Carbon Monoxide Redesignation Request and Maintenance Plan

Las Vegas Valley Nonattainment Area
Clark County, Nevada

September 2008

Clark County Department of Air Quality and Environmental Management

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EXECUTIVE SUMMARY

This maintenance plan is a formal request by the Clark County Department of Air Quality and Environmental Management to the U.S. Environmental Protection Agency (EPA) to redesignate the Las Vegas Valley nonattainment area to attainment of the 8-hour carbon monoxide (CO) National Ambient Air Quality Standard (NAAQS). It summarizes the progress of the area in attaining the CO standard, demonstrates that all Clean Air Act requirements for attainment have been adopted, and presents a plan to assure continued attainment over the next ten years.

This plan provides a revised CO attainment demonstration that incorporates proposed changes to existing control measures contained in the August 2000 CO state implementation plan (SIP) for Clark County and the October 2005 CO SIP revision, and makes use of the most recently adopted planning variables (e.g., updated vehicle miles traveled projections and population forecasts) approved by the designated Metropolitan Planning Organization for the Las Vegas urban area, the Regional Transportation Commission of Southern Nevada. The plan also provides, among other things, revised motor vehicle emission modeling, new emissions inventories, amended control measures, updated area-wide Urban Airshed Modeling, and microscale air quality modeling analyses (i.e., hotspot modeling (CAL3QHC) and airport modeling (EDMS)) using the updated inventories.

In the mid-1980s, portions of the Las Vegas Valley began violating the CO NAAQS during the winter months. The number and severity of these violations caused EPA to designate the valley as a "moderate" nonattainment area upon enactment of the Clean Air Act Amendments in November 1990. When Clark County did not attain the CO standards after a one-year extension to the required attainment date, EPA reclassified the valley as a "serious" CO nonattainment area. The county developed a SIP to establish measures for attaining the standards, and in August 2000 the Board of County Commissioners adopted the plan. EPA issued a final approval of the 2000 CO SIP in September 2004, and in June 2005 EPA found that the Las Vegas Valley had attained the standards by the applicable date of December 31, 2000. In October 2005 the county submitted a revision to the 2000 CO SIP updating CO motor vehicle emissions budgets using MOBILE6. The 2005 CO SIP Revision was subsequently approved in August 2006.

During the past several years, the valley has experienced substantial improvement in air quality: no violations of the 8-hour CO standard have been recorded since 1998. There has been a similar reduction in the intensity of CO concentrations. CO exceedances (not necessarily violations) often totaled 40 or more per year in the 1980s. During 1997 and 1998, the valley experienced only four unhealthful and three exceedance days. Exceedances and violations of the 8-hour CO NAAQS eased by 1999, and there have been no recorded exceedances since then.

After EPA approval, the maintenance plan will become a federally enforceable plan that identifies how Clark County will maintain the CO NAAQS for the Las Vegas Valley through 2020. Once approved, the motor vehicle emission budgets contained in the plan will become the projected budgets that the Regional Transportation Commission will use for conformity determinations in future regional transportation plans.

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ACRONYMS AND ABBREVIATIONS

Acronyms

ASTM	American Society for Testing and Materials
ATE	Advanced Truck Stop Electrification
BCC	Clark County Board of County Commissioners
CAA	1970 Clean Air Act
CAAA	1990 Clean Air Act Amendments
CAL3QHC	Hot Spot Emissions and Dispersion Modeling System
CBG	cleaner burning gasoline
CCSD	Clark County School District
CFR	Code of Federal Regulations
CO	carbon monoxide
DAQEM	Clark County Department of Air Quality and Environmental Management
DMV	Department of Motor Vehicles
EDMS	Airport Emissions and Dispersion Modeling System
EPA	U.S. Environmental Protection Agency
FMVECP	Federal Motor Vehicle Emissions Control Program
FY	fiscal year
GVWR	Gross Vehicle Weight Rating
I/M	Motor Vehicle Inspection and Maintenance (program)
MVEB	motor vehicle emissions budget
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
NAC	Nevada Administrative Code
NO_x	nitrogen oxides
NDEP	Nevada Division of Environmental Protection
NRS	Nevada Revised Statutes
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
RTC	Regional Transportation Commission of Southern Nevada
RVP	Reid Vapor Pressure
SIP	state implementation plan
SLAMS	State and Local Air Monitoring Station
TCM	Voluntary Transportation Control Measures
TDM	Transportation Demand Management
UAM	Urban Airshed Model
VMT	vehicle miles traveled
VOC	volatile organic compounds
VVRP	Clark County Voluntary Vehicle Repair Program

Abbreviations

g/mi	grams per mile
ppm	parts per million
ppmw	parts per million by weight
psi	pounds per square inch

tpd	tons per day

1.0 INTRODUCTION

The Clark County Department of Air Quality and Environmental Management (DAQEM), in coordination with the Nevada Division of Environmental Protection (NDEP), requests that the U.S. Environmental Protection Agency (EPA) redesignate the Las Vegas Valley nonattainment area to attainment status for the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO).

In the past several years, the valley has experienced substantial improvement in air quality: no 8-hour CO standard violations have been recorded since 1998. The intensity of CO concentrations has also been reduced. In June 2005, EPA determined the Las Vegas Valley had attained the NAAQS for CO by the applicable date of December 31, 2000, and was eligible for redesignation.

1.1 CHARACTERISTICS AND HEALTH EFFECTS OF CARBON MONOXIDE

CO is a colorless, odorless, tasteless gas that enters the body through the lungs, where it is absorbed by hemoglobin in the body's red blood cells. Hemoglobin normally picks up oxygen from the lungs and carries it to the body's tissues. By displacing oxygen in the hemoglobin, CO reduces the flow of oxygen to organs, tissues, and the central nervous system. Children, pregnant women, and those with cardiovascular or pulmonary disease are most susceptible to risk from prolonged exposure to CO at high concentrations. Common symptoms of CO poisoning include dizziness, headaches, fatigue, visual impairment, and disorientation.

CO is principally produced by the incomplete combustion of carbon contained in fossil fuels. Most CO in the Las Vegas Valley is emitted from motor vehicles, with peak concentrations normally occurring along roadways and near intersections with high traffic levels. Calm winds during the late fall and winter, coupled with night and early morning ground-based temperature inversions and low precipitation, generally precipitate the buildup of CO concentrations in the Las Vegas Valley.

1.2 NATIONAL AMBIENT AIR QUALITY STANDARDS FOR CARBON MONOXIDE

There are two federal standards for CO: an 8-hour standard of 9 parts per million (ppm) and a 1-hour standard of 35 ppm. An exceedance is a monitored value equal to or greater than 9.5 ppm for an 8-hour average and 35.5 ppm for a 1-hour average. The standard allows for no more than one exceedance of either standard in each calendar year; a violation occurs when two or more exceedances are recorded at the same monitoring site in the same year.

1.3 HISTORY OF THE LASVEGAS VALLEY NONATTAINMENT AREA

In the mid-1980s, parts of the Las Vegas Valley exceeded the CO NAAQS during the winter months. Although the valley never exceeded the 1-hour standard, it exceeded the 8-hour standard at least once each year. The number and severity of these violations caused EPA to designate the valley a "moderate" nonattainment area upon the enactment of the 1990 Clean Air Act Amendments (CAAA). The 1970 Clean Air Act (CAA) and its amendments required that

moderate nonattainment areas implement the following emission control measures as expeditiously as practicable to attain the CO NAAQS by December 31, 1995:

1. An Oxygenated Gasoline Program during the winter months requiring gasoline to contain no less than 3.5 percent oxygen by weight.

2. An enhanced Motor Vehicle Inspection and Maintenance (I/M) Program meeting CAA 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 actual VMT estimates 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.

5. Transportation control measures necessary to demonstrate attainment of the NAAQS (Clean Air Act Section 187(b)(2)).

6. Implementation of all Reasonably Available Control Measures as quickly as practicable.

Clark County implemented these controls and made significant progress toward attaining the CO NAAQS, but fell short of meeting the standard by the applicable date. However, EPA granted Clark County a one-year extension because of improved CO levels. When the county did not succeed in demonstrating compliance according to CAAA requirements in that year, EPA reclassified the Las Vegas Valley as a "serious" CO nonattainment area.

EPA published the notice of violation reclassifying the area in the *Federal Register* on October 2, 1997. The agency set a May 1999 deadline (18 months from the notice publication date) for submitting an implementation plan that would demonstrate CO NAAQS attainment by December 31, 2000. The CAAA requires that serious nonattainment areas implement all the measures for moderate areas listed previously, along with the following:

1. Gasoline sold during the winter months must contain the level of oxygen necessary to attain the standard, in combination with other measures.

2. Employers of 100 or more people must implement a mandatory travel reduction program that requires each company to increase average vehicle occupancy for commutes by at least 25 percent over the regional average. 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 can be achieved by other measures. Congress has since eliminated this requirement from the CAAA.

Areas could also implement an economic incentive program containing fees and marketable permits if emission reduction milestones were not met by December 31, 2000.

Clark County developed a state implementation plan (SIP) to establish measures for attaining CO standards by the end of 2000, and in August 2000, the Clark County Board of County

Commissioners adopted the plan. In September 2004, EPA issued final approval of the August 2000 *Carbon Monoxide State Implementation Plan, Las Vegas Valley Nonattainment Area, Clark County, Nevada* (2000 CO SIP). In October 2005, the county commissioners adopted a revision to the 2000 CO SIP that updated CO motor vehicle emissions budgets (MVEBs) using MOBILE6.2, the latest EPA-approved model for transportation conformity determinations. EPA approved the October 2005 *Carbon Monoxide State Implementation Plan Revision, Las Vegas Valley Nonattainment Area, Clark County, Nevada* (2005 CO SIP Revision) in August 2006.

In June 2005, EPA determined that the Las Vegas Valley had attained the CO NAAQS by the applicable date of December 31, 2000, making the area eligible to submit a request for redesignation to attainment status for CO.

1.4 REQUIRED COMPONENTS OF A REDESIGNATION REQUEST

CAA Sections 107(d)(3)(D) and (E) define the criteria that an area must meet before being redesignated to attainment/maintenance status. With the submittal of this redesignation request and maintenance plan, the Las Vegas Valley nonattainment area meets the following five required criteria:

1. Attainment of the Standard: Clark County must show that the nonattainment area has attained the NAAQS for CO (Section 3).

2. SIP Approval: The nonattainment area must have a fully approved CO SIP (Section 4).

3. Improvement in Air Quality due to Permanent and Enforceable Emission Reductions: Clark County must demonstrate that the improvement in air quality leading to attainment of the standard is due to permanent and federally enforceable emissions reductions (Section 5).

4. CAA Section 110 and Part D Requirements: Clark County must meet all CAA Section 110 and Part D requirements. Section 110 describes general requirements for SIPs, and Part D contains general requirements applicable to all nonattainment areas (Section 6).

5. Maintenance Plan: The area must have a fully approved CO maintenance plan that meets CAA Section 175a requirements, including a demonstration that the area will maintain the standard for at least 10 years following EPA redesignation. The plan must also contain contingency measures that could be implemented if the standard is violated at any time during the maintenance period (Section 7).

1.5 USE OF MOBILE6.2 EMISSIONS FACTOR MODEL

To complete this redesignation request, Clark County used EPA's current mobile source emissions factor model—MOBILE6.2—in concert with updated TransCAD vehicle volume data and the Urban Airshed Model (UAM) to estimate CO emissions and to calculate the peak CO concentrations for 2008, 2010 and 2020.

2.0 PRELIMINARY ANALYSIS OF PROPOSED MODIFICATIONS TO EXISTING CONTROL MEASURES IN THE NONATTAINMENT AREA

2.1 INTRODUCTION

In October 2006, DAQEM commissioned an independent analysis of the current wintertime gasoline specifications that apply in the Las Vegas Valley, as well as an evaluation of possible changes to those specifications (Appendix A of the *Clark County Wintertime Gasoline Fuel Specifications Study,* October 2007). In the analysis, on-road mobile source CO emission totals were estimated and future year CO concentration peaks were assessed using the UAM for various control measure modifications in a manner consistent with the 2005 CO SIP Revision. The analysis was intended to provide DAQEM with the necessary guidance to develop a set of control measures to be used in the development of this redesignation request and maintenance plan.

The analysis began by focusing on discontinuing the CO SIP credits taken from the Cleaner Burning Gasoline (CBG) Wintertime Fuels Program and relaxing the Reid Vapor Pressure (RVP) wintertime gasoline requirements. Proposing these programs' discontinuation or modification is appropriate at this time because it would reduce the cost of compliance for consumers and businesses, and facilitate increased motor fuel supplies to the Las Vegas Valley, without jeopardizing compliance with the CO standard.

The analysis also evaluated discontinuing the CO SIP credits taken from the Voluntary Transportation Control Measures/Transportation Demand Management (TCM/TDM) Program and the Alternative Fuels for Government Fleets Program. These evaluations were performed because of the limited reductions in CO emissions attributable to both measures.

Table 2-1 provides the current adoption and implementation dates for the control measures in the 1995 and 2000 CO SIPs and the 2005 CO SIP Revision.

Table 2-1. Control Measures Adopted for Clark County CO SIPs

Control Measure	Adoption Date
Oxygenated Gasoline Program	1991/1995
CBG Wintertime Fuels Program	1999
Reduced RVP Gasoline Program	1995
Motor Vehicle I/M Program	1978
TCM/TDM Program	1999
Alternative Fuels for Government Fleets Program	1991

2.2 CLEANER BURNING GASOLINE: WINTERTIME PROGRAM

Section 54 of the Clark County Air Quality Regulations sets forth the CBG Wintertime Fuels Program for Clark County, which requires a low sulfur and aromatic content in gasoline sold between November 1 and March 31. As outlined in Section 54, the maximum sulfur content for

wintertime fuels sold in Clark County is currently established at 80 parts per million by weight (ppmw), with an optional flat sulfur standard for producers and importers not to exceed 40 ppmw. Similarly, the maximum aromatic content of wintertime fuels sold in Clark County is established at 30 percent by volume, with an optional flat aromatic hydrocarbon standard for producers and importers not to exceed 25 percent by volume.

DAQEM evaluated discontinuing the CO SIP credits taken from the CBG Wintertime Fuels Program as part of this redesignation request and maintenance plan because wintertime sulfur contents of CBG became redundant when federal Tier 2 gasoline sulfur limits of 30 ppm average, with a maximum cap of 80 ppm, were fully implemented in 2006.

The analysis included 2006 winter fuel properties for Clark County and a CO effects estimate caused by a revision to the aromatics content (as reflected in the 2006 nationwide average). Winter gasoline fuel properties for Clark County and the nationwide average aromatic level were taken from the Alliance of Automobile Manufacturers' winter 2006 fuel survey data. Table 2-2 shows Clark County gasoline properties.

Table 2-2. Inputs for Clark County—Winter 2006 Gasoline

Fuel Property	Clark County Gasoline
MTBE (wt% oxygen)	0
ETBE (wt% oxygen)	0
Ethanol (wt% oxygen)	3.47
TAME (wt% oxygen)	0
Sulfur (ppm)	31
RVP (psi)	8.8
E200 (%)	46.4
E300 (%)	78.7
Aromatics (vol%)	20.2
Olefins (vol%)	6.7
Benzene (vol%)	0.60

Source: Winter fuel survey data (Alliance of Automobile Manufacturers' Winter 2006 Fuel Survey Data).

The evaluation concluded that very little impact on future CO emissions occurred when the CO SIP credits taken from the CBG Wintertime Fuels Program were discontinued (Appendix A). As previously mentioned, this is because Clark County wintertime fuel sulfur content requirements became redundant when federal Tier 2 gasoline rules were implemented. Additionally, the aromatic content requirements of wintertime fuels do not appear to impose any significant burden on fuel suppliers, negating any issue with regards to the supply of gasoline to Clark County.

2.3 VAPOR PRESSURE LIMITATIONS

Chapter 590 of the Nevada Revised Statutes (NRS) and Chapter 590 of the Nevada Administrative Code (NAC) set forth the reduced RVP gasoline requirements for wintertime fuels sold in Clark County (October 1 through March 31). Adopted by the Nevada Department of

Agriculture, these regulations set a maximum RVP of 9 pounds per square inch [psi] for gasoline sold in Clark County.

DAQEM evaluated relaxing the RVP for wintertime fuels sold in Clark County from 9 to 13.5 psi to coincide with the specification guides in Volume 05.02, "Petroleum Products and Lubricants," of D4814-01a, "Standard Specification for Automotive Spark-Ignition Engine Fuel," in the American Society for Testing and Materials' (ASTM) *2002 Annual Book of ASTM Standards*.

Regionally, only Clark County, Nevada, and Phoenix, Arizona, require a reduced wintertime RVP fuel specification as part of their overall CO control strategy. The reduced RVP requirement in Clark County contributes to reduced motor vehicle fuel supplies in the Las Vegas Valley because it precludes the distribution and sale of conventional and reformulated gasoline, which is sold throughout the rest of the southwestern United States during the winter season. Additionally, the proposed relaxation of the RVP for wintertime fuels in Clark County is likely to have a positive impact on gasoline supplies in Clark County without causing or contributing to future CO NAAQS exceedances.

An analysis using the standard EPA version of MOBILE6 concluded that the largest single impact on CO emissions is associated with relaxing the RVP requirement. It should be noted, however, that the MOBILE6 algorithm for modeling RVP impacts on CO emissions is quite dated and has been shown to be of questionable validity for the later model-year vehicles that dominated this analysis (Sierra Research 2005). Therefore, the impact of relaxing the RVP requirement for wintertime fuels sold in Clark County on CO emissions based on the standard EPA version of MOBILE6 is likely to be considerably overstated.

The overall analysis concluded that while relaxing the RVP wintertime fuel requirement continues to have the largest single impact on future CO emissions, the proposed change to RVP requirements would not jeopardize compliance with the CO standard (see Appendix A).

2.4 TRANSPORTATION CONTROL MEASURES/TRANSPORTATION DEMAND MANAGEMENT

When EPA reclassified the Las Vegas Valley as a "serious" CO nonattainment area in October 1997, Clark County was required to evaluate and implement TCMs to further reduce CO emissions. In 1999, the Transportation Demand Management Division of the Regional Transportation Commission of Southern Nevada (RTC), through the adoption of the fiscal year (FY) 1998-2000 *Transportation Improvement Plan*, implemented the Club Ride commuter services program (formally known as CAT MATCH). It included employer based commuter incentive programs, telecommuting incentives, and area-wide ridesharing programs.

DAQEM evaluated discontinuing the CO SIP credits taken from the TCM/TDM Program control measure. Although this measure still assists in Clark County's air quality improvement efforts, the limited reductions in CO emissions attributed to the measure suggests that the SIP credits taken from this measure could be discontinued without impeding Clark County's ability to maintain the CO NAAQS (Appendix A).

2.5 ALTERNATIVE FUELS FOR GOVERNMENT FLEETS PROGRAM

NRS and NAC 486A set forth the Alternative Fuels for Government Fleets Program regulations. Adopted in 1991 and administered by NDEP, these regulations establish procedures for accelerating the acquisition and use of alternative fueled vehicles in government fleets.

DAQEM evaluated discontinuing the CO SIP credits taken from the Alternative Fuels for Government Fleets Program. Although the program still assists in Clark County's air quality improvement efforts, the limited reductions in CO emissions attributed to the program suggest that the SIP credits taken from this program could be discontinued without impeding Clark County's ability to maintain the CO NAAQS (Appendix A).

2.6 SUMMARY OF PRELIMINARY CONTROL MEASURE ANALYSIS

During the past several years, the Las Vegas Valley has experienced substantial improvements in air quality; no 8-hour CO standard violations have been recorded since 1998, and the intensity of CO concentrations has fallen. Because of this, DAQEM evaluated the impact of relaxing the RVP gasoline requirements, and discontinuing the CO SIP credits taken from the CBG Wintertime Fuels Program, the TCM/TDM Program and the Alternative Fuels for Government Fleets Program. This section provided the initial analysis of the proposed changes.

As previously discussed, this analysis was only intended to provide necessary guidance to develop a set of control measures to be used in the development of the redesignation request and maintenance plan. The analysis was not intended to demonstrate maintenance of the CO NAAQS or establish future year MVEBs.

3.0 ATTAINMENT OF CARBON MONOXIDE STANDARD

3.1 INTRODUCTION

The first required component of an area's redesignation/maintenance request is a demonstration that it has attained the CO NAAQS. Attainment is demonstrated when two consecutive years of monitoring data for each site show no more than one exceedance per year of either the 8-hour (9 ppm) or 1-hour (35.0 ppm) standard. The information contained in this section demonstrates, as required by CAA Section 107(d)(3)(E), that the Las Vegas Valley nonattainment area has attained the CO NAAQS. This is based on quality-assured monitoring data representative of the location of expected CO maximum concentrations in the nonattainment area.

3.2 HISTORICAL PERSPECTIVE

Prior to 1998, the Las Vegas Valley regularly exceeded the national standards for CO in the wintertime. With the implementation of several control programs, CO concentrations began to decrease substantially. Data from the regional monitoring network indicate that the Las Vegas Valley nonattainment area has not violated the 8-hour standard for CO since 1998. An exceedance of the 1-hour CO national standard has never been recorded. In addition, the magnitude of observed CO concentrations has declined dramatically since monitoring began. Figure 3-1 illustrates the improvement in CO air quality since 1981.

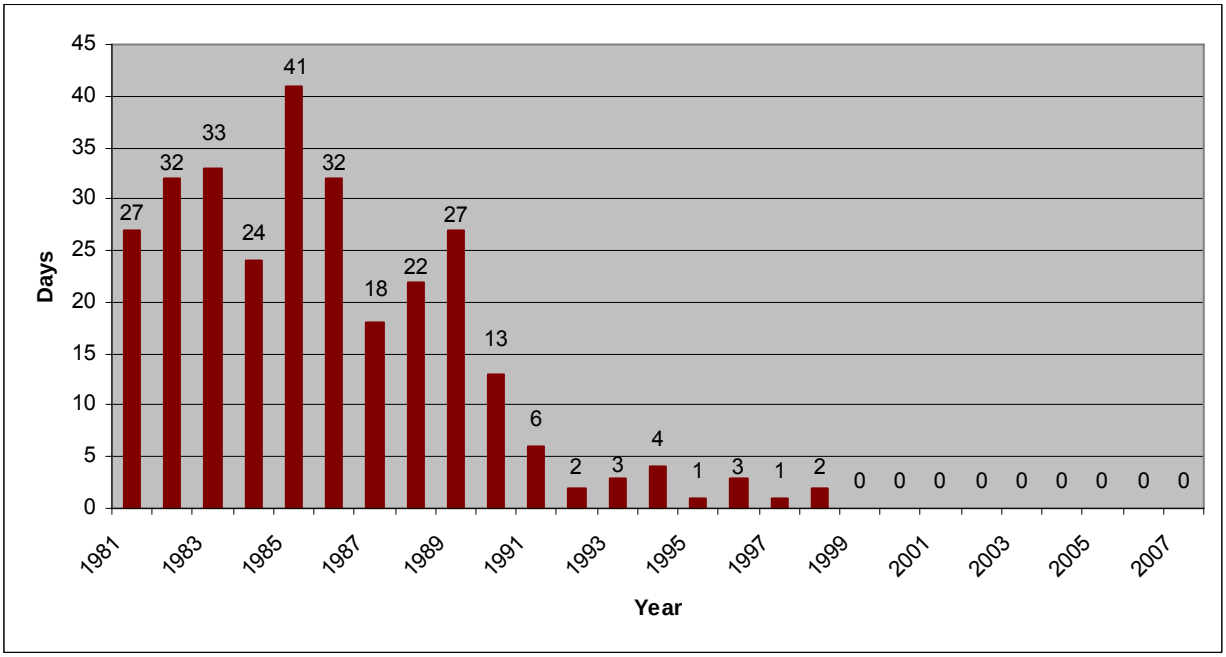


Figure 3-1. Las Vegas Valley CO Air Quality Trends: Number of Exceedances from 1981-2007.

3.3 MONITORING NETWORK

The current CO ambient air monitoring network in the Las Vegas Valley consists of four State and Local Air Monitoring Stations (SLAMS) and one National Air Monitoring Station (NAMS)/SLAMS (Table 3-1). DAQEM operates the monitoring system, which is governed by a set of quality assurance and quality control procedures approved by EPA and subject to periodic EPA performance audits. All sites have population exposure as their monitoring objective except Sunrise Acres, which has highest concentration as its monitoring objective.

Table 3-1. Las Vegas Valley CO Monitoring Site Locations and Descriptions

Site Name	Address	Type	Predominant Wind Direction
East Sahara	4001 E. Sahara Ave.	SLAMS	Southwest
Orr School	Maryland Pkwy. & Flamingo Road	SLAMS	Southwest
Winterwood	5483 Club House Dr.	SLAMS	Southeast
Sunrise Acres	2501 S. Sunrise Ave.	SLAMS	Southwest
J.D. Smith	1301B E. Tonopah	NAMS/SLAMS	Northwest

Source: 2000 CO SIP.

Figure 3-2 shows the current CO monitoring locations. Tables 3-2 through 3-5 contain summary data for all active and inactive sites in operation from 2004 through 2007.

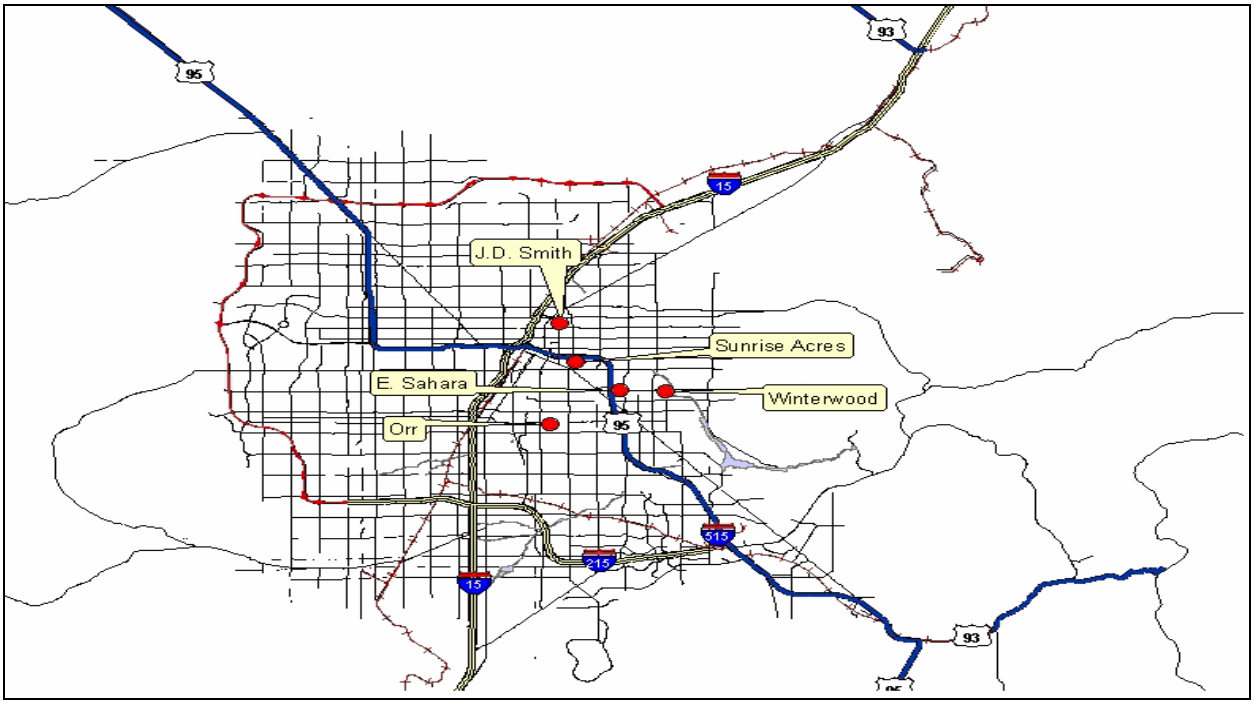


Figure 3-2. Las Vegas Valley CO Monitoring Sites, 2008.

Table 3-2. 2004 CO Monitoring Data Summary for the Las Vegas Valley Nonattainment Area[1]

Site Name	1-Hour		8-Hour	
	Max ppm	2nd Max ppm	Max ppm	2nd Max ppm
City Center	7.2	5.8	3.7	3.5
East Sahara	5.6	5.5	5.2	4.7
Orr School	4.9	4.7	4.1	3.7
Winterwood	4.5	4.2	3.3	3.3
South Las Vegas Blvd.	5.2	4.0	2.9	2.6
Sunrise Acres	7.0	6.5	5.8	5.1
J.D. Smith	5.8	5.7	3.8	3.7
Freedom Park	6.7	6.5	4.9	4.8

[1]1-hr standard = 35 ppm; 8-hr standard = 9 ppm. Due to mathematical rounding, values ≥ 35.5 and 9.9 ppm are necessary to exceed the national standard.

Table 3-3. 2005 CO Monitoring Data Summary for the Las Vegas Valley Nonattainment Area[1]

Site Name	1-Hour		8-Hour	
	Max ppm	2nd Max ppm	Max ppm	2nd Max ppm
City Center	5.1	5.1	3.7	3.4
East Sahara	5.1	5.1	4.6	4.5
Orr School	5.1	5.0	4.2	3.8
Winterwood	4.7	4.5	3.7	3.5
South Las Vegas Blvd.	4.2	4.2	2.3	2.3
Sunrise Acres	6.4	6.3	5.3	5.2
J.D. Smith	5.6	5.4	4.1	3.9
Freedom Park	5.7	5.4	4.6	4.1

[1]1-hr standard = 35 ppm; 8-hr standard = 9 ppm. Due to mathematical rounding, values ≥ 35.5 and 9.9 ppm are necessary to exceed the national standard.

Table 3-4. 2006 CO Monitoring Data Summary for the Las Vegas Valley Nonattainment Area[1]

Site Name	1-Hour		8-Hour	
	Max ppm	2nd Max ppm	Max ppm	2nd Max ppm
City Center[2]	4.8	4.5	2.9	2.9
East Sahara	5.5	5.2	4.5	4.2
Orr School	4.8	4.7	3.9	3.7
Winterwood	4.2	4.0	3.4	3.4
South Las Vegas Blvd.[3]	4.3	4.2	2.7	2.5
Sunrise Acres	6.6	6.3	5.3	5.0
J.D. Smith	5.3	4.8	3.8	3.7
Freedom Park[4]	---	---	---	---

[1]1-hr standard = 35 ppm; 8-hr standard = 9 ppm. Due to mathematical rounding, values ≥ 35.5 and 9.9 ppm are necessary to exceed the national standard.
[2]Ceased operation on April 30, 2006.
[3]Ceased operation on April 3, 2007.
[4]Ceased operation on April 30, 2005.

Table 3-5. 2007 CO Monitoring Data Summary for the Las Vegas Valley Nonattainment Area[1]

Site Name	1-Hour		8-Hour	
	Max ppm	2nd Max ppm	Max ppm	2nd Max ppm
East Sahara	4.3	4.2	4.0	3.7
Orr School	4.5	4.1	3.4	2.9
Winterwood	3.9	3.8	3.4	2.9
South Las Vegas Blvd.[2]	2.8	2.8	2.0	1.9
Sunrise Acres	4.7	4.6	4.1	3.8
J.D. Smith	5.0	4.5	3.0	2.8

[1]1-hr standard = 35 ppm; 8-hr standard = 9 ppm. Due to mathematical rounding, values ≥ 35.5 and 9.9 ppm are necessary to exceed the national standard.
[2]Ceased operation on April 30, 2007.

Figures 3-3 and 3-4 show the continuous downward long-term trend in 1-hour and 8-hour first-highest CO concentrations for all continuously active monitoring sites from 1998 through 2007.

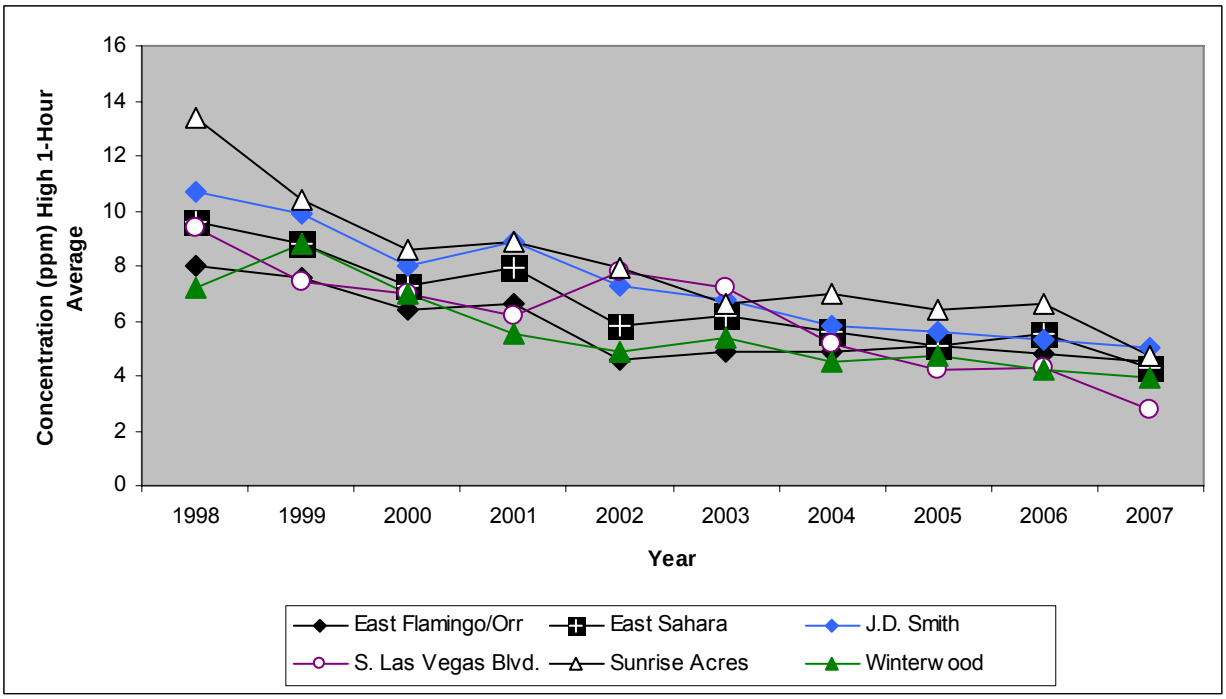


Figure 3-3. Las Vegas Valley CO Air Quality Trends: Annual Peak 1-Hour Concentrations of Continuously Active Monitoring Sites. 1998-2007.

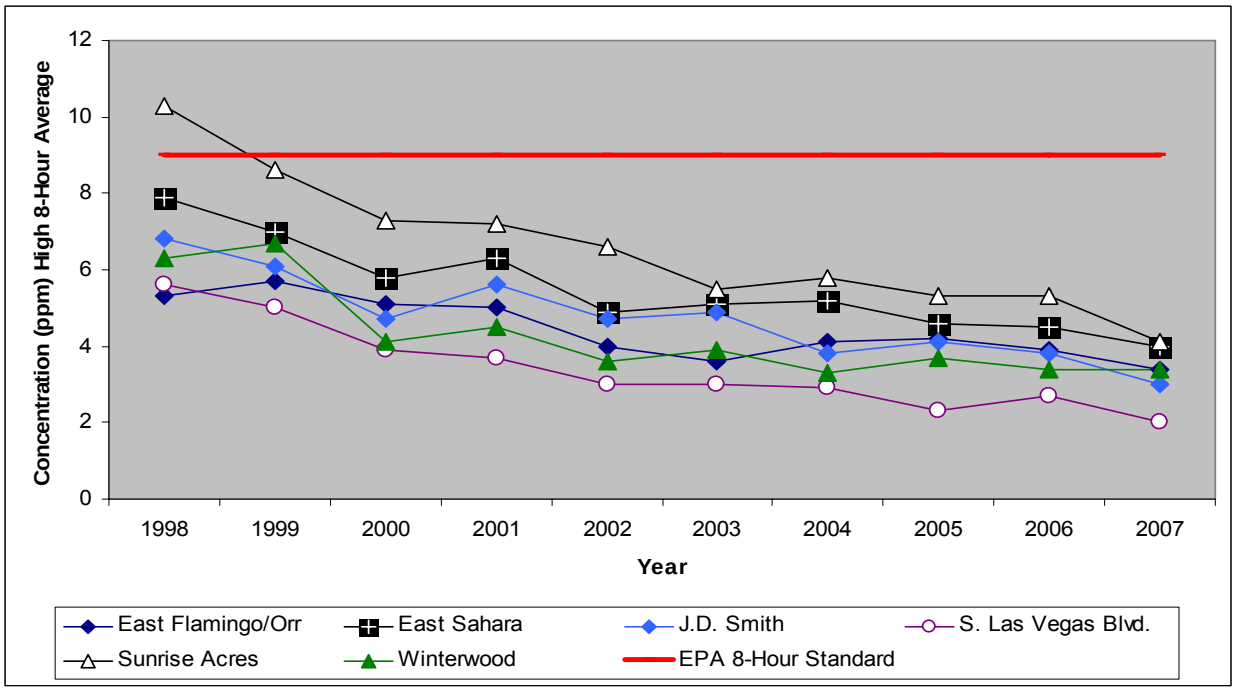


Figure 3-4. Las Vegas Valley CO Air Quality Trends: Annual Peak 8-Hour Concentrations of Continuously Active Monitoring Sites (1998-2007).

Figures 3-5 and 3-6 show the continuous downward long-term trend in 1-hour and 8-hour first-highest CO concentrations for all periodically active monitoring sites from 1998 through 2006.

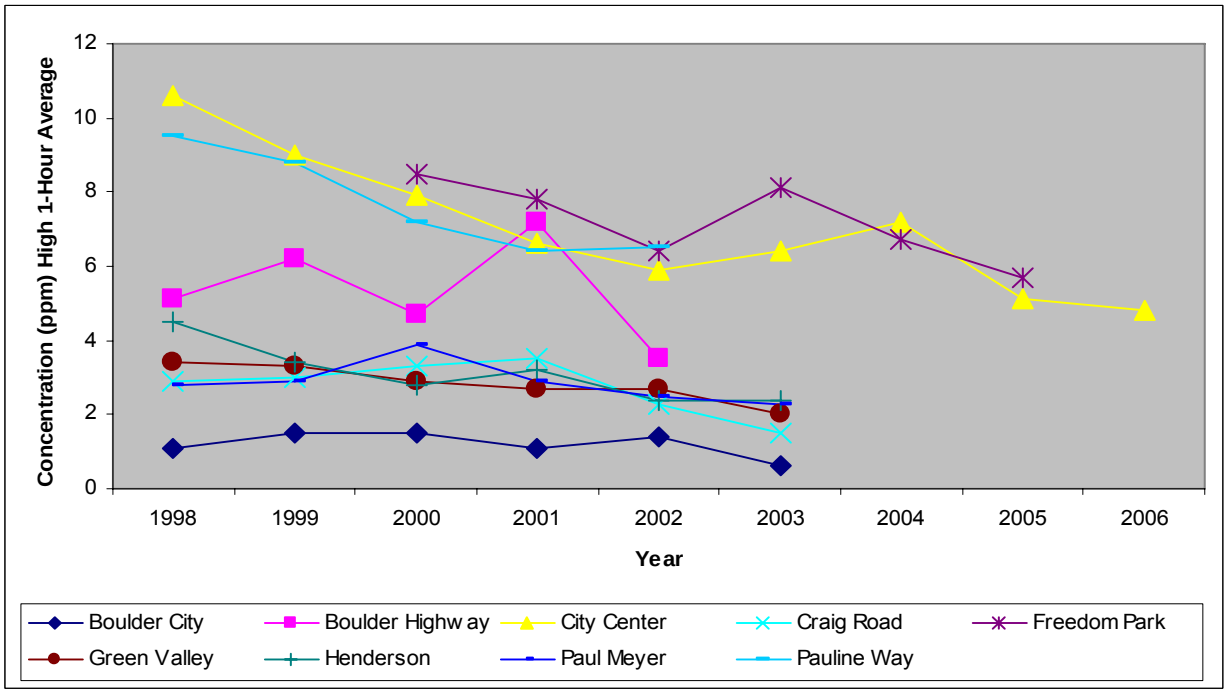


Figure 3-5. Las Vegas Valley CO Air Quality Trends: Annual Peak 1-Hour Concentrations of Periodically Active Monitoring Sites (1998-2006).

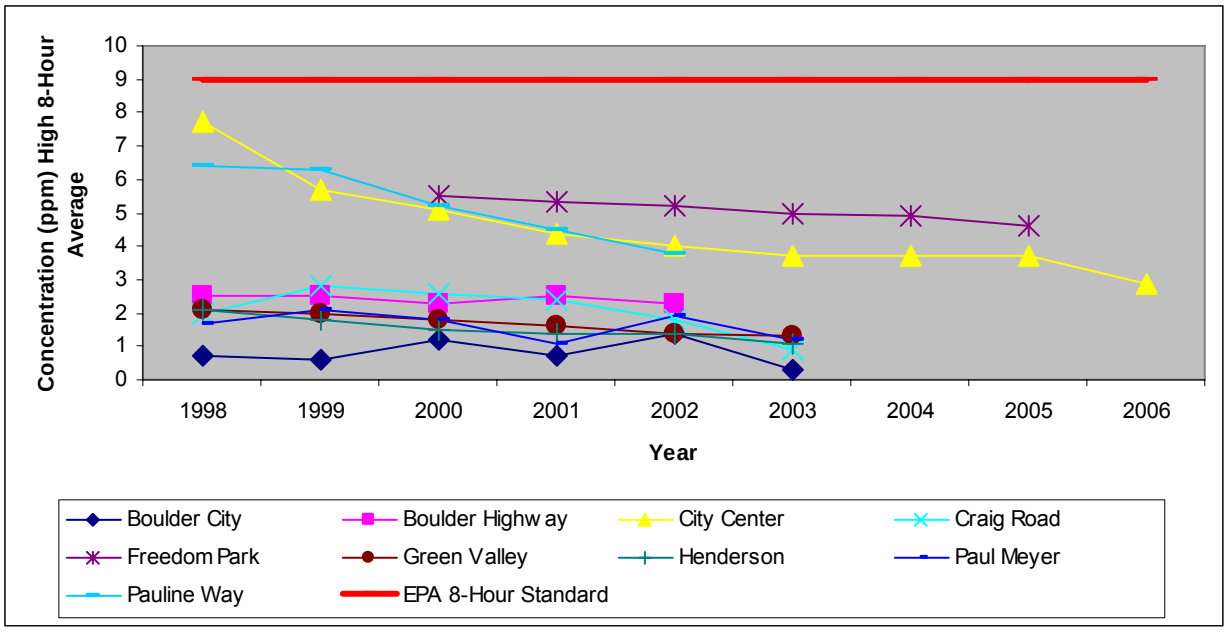


Figure 3-6. Las Vegas Valley CO Air Quality Trends: Annual Peak 8-Hour Concentrations of Periodically Active Monitoring Sites (1998-2006).

3.4 MONITORING RESULTS AND ATTAINMENT DEMONSTRATION

The monitoring data presented in Tables 3-2 through 3-5 and Figures 3-3 through 3-6 verify that the Las Vegas Valley nonattainment area has been in attainment with the CO NAAQS since 1999, including the most recent two-year period (2006-2007), in accordance with the federal requirements of Title 40, Part 58 of the Code of Federal Regulations (40 CFR 58). The data also illustrate the downward trend in CO concentrations in the Las Vegas Valley.

Data recovery rates for the monitors exceed the 75 percent completeness requirement for all years in accordance with all state and federal quality assurance procedures.

3.5 QUALITY ASSURANCE PROGRAM

CO data for the Las Vegas Valley nonattainment area have been collected and quality-assured in accordance with 40 CFR Part 58, Appendix A (EPA's "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Ambient Air Specific Methods") and the *DAQEM Quality Assurance Project Plan for Gaseous Criteria Pollutant Monitoring* (DAQEM 2006).

CO data are recorded in the EPA Aerometric Information Retrieval System and available for public review in air quality monitoring reports that DAQEM produces annually. The data are also available to the public in the Air Quality Index report on the DAQEM Monitoring Section Web page and are reported in local media.

4.0 STATE IMPLEMENTATION PLAN APPROVAL

4.1 INTRODUCTION

The second required component of an area's redesignation/maintenance request, per CAA Section 110(k), is a fully approved SIP. Section 110(k) addresses completeness findings, deadlines for EPA actions, types of EPA actions, and sanctions that may be applied to areas failing to meet CAAA requirements. The information in this section demonstrates, as required by Section 110(k), that the state of Nevada has an approved CO SIP for the Las Vegas Valley nonattainment area.

4.2 SUMMARY OF PREVIOUS STATE IMPLEMENTATION PLAN APPROVALS

In accordance with the CAAA, the Las Vegas Valley nonattainment area was initially classified as "moderate" for CO. When Clark County did not attain the CO standards after a one-year extension to the required attainment date, EPA reclassified the area as "serious" for CO. In order to meet the "serious" nonattainment area requirements, DAQEM submitted a CO SIP to EPA in August 2000. EPA issued a final approval of the 2000 CO SIP in September 2004, and in June 2005 found that the Las Vegas Valley had attained the standards by the applicable date of December 31, 2000.

In October 2005, DAQEM submitted a revision to the 2000 CO SIP to reflect updated CO MVEBs using MOBILE6.2, the latest EPA-approved model for transportation conformity determinations. The CO SIP Revision focused on recalculating the emissions for on-road and non-road sources using the newer MOBILE6.2 and NONROAD2004 models.

In August 2006, the EPA approved the 2005 CO SIP revision. The state of Nevada thus has an approved CO SIP for the Las Vegas Valley nonattainment area, as required by CAA Section 110(k).

5.0 PERMANENT AND ENFORCEABLE IMPROVEMENT IN AIR QUALITY

5.1 INTRODUCTION

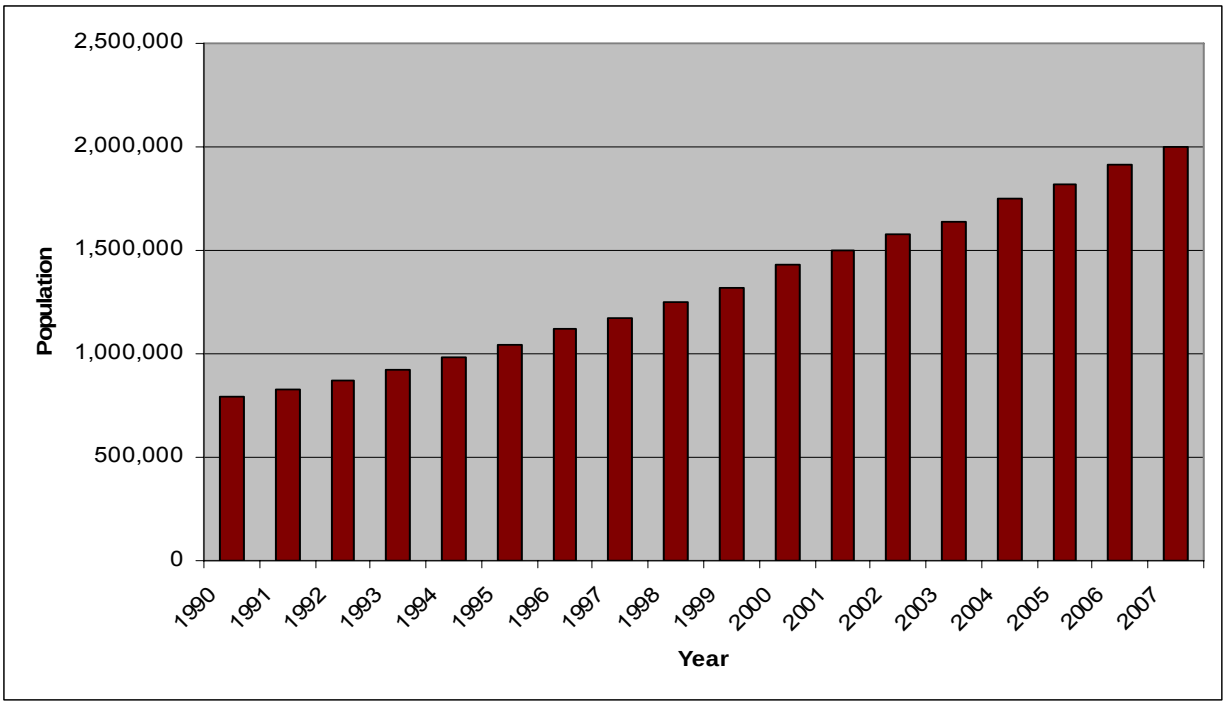
The third required component of an area's redesignation/maintenance request is a demonstration that improved air quality is due to permanent and enforceable emission reductions from the implementation of an applicable SIP. This section shows that the improved air quality in the Las Vegas Valley is the result of permanent and enforceable emission reduction control measures, as opposed to adverse economic or meteorological conditions.

5.2 ECONOMIC CONDITIONS

Between 1990 and 2007, the Las Vegas Valley has experienced strong economic growth while continuously reducing ambient CO levels. Based on these trends, it is reasonable to conclude that improvements in CO concentrations in the valley are attributable to emission reduction control measures that are permanent and enforceable, as opposed to a downturn in the valley's economy.

5.2.1 Population Trends

Clark County is one of the fastest-growing counties in the nation. Its population increased by 1,125,949 residents between 1990 and 2007, raising the total population to 1,996,542—an increase of 177 percent since 1990 (Clark County Department of Comprehensive Planning 2007). Figure 5-1 illustrates population growth from 1990 to 2007.

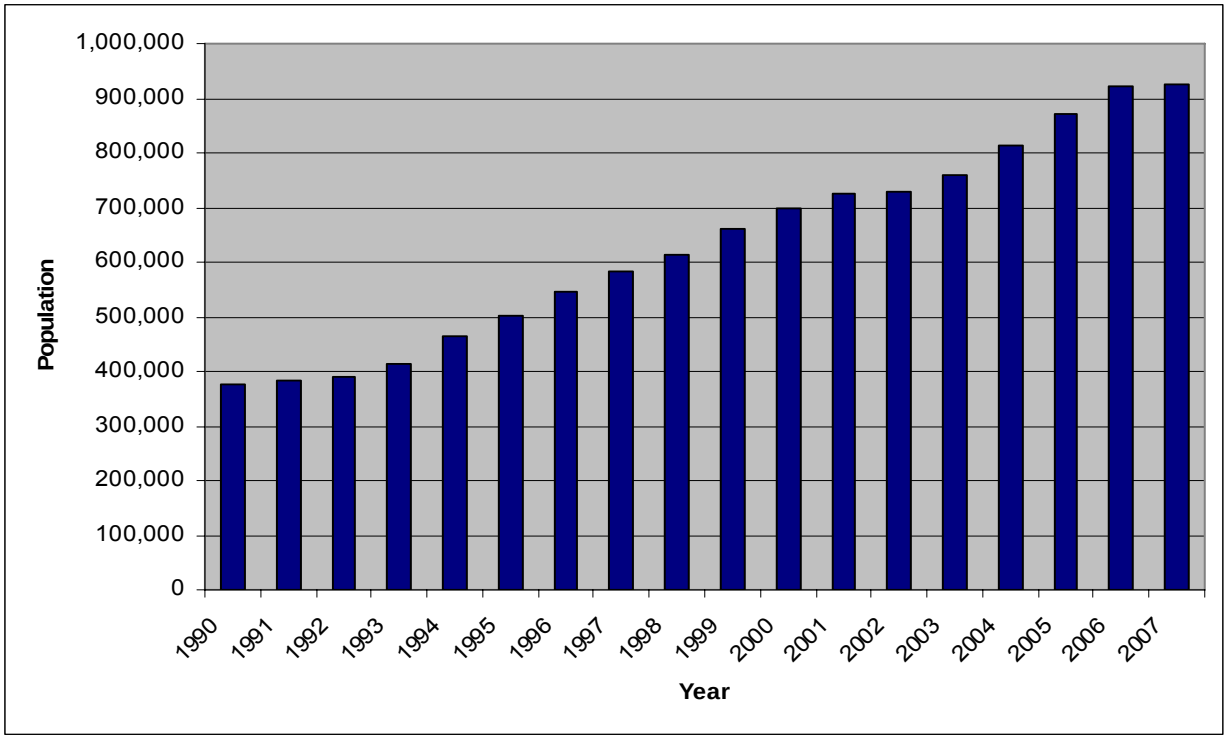


Source: Clark County Department of Comprehensive Planning (2007).

Figure 5-1. Clark County Population Growth Rate, 1990-2007.

5.2.2 Total Full-Time Employment Growth

The Las Vegas Valley has consistently led the nation in job growth since 1990, with most of those jobs created by the resort industry. From 1990 to 2007, total full-time employment in the valley grew from 374,642 to 926,783, an increase of 247 percent (UNLV Center for Business and Economic Research 2008). Figure 5-2 illustrates Las Vegas job growth from 1990 to 2007.



Source: UNLV Center for Business and Economic Research (2008).

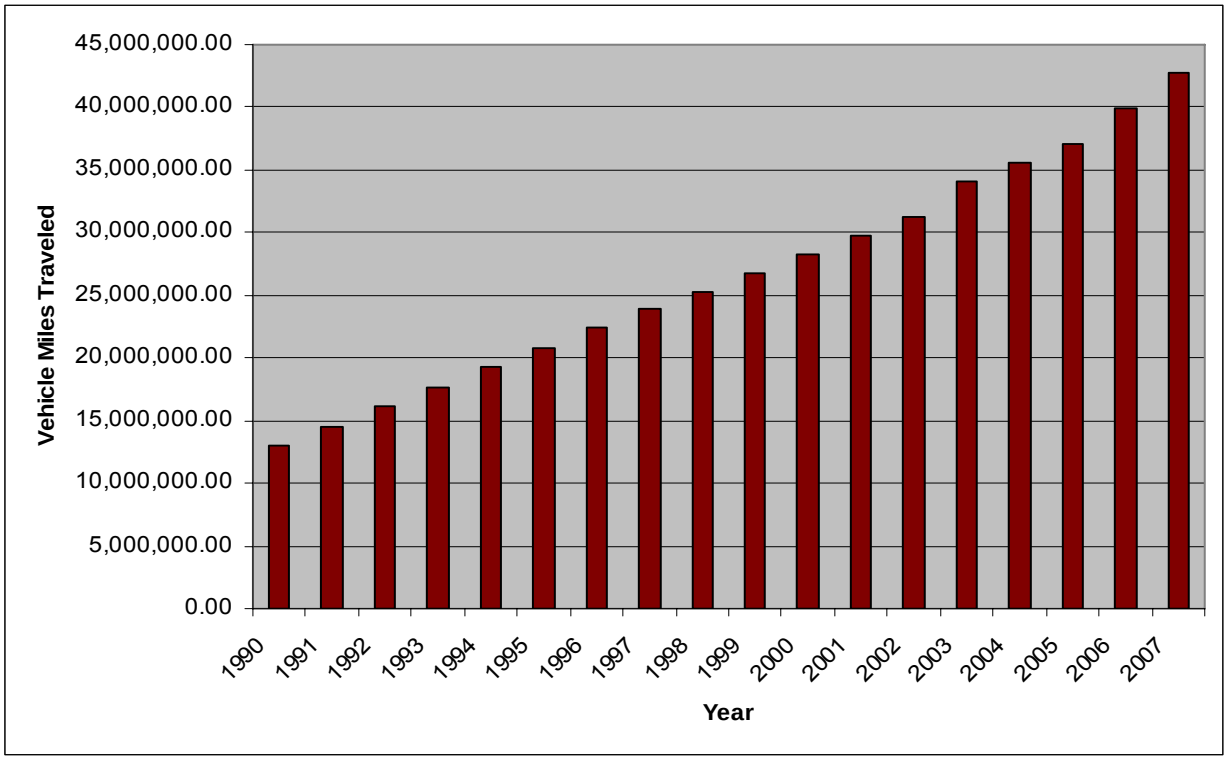
Figure 5-2. Clark County Economic Growth Rate, 1990-2007.

5.2.3 Vehicle Miles Traveled

With the rapid population growth in Clark County, VMT has similarly increased. The Las Vegas Valley's VMT increased by 29,786,606 from 1990 to 2007, raising total VMT to 42,733,565—a 330 percent increase since 1990 (RTC 2007). Figure 5-3 illustrates the valley's VMT growth from 1990 to 2007.

5.3 METEOROLOGICAL CONDITIONS

Las Vegas sits in a broad desert valley that runs about 600 miles from northwest to southeast. The mountains surrounding the valley extend from 2,000 to 10,000 feet above sea level. A general wintertime climatic summary shows that winters are mild and pleasant. Skies are mostly clear, and afternoon temperatures usually approach 60 degrees. Pacific storms occasionally bring rain to the valley; however, the Sierra Nevada and Spring Mountains generally block Pacific moisture. Nighttime temperatures fall below freezing, on average, 24 days per year. Snow accumulation is rare, perhaps an inch or more every four to five years.



Source: Regional Transportation Commission of Southern Nevada (2008)

Figure 5-3. Clark County VMT Growth Rate from 1990-2007.

Cooler nights, combined with the local mountain topography, can create temperature inversions where a layer of cold air is contained in the valley. Warm air then hovers above, trapping CO pollutants. Such weather happens regularly and is characterized by stable atmospheric conditions, light winds, sunny days, and clear, cold nights. Weather conditions unfavorable for CO development include periods of unstable atmospheric conditions: clouds, precipitation, milder temperatures, wind, and good dispersion all impede CO development.

Tables 5-1, 5-2, and 5-3 summarize temperature and precipitation data (as well as departures from normal) recorded at McCarran International Airport from 1998 to 2007 during January, November, and December, respectively. A column in each table shows years in which favorable meteorological conditions, such as increased precipitation combined with increased temperatures, led to low CO concentrations.

Table 5-1. 10-Year Monthly Climate Data for Las Vegas for January

Year	Temperature in Celsius	Departure from Normal	Precipitation (0.01 inches or greater)	Departure from Normal	Favorable Meteorology
2007	7.9	.4	2	-9	
2006	10.1	2.6	0	-12	
2005	10.8	3.3	8	41	X
2004	8.7	1.2	0	-12	

Table 5-1. 10-Year Monthly Climate Data for Las Vegas for January (cont.)

Year	Temperature in Celsius	Departure from Normal	Precipitation (0.01 inches or greater)	Departure from Normal	Favorable Meteorology
2003	12.4	4.9	0	-12	
2002	8.0	.5	0	-12	
2001	8.0	.5	5	10	X
2000	10.8	3.3	0	-12	
1999	10.1	2.6	0	-12	
1998	9.4	1.9	2	-8	

Source: Monthly Climatic Data for the World as prepared by the National Oceanic and Atmospheric Administration, Asheville, NC.

Table 5-2. 10-Year Monthly Climate Data for Las Vegas for November

Year	Temperature in Celsius	Departure from Normal	Precipitation	Departure from Normal	Favorable Meteorology
2007	16.1	3.3	2	6	X
2006	14.7	1.9	0	-10	
2005	14.3	2.3	0	-10	
2004	12.1	-.7	4	33	X
2003	11.6	-1.2	2	6	X
2002	13.9	1.1	3	-7	
2001	14.9	2.1	1	-8	
2000	10.1	-2.7	0	-10	
1999	15.0	2.2	0	-10	
1998	12.5	-.3	2	-2	

Source: Monthly Climatic Data for the World as prepared by the National Oceanic and Atmospheric Administration, Asheville, NC.

Table 5-3. 10-Year Monthly Climate Data for Las Vegas for December

Year	Temperature in Celsius	Departure from Normal	Precipitation	Departure from Normal	Favorable Meteorology
2007	7.5	-.1	1	-7	
2006	8.7	1.1	2	-4	
2005	10.1	2.5	0	-9	
2004	9.6	2.0	2	44	X
2003	8.9	1.3	3	15	X
2002	8.7	1.1	2	-7	
2001	7.6	.0	0	-9	
2000	9.7	2.1	1	-8	
1999	9.4	1.8	0	-9	
1998	8.7	1.1	1	-8	

Source: Monthly Climatic Data for the World as prepared by the National Oceanic and Atmospheric Administration, Asheville, NC.

Wintertime data indicates that over a ten-year period, January had two favorable months, November three, and December two. Because so few months were considered favorable to low CO concentrations, it is reasonable to conclude that improvements in CO concentrations are

attributable to emission reduction control measures that are permanent and enforceable, rather than weather conditions favorable to low CO concentrations.

5.4 ATTAINMENT AND MAINTENANCE CONTROL MEASURES

This plan demonstrates maintenance of the CO NAAQS in 2020 with the following permanent and enforceable emissions reduction control measures: (1) the Federal Motor Vehicle Emissions Control Program (FMVECP), (2) the state I/M Program, (3) the Oxygenated Gasoline Program, (4) a relaxed RVP gasoline standard (as modified in Section 2), and (5) the state Technician Training and Certification Program. Other emissions reduction control measures providing further CO reductions, but not used for emission reduction credit in this plan, are discussed, along with a brief summary of current stationary point and area source programs.

5.4.1 Permanent and Enforceable Emissions Reduction Control Measures

The five control measures used for numeric emission reduction credit in this CO maintenance plan are described below. These measures, which are permanent and enforceable, will be in place through the maintenance year of 2020 and will ensure continued CO emissions reductions in the nonattainment area, as demonstrated in Section 7.4.

1. FMVECP

The first control measure is the FMVECP. This program, originally established in 1968, has dramatically reduced CO emissions by continually requiring automobile manufacturers to produce new vehicles that meet increasingly tighter emission standards. These requirements include the federal Tier 2 emission standards for new light- and medium-duty cars and trucks, as well as standards for heavy-duty on-road and non-road vehicles.

Before CO emissions were regulated, a typical 1950s car emitted approximately 87 grams per mile (g/mi) of CO. Federal rules have since lowered CO emissions to the point where today's requirements limit cars to no more than 3.4 g/mi of CO, a 95 percent reduction (EPA 2007).

DAQEM will continue to rely on the FMVECP as a primary control measure for maintaining the CO NAAQS. Emission reductions mandated by the FMVECP have been primarily responsible for the large decrease in CO concentrations in the Las Vegas Valley. As newer, cleaner vehicles replace older, dirtier ones, CO emissions will continue to decline.

2. State Vehicle I/M Program

The second control measure is the state's I/M Program. NRS and NAC 445B set forth the regulations governing motor vehicles in Clark County. Adopted in 1978 and administered by the Nevada Department of Motor Vehicles (DMV), these regulations establish annual testing procedures for 1968 or newer gasoline-powered vehicles, regardless of size, and for diesel-powered vehicles with a manufacturer's gross vehicle weight rating (GVWR) of up to 10,000 pounds. The I/M Program also allows for exemptions from emissions testing for new vehicles on their first and second registration, new hybrid-electric vehicles for the first five model years,

alternative fuel vehicles, vehicles registered as Classic Rods or Classic Vehicles and driven 2,500 miles or less per year, and vehicles registered as Replica Vehicles.

Nevada uses on-board diagnostic testing procedures for 1996 and newer vehicles, while older vehicles are tested with a two-speed idle test. The program also includes waiver provisions for motorists who spend $450 on emission-related repairs. No waivers are allowed for vehicles that emit visible smoke.

As part of this CO redesignation request and maintenance plan, DAQEM will continue to rely on the I/M Program as a primary control measure for maintaining the CO NAAQS. Emission reductions since the program's inception have been central to decreasing CO concentrations in the Las Vegas Valley.

3. Oxygenated Gasoline Program

The third control measure is the Oxygenated Gasoline Program. The current program, set forth in Section 53 of the Clark County Air Quality Regulations, requires that all fuel during the winter season (October 1 to March 31) contain 3.5 percent oxygenate by weight. The area of applicability covers the hydrographic basins containing the Las Vegas, Eldorado, and Ivanpah Valleys, the Boulder City limits, and any area within three miles of these hydrographic basins that is within Clark County.

The use of oxygenated gasoline was originally mandated under the CAAA, which required gasoline sold in areas that did not meet the CO NAAQS to contain 2.7 percent oxygen content by weight. Clark County's program is considerably more stringent than that minimum (i.e., 3.5 percent oxygen content by weight or 10 percent by volume). Ethanol is the principal oxygenate used in Clark County.

As part of this CO redesignation request and maintenance plan, DAQEM will depend on the current Oxygenated Gasoline Program as a primary control measure for maintaining the CO NAAQS.

4. Relaxed RVP Gasoline Standard

The fourth control measure is a relaxed RVP standard. NRS and NAC 590 currently set a maximum RVP of 9 psi for gasoline sold in Clark County.

As part of this CO redesignation request and maintenance plan, DAQEM proposes relaxing the RVP for wintertime fuels sold in Clark County from 9 to 13.5 psi to coincide with the specification guides for gasoline contained in Standard D4814-01a, Volume 05.02, of the *2002 Annual Book of ASTM Standards* (ASTM 2006). The proposed relaxation of the RVP for wintertime fuels will have a positive impact on gasoline supplies to the Las Vegas Valley because it will no longer preclude the distribution and sale of conventional and reformulated gasoline, which is sold throughout the rest of the southwestern United States during the winter season.

5. State Technician Training and Certification Program

The fifth control measure is the state's Technician Training and Certification Program. 40 CFR 51.367 requires that state I/M inspectors be trained and certified; NRS and NAC 445B set forth the regulations governing technician training and certification. The Nevada DMV is responsible for administering these regulations.

The general requirements to become a class 1 approved inspector include submittal of a certificate of competence from an exhaust gas analyzer manufacturer, successful completion of a training course and written exam, and a practical demonstration of the procedures for testing motor vehicles prescribed by the DMV. Requirements for becoming a class 2 approved inspector include establishment of proper qualifications; demonstration of the ability to test motor vehicles and to diagnose, repair, and service a device for controlling exhaust emissions; successful completion of a written test; and submittal of a current certification from the National Institute for Automotive Service Excellence as an advanced engine performance specialist.

DAQEM will continue to rely on the Technician Training and Certification Program as a primary control measure for maintaining the CO NAAQS.

5.4.2 Other Carbon Monoxide Control Programs

The Las Vegas Valley also benefits from the other CO control programs listed below. Although these programs are not used for numeric emission reduction credit in the CO maintenance plan, they play an important role in assisting Clark County's air quality improvement efforts.

5.4.2.1 Contingency Measure Programs

1. TCM/TDM Program

As noted in Section 2.4, EPA required Clark County to evaluate and implement TCMs to further reduce CO emissions. In 1999, the RTC's Transportation Demand Management Division, through the adoption of the *Transportation Improvement Plan* (FY 1998-2000), implemented the Club Ride commuter services program. The program included employer based commuter incentive programs, telecommuting incentives, and area-wide ridesharing programs. This program is referenced in both the 2000 CO SIP and the 2005 CO SIP Revision.

Major components of the Club Ride commuter services program include employer/community outreach and marketing efforts, employer rideshare program incentives, preferential parking for carpoolers and vanpoolers, emergency rides home for Club Ride members, travel assistance information on the Internet and at public kiosks, transit passes to subsidize employees' transit expenses, and partnerships with vanpool leasing companies.

These voluntary TCM/TDM programs, while no longer used for numeric emission reduction credit, continue to play an important role in Clark County's efforts to improve air quality and serves as a contingency measure, as described in Section 7.7. They are expected to reduce mobile source emissions by approximately 2.3 tpd in 2020 (2000 CO SIP).

2. Alternative Fuels for Government Fleets Program

As noted in Section 2.5, NRS and NAC 486A set forth regulations for the Alternative Fuels for Government Fleets Program. Adopted in 1991 and administered by NDEP, these regulations establish procedures for accelerating the acquisition/conversion and use of alternative fueled vehicles in government fleets. This program is referenced in both the 2000 CO SIP and the 2005 CO SIP Revision.

The Alternative Fuels for Government Fleets Program regulates state and local government fleets based in Clark County and operating 10 or more vehicles. Alternative fuels accepted by the program include methanol, ethanol or other alcohol 85 percent or greater by volume (E-85), compressed natural gas, liquefied petroleum gas, hydrogen, federal reformulated gasoline or its equivalent, ultra-low sulfur diesel, electricity, certain ethanol-diesel blends (e.g., O2Diesel™), and biodiesel from B5 to B100. Hybrid electric vehicles are considered alternative fuel vehicles if the electric motor is used as a propulsion device during parts of the vehicle's drive cycle. As of FY 2000, government fleet operators had to ensure that 90 percent of new vehicle purchases were alternative fueled vehicles.

While no longer used for numeric emission reduction credit, this program continues to assist in Clark County's efforts to improve air quality and serves as a contingency measure, as described in Section 7.7. It is expected to reduce mobile source emissions by approximately 1.37 tpd in 2020 (2000 CO SIP).

3. CBG Wintertime Fuels Program

As noted in Section 2.2, the CBG Wintertime Fuels Program for Clark County requires a low sulfur and aromatic content in gasoline sold between November 1 and March 31. The maximum sulfur content for wintertime fuels sold in Clark County is currently established at 80 ppmw, with an optional flat sulfur standard for producers and importers not to exceed 40 ppmw. Similarly, the maximum aromatic content of wintertime fuels sold in Clark County is established at 30 percent by volume, with an optional flat aromatic hydrocarbon standard for producers and importers not to exceed 25 percent by volume.

Clark County wintertime fuel sulfur content requirements became redundant when federal Tier 2 gasoline rules were implemented. Additionally, the aromatic content requirements of wintertime fuels do not appear to impose any significant burden on fuel suppliers, negating any issue with regards to the supply of gasoline to Clark County. While no longer used for numeric emission reduction credit, this program continues to assist in Clark County's efforts to improve air quality and serves as a contingency measure, as described in Section 7.7.

4. Reduced RVP Gasoline Program

As noted in Section 2.3, NRS and NAC 590 set a maximum RVP of 9 psi for gasoline sold in Clark County. Tightening the RVP standard back to 9.0 psi will act as a contingency measure if future CO exceedances occur, as described in Section 7.7.

5.4.2.2 State Mandated and Voluntary Emission Reduction Programs

1. Heavy-Duty Vehicle Program

NRS and NAC 445B set forth the Heavy-Duty Vehicle Program regulations. Adopted in 1991 and administered by the DMV, these regulations establish procedures for reducing motor vehicle emissions by limiting excessive tailpipe or smokestack smoke from any vehicle, diesel or gasoline, with a manufacturer's GVWR of 8,500 pounds or more.

The program incorporates random roadside testing of heavy-duty vehicles to determine if their exhaust exceeds state opacity (or smoke) standards. Violators are notified and must repair and retest the vehicle within 30 days. Government and private fleet operators may request opacity testing of their fleet vehicles as well; if violations are found, fleet managers are notified and vehicles are voluntarily repaired and retested.

2. Smoking Vehicle Program

The Smoking Vehicle Program was developed in 1996 by the DMV in accordance with CAAA Titles I and II and NRS Sections 445B.100 and 445B.845. The program allows Nevada residents to voluntarily participate in improving the region's air quality by reporting motor vehicles with visible exhaust emissions. The program also educates the public on the causes of exhaust emissions and the benefits of keeping vehicles in good running order.

Once a smoking vehicle is reported, the DMV sends a courtesy notice to the registered owner of the vehicle asking the owner to repair it. If multiple reports are received on the same vehicle, or if law enforcement or DMV staff make the report, the notice will require the owner to bring the vehicle to a DMV emissions lab for testing. Failure to comply can result in a hold or suspension of the vehicle's registration, in accordance with state law.

3. Voluntary Vehicle Repair Program

DAQEM implemented the Voluntary Vehicle Repair Program (VVRP) in 2006. Funded through a grant from the DMV Emissions Control Program, the VVRP helps eligible residents fix high-emitting vehicles and light-duty trucks that have failed a smog check.

The program provides eligible recipients up to $650 toward the repair of a vehicle. An individual may be eligible to receive VVRP assistance if a vehicle is currently registered and operating in Clark County, the vehicle to be repaired is registered to the owner/participant, the needed repairs are not covered by a manufacturer's warranty, the estimated repairs do not exceed the fair market value of the vehicle, and the owner/participant meets income eligibility requirements.

In addition to reducing CO emissions, the VVRP results in better vehicle performance, extended vehicle life, and improved fuel efficiency.

4. Advanced Truck Stop Electrification Program

DAQEM received almost $2 million in Congestion Mitigation and Air Quality (CMAQ) funds to install Advanced Truck Stop Electrification (ATE) systems in Clark County between 2007 and 2010. DAQEM plans to equip 150 truck parking spaces in the valley with an ATE system. CMAQ will fund 100 percent of the project.

ATE facilities remove 100 percent of emissions associated with extended diesel idling, including nitrogen oxides, particulate matter, volatile organic compounds, CO, and carbon dioxide. The system reduces criteria pollutants by 98 percent, even after accounting for the electricity from the grid used to power the system.

DAQEM will continue to explore funding additional ATE projects through CMAQ and/or local funding sources.

5. Diesel Engine Retrofit Program

Using almost $1 million in CMAQ funds, DAQEM plans to retrofit 69 non-road diesel engines with diesel oxidation catalysts, diesel particulate filters, and closed crankcase filter systems between 2007 and 2010. The retrofit is expected to reduce CO emissions from these engines by 52 percent each year.

DAQEM will continue to explore funding an expanded diesel-engine retrofit program to include on-road diesel engines.

6. Clark County School District Bus Retrofit Program

The Clark County School District (CCSD) received $1 million in Federal Highway Administration funds from the U.S. 95 widening project settlement to retrofit diesel-powered school buses. CCSD plans to retrofit 400-500 buses with diesel oxidation catalysts and closed crankcase filter systems at an estimated cost of $2,000 per vehicle. CCSD will begin with the newest buses that do not have after-market emission reduction equipment: those from the 2003 model year. The CCSD anticipates that the EPA-verified retrofit technologies will reduce CO by 50 percent after it begins the project in January 2008.

The CCSD is seeking additional funding sources, including EPA grants, to further retrofit the school bus fleet.

5.4.3 Stationary Point and Area Source Programs

Clark County estimates that stationary point and area sources account for about 3 percent of total CO emissions in the Las Vegas Valley. This plan suggests no controls other than the minimum federal requirements.

6.0 SECTION 110 AND PART D REQUIREMENTS

6.1 INTRODUCTION

The fourth required component of an area's redesignation/maintenance request is proof that it meets CAAA Section 110 and Part D requirements. This section addresses those requirements.

6.2 SECTION 110 REQUIREMENTS

Before EPA can redesignate the Las Vegas Valley nonattainment area to attainment, based on the proposed changes contained in this plan, the provisions of Section 110(a)(2) and Section 110(l) must be satisfied. Section 110(a)(2) addresses the general requirements for SIPs. Section 110(l) prevents approval of SIP revisions if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress towards attainment of a NAAQS or any other applicable requirement of the CAAA.

6.2.1 Section 110(a)(2) Analysis

In general, the requirements for SIPs contained in Section 110(a)(2) are:

1. The establishment and implementation of enforceable emission limitations.

2. The monitoring, compilation, and analysis of ambient air quality data.

3. Pre-construction reviews and permitting of new and modified major stationary sources.

4. Consultation with, and provisions for the participation of, affected local governments.

5. Assurance that the state has adequate funds and authority to enforce the SIP element and associated regulations.

6. The establishment of permit fees for stationary sources.

NRS 445B.500 addresses the establishment, administration, and enforcement of programs for controlling air pollution. In Clark County, these programs are administered and enforced by DAQEM. The department has nearly 150 staff members and an annual budget of approximately $24 million to implement and enforce the air quality plans and regulations applicable to the Las Vegas Valley CO nonattainment area.

Furthermore, the 2000 CO SIP and 2005 CO SIP Revision include the provisions required by Section 110(a)(2). In approving the Clark County 2000 CO SIP and 2005 CO SIP Revision in January 2003 and August 2006, respectively, EPA determined that DAQEM met Section 110(a)(2) requirements.

Should DAQEM be unable to meet these requirements in the future, NRS 445B.520 and 445B.530 allow the State Environmental Commission to assume jurisdiction over the local air quality management program to ensure that CAAA requirements are satisfied. EPA also has

authority to impose sanctions on a state where EPA "…finds that any requirement of an approved plan (or approved part of a plan) is not being implemented" (CAAA, Section 179).

6.2.2 Section 110(l) Analysis

The maintenance plan proposes to relax one federally enforceable control measure—the Reduced RVP Gasoline Program—and discontinue the CO SIP credits taken from three other previous control measures: the CBG Wintertime Fuels Program, the TCM/TDM Program, and the Alternative Fuels for Government Fleets Program.

CAA Section 110(l) requires that any SIP revision not interfere with requirements for attainment or reasonable further progress regarding other criteria pollutants, or with any other CAA requirements. The following analysis demonstrates that the control measure changes proposed in this CO maintenance plan will not interfere with Clark County's progress towards attaining the 8-hour ozone NAAQS, or with continued attainment of the PM_{10} NAAQS. Nevada is currently designated as attainment/unclassifiable for $PM_{2.5}$ under Section 107(d) of the CAA; therefore, no analysis is required on $PM_{2.5}$ NAAQS impacts.

6.2.2.1 Ozone

1. Relaxed RVP Gasoline and CBG Wintertime Fuels Programs

Relaxation of the RVP for wintertime fuels and discontinuation of the CO SIP credits taken for the CBG Wintertime Fuels Program are not expected to interfere with attainment of the 8-hour ozone standard because both are wintertime programs. Elevated levels of ozone normally occur during the summertime, since heat and sunlight are needed to produce the chemical reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOC) that forms ground-level ozone.

2. TCM/TDM Program

CAAA Section 187(b)(2) requires areas classified as serious nonattainment to adopt TCMs as provided in Section 182(d)(1). The RTC adopted Resolutions No. 177 and No. 186 (2000 CO SIP, Appendix D), which indicated support for, and established the guidelines for administering, a voluntary employer-based commuter incentive program, currently known as Club Ride.

DAQEM is evaluating the benefits of this program in conjunction with the development of the ozone SIP; discontinuation of CO SIP credits from the TCM/TDM Program is not expected to interfere.

3. Alternative Fuels for Government Fleets Program

The state of Nevada developed the Alternative Fuels for Government Fleets Program as a result of the Energy Policy Act of 1992, which required federal, state, and fuel provider fleets to acquire alternative fuel vehicles. The law establishing this program is set forth in NRS 486a, which authorizes the State Environmental Commission to promulgate implementing regulations.

NAC 486a sets forth those regulations.
DAQEM is evaluating the benefits of the Alternative Fuels for Government Fleets Program in conjunction with the development of the ozone SIP; discontinuation of CO SIP credits from the program is not expected to interfere, since the estimated benefits from this program are small.

6.2.2.2 Particulate Matter

Relaxation of the RVP requirement for wintertime fuels and discontinuation of the CO SIP credits taken from the CBG Wintertime Fuels Program, TCM/TDMs and Alternative Fuels for Government Fleets Program are not expected to interfere with continued attainment of the 24-hour PM_{10} standard because DAQEM has demonstrated that motor vehicle exhaust is an insignificant source of PM_{10} in the Las Vegas Valley (*PM_{10} State Implementation Plan for Clark County,* DAQEM 2001; *Milestone Achievement Report for Clark County,* DAQEM 2007). Additionally, removing fuel controls has no impact on PM_{10} emissions from vehicle exhaust.

DAQEM's determination of source significance was based primarily on the J.D. Smith annual inventory and the 24-hour micro-inventories at five representative sites, supplemented by reviews of the 1998 valley-wide annual emission inventory and Chemical Mass Balance modeling. The emission inventories/projections in the *Milestone Achievement Report for Clark County* (DAQEM 2007) show that motor vehicle exhaust makes an insignificant contribution to PM_{10} concentrations, so additional reductions were not needed to advance the attainment date.

Table 6-1 shows total PM_{10} mobile source emissions for the Las Vegas Valley in 2006. The contribution of vehicle exhaust to total PM_{10} mobile source emissions is less than 1 percent.

Table 6-1. Total PM_{10} Mobile Source Emissions for 2006

On-Road Mobile Source Category	Tons per Day (tpd)
Paved road dust (includes construction and unpaved shoulder track-out)	83.53
Private unpaved roads	9.34
Highway construction projects activities	1.34
Highway construction projects - wind erosion	3.13
Vehicular sulfate PM	0.02
Vehicle tire wear	0.37
Vehicle brake wear	0.55
Vehicle exhaust	0.53
Total PM_{10} mobile source emissions	**98.81**

Source: *PM_{10} Milestone Achievement Report for Clark County,* DAQEM 2007.

Table 6-2 shows that mobile source emission programs, such as reduced RVP, CBG, TCM/TDM, and alternative fuel fleets, have a negligible effect in reducing 24-hour PM_{10} concentrations in the Las Vegas Valley.

Table 6-2. 2006 24-Hour Controlled PM_{10} Emissions

On-Road Mobile Source Category	Uncontrolled PM_{10} (tpd)	Controlled PM_{10} (tpd)	Percent Reduction
Paved road dust (includes construction track-out)	83.53	59.31	29.00
Unpaved road dust	9.34	3.27	65.00
Highway construction projects activities	1.34	0.43	68.00
Highway construction projects–wind erosion	3.13	0.91	71.00
Vehicle sulfate PM	0.02	0.02	0.00
Vehicle tire wear	0.37	0.37	0.00
Vehicle brake wear	0.55	0.55	0.00
Vehicle exhaust	0.53	0.53	0.00
Total	**98.81**	**65.38**	**33.83**

Source: ***PM_{10} Milestone Achievement Report for Clark County*****, DAQEM 2007.**

6.3 PART D REQUIREMENTS

CAAA Part D requires the following items be addressed in nonattainment plan provisions:

1. The implementation of reasonable available control measures, including reasonably available control technologies, for existing sources.

2. Reasonable further progress for existing sources.

3. A current emissions inventory and periodic inventories every three years until attainment.

4. The identification and quantification of allowable emissions for new and modified stationary sources.

5. A stationary source permitting program.

6. Other measures, including enforceable emission limitations, additional control measures, and a schedule for compliance.

7. Compliance with Section 110 provisions.

8. Contingency measures.

The EPA-approved 2000 CO SIP and 2005 CO SIP Revision include the provisions required by CAAA Part D. In approving the CO SIP and CO SIP Revision in January 2003 and August 2006, respectively, EPA determined that DAQEM met the CAAA Part D requirements.

Other Part D requirements applicable in nonattainment and maintenance areas include the general and transportation conformity provisions of CAAA Section 176(c). These provisions ensure that federally funded or approved projects and actions will conform to this CO maintenance plan before implementation. In approving the 2000 CO SIP and 2005 CO SIP Revision in January 2003 and August 2006, respectively, EPA determined that DAQEM met the Section 176(c) requirements and the transportation conformity rule (40 CFR 93, Subpart A).

7.0 MAINTENANCE PLAN

7.1 INTRODUCTION

The fifth required component of an area's redesignation/maintenance request is fulfillment of CAAA Section 107(d)(3)(E) requirements. These specify that for an area to be redesignated as attainment, EPA must approve a maintenance plan that meets Section 175(A) requirements. This plan provides for maintenance of the CO NAAQS for at least ten years after the redesignation. CAAA Section 107(d)(3)(D) allows EPA up to 18 months after submittal to process a redesignation/maintenance request. To accommodate the potential review time, this plan covers the period from 2008 to 2020.

This section focuses on the following core elements EPA has established as necessary for approval of maintenance plans:

1. Maintenance plan control measures (Section 7.2).

2. Emission inventory summary (Section 7.3).

3. Maintenance demonstration (Section 7.4).

4. MVEB (Section 7.5).

5. Approved monitoring networks (Section 7.6).

6. Verification of continued attainment (Section 7.6).

7. Contingency plan (Section 7.7).

8. Subsequent maintenance plan revisions (Section 7.8).

7.2 MAINTENANCE PLAN CONTROL MEASURES

DAQEM will rely on the five control measures discussed in Section 5.3.1 to demonstrate maintenance of the CO NAAQS through 2020:

1. The FMVECP, as approved in the 2000 CO SIP and 2005 CO SIP Revision.

2. The state I/M Program, as approved in the 2000 CO SIP and 2005 CO SIP Revision.

3. The Oxygenated Gasoline Program, as approved in the 2000 CO SIP and 2005 CO SIP Revision.

4. The state Technician Training and Certification Program, as approved in the 2000 CO SIP and 2005 CO SIP Revision.

5. A Relaxed RVP Gasoline Program, with a maximum RVP of 13.5 psi.

No other emission reduction credit has been taken in the maintenance demonstration for any other state or local control programs. No other programs, strategies, or regulations shall be incorporated or deemed enforceable control measures for the maintenance demonstration.

Four attainment control measures in the CO SIP that will no longer be used for SIP credit will remain as contingency measures in the CO maintenance plan. These include the Reduced RVP Gasoline Program (a maximum RVP of 9 psi), the TCM/TDM Program, the Alternative Fuels for Government Fleets Program, and the CBG Wintertime Fuels Program.

Table 7-1 lists the maintenance control measures that will be used for numeric credit in the CO maintenance plan, along with the attainment control measures approved in the 2000 CO SIP and 2005 CO SIP Revision that will now be incorporated as contingency measures.

Table 7-1. Summary of Control Measures Used in CO Maintenance SIP and CO Attainment/Revision SIPs

Control Measure	Status in Maintenance Plan	Status in Attainment Plan and Revision
FMVECP	Maintenance measure	Attainment measure
State I/M Program	Maintenance measure	Attainment measure
Oxygenated Gasoline Program	Maintenance measure	Attainment measure
Technician Training and Certification Program	Maintenance measure	Attainment measure
Relaxed RVP Gasoline Program	Maintenance measure (with 13.5 psi max RVP)	N/A
Reduced RVP Gasoline Program	Contingency measure (with 9 psi max RVP)	Attainment measure
TCM/TDM Program	Contingency measure	Attainment measure
Alternative Fuels for Government Fleets Program	Contingency measure	Attainment measure
CBG Wintertime Fuels Program	Contingency measure	Attainment measure

7.3 EMISSION INVENTORY SUMMARY

EPA requires that all maintenance plans include an emissions inventory that is comprehensive, accurate, and current with respect to actual emissions in the area. This section summarizes the 1996 base year CO inventory for the Las Vegas Valley nonattainment area, which addresses CO emissions from four major type categories: on-road mobile, area sources, non-road mobile, and point sources. Detailed information on the development of the 1996 base year CO inventory can be found in the 2000 CO SIP and the 2005 CO SIP Revision.

The 2000 CO SIP and 2005 CO SIP Revision were also based on computer modeling (using UAM) of the single best performing episode of the three originally modeled: the night of December 8-9 (Sunday-Monday), 1996. This maintenance plan continues to rely on that episode.

For all future years modeled in this plan, DAQEM used the most recently adopted planning variables approved by the RTC, which is the designated Metropolitan Planning Organization for the Las Vegas urban area. Output provided by the RTC from the 2006 TransCAD TDM includes updated link volumes and trip tables, modified population projections reflecting higher growth rates in the county, and revised daily VMT.

All emission inventory estimates are for the Las Vegas Valley CO nonattainment area on a typical weekday during the wintertime season (November through February). The inventories were developed using EPA-approved emissions modeling methods.

7.3.1 Demographic and Transportation Data

Table 7-2 summarizes the demographic data used to develop the emission inventories for the Las Vegas Valley CO inventory/modeling domain. The information was obtained from the RTC FY 2006-2030 *Regional Transportation Plan*, approved in October 2006. All other information in the CO maintenance plan inventory/modeling domain—including vehicle fleet mix, seasonal/day-of-week adjustment factors, and hourly activity profiles—has also been updated with the most current data available.

Table 7-2. Demographic Data Used to Develop Emission Inventories

January	Population of Las Vegas Valley	Modeled VMT (Monday)
1996 Base[1]	1,037,844	22,395,251
2008[2]	2,102,216	49,439,086
2010[2]	2,281,340	54,375,446
2020[2]	2,999,953	70,240,128

[1]2000 CO SIP and 2005 CO SIP Revision.
[2]RTC FY2006-2030 RTP, adopted October 2006.

7.3.2 Summary of Emission Inventories

The 1996 base year emissions inventory incorporates the nonattainment control measures described in the 2000 CO SIP. Inventories for the 2008 and 2010 interim years, and the 2020 maintenance year, incorporate the maintenance plan control measures described in Section 7.2. All inventories include on-road mobile, aviation (including McCarran International, North Las Vegas, Henderson, and Nellis Air Force Base), area, non-road mobile, railway, and point sources.

Table 7-3 summarizes the emission inventories by source category for all years, also with the control measures described in Section 7.2. Figures 7-1 through 7-4 show the emission inventories for each individual year; detailed information on the methodologies used to estimate future year emissions can be found in the 2005 CO SIP Revision.

In all four years, on-road mobile source emissions represent the largest source of CO in the modeling domain: about 77 percent in the base year, 82 percent in the interim years, and 79 percent in the maintenance year. The modeling domain shows that with the implementation of the maintenance control measures in Section 7.2, in conjunction with stricter federal controls on vehicles and fuels, on-road mobile emissions change by less than 1 percent between 2008 and 2020, or from 579.3 tpd to 574.4 tpd.

Table 7-3. Summary of Total Daily CO Emissions for the Inventory/Modeling Domain (tpd)

Source Category	1996-Base[2]	2008[3]	2010[3]	2020[3]

On-road mobile[1]	511.4	579.3	579.7	574.4
Aviation	34.4	39.7	42.2	53.5
Area sources	9.5	13.9	14.7	18.6
Non-road mobile	103.4	57.7	60.8	71.2
Railway	0.3	0.3	0.3	0.4
Point sources	3.1	15.8	15.8	15.8
Total	662.1	706.7	713.5	733.9

[1]Based on the second Monday in December (12/9/2006).
[2]2000 CO SIP and 2005 CO SIP Revision.
[3]*Clark County Carbon Monoxide Redesignation Request and Maintenance Plan Technical Support Document*, DAQEM 2008.

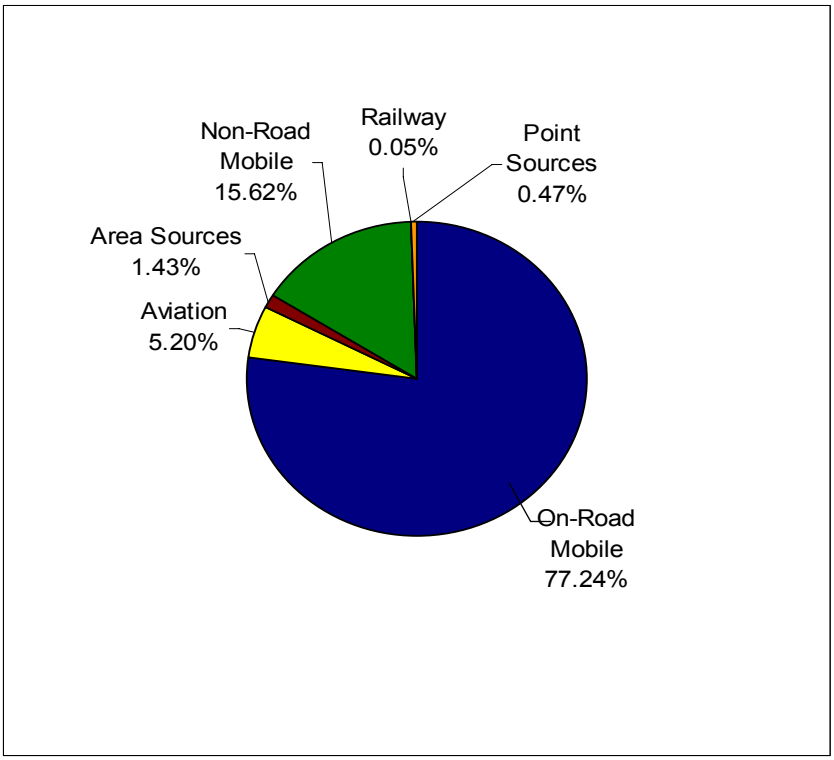


Figure 7-1. 1996 Emission Inventory for the Las Vegas Valley CO Modeling Domain.

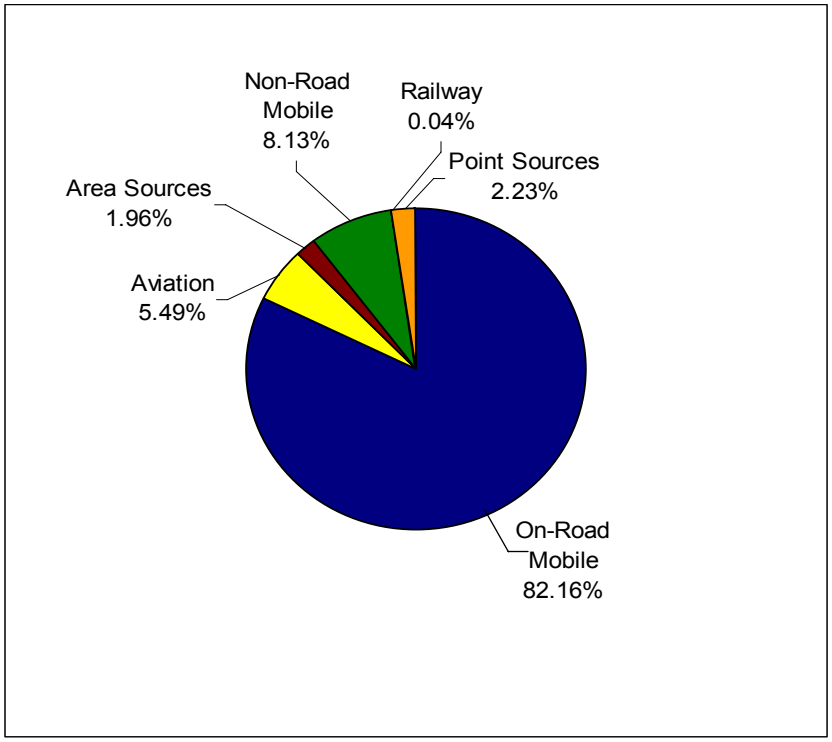


Figure 7-2. 2008 Emission Inventory for the Las Vegas Valley CO Modeling Domain.

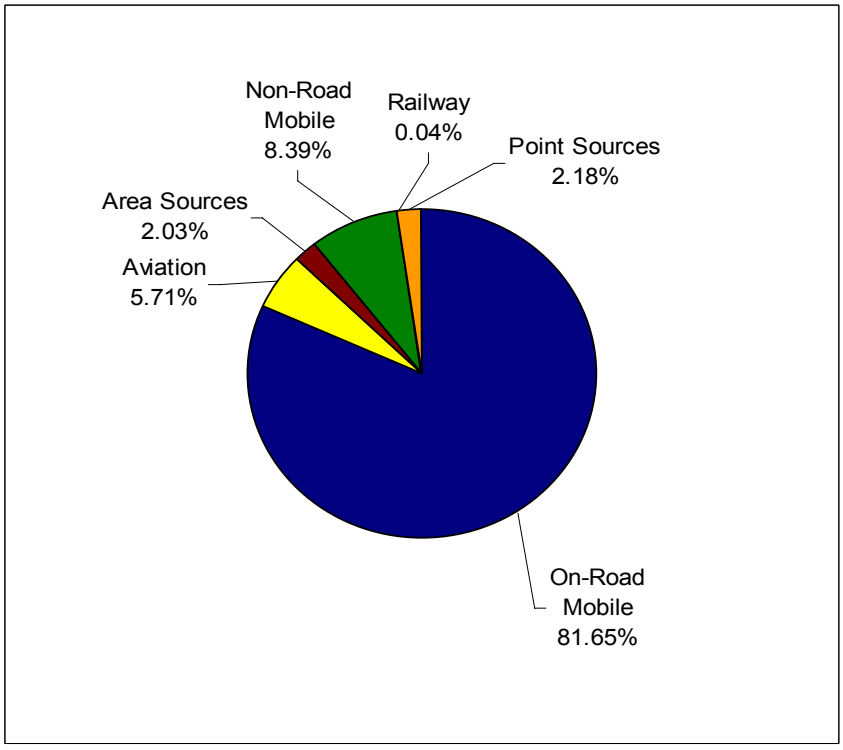


Figure 7-3. 2010 Emission Inventory for the Las Vegas Valley CO Modeling Domain.

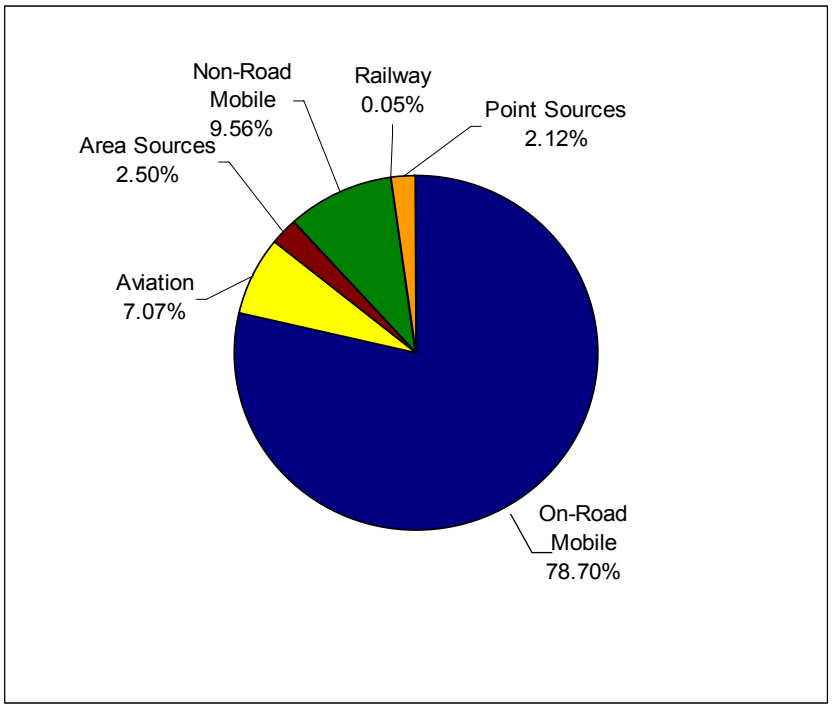


Figure 7-4. 2020 Emission Inventory for the Las Vegas Valley CO Modeling Domain.

Non-road mobile source emissions represent the second largest source of CO in the modeling domain: about 16 percent in the base year, 8 percent in the interim years, and 9 percent in the maintenance year. Non-road mobile source emissions increase by about 19 percent between 2008 and 2020, or from 57.7 tpd to 71.2 tpd. The increase comes mainly because maintenance control measures do not fully offset growth in the number of non-road engines.

Aviation CO emissions rank third in the modeling domain at about 5 percent in the base year, 5-6 percent in the interim years, and 7 percent in the maintenance year. Aviation CO emissions increase steadily during the maintenance period due to projected growth in airport activities.

Area, railway, and point source CO emissions combined contribute less than 2 percent to the base year modeling domain, increasing to 4 percent in the interim years and 5 percent in the maintenance year due to anticipated regional population growth.

In summary, total emissions increase by only 5 percent between 2008 and 2020 with the implementation of the maintenance control measures described in Section 7.2, or from 706.7 tpd to 733.9 tpd.

7.4 MAINTENANCE DEMONSTRATION

As required by CAAA Section 175(a), each request for redesignation must include a SIP revision that provides for maintenance of the NAAQS for at least 10 years after redesignation. Per EPA

guidance and policy, maintenance plans require the same level of modeling performed for the attainment demonstration (Calcagni 1992).

This section summarizes the application of the UAM and CAL3QHC models in demonstrating maintenance of the CO NAAQS through December 31, 2020. The primary purpose for conducting UAM area-wide and CAL3QHC roadway intersection modeling is to demonstrate the effectiveness of the control measures described in Section 7.2 in maintaining the 8-hour average CO NAAQS.

EPA requires estimated 8-hour average concentrations to be lower than the 9 ppm standard when using the UAM area-wide model to demonstrate continued attainment. EPA also recommends that the CAL3QHC model be applied to intersections at potential hot-spot locations. The hot-spot modeling analysis combines concentrations from the UAM with those from the CAL3QHC microscale model.

To further support the maintenance demonstration, Emissions and Dispersion Modeling System (EDMS) results from the Ricondo (2003) analyses were combined with revised UAM model predictions for all future years to estimate 8-hour CO concentrations for the duration of an episode on and around the three civil airport properties in the valley. The following sections provide details on each of these components.

7.4.1 Urban Airshed Model Analysis

The UAM analysis used updated emission inventories for point, on-road mobile, and non-road mobile sources for the December 8-9, 1996, historical CO event. All other environmental parameters were taken from the original modeling documented in the 2000 CO SIP. The UAM was then run with the updated future year inventories for 2008, 2010, and 2020 to determine peak 8-hour CO levels in the valley using the same December 8-9, 1996, conditions. Figures 7-5 through 7-7 display predicted 8-hour maximum CO concentrations in the modeling domain for the 2008 and 2010 interim years and the 2020 maintenance year, respectively. UAM predictions show that the 8-hour CO standard of 9 ppm will not be violated anywhere within the domain. As Table 7-4 shows, peak 8-hour CO concentrations continue to decrease in each of the future years.

Table 7-4. Peak UAM 8-Hour Average CO Concentrations Predicted for Modeled Years

Year	Maximum 8-Hour CO Concentration (ppm)
2008	8.8
2010	8.5
2020	7.7

Figures 7-1 through 7-4 showed that the contribution of McCarran International Airport to local CO concentrations increases only slightly during this period, due to the projected growth in airport activities reported by Ricondo (2003).

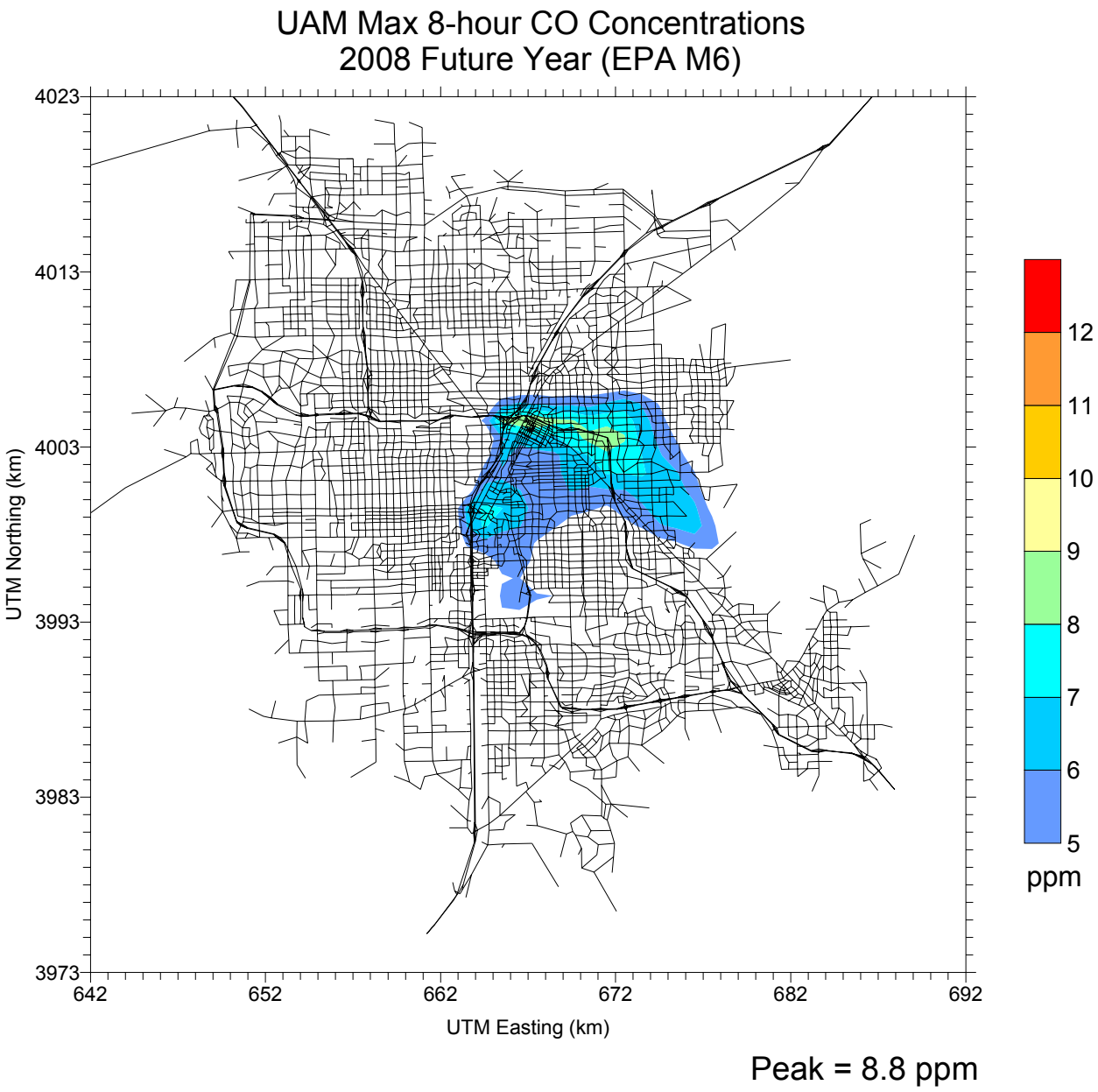


Figure 7-5. Spatial Distribution of UAM predicted 8-Hour Maximum CO Concentrations (ppm) for the December 8-9, 1996 Episode Using Emission Forecasts for 2008 (Air Version of MOBILE6).

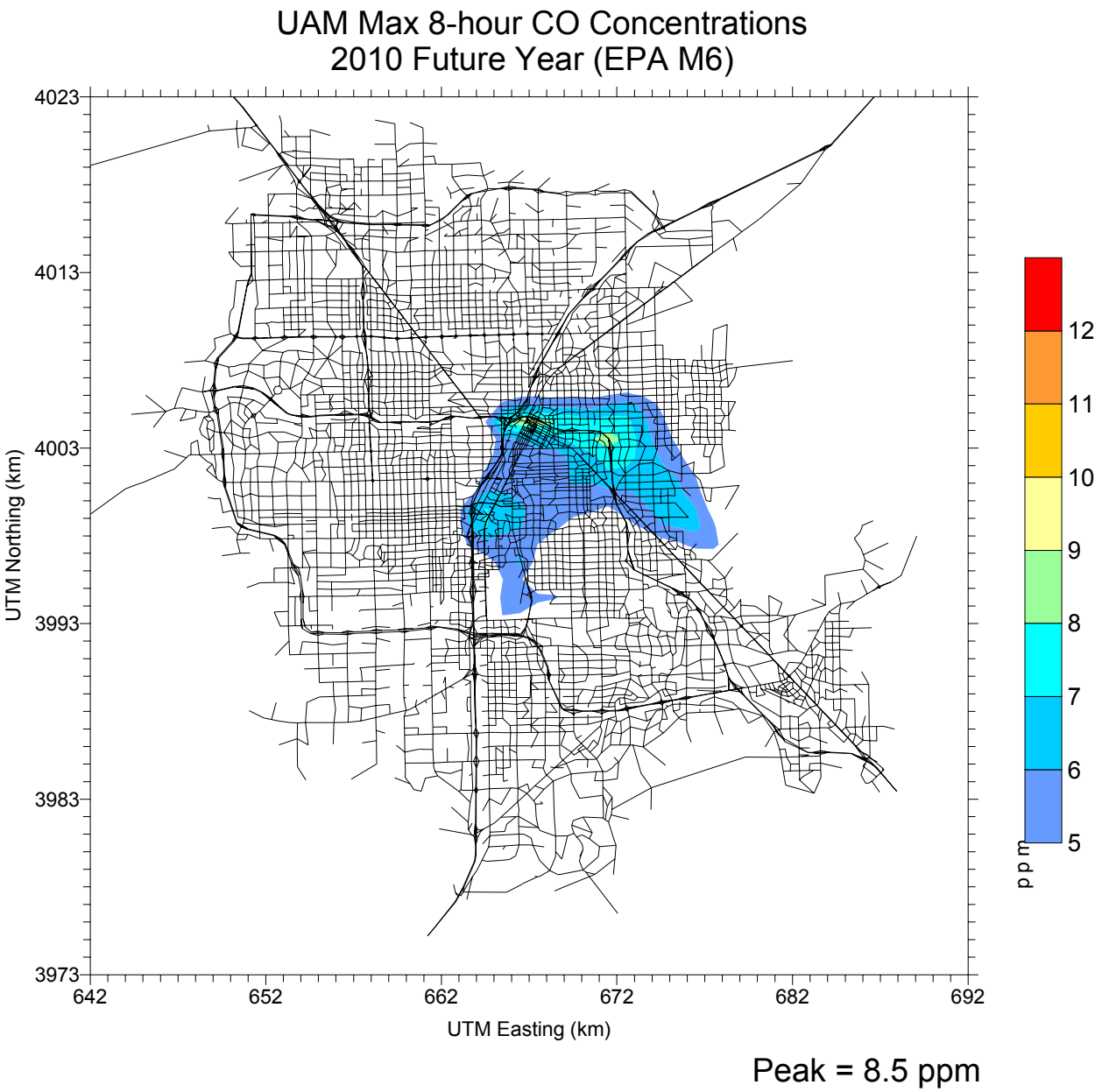


Figure 7-6. Spatial Distribution of UAM predicted 8-Hour Maximum CO Concentrations (ppm) for the December 8-9, 1996 Episode Using Emission Forecasts for 2010 (Air Version of MOBILE6).

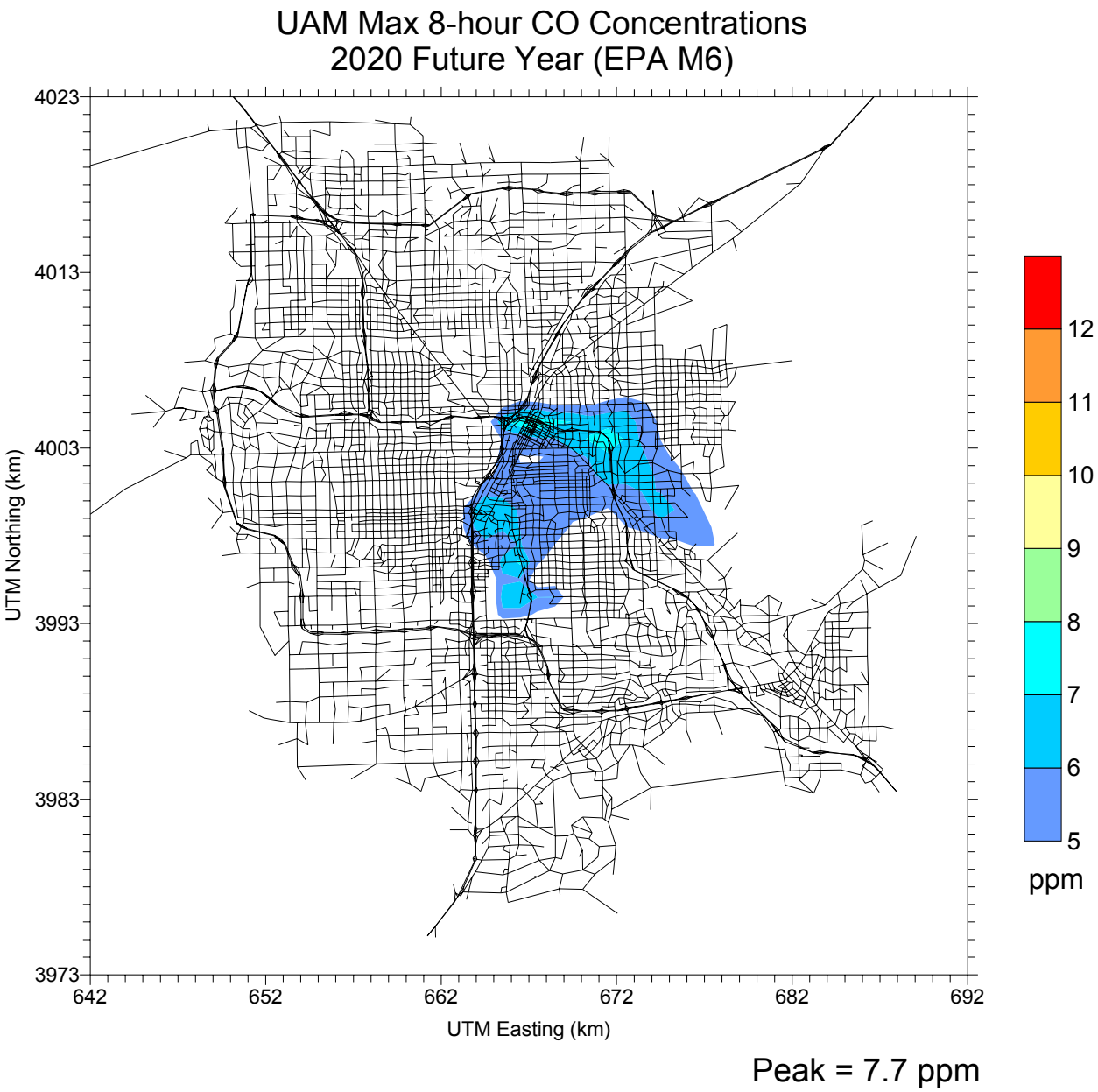


Figure 7-7. Spatial Distribution of UAM predicted 8-Hour Maximum CO Concentrations (ppm) for the December 8-9, 1996, Episode Using Emission Forecasts for 2020 (Air Version of MOBILE6).

The UAM was used to refine the estimation of future year on-road mobile CO emission budgets for the central, most urbanized portion of the modeling domain. Table 7-5 defines this central urban subdomain, and Figure 7-8 outlines the subdomain in relation to the total modeling domain.

Table 7-5. Grid Definition of the Central Urban Subdomain

	Column	Row	UTM East[1]	UTM North
Low-Left	11	19	652.000	3991.000
Upper-Right	36	45	678.000	4018.000

[1]Universal Transverse Mercator.

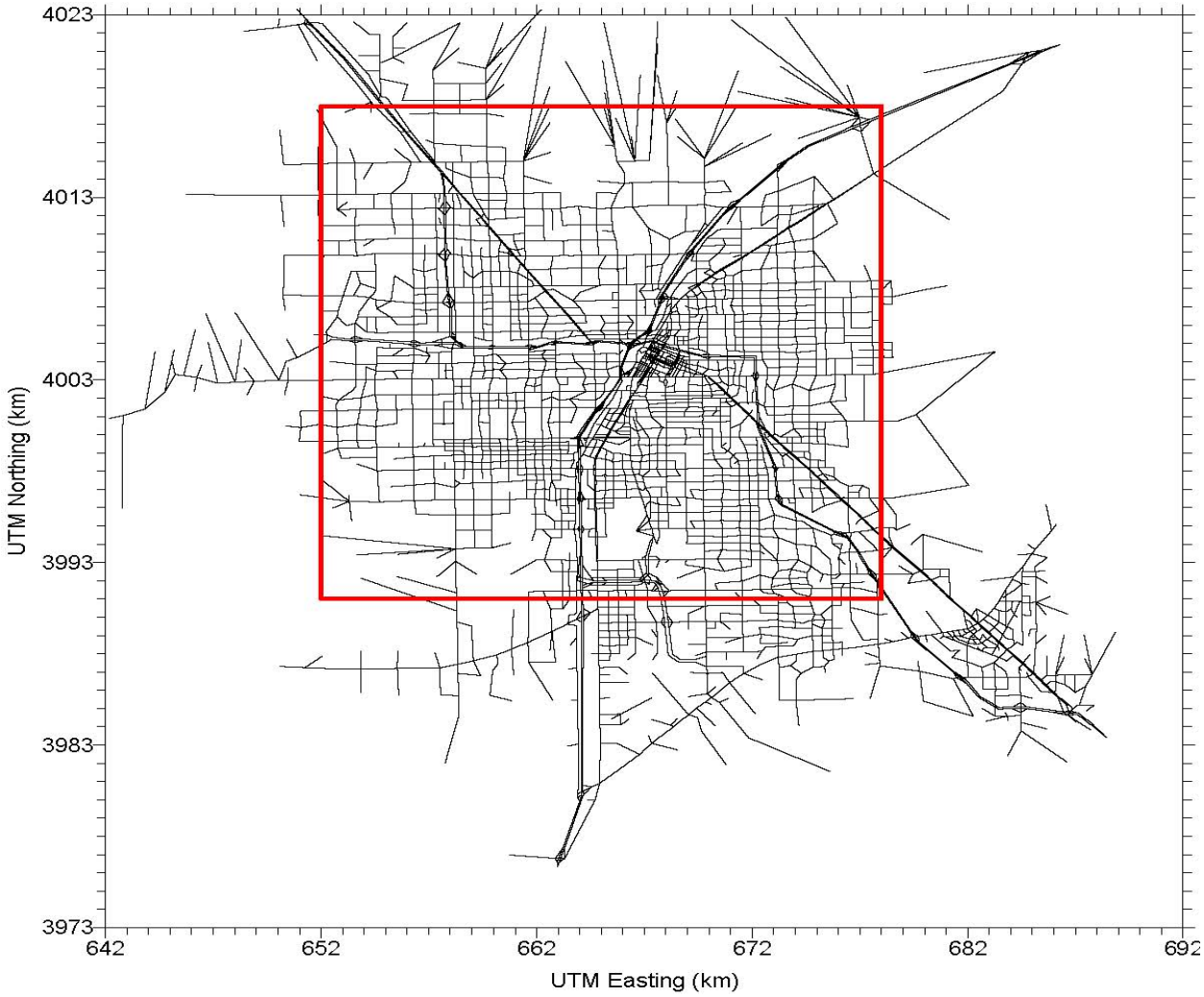


Figure 7-8. Boundaries of the Outer Domain and Subdomains.

In the analysis, future year on-road mobile source emissions were scaled up across the entire modeling domain to the point at which the peak 8-hour CO concentrations reached 8.9 ppm. Next, on-road mobile source emissions outside the central urban subdomain were increased in each year by an additional 60 percent to reach a maximum peak 8-hour CO concentration of just under 9 ppm. Hence, the resulting daily on-road emission totals for December 9 can be used to establish future-year emission budgets. Table 7-6 presents the results of this analysis.

Table 7-6. Weekday On-Road Emissions Increases, UAM-Predicted Peak CO, and Resulting Emissions Budget for Each Future Year

Year	Domain-Wide On-Road Emissions Increase	Net On-Road Emissions Increase[1]	Peak 8-Hour CO (ppm)	Total Domain On-Road Emissions (tpd)	Subdomain On-Road Emissions (tpd)
2008	0.05%	13%	8.87	658	457
2010	4.0%	18%	8.88	686	464
2020	5.0%	23%	8.12	704	435

[1]Includes an additional 60 percent increase outside the central urban subdomain.

There was no change in the location of the predicted peak. Furthermore, no additional hot spots were generated anywhere in the domain by increasing the on-road mobile source emissions in the outer portion of the domain by 60 percent.

7.4.2 Microscale Modeling

Future year UAM simulation results provided estimates of background ambient CO levels for microscale modeling of the Five Points area hot spot and the three civil airports in the modeling domain: McCarran, Henderson, and North Las Vegas. UAM concentrations from the appropriate grid cells were simply added to the concentrations predicted at each microscale receptor to obtain a total (background + microscale) CO concentration.

7.4.2.1 CAL3QHC Intersection Modeling

Consistency with the 2005 CO SIP Revision was imperative for hot-spot modeling, so the following three intersections were used: Charleston and Eastern, Charleston and Fremont, and Eastern and Fremont (Figure 7-9). DAQEM followed EPA guidance for screening-level modeling of these three intersections (EPA 1992, 1995). The UAM + CAL3QHC model for the 2000 CO SIP provided the ambient temperature for each hour of the episode—which was needed to estimate emissions with the MOBILE6.2 model—and the wind speed and direction needed for the CAL3QHC estimates. The CAL3QHC model output was added to the background UAM levels to estimate 8-hour CO concentrations for the duration of the episode.

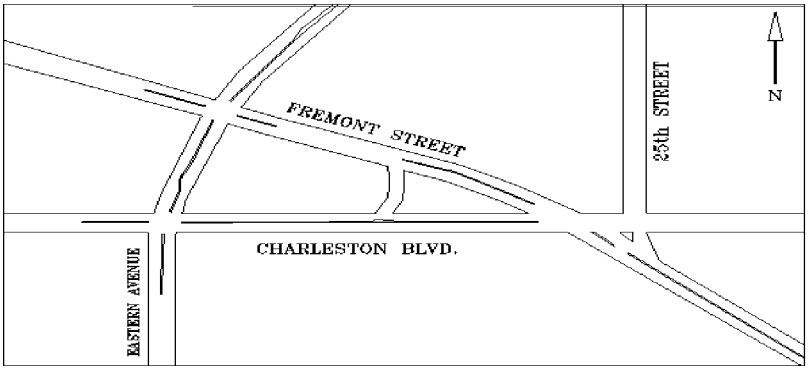


Figure 7-9. CAL3QHC Intersection Location Diagram (Five Points Area).

Table 7-7 presents the peak UAM + CAL3QHC 8-hour average CO concentrations predicted in each of the future years for each of the three intersections in the Five Points area. Modeling for the intersections showed no violations of the 8-hour maximum CO NAAQS. Further, all values are well below the 9 ppm standard.

Table 7-7. Peak UAM + CAL3QHC 8-Hour Average CO Concentrations Predicted for Modeled Years and Each Intersection

Year	Charleston/Eastern	Fremont/Eastern	Fremont/Charleston
2008	8.2	7.8	7.0
2010	8.0	7.7	7.0
2020	7.2	7.0	6.3

7.4.2.2 Airport Modeling Using the Emissions and Dispersion Modeling System

For microscale airport modeling, peak total UAM + EDMS 8-hour CO concentrations at all three Las Vegas civil airports were evaluated. The UAM + EDMS model runs for 2008, 2010, and 2020 incorporated the maintenance plan control measures proposed in Section 7.2. To minimize double-counting, emissions for the three airports were removed from the UAM inventory.

It is important to note that traffic volumes on the major roadways within the McCarran airport property are included in both EDMS and TransCAD. As a result, the EDMS + UAM CO concentration results for McCarran reflect a double-counting of portions of the on-road mobile source emissions on that property; therefore, the CO concentrations reported for McCarran are conservative (i.e., high) estimates.

Table 7-8 lists the peak total 8-hour CO concentrations at all three airports for each of the modeled years. Values for McCarran are taken from the peak publicly accessible receptor. As the table shows, all peak CO concentrations are below the 9 ppm standard in all modeled years.

Table 7-8. Peak Total UAM + EDMS 8-Hour CO Concentrations at Las Vegas Airports for 2008, 2010, and 2020

Airport	2008	2010	2020
McCarran[1]	7.88	7.77	8.98
Henderson Executive	1.38	1.50	3.38
North Las Vegas	3.53	3.51	3.10

[1]Values shown for McCarran occur at the peak publicly accessible receptor.

7.4.3 Air Quality Trend Analysis—Weight of Evidence Approach

Modeling for CO concentrations in future years carries some level of uncertainty, so DAQEM performed an air quality trend analysis for the ten-year period from 1996 to 2005 using data from the Sunrise Acres monitoring site (2005 CO SIP Revision, Appendix D). The purpose was to use a weight-of-evidence approach to support the attainment demonstration of the CO NAAQS with future-year CO emissions budgets.

Recognizing that meteorological conditions may affect CO concentrations, the trend analysis incorporated a normalization approach to account for temperature variations and wind velocity. The meteorological data set used for statistical analysis consisted of hourly temperature and wind velocity readings (6 p.m. to 6 a.m.) collected at the Sunrise Acres monitoring site for each day between November 1 and January 31 (typically considered the CO season) from 1996 to 2005.

The normalized analysis showed a continued downward trend of maximum CO concentrations in future years (Figure 7-10). It also indicated that year-to-year variations in temperature and wind velocity did not substantially influence the downward trend in observed 8-hour maximum CO concentrations at the site.

Based on this analysis, DAQEM is confident that future 8-hour maximum CO concentrations in the Las Vegas Valley will continue to trend downward, even with the control measure modifications and discontinuation of the credits proposed in Section 2. This trend analysis also supports the MVEBs developed from the modeling conducted for this maintenance plan. Even with the forecasted increases in future CO emissions resulting from the proposed maintenance plan control measures in Section 7.2, DAQEM is confident that future CO concentrations will be well below the CO NAAQS.

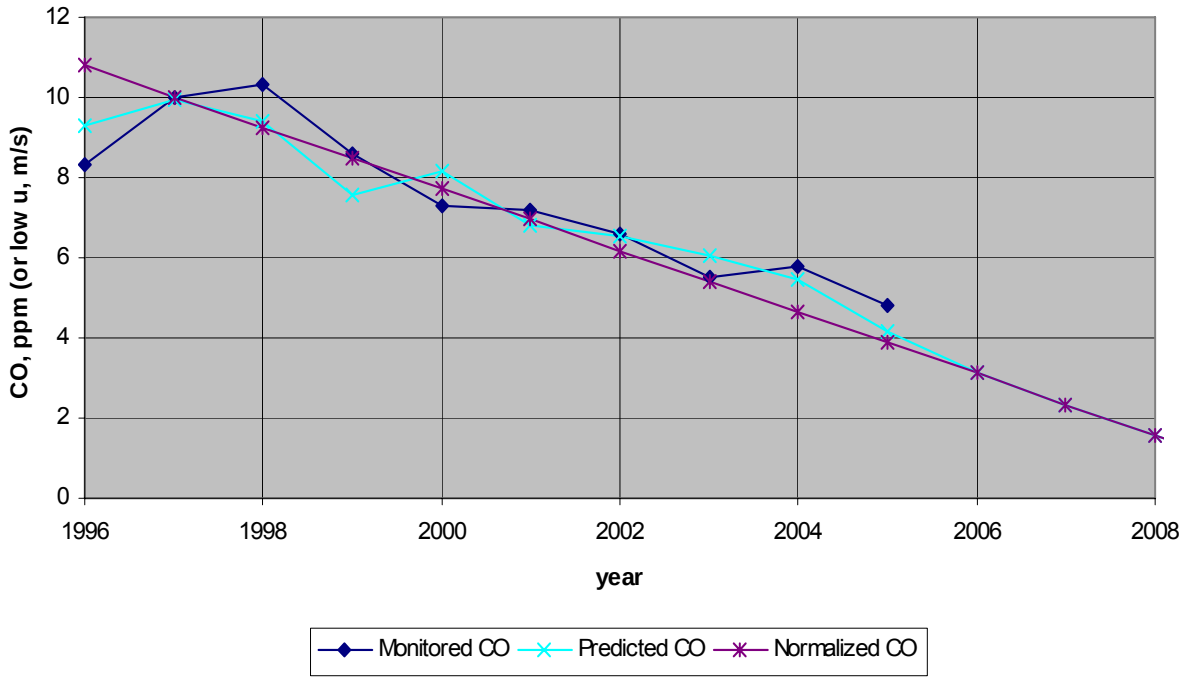


Figure 7-10. Sunrise Monitoring Site: Actual, Predicted, and Normalized CO Trends.

7.5 MOTOR VEHICLE EMISSIONS BUDGET

Under CAA Section 176(c), transportation plans, programs, and projects in maintenance areas that are funded or approved under Title 23 of the U.S. Code or the Federal Transit Act must

conform to the on-road MVEBs specified in the applicable SIP. In this case, 40 CFR 93.118 provides the criteria and procedures for MVEBs.

The MVEB establishes a cap on motor vehicle-related emissions that cannot be exceeded by predicted transportation system emissions. The emissions budget applies as a ceiling on emissions in the year for which it is defined, and for all subsequent years until a different budget is defined for another year or a SIP revision modifies the budget. Unless the SIP clearly indicates otherwise, the estimate of future transportation network emissions used in the milestone or attainment demonstration acts as the MVEB.

The emissions analysis for conformity determinations must include emissions from the entire transportation network within the nonattainment area. In the case of Las Vegas, the nonattainment area encompasses both the air quality modeling domain and the transportation planning domain.

Table 7-9 reflects the calculated peak 8-hour CO concentrations and MVEBs for the 2008 and 2010 interim years, and the 2020 maintenance year, based on MOBILE6.2.

Table 7-9. Peak 8-Hour CO Concentrations and MVEBs in the Las Vegas Valley

Year	Peak 8-Hour CO (ppm)	MVEB (tpd)
2008	8.87[1]	658
2010	8.88[1]	686
2020	8.98[2]	704

Note: Values include impacts of microscale modeling concentrations predicted at peak microscale receptor.
[1] Values shown for UAM-predicted peak CO.
[2] Value shown for UAM + EDMS predicted peak CO for McCarran publicly accessible receptor.

Based on the analysis in this plan, future motor vehicle emissions nearing the MVEB will not lead to an exceedance or violation of the CO NAAQS. Once approved by EPA, the MVEBs listed in Table 7-9 will become the budgets that the RTC will use for conformity determinations in future regional transportation plans.

7.6 MONITORING NETWORK/VERIFICATION OF CONTINUED ATTAINMENT

After EPA redesignates the Las Vegas Valley CO nonattainment area to attainment status, DAQEM will continue to operate a monitoring network in accordance with 40 CFR 58 to verify continued attainment of the CO NAAQS. If measured mobile source parameters (e.g., VMT, fleet mix) change over time, DAQEM will conduct studies to determine whether additional or re-sited monitors are necessary. Additionally, the air quality monitoring system will be reviewed annually in accordance with 40 CFR 58.10 to determine whether the system continues to meet the monitoring objectives in 40 CFR 58, Appendix D.

7.7 CONTINGENCY PLAN

CAAA Section 175A(d) requires that the maintenance plan contain contingency provisions. The inclusion of contingency provisions in maintenance plans is to assure prompt correction of any violation of the CO NAAQS. Additionally, such provisions shall include a requirement that the

state will implement all measures that were contained in the SIP before the area was redesignated to attainment.

While EPA guidance states that a contingency plan does not need to contain fully adopted contingency measures (EPA memorandum, 09/04/92), it should contain:

1. Clearly identified contingency measures.

2. Tracking and triggering mechanisms to determine when contingency measures are needed.

3. A description of the process for recommending and implementing contingency measures.

4. A specific time limit for action.

Consistent with the EPA guidance memorandum titled, "Early Implementation of Contingency Measures for Ozone and Carbon Monoxide (CO) Nonattainment Areas" (08/13/93), the contingency plan described in this maintenance plan is comprised of committed control measures. The four contingency measures set forth by Clark County are the Reduced RVP Gasoline Program, the TCM/TDM Program, the Alternative Fuels for Government Fleets Program, and the CBG Wintertime Fuels Program.

DAQEM's primary tracking mechanism is continuous monitoring of CO levels, and the department will continue to maintain CO monitors (Section 3.3). To ensure that future violations of the CO NAAQS do not occur, ambient air quality monitoring data will be examined to determine if additional contingency measures are needed. A NAAQS violation occurs when the second-highest reading at the same monitoring site over two consecutive years is greater than or equal to 9.5 ppm. Any verified exceedance over 9 ppm during the CO season (October 1 through March 31) will trigger an automatic review to determine which contingency measure(s) should be adopted if another exceedance occurs at the same monitor.

DAQEM must review and verify monitoring data within three months of an exceedance, and recommend contingency measures within six months. DAQEM may recommend local, voluntary measures to prevent a second exceedance; however, such action is voluntary. The only federally-enforceable trigger for mandatory implementation of contingency measures shall be a violation of the 8-hour CO NAAQS.

If a second exceedance occurs at the same monitoring site within a consecutive two-year period, DAQEM will recommend contingency measures to the Clark County Board of County Commissioners (BCC). If the contingency measures in Sections 5.3.1.(4), 5.3.2.(1), 5.3.2.(2), and 2.2 are not adequate to prevent future exceedances, DAQEM will recommend more stringent contingency measures and/or additional CO reduction measures. Within three months of the second exceedance, DAQEM will verify and evaluate the monitoring data; within six months, the department will determine what contingency measures should be implemented and make recommendations to the BCC. The contingency control measures will be implemented six to twelve months after BCC approval, depending on the time needed to put the measures in place.

7.8 SUBSEQUENT MAINTENANCE PLAN REVISIONS

A maintenance plan revision must be submitted to EPA eight years after the original redesignation request/maintenance plan is approved. The revision should provide for maintenance of the NAAQS for an additional ten years following the first ten-year period. As the designated air pollution control agency for Clark County—specifically, the Las Vegas Valley CO nonattainment area—DAQEM intends to prepare a revised maintenance plan eight years after redesignation to attainment, as required by the CAAA and EPA.

8.0 REFERENCES

Alliance of Automobile Manufacturers 2006. "Alliance of Automobile Manufacturers North American Fuel Survey Motor Gasoline." Winter 2006. Washington, D.C.: Alliance of Automobile Manufacturers.

American Society for Testing and Materials 2006. *2002 Annual Book of ASTM Standards,* D4814-01a, "Standard Specification for Automotive Spark-Ignition Engine Fuel," Volume 05.02, "Petroleum Products and Lubricants." Philadelphia, Pennsylvania: American Society for Testing and Materials.

Calcagni, J. 1992. "Procedures for Processing Requests to Redesignate Areas to Attainment." Memorandum from John Calcagni, Air Quality Management Division Director, to EPA Regional Division Directors, dated 9/4/1992.

Center for Business and Economic Research 2008. "Historical Economic Data for Metropolitan Las Vegas." Las Vegas, Nevada: University of Nevada, Las Vegas. http://cber.unlv.edu/snoutlk.html.

Clark County Department of Air Quality and Environmental Management (DAQEM) 2000. *Carbon Monoxide State Implementation Plan, Las Vegas Valley Nonattainment Area, Clark County, Nevada*. Las Vegas: DAQEM.

Clark County Department of Air Quality and Environmental Management 2001. *PM_{10} State Implementation Plan for Clark County*. Las Vegas: DAQEM.

Clark County Department of Air Quality and Environmental Management 2005. *Carbon Monoxide State Implementation Plan Revision, Las Vegas Valley Nonattainment Area, Clark County, Nevada*. Las Vegas: DAQEM.

Clark County Department of Air Quality and Environmental Management 2007. *PM_{10} State Implementation Plan Milestone Achievement Report*. Las Vegas: DAQEM.

Clark County Department of Comprehensive Planning 2008. http://www.co.clark.nv.us/comprehensive_planning/Advanced/Demographics/HistoricalPopulationData/CCHistoricalPopSummary1990toPresent.pdf. Las Vegas, Nevada: Clark County Department of Comprehensive Planning.

Environ International Corporation 2007. "Clark County Wintertime Gasoline Fuel Specifications Study." Las Vegas, Nevada: Clark County Department of Air Quality and Environmental Management.

Regional Transportation Commission of Southern Nevada . *FY 1998-2000 Transportation Improvement Plan*. Las Vegas: RTC.

Sierra Research 2003. "Review of Current and Future CO Emissions from On-Road Vehicles in Selected Western Areas." Prepared for Western States Petroleum Association, by Sierra Research, Inc., Report No. SR03-01-01 (January 28, 2003)

Sierra Research 2005. "Impacts of Eliminating Maricopa County Wintertime Gasoline Standards on Emissions and Ambient Concentrations of CO in February and March." Prepared for the Arizona Department of Environmental Quality by Sierra Research\, Inc. (January 24, 2005).

U.S. Environmental Protection Agency 2007. "Milestones in Auto Emissions Control." Seattle, Washington: EPA Region 10. http://yosemite.epa.gov/R10/airpage.nsf/webpage/Milestones+in+Auto+Emissions+Control.