosa, CA, and ENVIRON International Corporation, Novato, CA.

8. Emery, C., J. Heiken, D. Souten. 1996. “Phase I Draft Final Report.” Technical memorandum prepared for the Clark County Department of Comprehensive Planning, by ENVIRON International Corp., Novato, California.

References - Continued

9. Emery, C., D. Souten, N. Kumar, F. Lurmann, and P. Roberts. 1998. "The Las Vegas Valley Carbon Monoxide Urban Airshed Model Update Project – Phase II: UAM Base Case and Sensitivity Applications." Prepared for the Clark County Department of Comprehensive Planning, by ENVIRON International Corporation, Novato, CA, and Sonoma Technology, Inc., Santa Rosa, CA.

10. Emery, C., D. Souten. 1998. "Results of Revised Phase II Base Case CO Modeling, and Recommendation of Episode Selection for Future Year Assessments." Technical memorandum prepared for Scott Bohning of the U.S. Environmental Protection Agency, Region IX, San Francisco, CA, by ENVIRON International Corp., Novato, CA.

11. ENVIRON. 1996. "Modeling Protocol for the Las Vegas Valley Carbon Monoxide Urban Airshed Model Update Project." Prepared for the Clark County Department of Comprehensive Planning, by ENVIRON International Corp., Novato, California.

12. EPA 1992. Guidelines for Regulatory Application of the Urban Airshed Model for Areawide CO Applications. EPA-450/4-92-011a&b, Research Triangle Park, NC.

13. U.S. EPA. January 1992. Section 187 VMT Forecasting and Tracking Guidance.

14. EPA. 1997. "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs)." Memorandum to EPA Regional Administrators, from Richard D. Wilson, Acting Assistant Administrator for Air and Radiation (October 24, 1997).

15. EPA. 1991. Emission Inventory Requirements for carbon Monoxide State Implementation Plans. U.S. EPA. Research Triangle Park, NC (EPA-450/4-91-011).

16. EPA. 1991. Final Draft, Section 187 VMT Forecasting and Tracking Guidance.

17. EPA. 1988. Guidance for the Preparation of Quality Assurance Plans for O3/CO SIP Emission Inventory. EPA-450/4-88-023.

References – Continued

18. EPA. 1991. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources. EPA-450/4-91-016, Research Triangle Park, NC.

19. EPA. 1991. Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume II: Emission Inventory Requirements for Photochemical Air Quality Simulation Models. EPA-450/4-91-014, Research Triangle Park, NC.

20. EPA. 1991. Quality Review Guidelines for 1990 Base Year Emission Inventory. EPA-450/4-91-022, Research Triangle Park, NC.

21. EPA. 1991. User's Guide to MOBILE5. U.S. EPA, Ann Arbor, Michigan.

22. Lima and Associates. 1998. "Carbon Monoxide Transportation Control Measures Analysis." Prepared for the Clark County Department of Comprehensive Planning, by Lima & Associates.

23. Environ, July 1999. "Dispersion Modeling of Carbon Monoxide Emissions from Three Clark County Airports in Support of the Revised CO SIP". Prepared for the Clark County Department of Aviation, by ENVIRON International Corp., Novato, California.

24. Ricondo & Associates, 1999. "Carbon Monoxide Emissions Inventories and Dispersion Modeling from McCarran International, North Las Vegas, and Henderson Executive Airports" Prepared for Clark County, Department of Aviation.