PM_{10} State Implementation Plan
for
Clark County

June 2001

RESOLUTION OF THE CLARK COUNTY BOARD OF COMMISSIONERS ADOPTING THE PM_{10} STATE IMPLEMENTATION PLAN FOR CLARK COUNTY

WHEREAS, significant progress has been made to improve air quality; however, the Las Vegas Valley continues to exceed the national ambient air quality standards for PM_{10} (particulate matter with an aerodynamic diameter of 10 microns or less) for the 24-hour average and the annual average, and was reclassified as "serious nonattainment" for PM_{10} by the U.S. Environmental Protection Agency; and

WHEREAS, the 1990 Clean Air Act Amendments and noticing in the Federal Register require the preparation and submittal of a State Implementation Plan which addresses PM_{10} pollution; and

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

WHEREAS, the PM_{10} State Implementation Plan for Clark County has been prepared to comply with the requirements of the Clean Air Act Amendments of 1990, contains control measures to reduce emissions, and demonstrates attainment of the standards;

NOW, THEREFORE, BE IT RESOLVED, that the Clark County Board of Commissioners adopt the PM_{10} State Implementation Plan for Clark County to improve air quality, to attain the annual PM_{10} standard by December 31, 2001, and to request the U.S. EPA extend the attainment date for the 24-hour standard to December 31, 2006; and

NOW, THEREFORE, BE IT FURTHER RESOLVED, that the Clark County Board of Commissioners commits to the U.S. EPA to work with the Clark County Board of Health and other local entities to implement the commitments made within the PM_{10} State Implementation Plan.

PASSED, APPROVED, AND ADOPTED this 19th day of June 2001.

CLARK COUNTY, NEVADA
BOARD OF COMMISSIONERS

DARIO HERRERA, Chairman

Attest:

SHIRLEY B. PARRAGUIRRE, County Clerk

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The United States Environmental Protection Agency (U.S. EPA) has established health based National Ambient Air Quality Standards (NAAQS) for particulate matter with an aerodynamic diameter of ten microns or less (PM_{10}). The Las Vegas Valley has not attained either the established annual standard of 50 micrograms per cubic meter ($\mu g/m^3$), or the 24-hour standard of 150 $\mu g/m^3$, and has been designated by the U.S. EPA as a serious PM_{10} nonattainment area.

Under authority granted by the Governor of the State of Nevada, the Clark County Board of Commissioners is responsible for the preparation of State Implementation Plans for nonattainment areas within Clark County to attain the NAAQS at the earliest practicable date. This PM_{10} State Implementation Plan (SIP) for Clark County has been prepared and submitted in fulfillment of this responsibility.

The purpose of this PM_{10} SIP is to demonstrate that adoption and implementation of Best Available Control Measures and technologies for all significant sources of PM_{10} will result in attainment of the annual NAAQS by 2001 and the 24-hour NAAQS by 2006. This document replaces previously submitted PM_{10} plans which did not demonstrate attainment of the NAAQS, and were withdrawn by the Board of County Commissioners in December 2000.

The plan includes a comprehensive inventory of emissions from all sources of PM_{10}. It includes the 1998 base year valley-wide emissions inventory, 24-hour micro-inventories surrounding five representative air quality monitoring stations, and projections of emissions to the anticipated attainment years of 2001 and 2006. The emission inventories indicate that the significant sources contributing to exceedances of the PM_{10} NAAQS are fugitive dust sources including construction activities, vacant land, paved roads and unpaved roads.

An analysis of Best Available Control Measures (BACM) to reduce emissions from PM_{10} sources is documented in the SIP. Through extensive public participation, new Air Quality Regulations were developed and adopted by the Clark County District Board of Health, the air quality regulatory authority for Clark County. These controls are implemented through Sections 90, 91, 92, 93, and 94 of the Air Quality Regulations, which are comprehensive and contain a number of innovative concepts to reduce emissions. The SIP also contains commitments for additional control measures determined necessary for attainment including enhanced enforcement efforts, paving unpaved roads, and stabilizing shoulders of paved roads.

The predicted emission reductions to be achieved by the implemented and committed control measures are the basis for the attainment demonstrations. A proportional rollback model is applied to both the annual and 24-hour emission inventories to demonstrate the reductions achieved and their impact on attainment concentrations. Utilizing the BLM disposal area for the modeling domain, the results of the model demonstrate attainment of the annual standard in 2001 by reducing the annual average concentration from the design value of 53 $\mu g/m^3$ to an anticipated ambient concentration of 46 $\mu g/m^3$. For the 24-hour standard, the model demonstrated that achieving the standard in 2001 is impracticable since controls as partially implemented in 2001 will not reduce emissions to a level below the 24-hour NAAQS. Most of the controls will be in place by the end of 2003, reducing emissions below the NAAQS for the three years ending in 2006. The overall impact of the control measures in 2006 is predicted to be a nearly fifty percent reduction in emissions resulting in an ambient concentration of 147.04 $\mu g/m^3$. Attaining the 24-hour standard in 2006 is the most expeditious alternative date practicable.

Milestone achievement dates are analyzed in the plan for 2003 and 2006 to demonstrate reasonable further progress (RFP) toward attaining the 24-hour standard by December 31, 2006. RFP reports will be submitted in 2001 and 2003.

The attainment demonstration includes the development of PM_{10} mobile source emissions budgets to assist the Regional Transportation Commission in future transportation conformity determinations. The transportation conformity budget for 2001 is set at 201.75 tons per day (TPD). For the analysis year 2003, the budget will change to 155.77 TPD. Beginning in analysis year 2006 a mobile source emissions budget of 141.41 TPD will be used for transportation conformity purposes.

The SIP also includes a Most Stringent Measure (MSM) analysis to document that it does contain the MSMs included in any state implementation plan, or achieved in practice in any state, and that can be feasibly implemented in the Las Vegas Valley nonattainment area. The MSM analysis is one of the requirements for an attainment date extension. A formal request for a five year extension of the attainment date for the 24-hour standard from 2001 to 2006 is submitted as a part of the SIP.

Public participation in the SIP review was initiated on March 6, 2001 when the County Commission received the March 2001 Draft SIP, initiated a 42-day public comment period, and set a public hearing for April 17, 2001. A second public hearing was held June 19, 2001 to solicit public input on changes made to the Draft SIP and on responses to comments received during the initial comment period and public hearing. The Board of County Commissioners approved and adopted the plan on June 19, 2001.

Staff acknowledges the efforts of the many stakeholders, interested persons, state and local agencies, and U.S. EPA staff whose contributions made the successful completion of this document possible. The result is a SIP that is complete, demonstrates attainment of the PM_{10} NAAQS, and will improve air quality in the Las Vegas Valley.

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CHAPTER 1: INTRODUCTION

1.1 STATEMENT OF PURPOSE

Attainment Demonstration

In previous submittals of PM_{10} State Implementation Plans (SIPs) for the Las Vegas Valley, Clark County has not been successful in demonstrating attainment of National Ambient Air Quality Standards (NAAQS). On December 6, 2000, the State of Nevada officially withdrew from submission of all previous plans and addenda that did not demonstrate attainment of the NAAQS. Research and work programs have been completed to address problem areas identified in the 1997 PM_{10} SIP Revision. The purpose of this 2001 PM_{10} SIP is to demonstrate that adoption and implementation of Best Available Control Measures (BACM) and technologies for all significant sources of PM_{10} will result in attainment of the annual average PM_{10} NAAQS by 2001 and attainment of the 24-hour NAAQS by 2006. This SIP is designed to meet all the requirements of the Federal Clean Air Act that pertain to “serious” PM_{10} nonattainment areas.[1] The attainment demonstration includes the development of mobile source emissions budgets to assist the Regional Transportation Commission in future transportation conformity determinations.

Request for Extension of the 24-hour NAAQS Attainment Date

Since attainment of the 24-hour PM_{10} NAAQS within the Las Vegas Valley is not feasible by 2001, this document includes a formal request to the U.S. EPA for a five-year extension of the 24-hour NAAQS attainment date from 2001 to 2006. In support of the request for an extension of the 24-hour NAAQS attainment date, this attainment demonstration plan includes a Most Stringent Measure control analysis for significant sources of PM_{10} contributing to an exceedance of the 24-hour NAAQS. This analysis provides documentation that the emission control programs to be implemented within the Las Vegas Valley nonattainment area are as stringent, if not more stringent, than control programs adopted and implemented in other areas not attaining

[1] PM_{10} Guideline Document, U.S. EPA, EPA-452/R-93-008, April 1993.

the 24-hour NAAQS, or achieved in practice in any other state.

1.2 BACKGROUND

1.2.1 PM_{10} National Ambient Air Quality Standards (NAAQS)

Revised Particulate Matter Standards

The United States Environmental Protection Agency (U.S. EPA) revised its NAAQS for particulate matter on July 1, 1987. Prior to this time, the standards pertained to Total Suspended Particulate (TSP) without regard for size. The revised standards address only particles having an aerodynamic diameter of ten microns or less. These particulate standards are commonly referred to as the PM_{10} standards. The U.S. EPA has determined that these minute particles, because they can be inhaled deep into the lungs, present a hazard to the public health when concentrations exceed certain levels. The PM_{10} (health-based) standards, which are set at 150 micrograms per cubic meter ($\mu g/m^3$) for a 24-hour average and 50 $\mu g/m^3$ for an annual average, replace the previous standards for TSP.

24-hour and Annual Average PM_{10} Health Standard

1.2.2 Public Health and Particulate Matter

Description of Particles

Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles (larger than 2.5 micrometers) often come from a variety of sources, including windblown dust. Fine particles (less than 2.5 micrometers) often come from fuel combustion, power plants, and diesel buses and trucks. According to the U.S. EPA, scientific studies have linked particulate matter, especially fine particles (alone or in combination with other pollutants), with a series of significant health problems:

Health Effects

- Premature death;
- Respiratory-related hospital admissions and emergency room visits;
- Aggravated asthma;
- Acute respiratory symptoms, including aggravated coughing and difficult or painful breathing;
- Chronic bronchitis;

- Decreased lung function that can be experienced as shortness of breath; and
- Work and school absences.

1.2.3 Institutional Framework and Legal Authority for Air Quality Planning and Regulatory Programs in Clark County, Nevada

Governor Designates Clark County Board of Commissioners as Planning Authority

Pursuant to the 1977 Federal Clean Air Act, the Clark County Board of Commissioners was designated by the Governor of Nevada in 1978 as the lead air quality planning organization for the Las Vegas Valley Nonattainment Area. Such delegation is permissible under Nevada Revised Statutes 445B. Although the 1977 Federal Clean Air Act expired in 1987, the Clark County Board of Commissioners continued to provide area-wide leadership and direction in air quality planning and management in Clark County. On August 6, 1991, after implementation of the 1990 Clean Air Act Amendments (CAAA), the Chairman of the Clark County Board of Commissioners sent a letter to the Governor of Nevada requesting reaffirmation that the Board is the lead air quality planning organization pursuant to the 1990 CAAA.

Clark County Board of Commissioners' Responsibilities

The Governor of Nevada, in a letter to the U.S. EPA later that year, reaffirmed the Clark County Board of Commissioners' lead role in air quality planning programs. Under the authority granted by the Governor of Nevada, the Clark County Board of Commissioners is responsible for the preparation of State Implementation Plans for nonattainment areas within Clark County to attain NAAQS at the earliest practicable date. Once approved by the Clark County Board of Commissioners, State Implementation Plans are forwarded to the Nevada Division of Environmental Protection for approval. After approval by the State of Nevada, the Governor of Nevada sends State Implementation Plans to the U.S. EPA for approval in accordance with the 1990 CAAA.

The District Board of Health, through the Air

District Board of Health

Quality Division within the Clark County Health District, is the air quality regulatory authority for Clark County. The Air Quality Division administers the ambient air quality monitoring network under a Section 105 Grant from the U.S. EPA. The Air Quality Division also administers the District's "Air Pollution Control Regulations" in compliance with the New Source Review (NSR) and Title V requirements under the 1990 CAAA.

Clark County Air Quality Planning Committee (AQPC)

Intergovernmental coordination is accomplished through the Clark County Air Quality Planning Committee (AQPC). The AQPC was established by a resolution adopted by the Clark County Board of Commissioners on May 4, 1993. The mission statement outlined in the resolution called for the following:

AQPC Responsibilities

A. Provide assistance, where practicable, to Clark County staff on all phases of the air quality implementation plan development process;

B. Through intergovernmental coordination and cooperation - with due consideration to potential emission reductions, cost effectiveness, and feasibility of implementation - recommend air pollution control measures to be included in air quality implementation plans for the Las Vegas Valley;

C. Discuss and recommend solutions to conflicts, problems, or policy issues relating to air quality planning, plan adoption, and plan implementation;

D. Ensure that the respective governing bodies of the local governments and agencies represented on the AQPC are kept abreast of all issues of concern, problem areas, and progress in the development of air quality implementation plans, plan adoption, and plan implementation.

The membership of the AQPC includes a representative from the following local governments and agencies:

- City of Las Vegas
- City of Henderson
- City of North Las Vegas
- City of Boulder City
- Regional Transportation Commission of Clark County
- Nevada Department of Transportation
- Clark County Health District
- McCarran International Airport
- University of Nevada, Las Vegas
- Clark County Department of Comprehensive Planning

AQPC Membership

1.2.4 The 1990 Clean Air Act Amendments (CAAA)

Designation of the Las Vegas Valley as a "Moderate" Nonattainment Area

The 1990 CAAA were signed into law by President Bush in November 1990. All areas in the United States previously classified as federal nonattainment areas for PM_{10}, which included the Las Vegas Valley, were initially designated by operation of law as "moderate" nonattainment areas for PM_{10}.

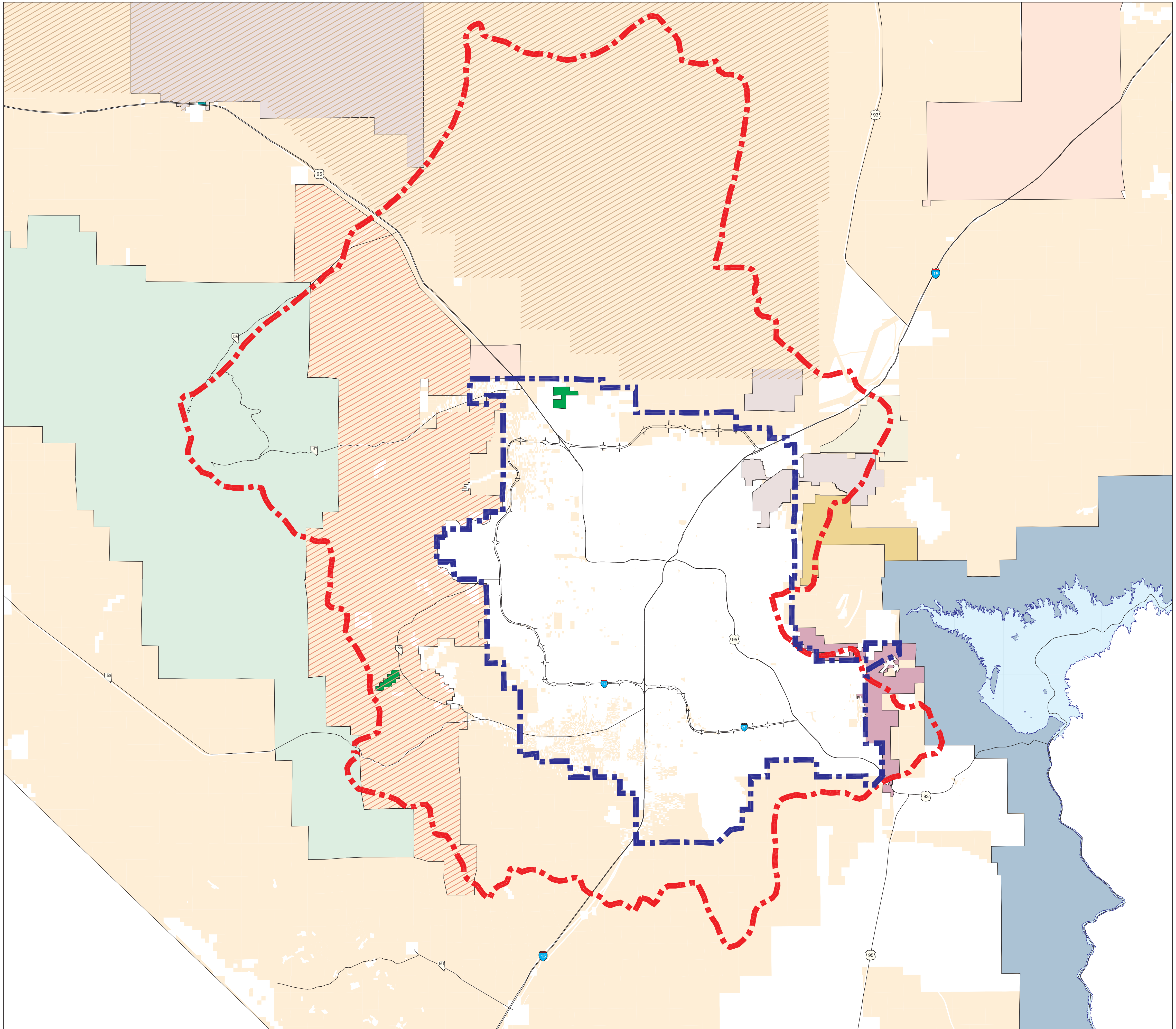
The Las Vegas Valley nonattainment area, which coincides with Hydrographic Basin 212, is illustrated in Figure 1-1. This area is roughly 1,500 square miles in size, largely under federal control, and includes:

- the City of Las Vegas,
- the City of North Las Vegas,
- the City of Henderson,
- unincorporated areas of Clark County,
- Desert National Wildlife Refuge lands,
- Toiyabe National Forest lands,
- Red Rock Canyon National Conservation Area,
- Nellis Air Force Base,
- Lake Mead National Recreation Area lands, and
- Bureau of Land Management lands.

The Bureau of Land Management (BLM) disposal area is shown in Figure 1-1. The land within the disposal area will be sold for private use or granted for public uses such as for parks or schools.

Figure 1-1

Las Vegas Valley PM $_{10}$ Nonattainment Area Land Use



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of the data delineated hereon.

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Boulder City is located outside of the nonattainment area on the southeast side.

1.2.5 Air Quality Planning for PM_{10} in Clark County, Nevada

Planning Requirements

Under Section 189(a) of the 1990 CAAA, "moderate" nonattainment areas were required to submit to the U.S. EPA by November 15, 1991, a PM_{10} State Implementation Plan, which provided for the adoption and implementation of Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT). In addition, this "moderate" area PM_{10} SIP was required to include a demonstration that federal air quality standards would be attained by December 1994.

1991 PM_{10} State Implementation Plan (SIP)

The Clark County Board of Commissioners approved a PM_{10} SIP for the Las Vegas Valley on November 5, 1991. This 1991 PM_{10} SIP for the Las Vegas Valley provided for the adoption and implementation of RACM (RACT) in accordance with the 1990 CAAA but was unable to demonstrate attainment of PM_{10} national standards by the mandated attainment date of December 1994. An attainment demonstration was not possible because implementation of RACM (RACT) did not reduce emissions from construction activities and disturbed vacant land sufficiently to prevent violations of PM_{10} national health standards.

Reclassification to a "Serious" Nonattainment Area

On January 8, 1993, the U.S. EPA reclassified the Las Vegas Valley, along with four areas in California, from "moderate" to "serious" for PM_{10}. This classification became effective on February 8, 1993. The reclassification to "serious" introduced new requirements for the affected areas. First, regulations requiring the use of Best Available Control Measures (BACM) for mobile and area sources of PM_{10}, including the application of Best Available Control Technology (BACT) to stationary sources, were to be adopted and submitted to the U.S. EPA as a State Implementation Plan revision.

1994 PM_{10} State Implementation Plan (SIP)

In response to this federal mandate, the Clark County Board of Commissioners adopted a revised PM_{10} State Implementation Plan on December 6, 1994, which provided for the adoption and implementation of BACM and BACT within the Las Vegas Valley. Under the 1990 CAAA, BACM and BACT were to be implemented within the Las Vegas Valley no later than February 1997.

Addendum to the 1991 PM_{10} SIP

In January 1995, in response to a request from the U.S. EPA (Region IX), Clark County submitted an addendum to the 1991 PM_{10} State Implementation Plan which provided additional documentation on the adoption and implementation of RACM and RACT.

1997 PM_{10} SIP

In August 1997, as a part of an attainment demonstration plan, a new PM_{10} SIP Revision was approved by the Clark County Board of Commissioners and subsequently submitted to the State of Nevada and the U.S. EPA. This plan, as with previous submittals, failed to demonstrate attainment of both the annual average and 24-hour PM_{10} NAAQS for the following reasons:

Problems with Attainment Demonstration in the 1997 PM_{10} SIP

1. The Las Vegas Valley is an arid desert environment. The Valley is also experiencing unprecedented population growth and development. Attaining the 24-hour standard where PM_{10} air quality problems are largely associated with fugitive dust presents difficult problems that could not be resolved in 1997, as solutions were not available. For example, controlling wind-blown dust at a construction site in an arid environment with wind speeds in excess of 25 miles per hour presents a difficult problem for the reasons outlined below.

2. There were continuing problems in emission inventories and air quality modeling for sources of fugitive dust. These information gaps presented serious problems for determining BACM and BACT for several significant sources of PM_{10} within the Las Vegas Valley Nonattainment Area. The uncertainty regarding reliable air quality projections to future years was also problematic.

3. There was uncertainty regarding how to address

PM_{10} emissions in a cost-effective way from disturbed vacant land and other non-traditional sources of PM_{10} that have largely escaped regulatory attention in the past.

4. Control strategies for construction activities were not sufficient to prevent violations of PM_{10} national air quality standards during high-wind events. Further research was needed to determine what is practicable with respect to emission reductions from construction activities and other sources.

On December 5, 2000, the Clark County Board of Commissioners requested that the State of Nevada formally withdraw all previously submitted PM_{10} plans and addenda. Subsequently, the State of Nevada did formally withdraw all previously submitted plans and addenda. The plans were withdrawn because none demonstrated attainment of the NAAQS.

1.3 ORGANIZATION OF THE PLAN

Chapter 2 – Air Quality Monitoring for Particulate Matter

The following chapters address specific subject areas relating to the attainment demonstration and the request to the U.S. EPA for a five-year extension of the 24-hour attainment date from 2001 to 2006. Chapter 2 describes the air quality monitoring network for PM_{10} and summarizes PM_{10} air quality monitoring data for the Las Vegas Valley for calendar years 1997 through 1999. Chapter 2 also includes commitments to assess the adequacy of the PM_{10} monitoring network since population growth and development within and outside the Las Vegas Valley is continuing at an unprecedented level.

Chapter 3 – PM_{10} Emissions Inventories

Chapter 3 contains summaries of PM_{10} emissions inventories within the Las Vegas Valley including projections of emissions to the anticipated attainment years of 2001 and 2006 for the 24-hour and annual standards respectively. The emissions inventories and projections include the following:

- The 1998 base year valley-wide emissions inventory;

- 24-hour micro-inventories surrounding five air quality monitoring stations selected as representative sites that lead to elevated concentrations of particulate matter; and
- Emission projections out to the 2001 attainment year.

Chapter 4 – Overview of PM_{10} Control Measures

Chapter 4 includes an overview of PM_{10} control strategies that, when fully implemented, will lead to attainment of national health standards for PM_{10}. A RACM and BACM analysis is included in accordance with the requirements of the 1990 CAAA and U.S. EPA regulations. Chapter 4 also presents specific commitments regarding control programs and improved emission inventories.

Chapter 5 – Demonstration of Attainment of PM_{10} National Ambient Air Quality Standards

Chapter 5 provides the demonstration, through proportional rollback modeling, that implementing control measures discussed in Chapter 4 will lead to attainment of the annual average NAAQS for PM_{10} by 2001 and attainment of the 24-hour NAAQS by 2006, the earliest practicable date. In addition, a mobile source emissions budget is established to assist the Regional Transportation Commission in future transportation conformity determinations.

Chapter 6 – Most Stringent Measure Analysis

Chapter 6 provides documentation that this PM_{10} State Implementation Plan (SIP) does contain the most stringent measures for attaining the 24-hour standard included in the plan of any state or achieved in practice in any state that can feasibly be implemented in the Las Vegas Valley.

Chapter 7 – Request for Extension of the Attainment Date for the 24-hour NAAQS for PM_{10} from 2001 to 2006

Chapter 7 addresses the formal request for an extension of the attainment date for the 24-hour PM_{10} NAAQS from December 31, 2001 to December 31, 2006. Supporting appendices provide documentation on emissions inventories and projections, air quality modeling, and public hearings and stakeholder meetings that were part of the development of the 2000 PM_{10} State Implementation Plan.

CHAPTER 2: AIR QUALITY MONITORING FOR PARTICULATE MATTER

2.1 INTRODUCTION

Purpose

Section 110(a)(2)(C) of the 1990 Clean Air Act Amendments (CAAA) requires ambient air quality monitoring for the purposes of State Implementation Plan (SIP) development. These requirements also address criteria for reporting air quality monitoring data to the U.S. EPA. The purpose of this chapter is to present a general description of the meteorological and topographic features that affect ambient PM_{10} measured in the valley; a general description of the air quality monitoring network; and to summarize PM_{10} air quality monitoring data for calendar years 1997 through 1999.

Violations of PM_{10} National Ambient Air Quality Standards

The five air quality monitoring stations which experienced violations of the PM_{10} National Ambient Air Quality Standards (NAAQS) during this period will receive particular attention. These stations are Craig Road, J.D. Smith, East Flamingo, Green Valley, and Pittman. All of these stations are located within the Bureau of Land Management (BLM) disposal boundary area where almost 100 percent of the residents within the nonattainment area reside. For calendar years 1997 through 1999, violations of the 24-hour National Ambient Air Quality Standard (NAAQS) for PM_{10} (150 $\mu g/m^3$) are presented and discussed. This time frame was chosen to ensure that ambient air data reflected improved enforcement of air pollution control regulations implemented in 1995 and 1996. Elevated PM_{10} concentrations from these stations were utilized both in the assessment of source contributions (Chapter 3) and in the attainment demonstration (Chapter 5). J.D. Smith was the only station violating the annual average NAAQS for PM_{10} (50 $\mu g/m^3$).

Chapter Organization

A general description of the air quality monitoring network for PM_{10} is presented in the next section. Since meteorology and topography play an important role in influencing air quality, the climatological and physical setting in the Las Vegas Valley are also discussed. A subsequent section presents a detailed summary of air quality monitoring data for calendar years 1997 through 1999.

Commitment for Monitoring Network Evaluation

Population growth and development are continuing within the Las Vegas Valley, although growth rates are dropping from the records set in the last years of the 20th century. A periodic assessment of the monitoring network is necessary in order to ensure that stations are properly sited to measure levels of PM_{10} in all areas of concern. A commitment to conduct a PM_{10} saturation study to measure the impacts of growth in future years is described in Section 4.8.2.2.

2.2 PM_{10} AIR QUALITY MONITORING NETWORK

Particulate Matter Monitoring Plan Submittals

The Clark County Health District Air Quality Division (AQD) operates air quality monitoring instruments to measure ambient concentrations of particulate matter less than ten (10) microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). The AQD also measures visibility and haze, which are influenced by particulate matter concentrations. In November 1998, the Clark County Health District submitted a particulate matter monitoring network plan to the U.S. EPA for review and approval.[1] This plan addressed the entire particulate matter monitoring network pursuant to Section 58.20 of the 1990 CAAA.

The Clark County Health District submitted network review reports in July 1999[2] and later in November

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[1] *Particulate Matter Monitoring Network Plan Description*, July 1998 (Revised November 12, 1998), submitted to the U.S. EPA by the Air Pollution Control Division of the Clark County Health District.
[2] *Air Monitoring Network, 1998 – 1999 NAMS/SLAMS Network Review Report*; submitted to the U.S. EPA by the Air Pollution Control Division of the Clark County Health District, July 1999.

1999.[3] More recently, in July 2000, the Clark County Health District published a report updating the particulate matter monitoring network description, documenting implementation of the $PM_{2.5}$ network design.[4]

Compliance with Federal Regulations

All of these reports are designed to document that the network complies with U.S. EPA siting and operational criteria. They were submitted in accordance with the Section 103 and Section 105 Air Grant, and the Code of Federal Regulations (CFR), Title 40, Part 58. A full description of the monitoring network is on file and available for public inspection between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday excluding legal holidays, at the Clark County Health District Air Quality Division located at 625 Shadow Lane, Las Vegas, Nevada.

The PM_{10} Air Quality Monitoring Network

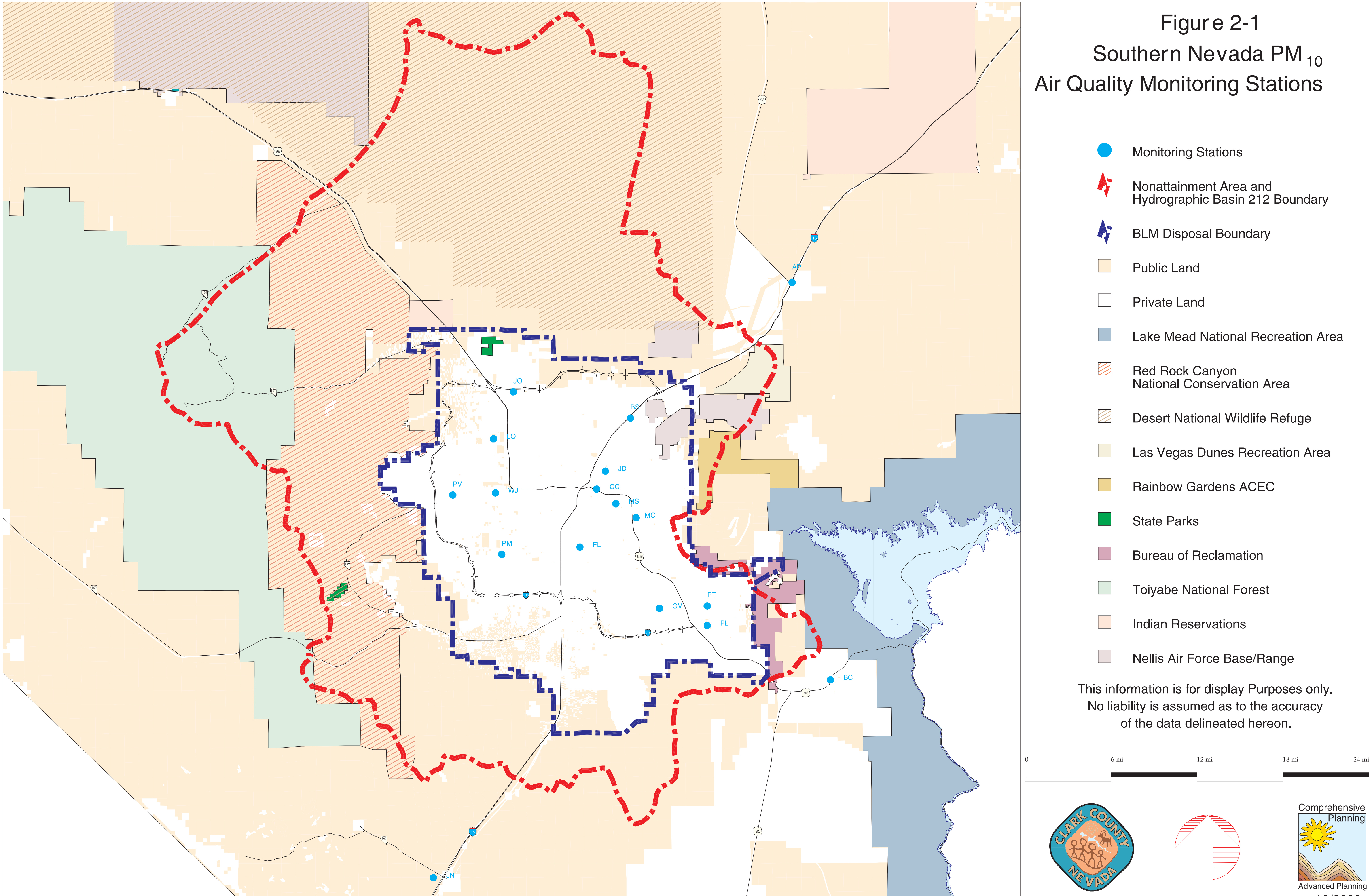
Figure 2-1 illustrates the locations of the 17 PM_{10} air quality monitoring stations currently within the nonattainment area and in outlying areas. Stations that were utilized earlier and have since been relocated are also shown. The 17 stations currently operating are:

- AP – Apex,
- BC – Boulder City,
- BS – Craig Road,
- CC – City Center,
- FL – East Flamingo,
- GV – Green Valley,
- JD – J. D. Smith,
- JN – Jean,
- JO – Joe Neal,
- LO – Lone Mountain,
- MC – East Sahara,
- MS – Microscale,
- PL – Henderson,
- PM – Paul Meyer Park,
- PT – Pittman,

Description of the PM_{10} Nonattainment Area

[3] *Final Progress Report on Workplan for FY99*; submitted to the U.S. EPA by the Air Pollution Control Division of the Clark County Health District, November 1999.
[4] *Particulate Matter Monitoring Network Description, (Section 58.20)*; submitted to the U.S. EPA by the Air Quality Division of the Clark County Health District, July 2000.

Figure 2-1
Southern Nevada PM_{10} Air Quality Monitoring Stations



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Comprehensive Planning

Advanced Planning

12/2000

- PV – Palo Verde, and
- WJ – Walter Johnson.

The Joe Neal station began monitoring in 2000, and no data from that site is available from 1997 through 1999.

Air quality monitoring data are submitted to the U.S. EPA through the Aerometric Information Retrieval System/Air Quality Subsystem (AIRS/AQS). This network remains one of the most extensive PM_{10} monitoring networks in the United States.

2.3 PHYSICAL AND CLIMATOLOGICAL SETTING

2.3.1 Physical Description

2.3.1.1 Land Use

The Las Vegas Valley nonattainment area is in excess of 1,500 square kilometers in size and includes the City of Las Vegas, the City of North Las Vegas, the City of Henderson and unincorporated areas of Clark County. Boulder City is located outside of the nonattainment area on the southeast side. Roughly two-thirds of the nonattainment area is under the jurisdiction of the federal government and not available for private use (Figure 1-1). Congress enacted the Southern Nevada Public Land Management Act of 1998[5] (Act). One purpose of the Act was to promote responsible and orderly development in the Las Vegas Valley. The Act limits the disposal of federal lands for private use to those lands within a given area. The area available for disposal to the public is designated as the BLM disposal area. The boundary of the BLM disposal area may only be changed by another act of Congress.

Much of the Land in the Nonattainment Area is Federally Owned and Sparsely Populated

2.3.1.2 Topography

The Las Vegas Valley airshed extends in a northwest-southeast direction with the Spring Mountains to the west, the Pintwater, Desert, Sheep, and Las Vegas Mountains to the north and Frenchman Mountain to the east. The McCullough Range and Big Spring Range close the airshed to the south.

[5] Public Law 105-263, 105th Congress, October 19, 1998 [H.R. 449], 112 STAT. 2343.

The Las Vegas Valley slopes from the northwest to the southeast. Topography of the nonattainment area is shown in Figure 2-2. Water drainage flows southward and then easterly through the Las Vegas Wash to Lake Mead. The upper boundaries of the alluvial apron occur at approximately 9,000 feet above sea level and are marked by a noticeable change in slope. The lower boundaries of the alluvial aprons are less well defined due to massive sedimentation on the valley floor, but occur at an average elevation above sea level of approximately 2,500 feet. The basin lowland levels of the Las Vegas Valley range from 1,800 to 2,500 feet above sea level.

Elevations Within the Nonattainment Area Vary by 7,000 Feet

2.3.2 Meteorology

Excess PM_{10} concentrations result from a combination of emissions, transport, transformation, and accumulation of pollutants. Meteorology is an important factor in this equation. The Las Vegas Valley is situated on the edge of the Mojave Desert and experiences an arid climate typical of the southern Mojave Desert. Due to the "rain shadow" affect of the Sierra Nevada Range and Spring Mountains to the west, moisture associated with storms originating in the Pacific Ocean rarely reach the Valley. The movement of these air masses over the Valley provides clear to partly cloudy skies with 85 percent sunshine for an average year.

Arid Conditions

Temperatures on the Fahrenheit scale range from an average daily maximum in July of approximately 106 degrees to an average daily maximum in January of approximately 57 degrees. Average daily minimums range from 34 degrees in January to 76 degrees in July. Winters are generally mild and summers are hot. Average seasonal temperatures and precipitation are illustrated in Table 2-1.

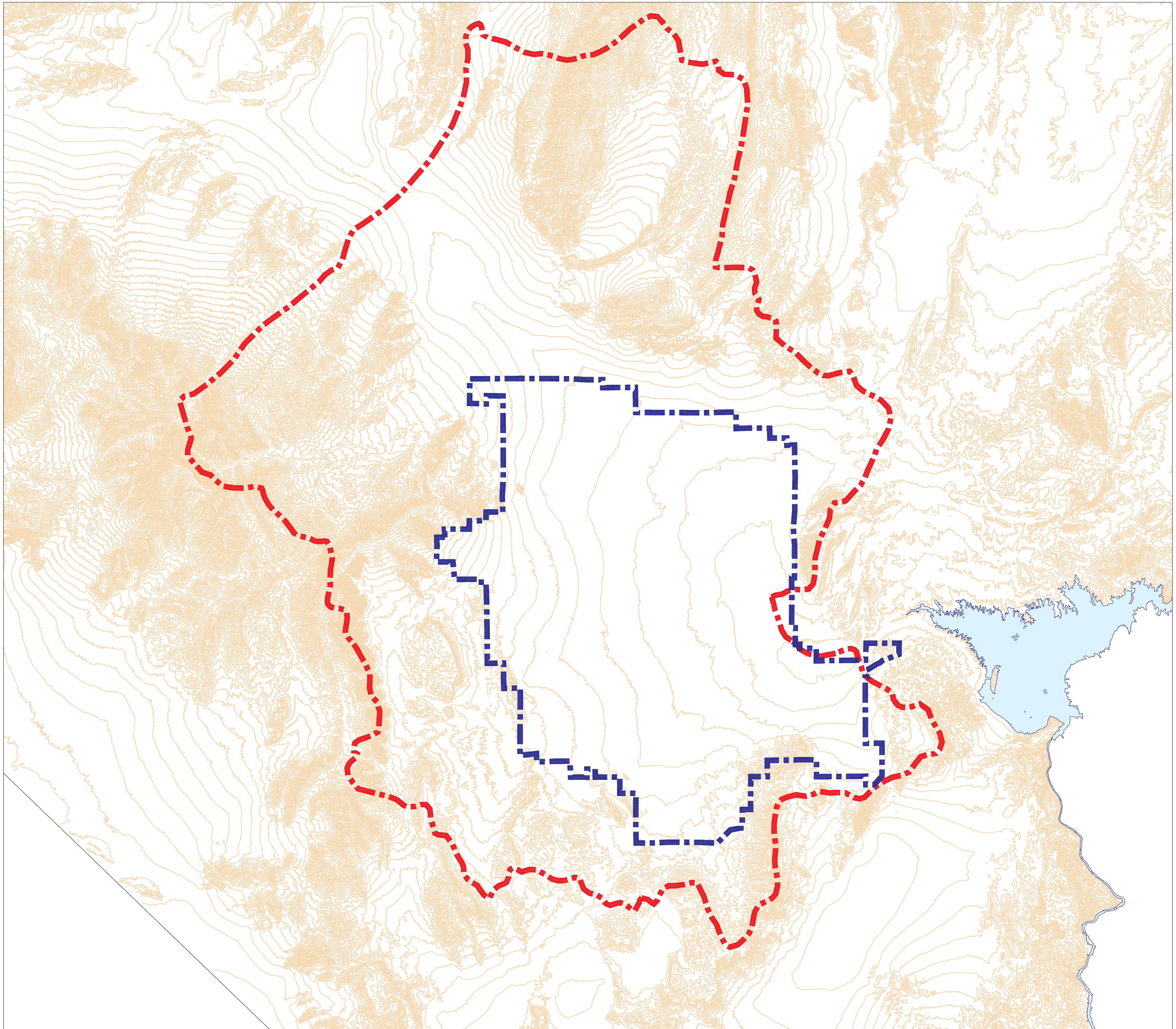
Average Temperatures

Annual precipitation averages 4.13 inches per year within the Las Vegas Valley. However, annual rainfall can vary substantially from year to year. Annual precipitation recorded at McCarran International Airport from 1988 through 1999 is illustrated in Figure 2-3 (Page 2-9). Precipitation during the years 1988 and

Rainfall

Figure 2-2

Las Vegas Valley PM$_{10}$ Nonattainment Area Topography



This information is for display Purposes only. No liability is assumed as to the accuracy of the data delineated hereon.

12/2000

Table 2-1

Average Seasonal Temperatures and Precipitation

MONTH	Maximum Temperature (°F)	Minimum Temperature (°F)	Precipitation (inches)
January	57	34	.48
February	63	39	.48
March	69	44	.42
April	78	51	.21
May	88	60	.28
June	100	69	.12
July	106	76	.35
August	103	74	.49
September	95	66	.28
October	82	54	.21
November	67	43	.43
December	58	34	.38

Source: National Weather Service (August 2000)

1989 reflect the end of a period of drought that had lasted for several years. In 1992 and 1993, precipitation was nearly double the normal annual rate.

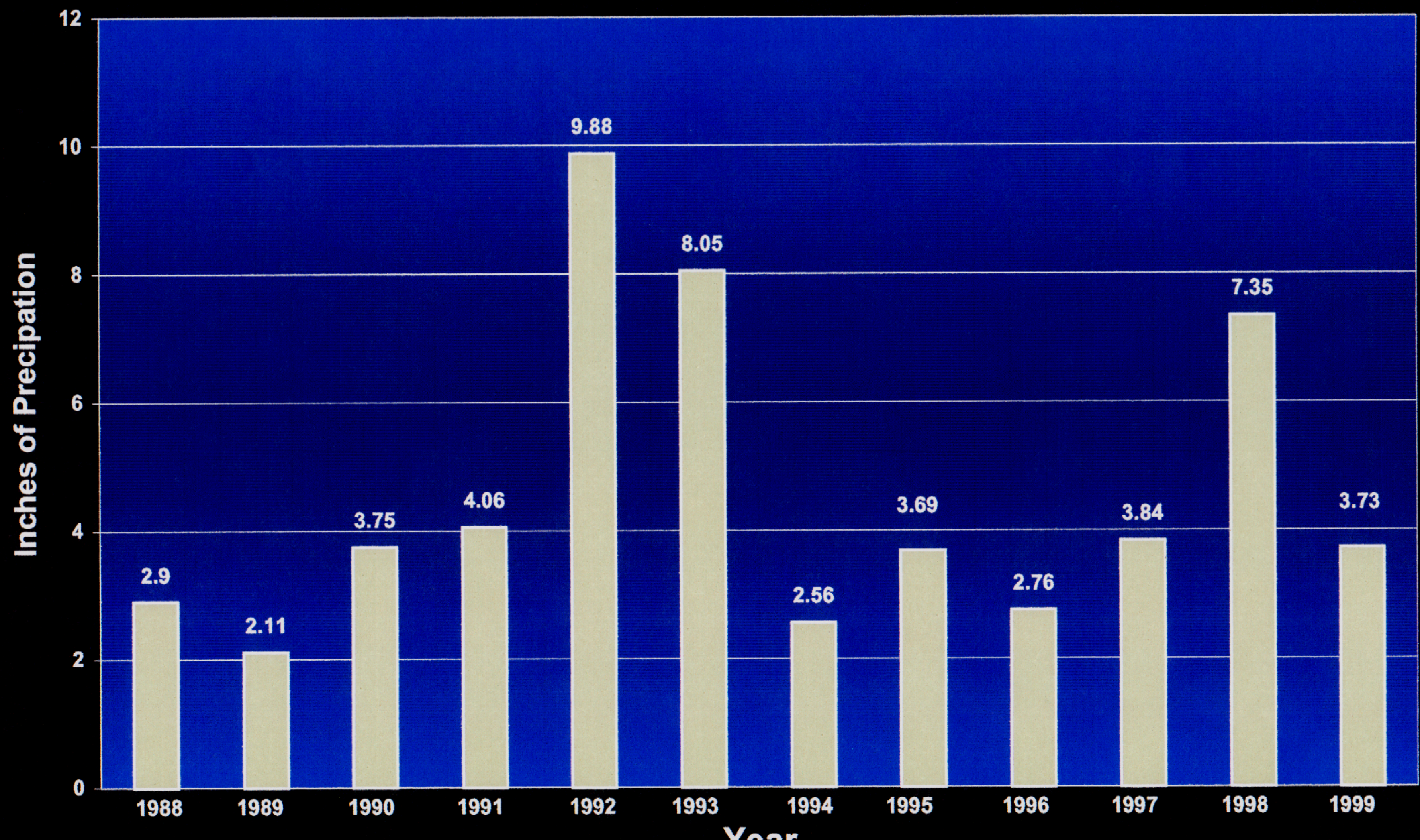
2.3.2.1 Wind Conditions in the Las Vegas Valley

Pressure Gradients and Topography Affect Wind Patterns

Wind conditions in the Las Vegas Valley are influenced by a wide range of meteorological conditions. Synoptic-scale flows, such as high-pressure and low-pressure systems, influence relatively large geographic areas, such as the western United States. Mesoscale influences, such as the Las Vegas Valley, modify the synoptic-scale flows. For example, winds usually flow along, rather than across, valleys. Especially during light wind conditions, local influences cause small-scale variations in wind direction and speed. Within the Las Vegas Valley, the East Charleston monitoring site frequently experiences very light winds; the dynamics affecting wind flow here are not fully understood. McCarran Airport often has relatively strong winds. It is in an open area at a higher elevation than East Charleston.

Figure 2-3

Annual Precipation (1988 - 1999)



{Data Source: National Weather Service (August, 2000)}

During most of the period from May to September, prevailing regional wind flows are from the southwest. High pressure over the eastern Pacific Ocean and lower pressure over the Colorado Plateau cause this southwesterly flow. This flow is occasionally interrupted by synoptic-scale storms moving through the area, most often in late spring. During July and August, moist monsoon flows from the northwest alternate with the dry flows from the southwest. Winds from the north are not common during summer, but occur on infrequent occasions. Strong winds in summer are usually associated with thunderstorms and they tend to be localized and may be from any direction.

During Most of the Year Prevailing Winds are From the Southwest

During October or early November, there is usually a transition from prevailing winds from the southwest to prevailing winds from the northwest or northeast. The Colorado Plateau and Great Basin are cold compared to the lower Colorado River Valley, and this cold, dense air flows down off the higher areas, giving a prevailing wind from the northeast during winter months in the Las Vegas Valley. Winds in the afternoon are usually from the northeast under these conditions; however, at night, flow is typically from higher to lower terrain. At McCarran Airport, nighttime drainage flows are from the southwest. During the winter, the prevailing flows are interrupted by synoptic-scale storms moving through the region. These usually produce winds from the south or southwest that increase in speed as cold fronts approach. After a cold front passes, winds come from the northwest and gradually subside.

Prevailing Winds Are From the Northwest or Northeast in the Winter

Surface meteorology within the Las Vegas Valley is generally characterized by prevailing winds from the southwest with monthly average wind speeds in the range of 7 to 14 miles per hour. Wind roses for 1997, 1998 and 1999 of wind speed and direction measured at McCarran International Airport are shown in Figures 2-4 through 2-6. General wind patterns do not vary greatly from year to year. High hourly wind speeds (20 to 30 miles per hour) occur more than 10 percent of the time during the spring and more than 5 percent of the time during the summer with a strong southwest component. Maximum wind speeds rarely (<1%)

Wind Speeds

Figure 2-4
Windrose for 1997 – McCarran International Airport

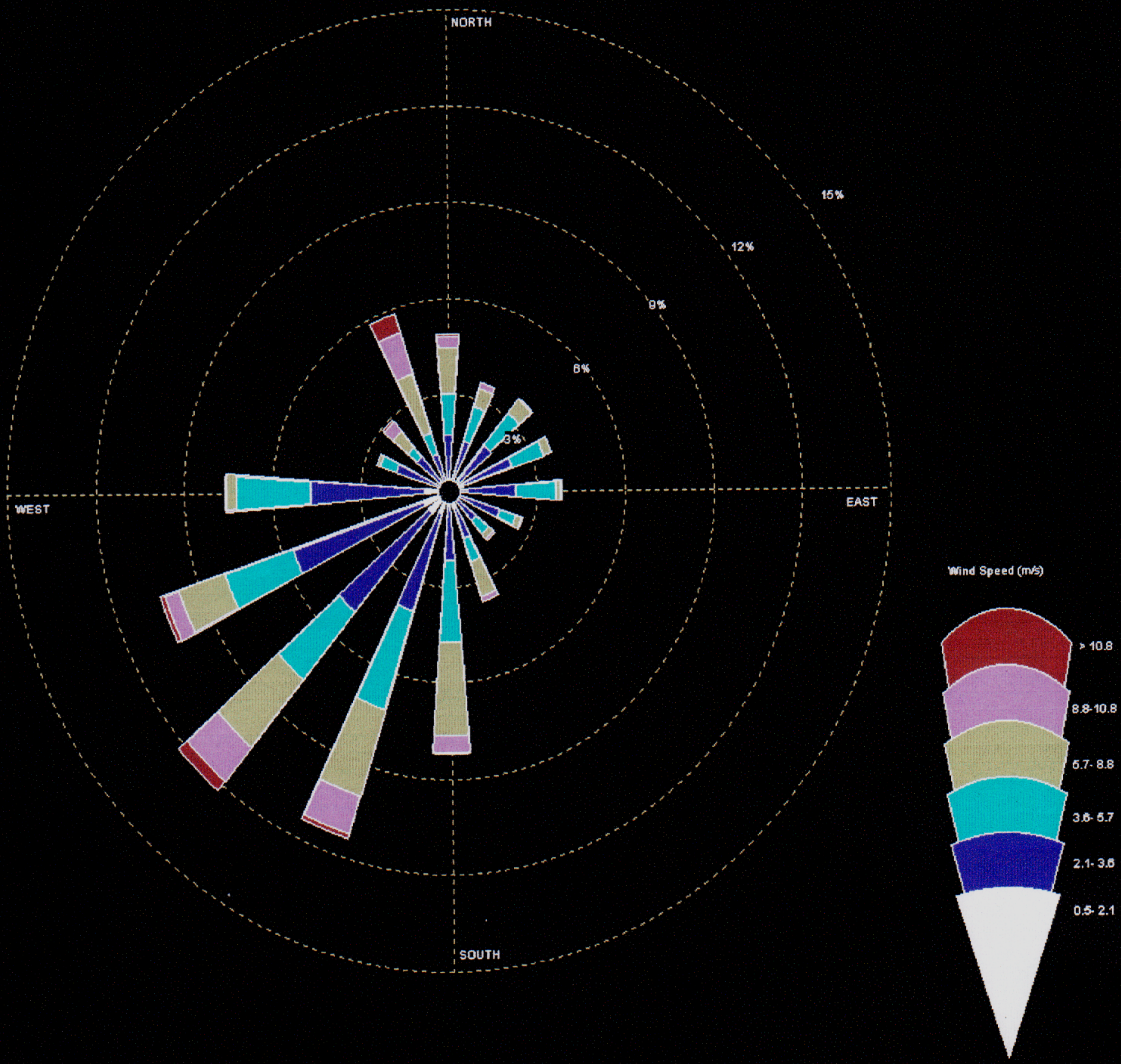


Figure 2-5
Windrose for 1998 – McCarran International Airport

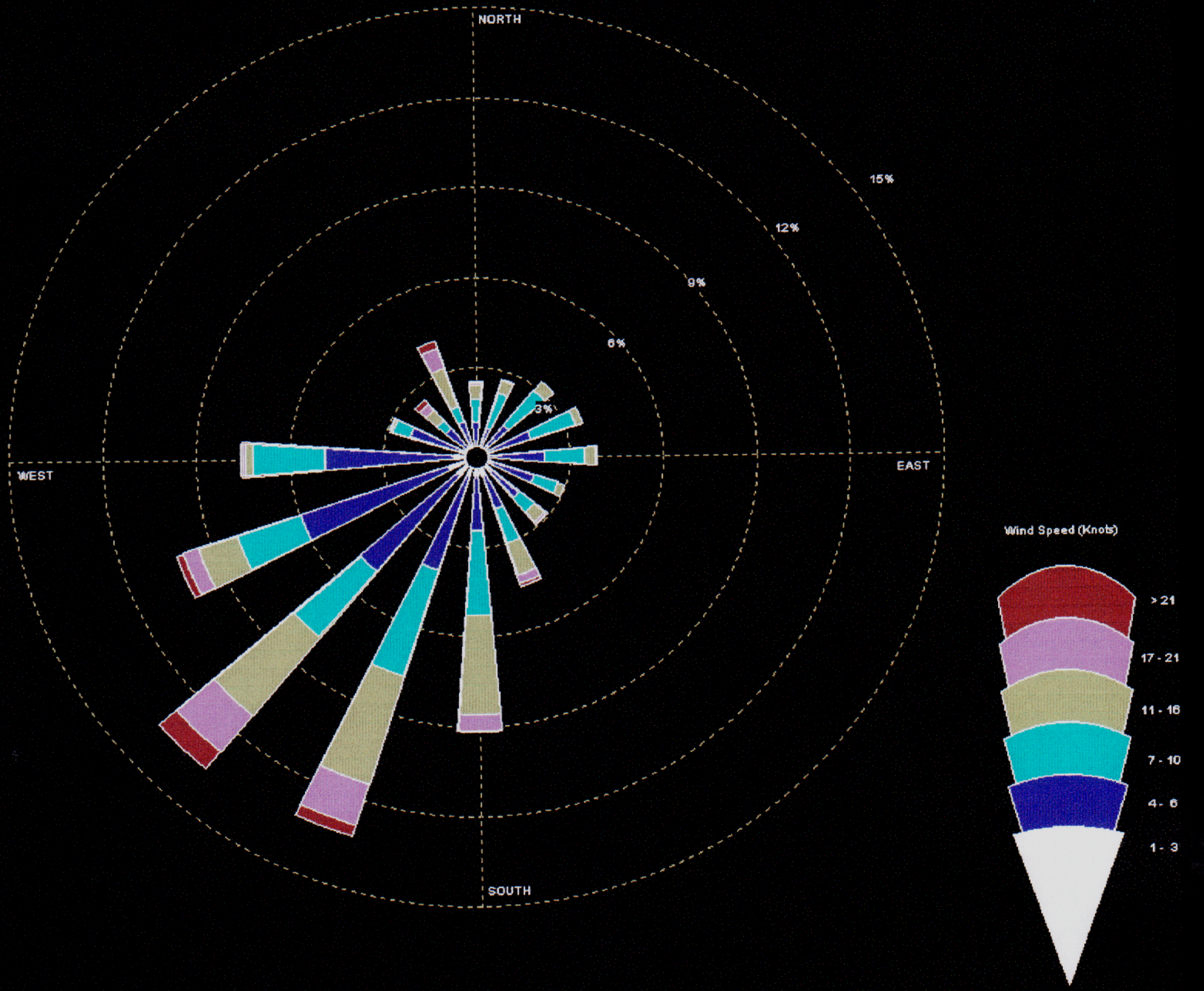
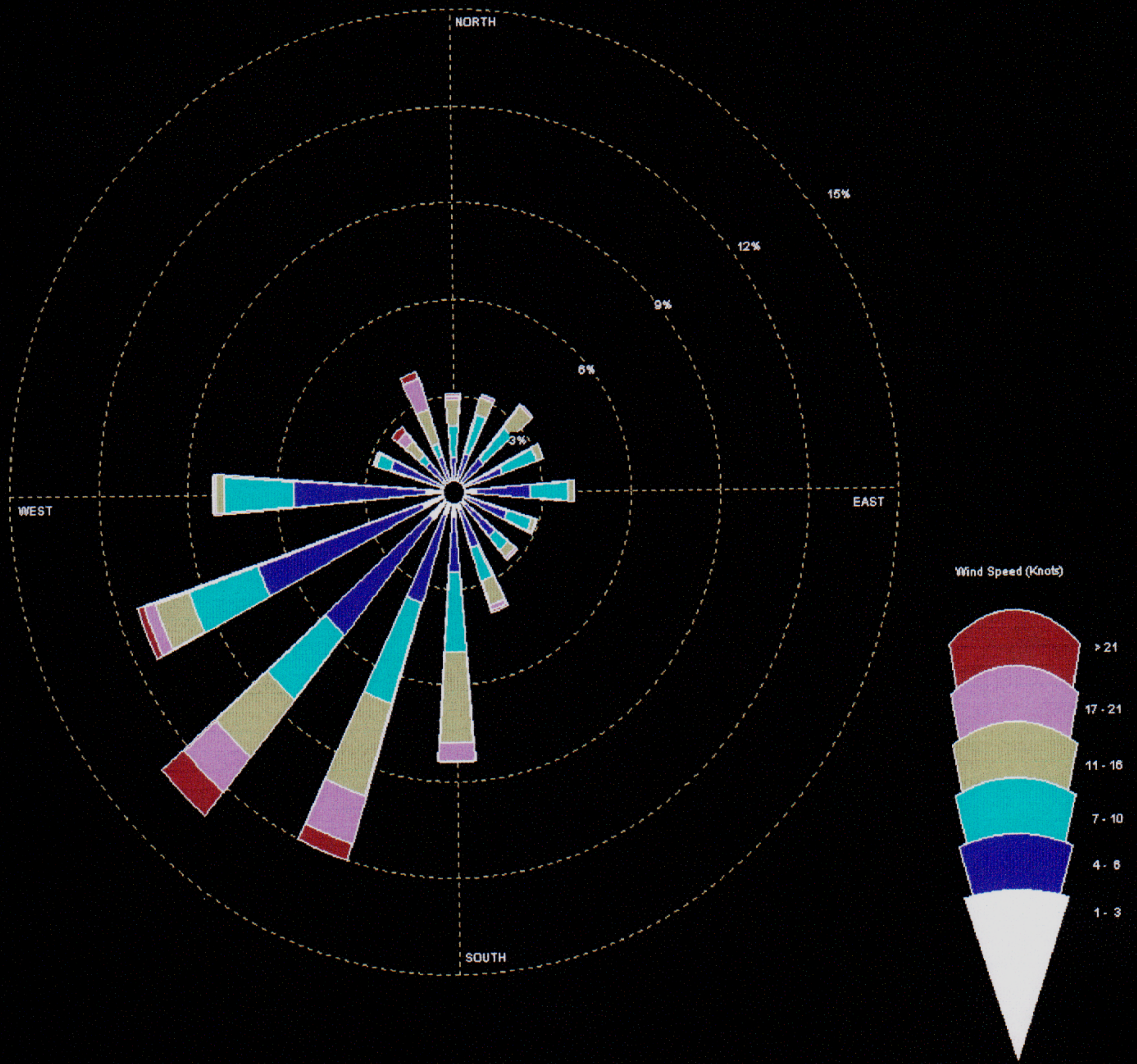


Figure 2-6
Windrose for 1999 – McCarran International Airport



exceed 30 mph. Strong winds (over 40 miles per hour), associated with steep pressure gradients across southern Nevada and high pressure ridges in adjacent states, can reach the Las Vegas Valley from the southwest and cause significant transport of suspended dust and sand throughout the area.

Local Conditions Affecting Wind Speed

In addition to prevailing winds, a pattern of local winds, generated by local topography and temperature, also affect the valley. During the day, as the Valley air is heated, wind directions are generally up-slope toward the northwest portion of the valley. At night the wind direction is reversed and cool air is drawn from the higher elevations to the lower portions of the Valley. Persistent temperature inversions are frequently observed during winter months. These inversions are often surface based due to radiative cooling of the air near the ground. These periods have light winds and high pollution potential since the inversions limit the mixing depth for the dilution of near-surface pollutants.

2.4 PM_{10} AIR QUALITY IN THE LAS VEGAS VALLEY

This section will focus on air quality monitoring data for calendar years 1997 through 1999 and only on those monitoring stations where violations of the PM_{10} national health standards were problematic during this period. The PM_{10} air quality monitoring stations of concern are: Craig Road, East Flamingo, Green Valley, J.D. Smith, and Pittman.

2.4.1 PM_{10} Air Quality Monitoring Data (1997 – 1999)

PM_{10} Monitors Were Located at 16 Sites From 1997 Through 1999

<u>2.4.1.1 24-hour Average Concentrations</u>

Table 2-2 summarizes the ambient concentrations measured throughout the valley on days when one or more monitors measured concentrations exceeding the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) from 1997 through 1999. The 24-hour national health standard for PM_{10} is 150 $\mu g/m^3$ and the exceedances are highlighted in bold print. Daily average concentration readings are obtained by dividing the total mass by the total volume. The monitoring stations are grouped by their general location within the nonattainment area. The Apex, Jean, and Boulder City monitors are outside the nonattainment area.

Violations of the 24-hour National Ambient Air Quality Standard

A violation of the 24-hour NAAQS occurs if a greater than 150 $\mu g/m^3$ PM_{10} concentration is measured more than once a year. For the three-year period summarized in Table 2-2, those stations where greater than 150 $\mu g/m^3$ of PM_{10} concentration was measured four or more times were registering violations of the 24-hour NAAQS. Five stations located in the northeast, and southeast quadrants of the valley registered violations of the NAAQS: Craig Road, East Flamingo, J. D. Smith, Green Valley, and Pittman.

There were 43 exceedance days at these five air quality monitoring sites over the three-year period from January 1, 1997 through December 31, 1999. Twenty-two exceedances were measured at the two monitoring stations in the northeast, and the three monitoring stations in the southeast measured 21 exceedances. During the three-year period, the highest 24-hour PM_{10} concentration of 442 micrograms per cubic meter was recorded at the Craig Road site on March 31, 1999. Three other air quality-monitoring stations (Pittman, J.D. Smith, and Green Valley) also recorded violations on that day.

Table 2-2 illustrates that elevated PM_{10} concentrations at one site do not necessarily correspond with high concentrations at the other sites. This implies that nearby sources are, in most cases, the driving forces for violations of the 24-hour national health standard. The location and area surrounding these five monitoring sites are described below.

Table 2-2
24-Hour Average PM_{10} Concentrations ($\mu g/m^3$) Measured Within the Las Vegas Valley
(1997 – 1999)

(24-Hour NAAQS for PM_{10} = 150 $\mu g/m^3$)

Date	Walt. Johnson (WJ)	Lone Mt. (LO)	Palo Verde (PV)	Paul Meyer Park (PM)	Craig Rd. (BS)	J.D. Smith (JD)	City Cntr (CC)	E. Sahara (MC)	Micro-scale (MS)	Hend. (PL)	Grn Vly (GV)	E.Flm (FL)	Pitt (PT)	Jean (JN)	Apex (AP)	Bo.Cty (BC)
	N.W Valley	N.W. Valley	N.W. Valley	S.W. Valley	N.E. Valley	N.E. Valley	N.E. Valley	N.E. Valley	N.E. Valley	S.E. Valley	S.E. Valley	S.E. Valley	S.E. Valley	Not In Valley	Not In Valley	Not In Valley
01/10/97	32	*N/A	*N/A	52	49	60	53	55	72	47	*N/A	**155**	61	14	7	8
01/20/97	16	*N/A	*N/A	36	50	55	44	42	94	22	29	**160**	37	8	18	8
02/18/97	19	*N/A	*N/A	31	43	**241**	63	61	68	46	42	28	46	12	5	13
03/24/97	57	*N/A	*N/A	75	**165**	64	103	84	48	91	90	85	80	18	16	15
04/23/97	73	*N/A	*N/A	116	**174**	**397**	135	**186**	130	**155**	*N/A	88	**258**	55	27	45
04/24/97	23	*N/A	*N/A	39	54	**165**	42	45	40	55	63	*N/A	62	23	5	11
05/24/97	17	*N/A	*N/A	24	36	53	31	54	43	31	**248**	108	44	20	25	21
06/06/97	56	32	*N/A	64	52	**158**	64	46	68	63	115	61	56	39	21	29
06/30/97	42	*N/A	*N/A	56	118	*N/A	69	48	83	32	78	**157**	90	22	105	24
07/11/97	25	37	*N/A	27	55	111	35	*N/A	36	31	**153**	42	60	25	29	30
07/17/97	32	47	*N/A	36	80	**153**	48	31	37	*N/A	*N/A	66	*N/A	24	44	29
08/09/97	108	111	*N/A	131	108	138	100	103	117	114	**339**	115	148	93	52	62
10/11/97	8	19	*N/A	29	85	**167**	43	31	34	26	*N/A	29	77	10	15	27
10/24/97	22	71	*N/A	44	79	**181**	70	62	77	61	75	43	71	25	19	19
11/26/97	27	*N/A	*N/A	**152**	**198**	110	*N/A	82	*N/A	*N/A	**230**	*N/A	**186**	29	53	15
04/28/98	*N/A	43	*N/A	**161**	74	35	39	31	35	34	39	47	31	24	*N/A	*N/A
06/16/98	38	52	119	78	**170**	**169**	135	78	80	40	82	72	135	43	67	49
11/17/98	22	40	20	50	**164**	79	65	43	54	32	62	80	91	11	125	17
12/19/98	34	38	47	51	**208**	91	87	65	65	43	*N/A	149	92	41	**191**	29
12/21/98	11	*N/A	17	18	*N/A	27	22	14	20	26	15	**281**	14	10	9	7
12/28/98	45	59	40	113	71	43	77	65	79	50	47	**188**	64	11	15	*N/A
01/20/99	66	97	*N/A	*N/A	**254**	79	73	66	66	64	*N/A	**163**	138	24	69	41
01/21/99	23	46	*N/A	53	118	115	103	108	96	**188**	81	105	**196**	27	42	65
02/25/99	43	53	48	75	**202**	78	69	74	73	73	**281**	*N/A	**260**	16	85	50
03/09/99	33	35	33	36	137	74	67	33	43	52	*N/A	*N/A	**183**	19	*N/A	34
03/30/99	44	49	89	50	**261**	123	110	64	81	73	**358**	**189**	**239**	35	**351**	40
03/31/99	42	57	109	60	**442**	**218**	**183**	108	127	115	**200**	150	**217**	56	105	76
05/13/99	*N/A	60	49	71	*N/A	24	100	77	107	54	128	**192**	88	39	111	33
12/01/99	35	62	41	43	**182**	133	128	107	83	81	65	62	116	16	26	*N/A
12/07/99	49	85	103	82	**195**	**170**	**159**	128	108	91	53	83	135	36	18	62

*N/A means no data available, equipment service/malfunction or a new site.

Data Displayed in **BOLD face are the days when measured concentrations exceeded the 24-Hour NAAQS at one or more stations.

Source: Clark County Health District, Air Quality Division (August, 2000)

2.4.1.2 Description of Monitoring Stations Measuring Violations of the 24-hour NAAQS

2.4.1.2.1 Craig Road: The Craig Road monitoring station is located at 4701 Mitchell Street within the City of North Las Vegas. The site is in the northeast portion of the Valley and the monitor is located in the paved parking lot of a light industrial facility. Continuous monitoring with a Graseby-Andersen Beta Attenuation Monitor began in late 1992. The surrounding vacant land is rapidly developing with commercial, light industrial, and some residential land uses. The site is adjacent to heavy traffic volumes from I-15 and Craig Road.

Description of the Craig Road Air Quality Monitoring Station

It is representative of air quality in the Valley's development boundary due to urban growth and expansion. Meteorological parameters measured at the site include temperature, wind speed, and wind direction. The Universal Trans Mercator (UTM) coordinates for the site are 671439 easting and 4012654 northing. The monitor inlet is 3.5 meters above ground level and 625 meters above mean sea level.

2.4.1.2.2 East Flamingo: The East Flamingo monitoring station is located three-fourths of a mile from the gaming corridor along Las Vegas Boulevard known as "The Strip." The Strip is the heart of Las Vegas' tourist industry where a vast majority of the world's largest resorts are located, housing roughly 30 million visitors a year. The metropolitan area where the monitor is located is an unincorporated area of Clark County. The site represents a highly commercialized area. The traffic volumes along the arterials within two kilometers of the monitor are the highest traffic volumes on any non-freeway road segment in the entire county.

Description of the East Flamingo Air Quality Monitoring Station

The monitor is located on a power line service easement. Continuous monitoring with a Graseby-Andersen Beta Attenuation Monitor began in late 1992. The monitor inlet is located 3.5 meters above ground level and 600 meters above sea level. Easting and northing UTM coordinates are 665976 and 3998058 respectively. Meteorological data for the following parameters are collected: temperature, wind speed, wind direction, and relative humidity.

Description of the Green Valley Air Quality Monitoring Station

2.4.1.2.3 Green Valley: The Green Valley air quality monitoring station is located at 298 Arroyo Grande Boulevard in the southeast portion of the Valley in the City of Henderson. The site lies on the border of a public park and is just north of a 480-acre sand and gravel operation. Several construction sites are located within two kilometers of the monitor, including the building of a new freeway. Continuous monitoring with a Graseby-Andersen Beta Attenuation Monitor began in April of 1995. Concentrations from this site can reflect specific impacts from the sand and gravel source. The UTM coordinates for the site are 675025 easting and 3991294 northing. The inlet height above ground is 3.5 meters and 613 meters above mean sea level. The meteorological parameters measured at the site are wind speed, wind direction, and temperature.

Description of the J. D. Smith Air Quality Monitoring Station

2.4.1.2.4 J. D. Smith: The J. D. Smith monitoring station is located at 1301 B East Tonopah, on the corner of Bruce and Tonopah, in the north central portion of the Valley. The site lies on the border of the J. D. Smith Middle School. Located within the City of North Las Vegas, the area is primarily residential with retail outlets along major thoroughfares. Monitoring began at this location in October 1998 when the McDaniel station required relocation. Particulate matter is monitored with a Grasby-Andersen Beta Attenuation Monitor. The UTM coordinates for the site are 668850 easting and 4006580 northing. The inlet height above ground is 3.5 meters and 581 meters above mean sea level. The meteorological parameters measured at the site are wind speed, wind direction and temperature.

2.4.1.2.5 Pittman: The Pittman air quality monitoring station is located in the City of Henderson, in the southeast portion of the Valley. Continuous monitoring using a Graseby-Andersen Beta Attenuation Monitor began in mid-1994. The monitoring station address is 1137 N. Boulder Highway, a commercial storage area. The area is surrounded by light-to-moderate commercial and industrial uses with light traffic volumes. Two of the seven major PM_{10} stationary sources are located within two kilometers of the monitoring station. The UTM coordinates for the site are 680390 easting and 3991640 northing. The monitor inlet is 4.5 meters above ground.

Description of the Pittman Air Quality Monitoring Station

2.4.1.3 Effects of High Wind Speeds

Hourly PM_{10} concentrations for the five monitoring sites measuring 24-hour NAAQS exceedances for each respective design day (see Appendix A) are presented in Figures 2-7 through 2-11. The maximum hourly concentrations measured at each site correspond with periods of high winds. The same design day occurs at the East Flamingo and Pittman monitoring sites, and maximum concentrations occurred during the same hour at both monitoring stations (Figures 2-9 and 2-11). During periods of the design day with low wind speeds, increases in PM_{10} concentrations were measured during morning commute hours at the Craig Road and J. D. Smith monitoring sites (Figures 2-7 and 2-10). The measured increases during this time period may be indicative of paved road dust impacts. Though measurable, the impacts from paved road dust appear to be much lower than from wind events.

24-hour Exceedances are Associated with High Winds

Meteorological analysis suggests that most of the 24-hour exceedances are typically associated with high winds. Previous studies show that maximum wind speed exceeded 10 meters/second on over 80 percent of violation days.[6] Wind roses when winds exceed 20 knots are presented in Figures 2-12 through 2-14. Comparing these wind roses to wind roses for all wind speeds (Figures 2-4 through 2-6) indicates high winds do not vary in direction as annual average winds. However, not all violations of the 24-hour health standard for PM_{10} are caused by high wind events. Even under low wind or stagnant conditions, nearby sources of PM_{10} (e.g., construction sites and paved road

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[6] *Fugitive Dust and Other Source Contributions to PM_{10} in Nevada's Las Vegas Valley*, Volume II-Final Report, Desert Research Institute Document No. 4039.2F1, April 18, 1997, pp. 6-1 through 6-6.

Figure 2-7

Craig Road Monitor PM_{10} Design Day

Hourly Concentration Variation - 01/20/99

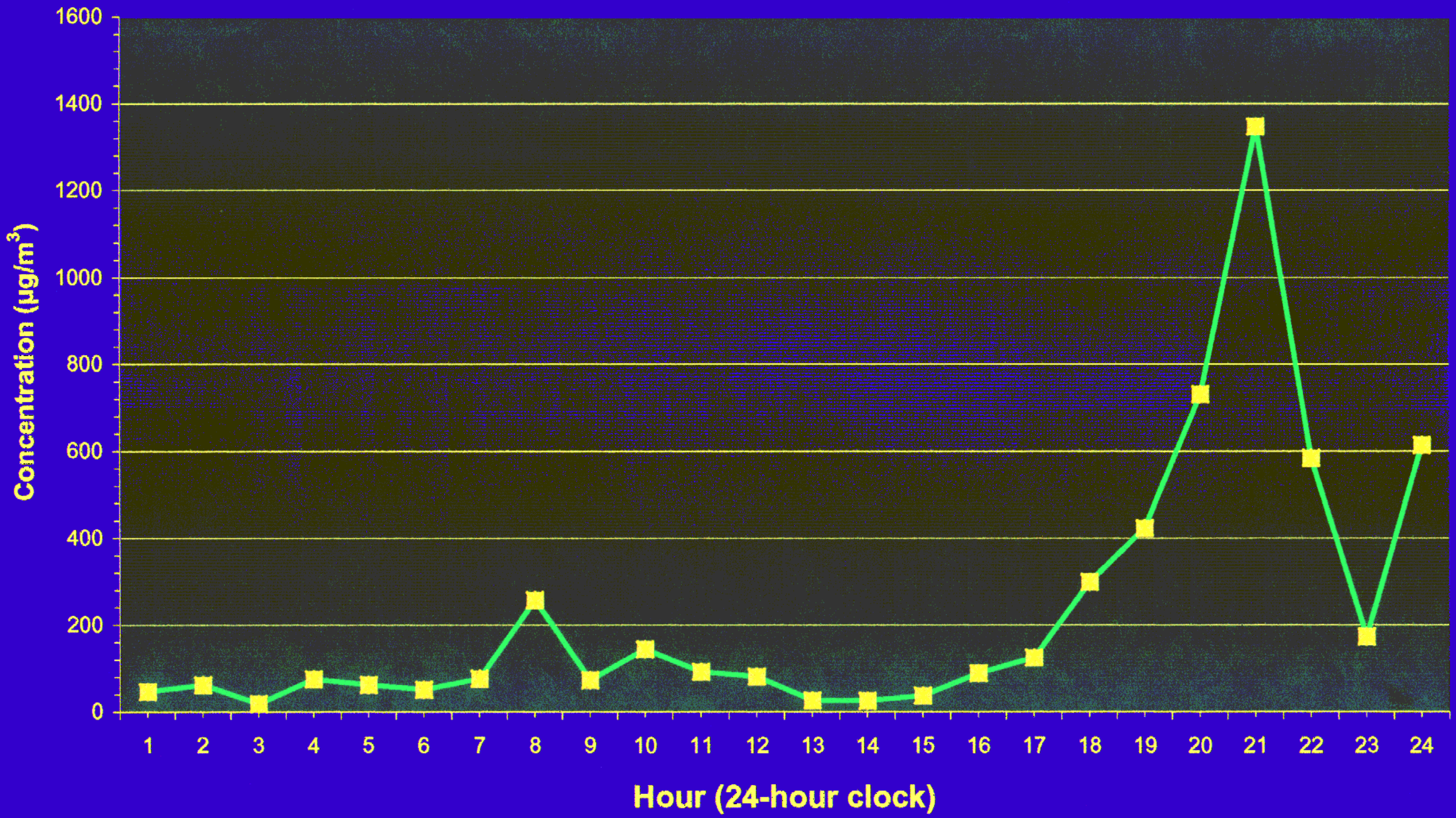


Figure 2-8

East Flamingo Monitor PM_{10} Design Day
Hourly Concentration Variation - 03/30/99

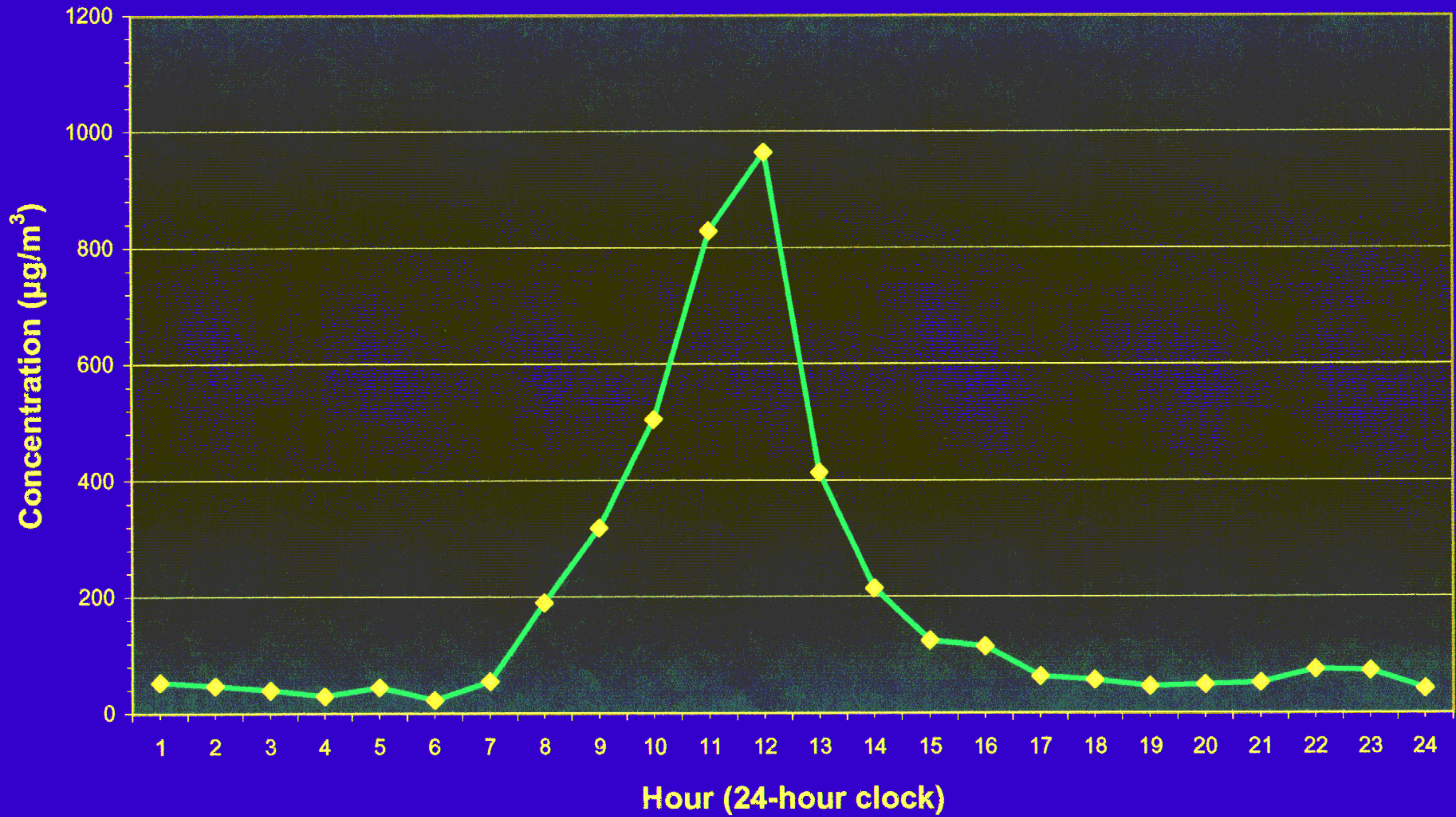


Figure 2-9

Green Valley Monitor PM_{10} Design Day

Hourly Concentration Variation - 02/25/99

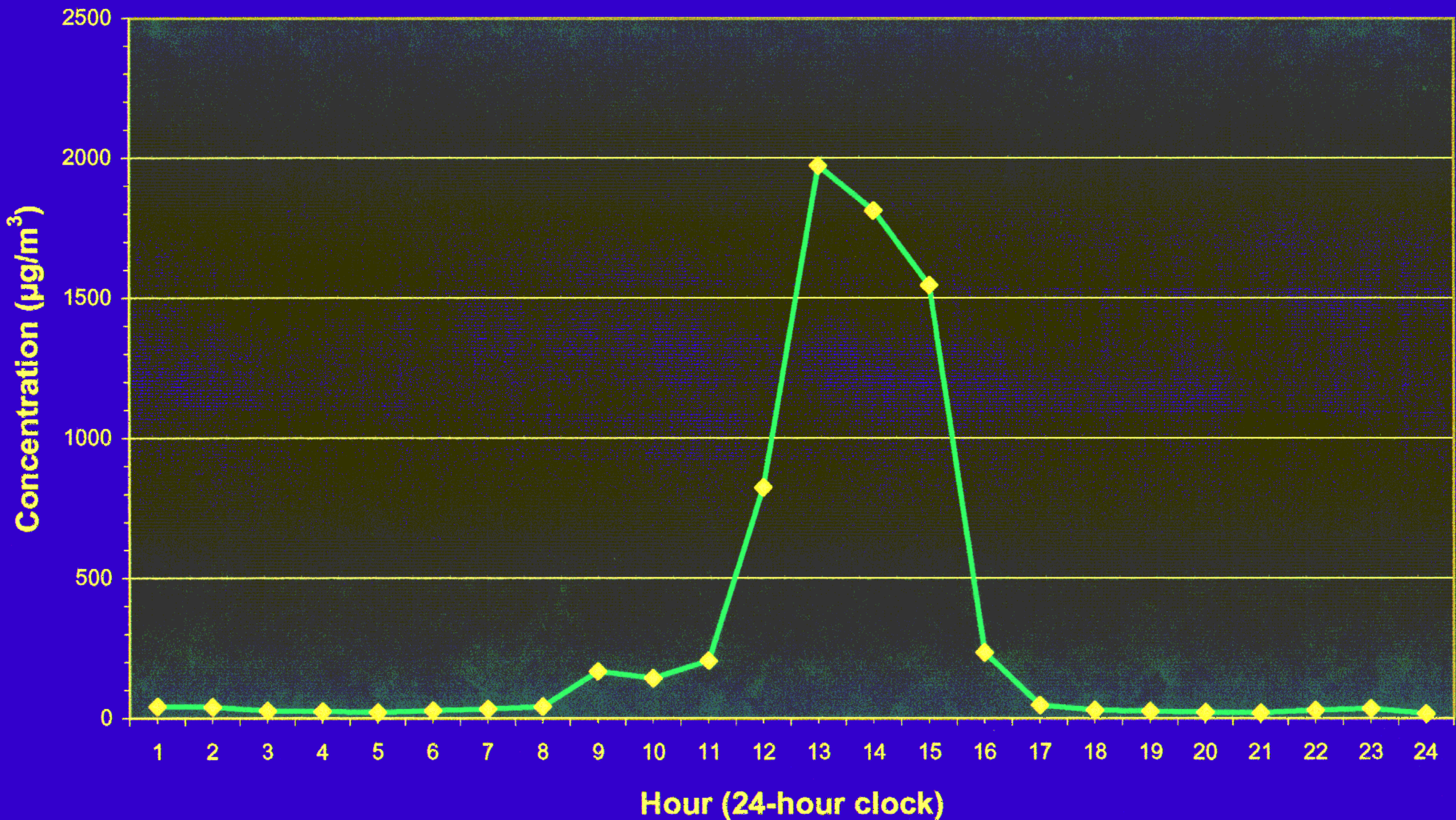


Figure 2-10

J. D. Smith Monitor PM_{10} Design Day
Hourly Concentration Variation - 03/31/99

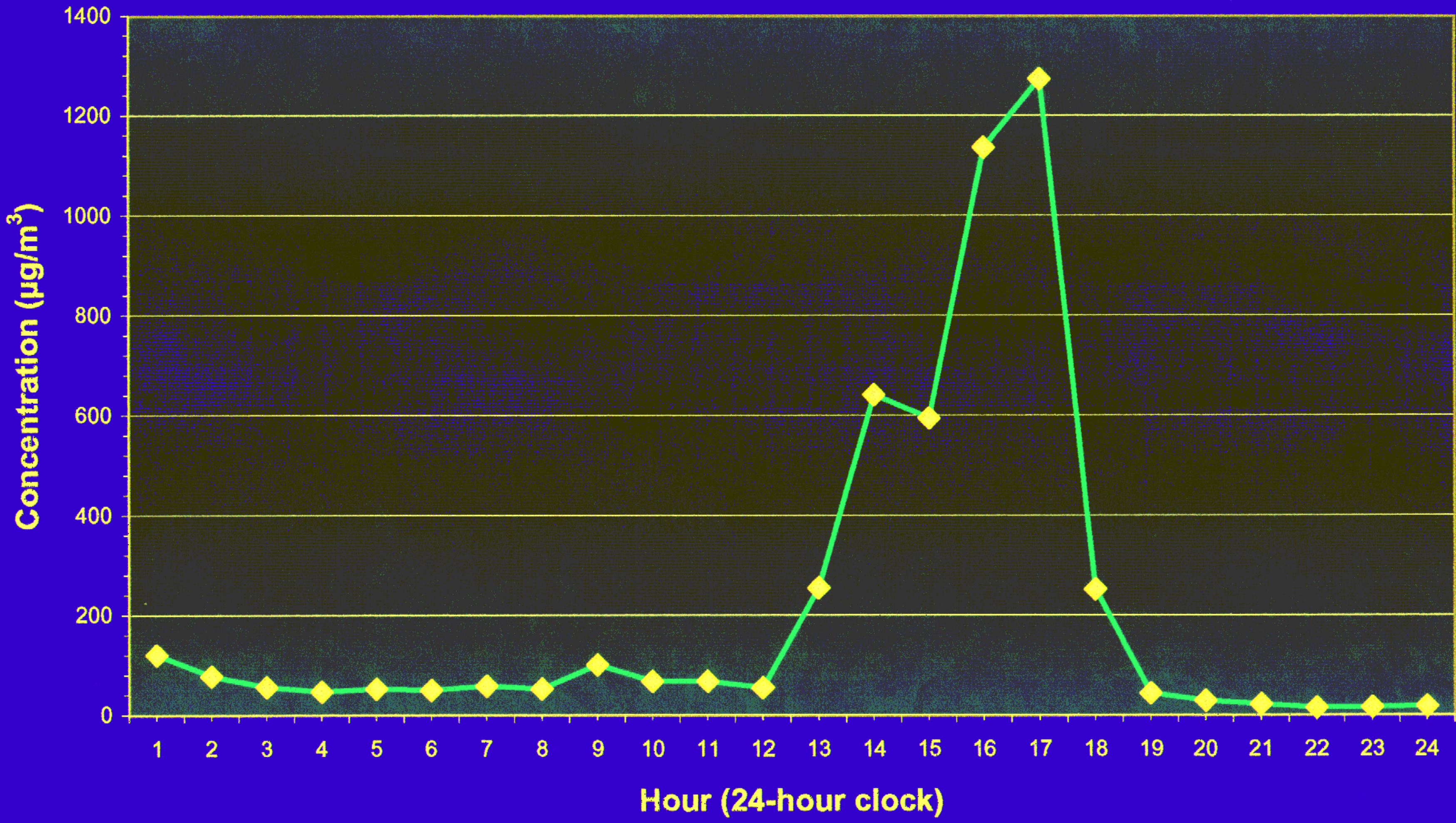


Figure 2-11

Pittman Monitor PM_{10} Design Day

Hourly Concentration Variation - 03/30/99

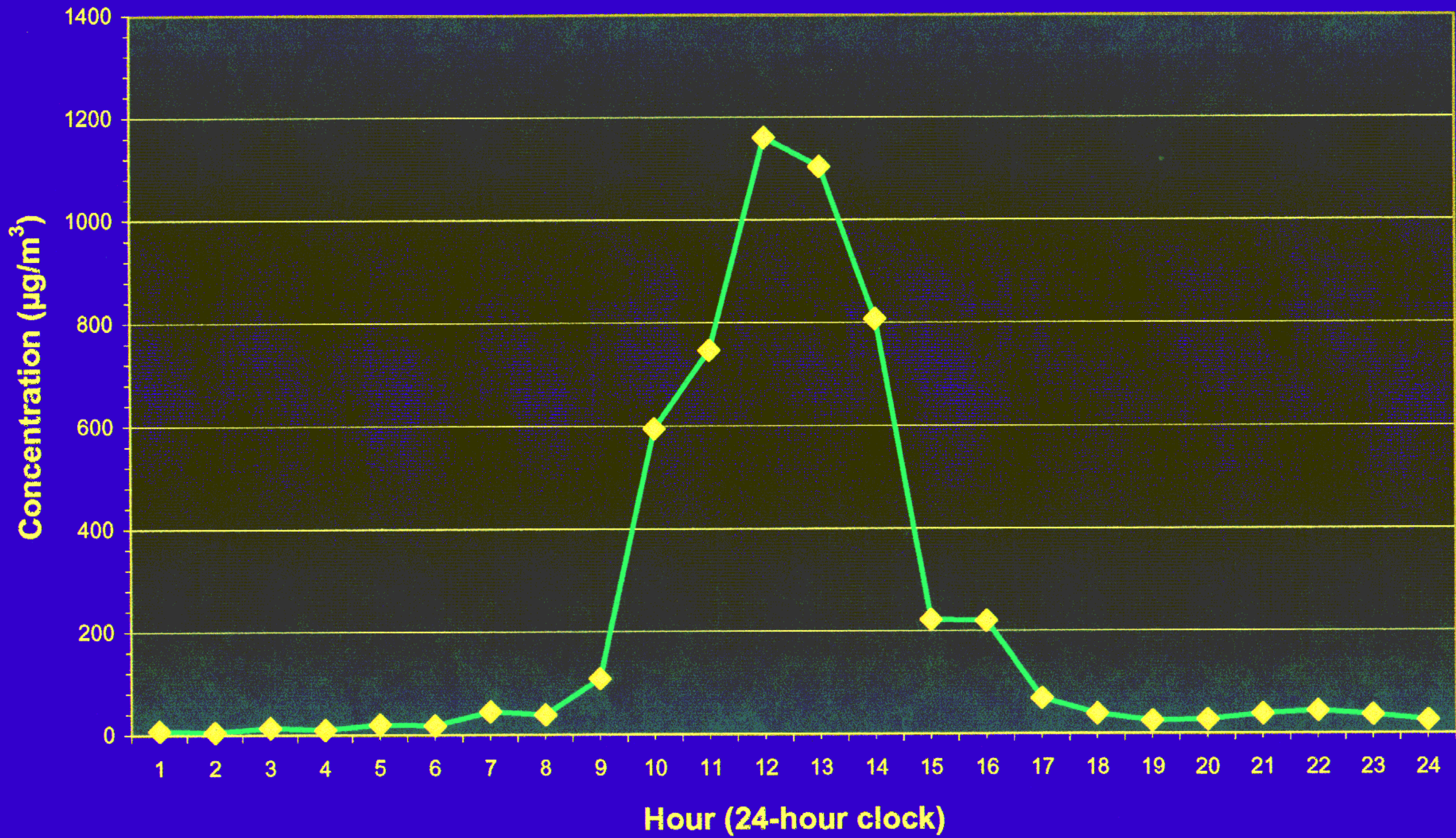


Figure 2-12
Windrose for 1997- High Wind Conditions
McCarran International Airport

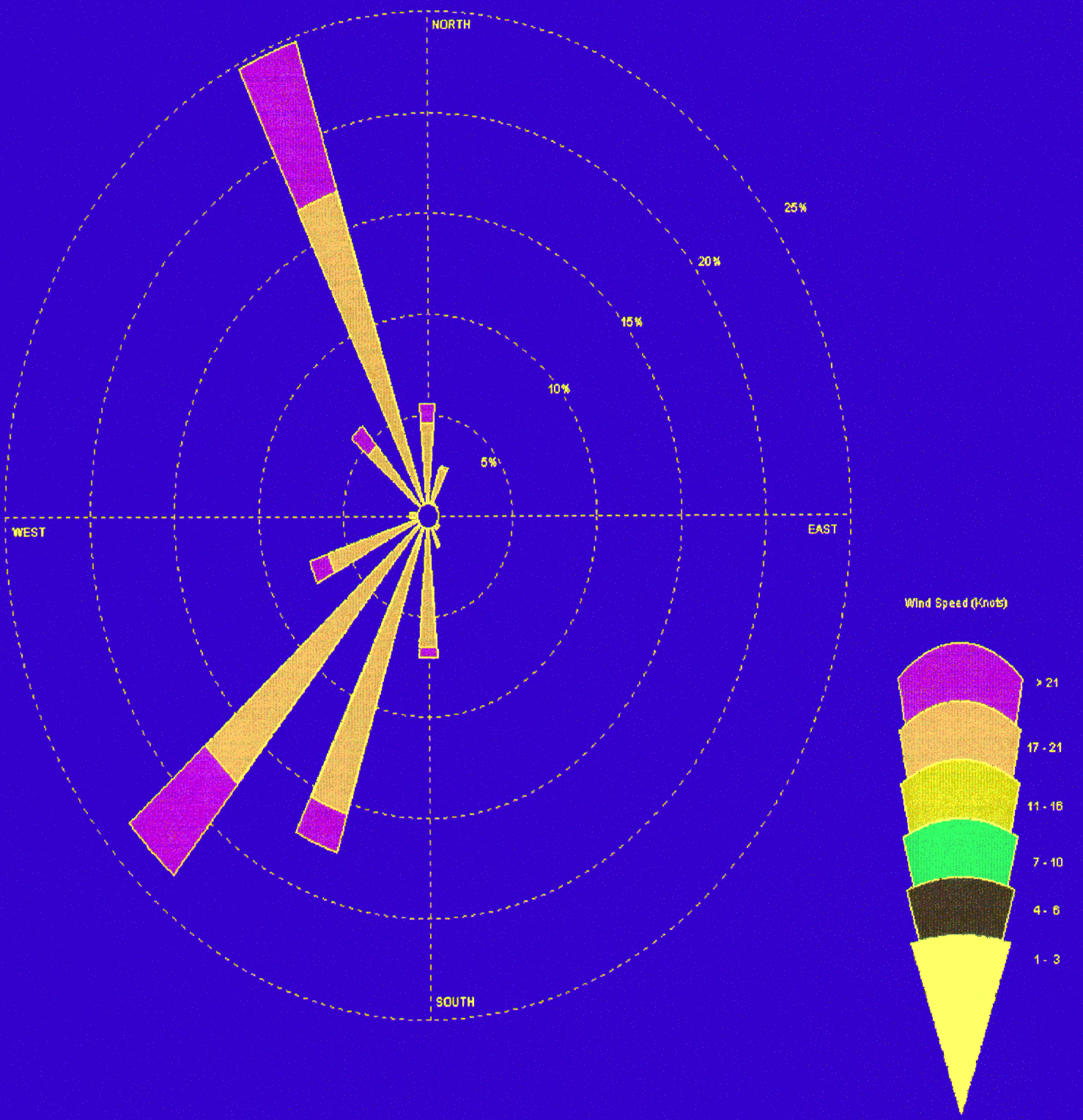


Figure 2-13
Windrose for 1998 – High Wind Conditions
McCarran International Airport

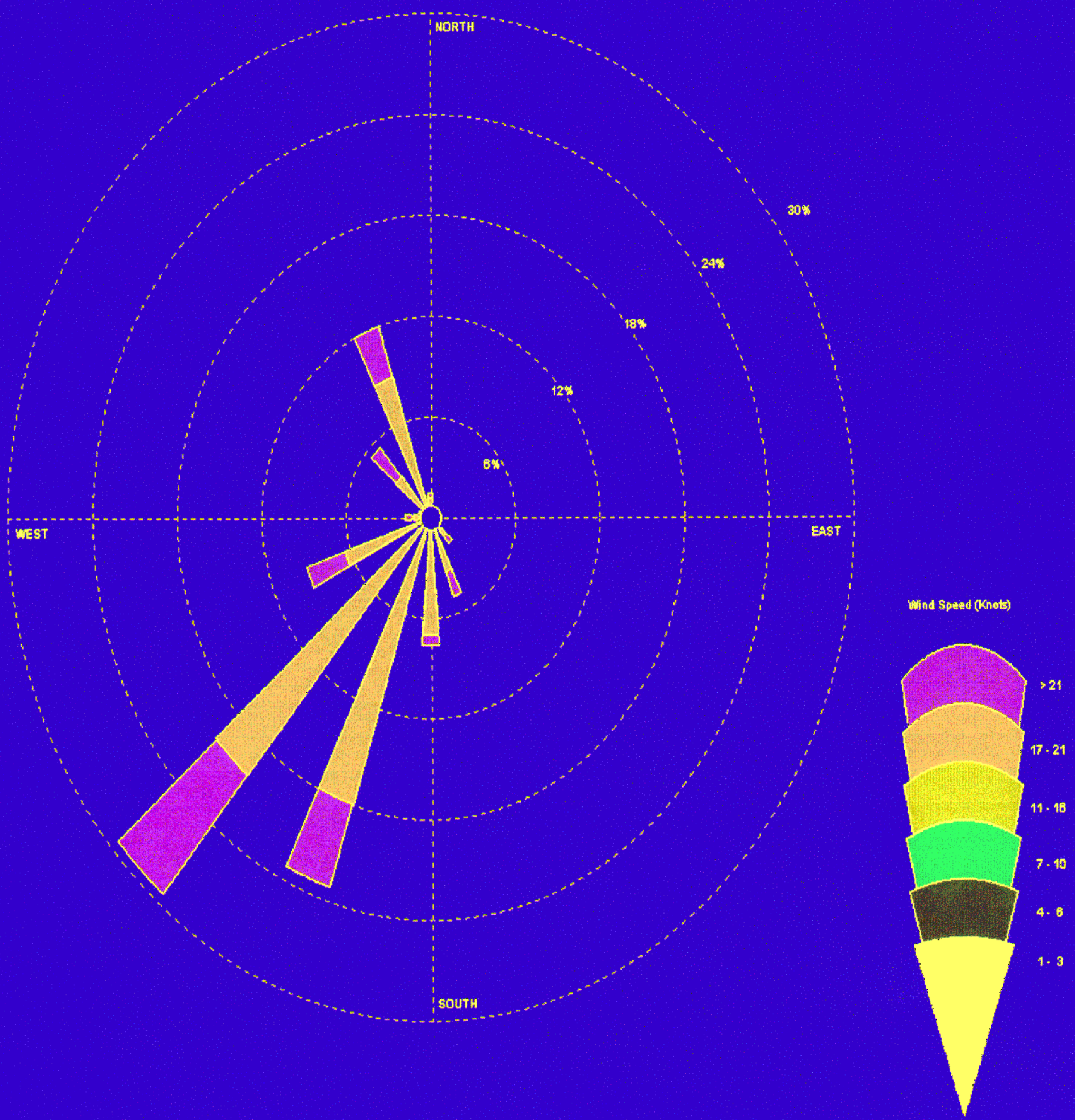
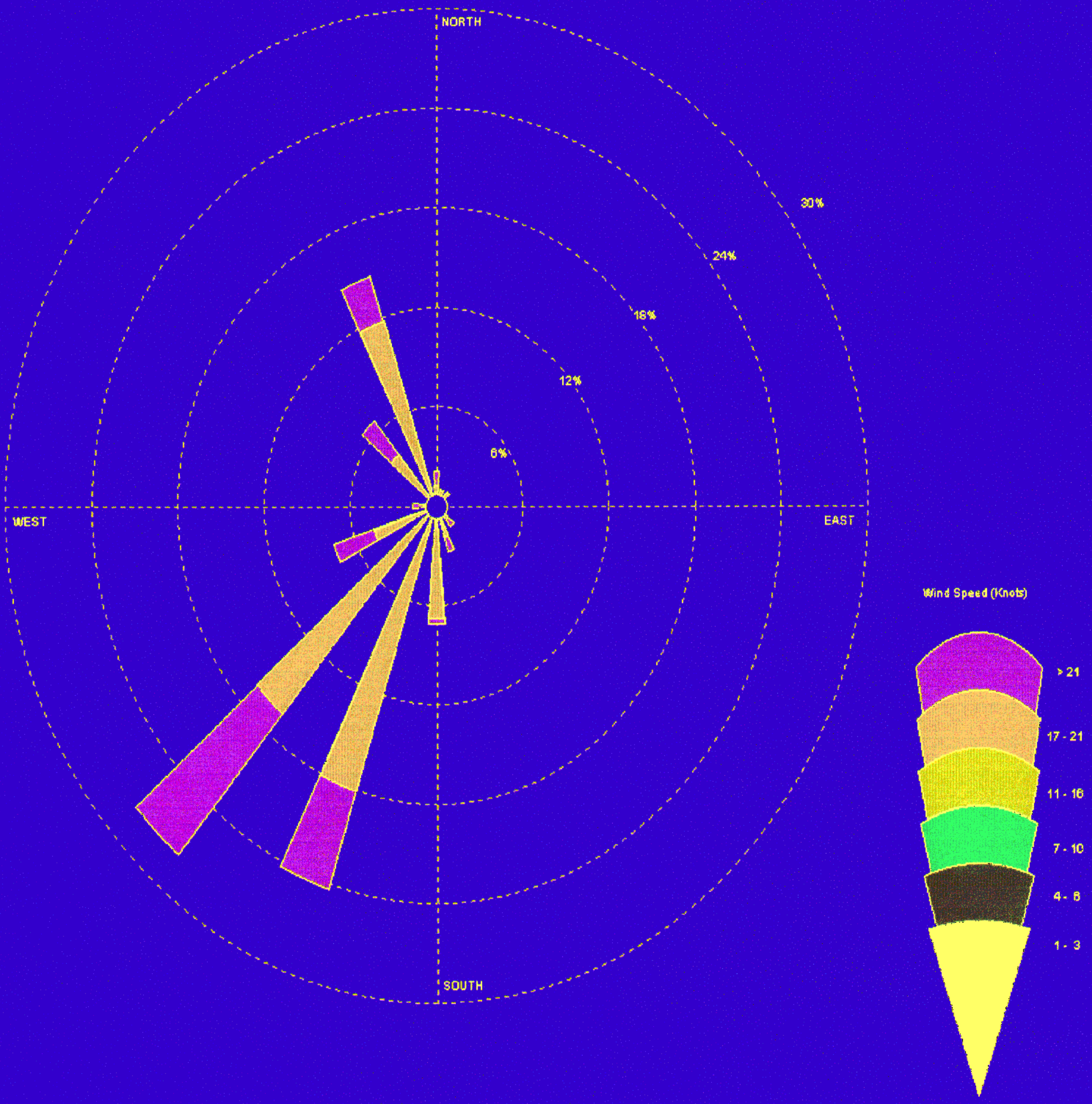


Figure 2-14
Windrose for 1999 – High Wind Conditions
McCarran International Airport



dust) with high activity levels may lead to emissions sufficient for a violation of the 24-hour health standard.

2.4.1.4 Annual Average Concentrations

Annual Average Measured Concentrations

Quarterly averages of measured PM_{10} concentrations for 1997 through 1999 are presented in Table 2-3. If 12 consecutive quarterly averages are averaged together and the resulting concentration is greater than the annual NAAQS of 50 $\mu g/m^3$, a violation of the annual NAAQS occurs.

Annual NAAQS Violation Measured at the J. D. Smith Monitoring Location

The average of the 12 quarters presented in Table 2-3 was greater than 50 $\mu g/m^3$ at the J. D. Smith monitoring station. Therefore, a violation of the annual standard has been measured at this monitoring location. The area surrounding the J. D. Smith monitoring site has been previously described. Attainment of the annual standard will be based upon demonstrating attainment at this site.

2.5 SUMMARY

This chapter presented a general description of the air quality monitoring network including the physical and climatological setting. Ambient air quality data for calendar years 1997 through 1999 was summarized. The primary focus was on elevated PM_{10} concentrations at the following air quality monitoring stations: Craig Road, J.D. Smith, East Flamingo, Green Valley, and Pittman.

Source contributions to elevated levels of PM_{10} concentrations and the role of wind speed, wind direction, and topography were discussed. Fugitive dust appears to be the predominant source of PM_{10} emissions. It was noted that most 24-hour violations are typically associated with high winds. Occasionally, under low wind or stagnant conditions, nearby sources of PM_{10} (e.g., construction sites and paved road dust) with high activity levels may lead to emissions sufficient for a violation of the 24-hour health standard.

Table 2-3
Quarterly Average PM_{10} Concentrations ($\mu g/m^3$) Measured within the Las Vegas Valley
(1997 – 1999)
(Annual NAAQS for PM_{10} = 50 $\mu g/m^3$)

Date	Walt. Johnson (WJ)	Lone Mt. (LO)	Palo Verde (PV)	Paul Meyer Park (PM)	Craig Rd. (BS)	J.D. Smith (JD)	City Cntr (CC)	E. Sahara (MC)	Micro-scale (MS)	Hend. (PL)	Grn Vly (GV)	E.Flm (FL)	Pitt (PT)	Jean (JN)	Apex (AP)	Bo.Cty (BC)
	N.W Valley	N.W. Valley	N.W. Valley	S.W. Valley	N.E. Valley	N.E. Valley	N.E. Valley	N.E. Valley	N.E. Valley	S.E. Valley	S.E. Valley	S.E. Valley	S.E. Valley	Not In Valley	Not In Valley	Not In Valley
1997																
1st Qtr	20.3	*N/A	57.7	34.4	38.2	57.7	37.3	37.9	50.5	32.3	35.6	54.8	37.7	12.7	9.1	11.7
2nd Qtr	27.7	39.0	83.2	39.4	51.8	83.2	36.6	34.1	41.9	37.4	48.6	44.8	42.8	21.2	21.6	19.0
3rd Qtr	26.7	34.8	63.6	42.7	48.9	63.6	36.6	31.0	39.6	31.6	52.9	47.1	37.3	18.4	23.0	18.7
4th Qtr	16.6	29.9	55.6	38.7	43.0	55.6	43.2	38.2	49.7	37.4	39.7	51.1	46.8	12.6	13.8	14.1
1998																
1st Qtr	12.5	20.2	*N/A	30.4	33.8	35.5	31.5	25.6	36.3	24.0	32.2	39.5	28.9	10.8	12.2	10.4
2nd Qtr	18.0	25.0	30.2	31.1	44.0	36.6	33.1	25.0	31.3	24.9	32.7	35.8	33.7	16.8	22.1	17.2
3rd Qtr	28.1	32.9	27.9	44.0	49.6	45.8	44.1	35.6	39.0	29.3	37.3	*N/A	36.2	17.7	24.0	17.3
4th Qtr	20.1	32.0	22.0	39.6	52.8	51.4	47.6	39.8	49.4	33.4	30.1	60.2	45.3	10.9	18.1	12.3
1999																
1st Qtr	23.1	34.5	25.5	37.6	69.3	56.4	49.4	40.6	50.2	40.8	42.3	59.0	58.9	11.8	21.8	14.9
2nd Qtr	21.2	29.5	23.4	33.6	45.7	40.2	35.0	24.4	33.5	29.7	33.8	43.1	43.1	15.3	23.4	15.7
3rd Qtr	24.3	28.6	22.8	43.3	50.6	45.1	39.7	30.7	40.6	29.2	36.0	39.2	39.2	14.4	19.5	14.6
4th Qtr	24.6	37.0	26.3	46.8	57.1	67.6	59.2	50.3	59.7	43.8	37.4	53.0	53.0	12.2	13.8	17.0
Average of all 12 Qtr's	**21.9**	**31.2**	**39.9**	**38.5**	**48.7**	**53.2**	**41.1**	**34.4**	**43.5**	**32.9**	**38.2**	**48.0**	**42.0**	**14.6**	**18.6**	**15.2**

*N/A denotes new site, equipment repair, or malfunction where data was not available. Source: Clark County Health District, Air Quality Division (August, 2000)

CHAPTER 3: PM_{10} EMISSIONS INVENTORIES

3.1 INTRODUCTION

In the Clark County, Nevada nonattainment area, particulate air pollution is largely associated with wind-blown dust, re-entrained road dust, or construction emissions. The U. S. Environmental Protection Agency (U. S. EPA) requires all PM_{10} emissions sources to be included in the inventory if they contribute significantly to an annual or 24-hour violation of the National Ambient Air Quality Standard (NAAQS). A significant contribution is defined by U. S. EPA as a minimum contribution to the ambient concentration of one $\mu g/m^3$ to the annual average PM_{10} concentration in an area or over five $\mu g/m^3$ to the 24-hour average concentration.[1] The first step in determining the magnitude of the contribution of various sources of PM_{10} is to develop base line inventories of emissions. There are a wide variety of sources contributing to ambient concentrations of PM_{10} within the Las Vegas Valley nonattainment area, including:

Types of PM_{10} Sources

- Major and minor stationary sources such as aggregate processing facilities, residential wood burning, natural gas-burning electric power plants and commercial charbroiling kitchens;
- Area wide fugitive emissions from construction activities, disturbed vacant land, vehicle exhaust, paved road dust, unpaved road dust, and other sources that do not emit through a stationary point; and
- Natural or background emissions resulting from physical and climatological conditions that would exist even in the

[1] *State Implementation Plans for Serious PM_{10} Nonattainment Areas, and Attainment Date Waivers for PM_{10} Nonattainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*, 40 CFR Part 52, August 16, 1994.

absence of humans. This may be particularly evident in an arid environment like the Las Vegas Valley where fugitive dust may be emitted from areas of native desert.

Primary PM_{10}

Sources may directly emit PM_{10} into the atmosphere or PM_{10} may be formed in the atmosphere as a result of condensation or chemical reactions with other pollutants. Therefore, PM_{10} particles may be characterized as primary, condensable, or secondary. Primary particles are directly emitted from a stack or open source. These particles are not formed after being emitted from the source. With the exception of particles emitted from the burning of fuels, primary PM_{10} sources usually include the larger or heavier portions of the PM_{10} size fraction (e.g., coarse particles larger than $PM_{2.5}$). These sources that emit a larger size fraction of particles also significantly contribute to dusty conditions during high-wind days. During calm conditions, the larger PM_{10} particles usually settle within close proximity to the emission source.

Condensable PM_{10}

Materials that are not particulate matter as emitted, but that condense upon cooling and dilution in the ambient air to form particulate matter soon after being emitted, are condensable particulate. Condensable PM_{10} include the smaller portions of the PM_{10} size fraction (e.g., fine particles less than or equal to $PM_{2.5}$) and may travel several miles before settling.

Secondary PM_{10}

Particles that form through chemical reactions in the air, usually some distance downwind from the source, are referred to as secondary particulate. Compounds that are emitted and often go through these reactions to form particulate are known as PM_{10} precursors. Both oxides of nitrogen and oxides of sulfur are known PM_{10} precursors. Secondary PM_{10} is distinguished from condensable PM_{10} by the time and/or distance downwind from the source from which the particles form. Secondary PM_{10} also includes many particles in the fine fraction of PM_{10} that may be transported over great distances. Peak ambient PM_{10} concentrations in the nonattainment area typically occur during high-wind conditions. These high concentrations are generated primarily by wind-blown soil particles from disturbed soil surfaces. Particles are largely available to become airborne due to the relative lack of protective vegetation typical of arid desert climate, the fine texture of the type of soils that are present in the basin, and the large amount of surface soil disturbance activities occurring in the nonattainment area. Strong wind-gust events occur generally between April and September, although high winds are also recorded in other months when storms pass through the region. High-wind speeds result from either thunderstorm activity or significant pressure differences between marine and continental air masses. During such high-wind events, soil particles dominate PM_{10} measurements, and stations recording the highest concentrations are those typically located near large expanses of disturbed soil.

Peak PM_{10} Concentrations Occur During High Winds

3.2 NONATTAINMENT AREA INVENTORIES

An emissions inventory for the entire nonattainment area is required by the U. S. EPA.[2] As depicted in Figure 1-1 and described in Chapter 2, the majority of the nonattainment area is under federal control. Land use is restricted and over one-half of the acres within the nonattainment area cannot be used for development. As previously described, wind-blown dust from vacant land is a significant source of PM_{10} emissions.

Nonattainment Area Inventories Are Dominated by Vacant Land Emissions

The base year and 24-hour emission inventories were developed for the design year and design day. The design year and design day were determined

[2] *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*, EPA-454/R-99-006; U. S. Environmental Protection Agency: Research Triangle Park, April, 1999.

using the U.S. EPA guideline[3] as described in Appendix A. The design year is 1998 and the design day is December 21,1998. The nonattainment area emission inventories were developed using the meteorological data collected at McCarran International Airport. The 1998 wind rose of the McCarran wind data is presented in Chapter 2. The emission inventory calculations are described in detail in Appendix B.

Paved and Unpaved Road Dust Contribute Almost 20 Percent to the Annual Inventory

The 1998 annual nonattainment area inventory is presented in Table 3-1. Over two-thirds of the emissions in the inventory come from wind erosion of vacant land. Paved road dust and unpaved road dust combine for less than 20 percent of the entire inventory. Construction activities and wind erosion total slightly over ten percent.

24-Hour Inventory Based on the Annual Inventory Except for Sources Related to Wind Conditions

The 24-hour nonattainment area inventory was developed using the annual inventory for activities that were anticipated to be average on Monday, December 21, 1998, such as construction and traffic. For these sources, the annual inventory emissions were divided by 365 to estimate the 24-hour emissions. The wind data for the day from McCarran International Airport was used for sources dependent on wind speeds, such as windblown construction dust and vacant land emissions. The inventory is summarized in Table 3-2. The calculations are described in detail in Appendix B.

Although winds did not exceed 25 mph and emissions were not calculated for native desert, vacant land emissions again dominated the nonattainment area inventory. Over two-thirds of all emissions were from vacant land fugitive dust. Road dust, paved and unpaved, accounted for just under ten percent of the inventory and construction activities accounted for almost four percent.

[3] *PM_{10} SIP Guideline*, EPA-450-2-86-001; U. S. Environmental Protection Agency: Research Triangle Park, June, 1987.

Table 3-1

1998 Annual Nonattainment Area PM_{10} Emissions Inventory

SOURCES	PM_{10} (tons/year)
Stationary Point Sources	
Sand & Gravel Operations	627
Utilities – Natural Gas	199
Asphalt Concrete Manufacture	268
Industrial Processes	80
Other Sources	124
Total	1,298
Stationary Area Sources	
Small Point Sources	184
Residential Firewood	76.2
Residential Natural Gas	67.4
Commercial Natural Gas	33.2
Industrial Natural Gas	13.8
NG – Purchased at the Source – Carried by SWG	210.3
Structural / Vehicle Fires / Wild Fires	17.4
Charbroiling / Meat Cooking	757.5
Disturbed Vacant Lands / Unpaved Parking Lots	133,000
Native Desert Fugitive Dust	80,400
Stabilized Vacant Lands Dust	15,700
Construction Activity Fugitive Dust	19,807
Windblown Construction Dust	15,755
Total	266,021.7
Nonroad Mobile Sources	
Airport Support Equipment	37.1
Commercial Equipment	0.3
Construction & Mining Equipment	364.6
Lawn & Garden Equipment	12.5
Railroad Equipment	14.6
Recreational Equipment	1.0
McCarran International Airport	250.2
Henderson Executive Airport	5.5
North Las Vegas Municipal Airport	22.8
Nellis Air Force Base	31.9
Total	740.6
Onroad Mobile Sources	
Paved Road Dust (Includes Construction Track Out)	45,284.4
Unpaved Road Dust	15,156
Highway Construction Projects Activities	2,384
Highway Construction Projects – Wind Erosion	1,260
Vehicular Sulfate PM	407
Vehicular Tire Wear	84
Vehicular Brake Wear	136
Vehicular Exhaust	361
Total	65,072.4
Total	**333,132.7**

Table 3-2

24-Hour Nonattainment Area PM_{10} Emissions Inventory (December 21, 1998)

SOURCES	PM_{10} (tons/day)
Stationary Point Sources	
Sand & Gravel Operations	1.72
Utilities – Natural Gas	0.55
Asphalt Concrete Manufacture	0.73
Industrial Processes	0.22
Other Sources	0.34
Total	3.56
Stationary Area Sources	
Small Point Sources	0.50
Residential Firewood	0.82
Residential Natural Gas	0.18
Commercial Natural Gas	0.09
Industrial Natural Gas	0.04
NG – Purchased at the Source – Carried by SWG	0.58
Structural / Vehicle Fires / Wild Fires	0.05
Charbroiling / Meat Cooking	2.08
Disturbed Vacant Lands / Unpaved Parking Lots	1,020
Native Desert Fugitive Dust	0
Stabilized Vacant Lands Dust	121
Construction Activity Fugitive Dust	54.27
Windblown Construction Dust	272.72
Total	1,472.32
Nonroad Mobile Sources	
Airport Support Equipment	0.10
Commercial Equipment	0
Construction & Mining Equipment	1.00
Lawn & Garden Equipment	0.03
Railroad Equipment	0.04
Recreational Equipment	0
McCarran International Airport	0.69
Henderson Executive Airport	0.02
North Las Vegas Municipal Airport	0.06
Nellis Air Force Base	0.09
Total	2.03
Onroad Mobile Sources	
Paved Road Dust (Includes Construction Track Out)	124.07
Unpaved Road Dust	41.52
Highway Construction Projects Activities	6.53
Highway Construction Projects – Wind Erosion	9.61
Vehicular Sulfate PM	1.12
Vehicular Tire Wear	0.23
Vehicular Brake Wear	0.37
Vehicular Exhaust	0.99
Total	184.44
Total	**1,662**

The inventories include only primary PM_{10}. Previous Chemical Mass Balance (CMB) receptor modeling[4] showed that secondary and condensable particulate formation contribute less than significant amounts to ambient PM_{10} concentrations (See Section 4.2.1). Average secondary particulate concentrations were added to the background as an irreducible part of the total PM_{10} concentration. Therefore, the inventories focus on primary PM_{10} particles that have significant impacts.

Secondary and Condensable PM_{10} Not Significant

3.3 ATTAINMENT DEMONSTRATION AREA

Although the U. S. EPA requires an inventory for the entire nonattainment area, the attainment demonstration can be made for a smaller area if there are compelling reasons to do so. As described in Chapter 1, the Las Vegas Valley nonattainment area covers an area of roughly 960,000 acres. As shown in Figure 1-1, over half of the nonattainment area is under federal control. The following federal land uses are within the nonattainment area:

Large Portion of the Nonattainment Area Under Federal Control

- Bureau of Reclamation – 9,689 acres;
- Desert National Wildlife Refuge – 226,728 acres;
- Lake Mead National Recreational Area – 1,148 acres;
- Nellis Air Force Base and Ranges – 25,124 acres;
- Red Rock Canyon National Conservation Area – 195,780 acres; and
- Toiyabe National Forest – 60,073 acres.

To ensure that the conservation and preservation areas remain rural in nature, the United States Department of Interior, Bureau of Land Management (BLM) adopted a boundary within the Las Vegas Valley that identifies federally owned land that is available for purchase, trade, or lease

BLM Disposal Area Designated by Congress

[4] Chow, J. C. et al; *Middle- and Neighborhood-Scale Variations of PM_{10} Source Contributions in Las Vegas, Nevada*, Journal of the Air & Waste Management Association, **1999** 44, 641-654.

by public or private interests. Congress codified this boundary in 1998. The area within the boundary is referred to as the BLM disposal area (See Figure 1-1). All lands controlled by the federal government outside of this boundary are planned to remain in a native state. The boundary can only be changed by a subsequent act of Congress.

Over 99 Percent of the Nonattainment Area Population Resides Within the BLM Disposal Area

There are 303,776 acres within the BLM disposal boundary. Over 99 percent of the nonattainment area population live within the BLM disposal area. As described in Chapter 2 and shown in Figure 2-1, all measured violations of the NAAQS occurred within the BLM disposal area. The BLM disposal area includes the populated areas within the nonattainment area and the area where growth may occur. Nearly all anthropogenic sources within the nonattainment area occur within the BLM disposal area.

BLM Disposal Area Will Be Used for Attainment Demonstration

By using the BLM disposal area for attainment demonstration, the focus of the attainment demonstration will be on the portion of the nonattainment area where humans reside. A greater emphasis of the attainment demonstration will be on man-made sources. Therefore, the attainment demonstration will be based on the BLM disposal area also referred to as valley-wide area.

3.4 BLM DISPOSAL AREA PM_{10} EMISSIONS INVENTORIES

3.4.1 Annual Valley-Wide Emissions Inventory

An annual valley-wide emissions inventory was prepared for 1998 using the McCarran International Airport meteorological data as recorded by the National Weather Service. The calendar year of 1998 was used as the base year as it was the year in the middle of the evaluation period. The emissions inventory was completed by Clark County using the methodology, emission factors, and emission estimates presented in Appendix B. The number of acres of vacant land was estimated by UNLV in their final report.[5] This report is provided in Appendix C. It was assumed that the relative distribution of vacant land (as disturbed, stabilized) and native desert was the same as the average distribution of vacant land surrounding three of the monitors where violations of the 24-hour NAAQS had been measured. The annual valley-wide inventory is presented in Table 3-3.

Vacant Land Emissions Largest Contributor to BLM Disposal Area Annual Inventory

The inventory was further summarized into general categories as shown in Figure 3-1. Although vacant land emissions are still the largest contributor to PM_{10} in the BLM disposal area as in the nonattainment area, construction and road dust percentage contributions are greater. The increase in relative contribution from man-made sources means more effective controls of these sources will be necessary to demonstrate attainment of the annual NAAQS.

Construction and Road Dust Emissions Contribute 60 Percent

Stationary source emissions are the actual emissions from stationary sources reported for 1998. The Clark County Air Quality Regulations (AQR) require stationary sources to include fugitive emissions in their permits and their emissions reporting, so unpaved roads, stockpiles, and vacant land emissions at stationary source sites are included in the stationary source inventories. Although the Clark County Health District Air Quality Division (AQD) has a minor source emission reduction credit (ERC) program, emission reduction credits were not included in the inventory. The program is not included in the PM_{10} SIP because the use of inter-pollutant trading within the program makes tracking PM_{10} emissions and credits problematic.

Stationary Source Actual Emissions Include Fugitives

ERC Program Not Included in SIP Inventories

3.4.2 J. D. Smith Micro-Scale Annual Inventory

An annual micro-scale inventory for the area surrounding the J. D. Smith monitoring station was

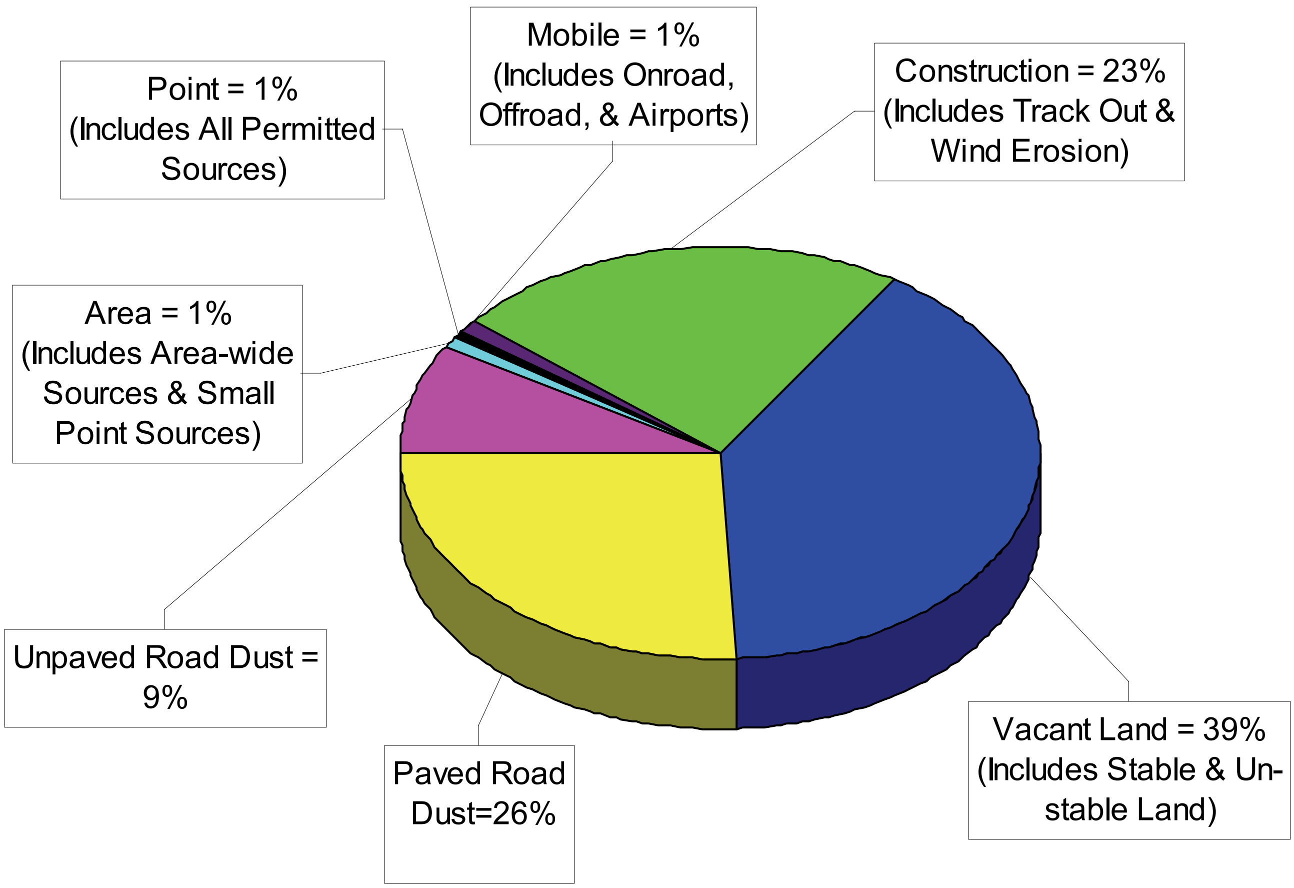
[5] James, David et al, *Estimation of Valley-wide PM_{10} Emissions Using UNLV 1995 Wind Tunnel-derived Emission Factors, 1998-1999 Emission Factors, Revised Vacant Land Classifications, and GIS-based Mapping of Vacant Lands,* September 13, 2000.

Table 3-3

1998 Annual BLM Disposal Area PM_{10} Emissions Inventory

SOURCES	PM_{10} (tons/year)
Stationary Point Sources	
Sand & Gravel Operations	627
Utilities – Natural Gas	199
Asphalt Concrete Manufacture	171
Industrial Processes	80
Other Sources	124
Total	1,201
Stationary Area Sources	
Small Point Sources	184
Residential Firewood	75.4
Residential Natural Gas	66.7
Commercial Natural Gas	33.2
Industrial Natural Gas	13.8
NG – Purchased at the Source – Carried by SWG	210.3
Structural / Vehicle Fires / Wild Fires	17.2
Charbroiling / Meat Cooking	750.0
Disturbed Vacant Lands / Unpaved Parking Lots	48,500
Native Desert Fugitive Dust	14,500
Stabilized Vacant Lands Dust	5,410
Construction Activity Fugitive Dust	19,807
Windblown Construction Dust	15,755
Total	105,323
Nonroad Mobile Sources	
Airport Support Equipment	37.1
Commercial Equipment	0.3
Construction & Mining Equipment	361
Lawn & Garden Equipment	12.4
Railroad Equipment	14.5
Recreational Equipment	1.0
McCarran International Airport	250.2
Henderson Executive Airport	5.5
North Las Vegas Municipal Airport	22.8
Nellis Air Force Base	31.9
Total	737
Onroad Mobile Sources	
Paved Road Dust (Includes Construction Track Out)	44,842
Unpaved Road Dust	15,025
Highway Construction Projects Activities	2,384
Highway Construction Projects – Wind Erosion	1,260
Vehicular Sulfate PM	408
Vehicular Tire Wear	83
Vehicular Brake Wear	135
Vehicular Exhaust	357
Total	64,494
Total	**171,755**

Figure 3-1
1998 Valley-Wide PM_{10} Major Emission Sources & Contributions
(Total = 171,755 Tons)



prepared by Clark County. The annual inventory was prepared for 1998, the design year. The micro-scale inventory was prepared for the area surrounding the J. D. Smith monitoring site because it is the only site that measured a violation of the annual NAAQS. Sources surrounding this monitoring station are the types of sources that lead to an annual standard violation. Meteorological data from McCarran International airport was used. The methodology, emission factors, and emission estimates are provided in Appendix B. The annual micro-scale inventory for the J. D. Smith monitoring station is presented in Table 3-4. Unlike the annual nonattainment and BLM disposal area inventories, the micro-scale annual inventory is not dominated by vacant land emissions. Paved road dust contributes over 80 percent of the PM_{10} emissions on an annual basis in the area surrounding the site.

1998 Annual J. D. Smith Micro-Scale Inventory Dominated by Paved Road Dust

Table 3-4

1998 J. D. Smith Micro-Scale PM_{10} Emission Inventory

Source Category	1998 Emissions (tons/year)	Percent Contribution
Vacant Land	231.4	4.73%
Native Desert	2.1	0.05%
Unstable	206.0	4.57%
Stabilized	5.3	0.12%
Construction	302.7	6.71%
Wind Erosion	109.8	2.43%
Construction Activities	186.6	4.14%
Track Out	6.3	0.14%
Unpaved Road Dust	1.4	0.03%
Paved Road Dust	3,951.3	87.59%
Vehicles		
PM_{10}	35.9	0.80%
SOx	41.9	
NOx	2,013.1	
Stationary Sources		
PM_{10}	6.3	0.14%
SOx	1.6	
NOx	55.2	
Total		
PM_{10}	4,511.0	
SOx	43.5	
NOx	2,068.3	

3.4.3 24-Hour Valley-Wide Emissions Inventory

The 24-hour valley-wide emissions inventory was completed for December 21, 1998. The highest concentration recorded in the valley during 1998, the base year, was recorded on this day. The 281 $\mu g/m^3$ concentration is also the highest design value for any of the five micro-inventory sites. The inventory was developed by Clark County, based largely on the 1998 annual valley-wide inventory.

24-Hour Valley-Wide Inventory Dominated by Wind Erosion of Disturbed Vacant Land

Most sources were scaled from the annual inventory with the exception of sources where meteorological conditions were factored into the emissions estimates. These sources included wind erosion from vacant land and construction sites.

Using the meteorological data from McCarran International Airport for the design day to estimate emissions, nearly half of the emissions were attributed to disturbed vacant land. Wind erosion from construction sites contributed over 20 percent. The 24-hour valley-wide inventory is presented in Table 3-5. The percent contribution of each general source category is presented in Figure 3-2.

3.4.4 24-Hour Micro-scale Inventories

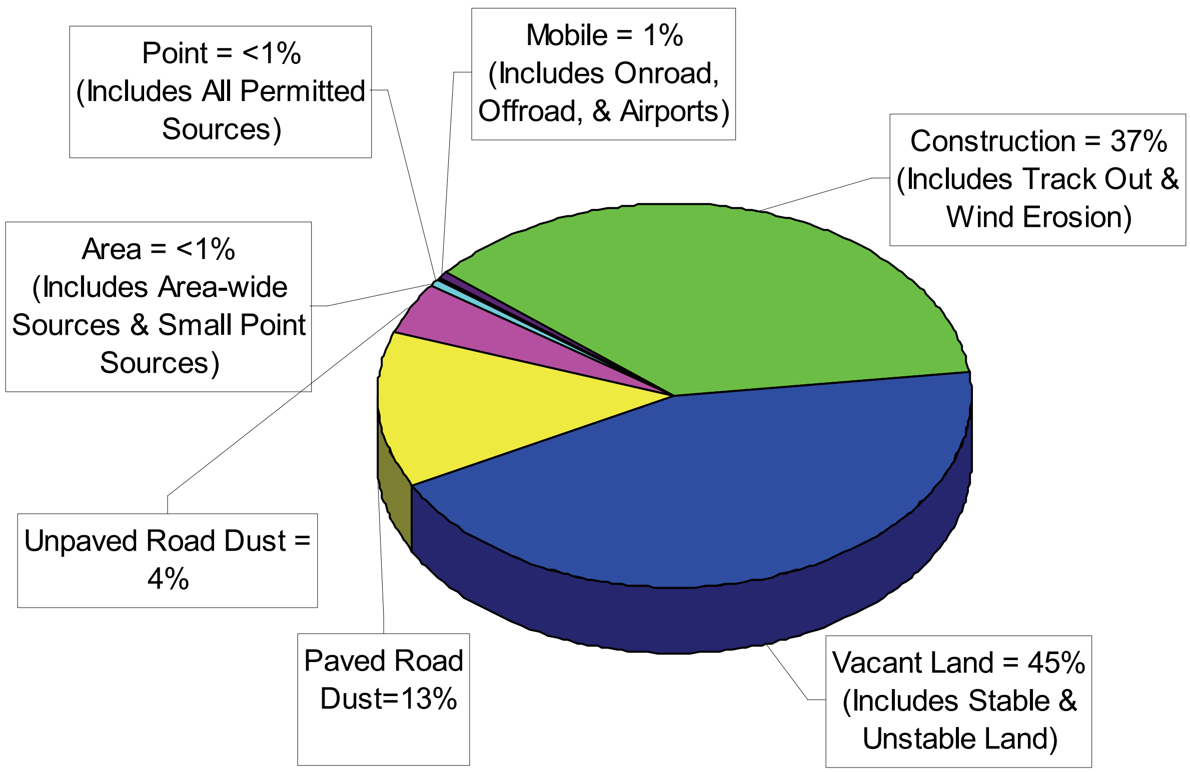
Five sites were selected as representative sites of the types of conditions that lead to elevated concentrations of PM_{10} in the Clark County nonattainment area. The sites recorded violations the 24-hour NAAQS for PM_{10} in the valley during the design period of 1997 through 1999. A design day was designated for each site as the day the third highest 24-hour PM_{10} concentration was measured during the design period. Using the third highest measured value is in accordance with

Table 3-5

24-Hour BLM Disposal Area PM_{10} Emissions Inventory (December 21, 1998)

SOURCES	PM_{10} (tons/day)
Stationary Point Sources	
Sand & Gravel Operations	1.72
Utilities – Natural Gas	0.55
Asphalt Concrete Manufacture	0.47
Industrial Processes	0.22
Other Sources	0.34
Total	3.29
Stationary Area Sources	
Small Point Sources	0.50
Residential Firewood	0.81
Residential Natural Gas	0.18
Commercial Natural Gas	0.09
Industrial Natural Gas	0.04
NG – Purchased at the Source – Carried by SWG	0.58
Structural / Vehicle Fires / Wild Fires	0.05
Charbroiling / Meat Cooking	2.05
Disturbed Vacant Lands / Unpaved Parking Lots	371
Native Desert Fugitive Dust	0
Stabilized Vacant Lands Dust	41.50
Construction Activity Fugitive Dust	54.27
Windblown Construction Dust	272.72
Total	743.79
Nonroad Mobile Sources	
Airport Support Equipment	0.10
Commercial Equipment	0
Construction & Mining Equipment	0.99
Lawn & Garden Equipment	0.03
Railroad Equipment	0.04
Recreational Equipment	0
McCarran International Airport	0.69
Henderson Executive Airport	0.02
North Las Vegas Municipal Airport	0.06
Nellis Air Force Base	0.09
Total	2.02
Onroad Mobile Sources	
Paved Road Dust (Includes Construction Track Out)	122.85
Unpaved Road Dust	41.16
Highway Construction Projects Activities	6.53
Highway Construction Projects – Wind Erosion	9.61
Vehicular Sulfate PM	1.12
Vehicular Tire Wear	0.23
Vehicular Brake Wear	0.37
Vehicular Exhaust	0.98
Total	182.85
Total	**931.95**

Figure 3-2
24-Hour PM_{10} Major Emission Sources & Contributions
(Total = 932 Tons)



40 Code of Federal Regulations (CFR) Part 50, Appendix K.

The representative sites and the corresponding design days are listed in Table 3-6. The location of the sites is shown in Figure 2-1. A description of each site and the sources surrounding it is presented in Section 2.4.1.2.

Table 3-6

Representative Monitoring Stations and Design Days

Monitoring Station	Design Day	PM_{10} Concentration ($\mu g/m^3$)
Craig Road	January 20, 1999	254
East Flamingo	March 30, 1999	189
Green Valley	February 25, 1999	281
J. D. Smith	March 31, 1999	218
Pittman	March 30, 1999	239

UNLV Vacant Land Emission Factors Used for Inventory Calculations

The micro-inventories were completed by a contractor, and a copy of *PM_{10} Emission Inventory of Sources Surrounding Five Ambient Monitoring Sites in the Las Vegas Valley*[6] is presented in Appendix D. The vacant land emissions were calculated by using emission factors developed by University of Nevada, Las Vegas (UNLV) and published in draft reports. The preliminary data was reviewed by UNLV and the final emission factors published after the completion of the micro-scale inventory report. The final UNLV report is presented in Appendix C. The factors for native desert were corrected to indicate native desert emissions only occurred after winds exceeded 25 mph. Although some emissions from native desert were recorded at lower wind speeds, steady emissions from native desert were not measured in

[6] *PM_{10} Emission Inventory of Sources Surrounding Five Ambient Monitoring Sites in the Las Vegas Valley*, Submitted to Clark County Department of Comprehensive Planning, April, 2000.

the wind tunnel until winds speeds reached 25 mph (as measured 10 meters above ground). The micro-inventories were updated by Clark County to reflect the changes in native desert emission rates.

Wind Erosion of Vacant Land, Construction Activities, and Paved Road Dust Largest Contributors to PM_{10} in the Micro-Scale Areas

Table 3-7 provides the design day 24-hour inventory for sources of PM_{10} surrounding the five sites and natural background conditions. Other types of manmade activities, such as various cooking methods, off-road vehicle exhaust, and lawn care equipment, are not included in Table 3-7, as the emissions from these sources are considered de minimis within the micro-scale areas. Other sources such as airplane exhaust or agricultural activities were not observed within the micro-scale areas. Wind erosion from vacant land, construction emissions and paved road dust are the three leading contributors of PM_{10} for all of the five sites.

The Five Micro-Scale Sites Are Representative of Worst Case Sources that Contribute to Violations of the 24-Hour NAAQS

The five micro-scale sites selected for modeling to demonstrate the attainment of the 24-hour NAAQS include some of the highest emitting sources in the nonattainment area. The Craig Road micro-scale area includes large tracts of vacant land, a desert area used as a motorcycle race track, and PM_{10} -emitting stationary sources such as a cinder block manufacturing plant and an aggregate plant. The East Flamingo site includes a portion of Tropicana Avenue from Paradise Road to Las Vegas Boulevard. This link of roadway has the highest traffic volume of any non-freeway roadway in the County[7] as it is largely impacted by tourist traffic between McCarran International Airport and the resort corridor commonly referred to as the "Las Vegas Strip." Of the 669 acres of vacant land in the Green Valley micro-scale area, 356 acres (53 percent) were under active construction. The area also includes two areas referred to as race tracks where motorcycles are routinely ridden. The J. D. Smith site represents a developed urban area. There are 4.5 miles of freeway, 13 stationary sources made up largely of boilers, and only 250 acres of vacant land, including 48 acres of active

[7] Clark County Comprehensive Planning, Tranplan Modeling, 2000.

Table 3-7
Five Monitoring Station Micro-Inventories

Source Category	Craig Road		East Flamingo		Green Valley		J. D. Smith		Pittman	
	Emissions (tons)	% Contribution	Emissions (tons)	% Contribution	Emissions (tons)	% Contribution	Emissions (tons)	% Contribution	Emissions (tons)	% Contribution
Vacant Land	4.82	30.79	2.91	24.38	7.33	21.83	10.08	36.56	13.16	67.07
Native Desert	-	-	0.141	1.18	-	-	0.63	2.28	-	
Unstable	4.32	27.60	2.68	22.44	7.29	21.71	9.40	34.09	12.9	65.75
Stabilized	0.50	3.19	0.091	0.76	0.04	0.12	0.05	0.18	0.26	1.33
Construction	3.43	21.91	3.92	32.83	21.19	63.11	5.52	20.02	1.32	6.73
Wind Erosion	2.72	17.38	3.56	29.81	18.3	54.50	5.10	18.50	1.12	5.71
Construction Activities	0.68	4.34	0.32	2.68	2.85	8.49	0.35	1.27	0.19	0.97
Track Out	0.03	0.19	0.04	0.33	0.04	0.12	0.07	0.25	0.01	0.05
Unpaved Road Dust	0.14	0.89	0.01	0.08	0.017	0.05	0.004	0.01	0.66	3.36
Paved Road Dust	3.98	25.42	4.96	41.53	3.54	10.54	11.63	42.18	2.92	14.88
Unpaved Parking	0.514	3.28	-	-	-	-	-	-	1.14	5.81
Wind Erosion	0.51	3.26	-	-	-	-	-	-	1.11	5.66
Vehicles	0.004	0.03	-	-	-	-	-	-	0.03	0.15
Race Tracks	2.43	15.52	-	-	1.26	3.75	-	-	-	-
Wind Erosion	1.71	10.92	-	-	1.08	3.22	-	-	-	-
Vehicles	0.72	4.60	-	-	0.18	0.54	-	-	-	-
Vehicles	-	-	-	-	-	-	-	-	-	-
PM_{10}	0.1	0.64	0.13	1.09	0.07	0.21	0.26	0.94	0.06	0.31
Sox	0.05	-	0.06	-	0.03	-	0.13	-	0.03	-
Nox	2.36	-	3.22	-	1.64	-	6.6	-	1.51	-
Stationary Sources	-	-	-	-	-	-	-	-	-	-
PM_{10}	0.24	1.53	0.01	0.08	0.17	0.51	0.08	0.29	0.36	1.83
Sox	0.0004	-	0.001	-	0.19	-	0.002	-	0.02	-
Nox	0.0583	-	0.14	-	0.02	-	0.12	-	0.19	-
Total	-	-	-	-	-	-	-	-	-	-
PM_{10}	15.65	-	11.94	-	33.58	-	27.57	-	19.62	-
Sox	0.0504	-	0.061	-	0.22	-	0.132	-	0.05	-
Nox	2.418	-	3.36	-	1.66	-	6.72	-	1.7	-

construction sites, within the micro-scale area. The Pittman area includes two of the seven major PM_{10} stationary sources, unpaved parking areas, and 13 miles of unpaved roads. These areas include sources that represent the types of sources that lead to violations of the 24-hour NAAQS. As these areas are considered representative of worst case sources for the 24-hour NAAQS, the 24-hour micro-scale inventories will not be projected for future years for the attainment demonstration.

3.5 2001 EMISSIONS PROJECTIONS

Population of BLM Disposal Area Projected at 1,367,692 by 2001

An increase in emissions from the base year is anticipated due to continued population growth projected in the Las Vegas Valley. The rate of population increase is anticipated to decrease from a 6.0 percent increase in 1999 to a 2.6 percent increase in 2006.[8] The Las Vegas metropolitan area, which is contained in the BLM disposal area, is projected to have a human population of 1,367,692 people by 2001.[9]

Population Growth Continues but at a Slower than Record Pace

As the rate of growth in population slows down from the record levels set in the 1990's, the demand for additional housing and businesses is also anticipated to decrease. This directly affects PM_{10} emissions from disturbed vacant land and construction activities. The number of acres under active construction in 2001 is projected to be 22,691, up slightly from the 19,449 acres under construction in 1998. The number of acres under construction will continue to decline, equaling 1998 levels in 2003 and declining to 14,587 acres in 2006. The number of acres with construction was estimated for each year from 1998 through 2000. The 95.4 percent of the number of acres with construction between 1998 and 2000 was subtracted from the acres of vacant land present in 1998, since it was assumed this percentage of

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[8] *Clark County & Las Vegas Metropolitan Area Population Forecast and Growth Rate: 1997-2035*, Regional Transportation Commission of Clark County, Nevada, July, 2000

[9] Ibid

construction would occur on vacant land. Paved road dust emissions are expected to increase in 2001 due to an expansion of the paved street network and an increase in vehicle traffic on roadways. However, the rate of growth for vehicle miles traveled (VMT) will relate directly to population. A monorail project along Las Vegas Boulevard and the addition of express buses for tourists will partially offset the expected growth in VMT from additional residents. Future vehicle counts were projected by the Regional Transportation Commission of Clark County using the Tranplan model.

Stationary source emissions are anticipated to remain fairly constant. The relative stability of stationary sources is reflected in annual emission inventories. In 1995, stationary sources emitted 1,855 tons of PM_{10} while in 1998 the stationary source emissions were estimated at 1,806 tons (stationary point sources, small point sources, and natural gas combustion). Individual source emissions varying and the Best Available Control Technology (BACT) requirements explain this slight decrease.

Emissions from unpaved roads were projected assuming the vehicle miles traveled on unpaved roads would grow at the same rate as vehicle miles traveled (VMT) on local paved roads. The rate of growth of VMT for local roads within the BLM disposal area is slightly lower than the population growth for the Las Vegas Valley for the same time period.

Nellis Air Force Base Aircraft Emissions Remain Constant

Aircraft emissions from Nellis Air Force Base were assumed to be unchanged. No new aircraft is proposed for the base unless Congress approves funding for the F-22 fighter. If funding is provided, F-22 fighters will be stationed at the base in exchange for F-15 fighters. Both planes are double-engine aircraft. As explained in the environmental impact statement prepared for the F-22 bed down at Nellis, it is anticipated that for every F-22 stationed at the base, one F-15 will be reassigned, producing no net change in PM_{10} emissions.

The emissions for nonroad mobile sources including McCarran, North Las Vegas, and Henderson airports were projected based upon population growth.

3.5.1 2001 Valley-Wide Annual Emissions Inventory

Paved Road Dust Becomes Dominant Source - Vacant Land Decreases Through Continued Construction

The 2001 annual emissions projection by source category for the BLM disposal area is presented in Table 3-8. December 2001 is the required date for the Las Vegas Valley's attainment, and a projected emission inventory for this time frame is required to establish a transportation conformity budget. The emission projections listed in Table 3-8 do not account for any new PM_{10} control strategies that may be introduced between 1998 and 2001. The 2001 inventories presented in this chapter do not include SIP-adopted controls. The control strategies and their anticipated impact on emissions and air quality in 2001 will be addressed in Chapters 4 and 5. The controlled 2001 inventories will be utilized for both the attainment demonstration and the transportation conformity budgets. The methodology and growth factors for the 2001 emission inventory projections are provided in Appendix E.

3.5.2 2001 Annual Micro-scale Inventory for the Area Surrounding the J. D. Smith Monitoring Station

Assume the Same Number of Acres of Vacant Land and Construction for J. D. Smith 2001 Inventory

There were 202 acres of vacant land inventoried in the J. D. Smith micro-inventory area for 1998. A worst-case assumption would be that all new construction occurred on areas with existing structures and none of the construction occurred on existing vacant land. The 202 acres of vacant land would remain a source of fugitive dust. Although this assumption is not plausible, it does allow the conservative evaluation of the impact of growth on ambient PM_{10} concentrations. Therefore, the 2001 annual micro-inventory for the J. D. Smith area, as

Table 3-8

2001 Annual BLM Disposal Area PM_{10} Emissions Inventory

SOURCES	PM_{10} (tons/year)
Stationary Point Sources	
Sand & Gravel Operations	627
Utilities – Natural Gas	199
Asphalt Concrete Manufacture	171
Industrial Processes	80
Other Sources	124
Total	1,201
Stationary Area Sources	
Small Point Sources	184
Residential Firewood	89
Residential Natural Gas	79
Commercial Natural Gas	33.2
Industrial Natural Gas	14
NG – Purchased at the Source – Carried by SWG	210
Structural / Vehicle Fires / Wild Fires	20
Charbroiling / Meat Cooking	889
Disturbed Vacant Lands / Unpaved Parking Lots	33,100
Native Desert Fugitive Dust	9,520
Stabilized Vacant Lands Dust	3,640
Construction Activity Fugitive Dust	23,109
Windblown Construction Dust	18,381
Total	89,269
Nonroad Mobile Sources	
Airport Support Equipment	44
Commercial Equipment	0.3
Construction & Mining Equipment	428
Lawn & Garden Equipment	15
Railroad Equipment	17
Recreational Equipment	1.0
McCarran International Airport	297
Henderson Executive Airport	7
North Las Vegas Municipal Airport	27
Nellis Air Force Base	31.9
Total	867
Onroad Mobile Sources	
Paved Road Dust (Includes Construction Track Out)	55,005
Unpaved Road Dust	18,932
Highway Construction Projects Activities	2,782
Highway Construction Projects – Wind Erosion	1,470
Vehicular Sulfate PM	489
Vehicular Tire Wear	100
Vehicular Brake Wear	163
Vehicular Exhaust	346
Total	79,287
Total	**170,625**

presented in Table 3-9, was completed with the assumption that the same number of acres are under construction and the same number of acres land are vacant as the base year inventory. The actual level of activity for each of these categories is expected to be less. For this reason, this methodology is conservative. Growth factors were applied as previously described to all other source categories.

Table 3-9

2001 J. D. Smith Micro-Scale PM_{10} Emission Inventory

Source Category	2001 Emissions (tons/year)	Percent Contribution
Vacant Land	231.4	3.99%
Native Desert	2.1	0.04%
Unstable	206.0	3.78%
Stabilized	5.3	0.10%
Construction	302.7	5.56%
Wind Erosion	109.8	2.05%
Construction Activities	186.6	3.49%
Track Out	7.9	0.15%
Unpaved Road Dust	1.8	0.03%
Paved Road Dust	4,789	89.50%
Vehicles		
PM_{10}	35.9	0.67%
SOx	51.9	
NOx	2,262	
Stationary Sources		
PM_{10}	6.3	0.12%
SOx	1.6	
NOx	55.2	
Total		
PM_{10}	5,453.1	
SOx	53.5	
NOx	2,317.5	

3.5.3 2001 Valley-Wide 24-Hour Emissions Inventory

The 2001 24-hour valley-wide emissions inventory is scaled to the 2001 annual valley-wide emissions inventory with the exception of those sources where meteorological conditions are included in the emission calculations. For these sources the same meteorological profile that was used in the 1998 emissions inventory was used for the 2001 emissions inventory for purposes of comparison. The projected emissions presented in Table 3-10 do not account for any new PM_{10} control strategies anticipated to be implemented between 1998 and 2001.

24-Hour Micro-Scale Inventories not Projected for 2001

The 24-hour micro-scale inventories were not projected because they are representative of worst case sources. Although the current areas will change in the future, the source contributions represented by the five sites are not projected because similar source combinations may develop in other areas within the BLM disposal boundary.

3.6 FUTURE EMISSIONS INVENTORY IMPROVEMENTS

The emissions inventories presented in this chapter are based upon the best available information at the time they were prepared. Extensive effort was made to determine the emission levels as accurately as possible. However there are a few data points where despite the effort that was made, significant relative uncertainty remains. Much of the uncertainty lies with the dynamic nature of the sources. The source parameters change on a regular basis, necessitating continual updates. Each of these areas is described below. Commitments for improving emission inventories are presented with all SIP commitments in Chapter 4.

The Dynamic Nature of Some Sources Require that Inventories Be Continually Updated

3.6.1 Acres of Vacant Land

The number of acres of vacant land was determined by UNLV as part of a larger study.[10] The methodology included using aerial photographs and doing field evaluation on a representative number of parcels. A copy of the final report has been provided in Appendix C. This initial evaluation needs to be refined to cover all parcels within the nonattainment area. Parcels must be tracked as

Satellite Images or Aerial Photographs Will Be Used to Update Vacant Land Inventories

[10] Op Cit.

Table 3-10

2001 24-Hour BLM Disposal Area PM_{10} Emissions Inventory

SOURCES	PM_{10} (tons/day)
Stationary Point Sources	
Sand & Gravel Operations	1.72
Utilities – Natural Gas	0.55
Asphalt Concrete Manufacture	0.47
Industrial Processes	0.22
Other Sources	0.34
Total	3.29
Stationary Area Sources	
Small Point Sources	0.50
Residential Firewood	0.96
Residential Natural Gas	0.22
Commercial Natural Gas	0.09
Industrial Natural Gas	0.04
NG – Purchased at the Source – Carried by SWG	0.58
Structural / Vehicle Fires / Wild Fires	0.06
Charbroiling / Meat Cooking	2.44
Disturbed Vacant Lands / Unpaved Parking Lots	253
Native Desert Fugitive Dust	0
Stabilized Vacant Lands Dust	28.00
Construction Activity Fugitive Dust	63.31
Windblown Construction Dust	140.53
Total	489.72
Nonroad Mobile Sources	
Airport Support Equipment	0.12
Commercial Equipment	0
Construction & Mining Equipment	1.17
Lawn & Garden Equipment	0.04
Railroad Equipment	0.05
Recreational Equipment	0
McCarran International Airport	0.81
Henderson Executive Airport	0.02
North Las Vegas Municipal Airport	0.07
Nellis Air Force Base	0.09
Total	2.38
Onroad Mobile Sources	
Paved Road Dust (Includes Construction Track Out)	150.70
Unpaved Road Dust	51.87
Highway Construction Projects Activities	7.62
Highway Construction Projects – Wind Erosion	11.20
Vehicular Sulfate PM	1.34
Vehicular Tire Wear	0.27
Vehicular Brake Wear	0.45
Vehicular Exhaust	0.95
Total	224.40
Total	**719.78**

they are developed. Either satellite images or aerial photographs may be used.

The inventory of vacant land should be completed during the same time frame each year using the same or similar methods. This will aid in tracking the source and being able to compare baseline inventories with updates.

3.6.2 Emission Factors for Wind Erosion of Vacant Land

More Wind Tunnel Studies Should Be Conducted

Emission factors have been developed on several parcels throughout the valley using a wind tunnel. These factors have been compared to factors measured in other areas of the desert southwest and appear to be in the same range. However, the factors vary greatly by soil type. Additionally, the factors for stabilized land are based upon the averages of emission rates from several different types of stabilizers such as water, acrylic polymer, gypsum mulch, and lignin sulfonate. All factors were developed using the same wind tunnel apparatus.

To improve these factors, more parcels should be tested. Additional testing of stabilized parcels should be performed to determine if the average of all types of suppression is an adequate factor to characterize all stabilized land. Lastly, the accuracy of the wind tunnel used should be determined by performing collocated tests using a different wind tunnel.

3.6.3 Paved Road Dust Emission Factors

New Measurement Techniques and Methodologies Likely To Be Used for Paved Road Dust Emissions Estimates

The factors used for the emissions inventories are based upon U. S. EPA methodologies and equations. Another method, the TRAKER system, was tested by DRI.[11] The new method allows more roadways to be tested. Additional refinement of the TRAKER method is anticipated in the future, so

[11] *Testing Re-entrained Aerosol Kinetic Emissions from Roads (TRAKER): A New Approach to Infer Silt Loading on Roads in Clark County, Nevada*, DRI, December 21, 1999.

more roadways can be tested and more representative samples collected.

Recently there has been debate regarding an assumption of the U. S. EPA methodology -- namely, the assumption that the same amount of road dust is resuspended each time a vehicle passes has been subject to significant discussion. It is Clark County's position that the current methodology significantly overestimates paved road emissions. There are data that suggest that the paved road dust reservoir is depleted after about 1,000 vehicles have passed. This suggests that the emissions from paved roads has more to do with the paved road dust "reservoir" charging or being expended than the silt loading at any given time. More research on this subject is planned and the methodology for determining emissions from paved roads may change in the future.

3.7 SUMMARY

Despite Unavoidable Uncertainties, the Inventories Are Sufficient to Assess Control Measure Impacts

The emission estimates for 1998 and 2006 are based on emission factors and methodologies recommended by the U. S. EPA. As is done typically in SIPs, these estimates have applied numerous hypotheses and assumptions in order to identify the types of PM_{10} sources impacting ambient PM_{10} concentrations and approximate the relative contribution from each major source category (expressed as a percentage of the total inventory). Emission inventories, if they are accurate and reliable, provide information on which sources to target for the development of cost - effective control strategies. PM_{10} emission inventories, particularly in a desert environment where windblown dust is the major problem, are difficult to prepare, since emission rates are affected by numerous variables (e.g., activity levels, meteorology, soil type, etc.). However, as outlined in Chapter 5, the estimates provided in this chapter are sufficient to assess control measure impacts on PM_{10} air quality in the future.

Local research projects carried out within the Las Vegas Valley were used to refine emission estimates for paved road dust. The University of Nevada, Las Vegas (UNLV) research projects relating to PM_{10} emission from unpaved surfaces and stabilized parcels provided useful data in calculating emissions from disturbed vacant land (Appendix D). These research projects have greatly improved emission inventories for these PM_{10} source categories. Research projects to further improve PM_{10} emission inventories will be carried out in the future as a part of air quality planning for PM_{10}.

More Research Will Be Completed

Fugitive and paved road dust sources dominate PM_{10} emissions in the Las Vegas Valley. Violations of the 24-hour national standard (150 $\mu g/m^3$) are typically associated with high-wind events and sources of fugitive dust that are located near the air quality samplers (construction activities, aggregate processing facilities, unpaved roads, and disturbed vacant land). Violations of the 24-hour PM_{10} national standard rarely occur at several monitoring stations throughout the Las Vegas Valley at the same time. However, even without high winds, fugitive dust sources can cause elevated 24-hour PM_{10} concentrations at a nearby air quality sampler leading to annual average concentrations above annual NAAQS for PM_{10} (50 $\mu g/m^3$). Combustion particles and particles that evolve from condensation and/or chemical reactions play a insignificant role in PM_{10} air quality problems in the Las Vegas Valley.

Fugitive Dust Is the Major Contributor to PM_{10} in the Nonattainment Area

CHAPTER 4: PM_{10} CONTROL MEASURES

4.1 INTRODUCTION

The Clean Air Act (CAA) requires serious PM_{10} nonattainment areas to apply best available control measures to reduce emissions from all significant sources that contribute to PM_{10} exceedances. This chapter addresses the processes utilized to identify, develop, and implement the control measures necessary to satisfy the CAA requirements and to achieve attainment of the PM_{10} annual and 24-hour standards. The following sections identify the significant sources contributing to exceedances of both the 24-hour and annual standard. The process for determining potential control measures is then discussed, followed by a description of the control measure evaluation and development process. The implemented control measures for each significant source are presented and evaluated, including their effectiveness in controlling emissions. The final sections of the chapter discuss the insignificant sources and the measures in effect that will ensure they remain insignificant in future years, and conclude with Clark County air quality outreach programs, research projects, and SIP commitments.

Control Measures for Each Significant Source Are Presented and Evaluated in this Chapter

4.2 SIGNIFICANT SOURCE CATEGORIES

The determination of source significance is based primarily on the J. D. Smith annual inventory and the 24-hour micro-inventories at the five representative sites, supplemented by reviews of the 1998 valley-wide 24-hour emission inventory, the 1998 valley-wide annual emission inventory, and Chemical Mass Balance (CMB) modeling. The 1998 base year emission inventories are described in Chapter 3. A list of these source categories and their designation as significant or insignificant is provided in Table 4-1. Past studies characterizing the nature and extent of the PM_{10} air quality problem in the Las Vegas Valley provide specific direction regarding the needed focus of control programs to attain National Ambient Air Quality Standards (NAAQS). Chapter 3 and Chapter 5 of this

Table 4-1 Lists Significant and Insignificant Sources

Table 4-1

Significant/Insignificant Source Categories

SOURCE CATEGORY	Annual		24-Hour	
	Significant	Insignificant	Significant	Insignificant
Stationary Point Sources				
Sand & Gravel Operations		4		4
Utilities – Natural Gas		4		4
Asphalt Concrete Manufacture		4		4
Industrial Processes		4		4
Other Stationary Point Sources		4		4
Stationary Area Sources				
Small Point Sources		4		4
Residential Firewood		4		4
Residential Natural Gas		4		4
Commercial Natural Gas		4		4
Industrial Natural Gas		4		4
NG – Purchased at the source-Carried by SWG		4		4
Structural/Vehicle/Wildfires		4		4
Charbroiling/Meat Cooking		4		4
Disturbed Vacant Land/Unpaved Parking Lots	4		4	
Construction Activity Fugitive Dust	4		4	
Windblown Construction Dust	4		4	
Race Track Wind Erosion		4	4	
Race Track Vehicles		4	4	
Nonroad Mobile Sources				
Airport Support Equipment		4		4
Commercial Equipment		4		4
Construction and Mining Equipment		4		4
Lawn & Garden Equipment		4		4
Railroad Equipment		4		4
Recreational Equipment		4		4
McCarran International Airport		4		4
Henderson Executive Airport		4		4
North Las Vegas Municipal Airport		4		4
Nellis Air Force Base		4		4
Onroad Mobile Sources				
Paved Road Dust (Includes Const. Track Out)	4		4	
Unpaved Road Dust	4		4	
Highway Construction Projects Activities	4		4	
Highway Construction Projects – Wind Erosion	4		4	
Vehicular Sulfate PM		4		4
Vehicular Tire Wear		4		4
Vehicular Brake Wear		4		4
Vehicular Exhaust		4		4

document address emission inventories, emission projections, and the attainment demonstration. The emission inventories/projections and the attainment demonstration show that the role of stationary sources, residential wood combustion, charbroiling, motor vehicle exhaust, and agricultural activities are insignificant in terms of their contribution to the annual average or 24-hour PM_{10} concentrations.

Insignificant Contributors

4.2.1 Chemical Mass Balance Receptor Modeling Results

The Desert Research Institute's (DRI) Las Vegas Valley PM_{10} Study provides clear documentation that fugitive dust sources dominate PM_{10} emissions within the Las Vegas Valley and that these sources must be the focus of PM_{10} control programs.[1] New control programs to limit combustion particles and secondary particle formation will have limited impact on PM_{10} air quality within the Las Vegas Valley. Documentation supporting this conclusion is provided in the following material.

Geologic Materials Dominate PM_{10} Concentrations

The Las Vegas Valley PM_{10} Study was completed by DRI in 1996. The objectives for that project included the following:

DRI Study Objectives

- To acquire a data base of specified precision, accuracy, and validity that is suitable to determine source contributions of elevated PM_{10} concentrations;
- To estimate the spatial and temporal distributions of PM_{10} concentrations, especially near fugitive dust sources;
- To apportion PM_{10} concentrations to source emissions, with emphasis on specific sources of fugitive dust; and
- To reconcile differences between source and receptor models.

Both source- and receptor-oriented modeling approaches were adopted to apportion PM_{10} to emission sources. These approaches included: 1) the Chemical

[1] Chow, J. C., Watson, J. G., Green, M. C., et al, *Middle- and Neighborhood-Scale Variations of PM_{10} Source Contributions in Las Vegas, Nevada,* Journal of the Air & Waste Management Association, **1999**, 44, 641-654.

Mass Balance (CMB) receptor model; 2) the Cluster Analysis receptor model (a multivariate statistical analysis tool); 3) the Geographical Information System (GIS) emission data base model; and 4) the Industrial Source Complex dispersion model.[2] Since fugitive dust was suspected to be a major contributor to suspended particles, several intensive monitoring periods were carried out to characterize seasonal emissions under different meteorological conditions.

Intensive Monitoring Studies Conducted to Characterize Seasonal Variations in Particulate Emissions

During these periods, 24-hour average samples were taken at 30 sampling sites located within, nearby, and far away from different fugitive emission source types. These data were intended to support the use of spatial and temporal receptor models, in addition to the well-established CMB model. The Industrial Source Complex dispersion model was also applied to simulate meteorological transport and diffusion and to estimate the fugitive dust impacts to PM_{10} from different geological source types. The dispersion model results were compared to ambient measurements taken at the receptor sites to evaluate the adequacy of the current emission inventory and reconcile the differences in source and receptor modeling.

Receptor and Dispersion Modeling Utilized

In the ambient sampling program, the DRI acquired PM_{10} measurements at two air quality monitoring sites in the cities of Las Vegas (i.e., East Charleston) and North Las Vegas (i.e., Craig Road). Intensive sampling at satellite sites surrounding the two air quality monitoring sites was also conducted. These periods of intensive monitoring were chosen based on meteorological forecasting for high winds and for typical low wind conditions. The ambient air sampling program and time periods are briefly summarized below:

Intensive Sampling at Satellite Sites also Conducted

- From 01/03/95 to 01/28/96 on an every-sixth-day sampling schedule and during a mini-intensive sampling period from 12/23/95 to 01/04/96; and

[2] Receptor models attempt to apportion atmospheric contaminants to sources by relating chemical and physical properties of the source material to the properties observed at a receptor (e.g., ambient air sampler). Geographic information systems allow the development of spatially distributed emission inventories. Dispersion models attempt to represent by mathematical or statistical means the observed phenomena of pollutants being diluted and dispersed in the open atmosphere.

- Five intensive monitoring periods were carried out on a daily basis with a saturation monitoring network consisting of 30 satellite sites. The monitoring periods were spring (from 04/15/95 to 04/21/95 and from 05/12/95 to 05/16/95), summer (from 06/05/95 to 06/07/95), fall (from 09/07/95 to 09/12/95), and winter (from 01/26/96 to 01/30/96).

Existing Emissions Inventories Evaluated

Existing emission inventories were evaluated with respect to their emission factors and activity levels. Micro-inventories surrounding the two monitoring sites were also developed and fugitive dust emission data were assembled. A geographical information system (GIS) emission data base model was developed to calculate the fugitive dust emission rates for paved and unpaved roads, construction activities, and disturbed/undisturbed vacant land.

Other Particulate Emission Sources Evaluated

Other particulate matter emission sources such as on-road and off-road vehicle exhaust; residential wood combustion; sand and gravel plants; natural gas combustion; aircraft operations; and natural desert background were also investigated. For example, source emissions for fugitive dust, motor vehicle exhaust, and residential wood combustion were sampled and chemically characterized. Ambient and source-specific PM_{10} samples were analyzed for mass, elements (i.e., sodium to uranium), and ions (i.e., chloride, nitrate, sulfate, ammonium, soluble potassium, and carbon [both organic carbon and elemental carbon]). The elemental analysis was conducted to determine if elements or ions were present as "signatures" of specific sources of PM_{10}.

Study Results and Conclusions

The results and conclusions of this comprehensive assessment of PM_{10} air quality in the Las Vegas Valley are summarized below:

Local Fugitive Dust Sources are the Primary Contributors to PM_{10} Concentrations

1. In most cases, elevated PM_{10} concentrations at one site did not necessarily correspond to high concentrations at other sites. Local fugitive dust sources, typically less than two kilometers from the receptor, are the driving force behind concentrations measured by the monitors;

2. Meteorological analysis showed that most elevated levels of PM_{10} are associated with high winds. Maximum wind speed exceeded ten meters a second on over 80 percent of the 24-hour violation days. The data indicates that meteorology is the major driving force in temporal variations of PM_{10} concentrations at commercial, residential, and vacant land. However, temporal variations of PM_{10} concentrations near specific types of industrial sources and construction sites were dominated by local fugitive dust sources, irrespective of changes in meteorology. In other words, activity levels at construction and industrial sites (e.g., aggregate processing facilities) were the dominant influence on the variability of PM_{10} concentrations regardless of meteorology;

Most Elevated PM_{10} Levels are Associated with High Winds

3. At the Craig Road base site, quarterly-averaged PM_{10} mass ranks highest (36.6 $\pm$ 14.3 $\mu g/m^3$) during the third quarter (July to September) and lowest (23.1 $\pm$ 14.1 $\mu g/m^3$) during the second quarter (April to June). Time series plots show insignificant seasonal variation at the Craig Road site. More pronounced differences were found for the East Charleston base site where quarterly-averaged PM_{10} varied by over a factor of two, ranging from 24.4 $\pm$ 7.8 $\mu g/m^3$ in the second quarter to 42.4 $\pm$ 23.3 $\mu g/m^3$ in the fourth quarter (October to December). For the East Charleston site, time series plots show that PM_{10} concentrations increased during the winter period.

   In 1995, seasonally stratified annual averages at the two base sites were well below the annual PM_{10} standard of 50 µg/m3, with 28.8 $\pm$ 0.5 $\mu g/m^3$ at the Craig site and 32.4 $\pm$ 7.1 $\mu g/m^3$ at the East Charleston site. On an annual basis, PM_{10} mass at the East Charleston site is approximately 13 percent higher than at the Craig Road site. Motor vehicle exhaust during stagnant conditions in the winter months is likely impacting the East Charleston site to a greater degree relative to the Craig Road site;

Seasonal Variations Were Found at the East Charleston Site but not the Craig Road Site

4. Concentrations of indicator species for motor vehicle exhaust such as bromine (Br) and lead (Pb) were a

Motor Vehicle Indicators Were Higher at the East Charleston Site

factor of two to four higher at the East Charleston site than those found at the East Craig site. The impact from motor vehicle exhaust is greater at the East Charleston site than at the Craig Road site. PM_{10} lead concentrations were not expected to be high since leaded gasoline was phased out of the United States market during the late 1980's;

5. Concentrations of indicator species for residential oil combustion, such as vanadium (V) and nickel (Ni), were low, with an average of 0.002 $\pm$ 0.002 $\mu g/m^3$ of PM_{10} for V and 0.003 $\pm$ 0.005 $\mu g/m^3$ for Ni. These low concentrations reflect an absence of or insignificant level of residential oil combustion in the study area;

6. Besides the Ni, V, and Pb levels, the average and maximum concentrations of several potentially toxic species such as manganese (Mn), copper (Cu), zinc (Zn), arsenic (As), selenium (Se), strontium (Sr), barium (Ba), and mercury (Hg) were typically at or below their respective minimum detection limits. Besides the 1.5 $\mu g/m^3$ quarterly average standard for lead in total suspended particulate matter, air quality standards have not been set for other metals. Since the maximum concentrations for these metals is very low, the risk from exposure to these concentrations is minimal;

Potentially Toxic Species Were Typically Below Minimum Detection Limits

7. Concentrations from secondary aerosols such as NO_3, SO_4, and NH_4 that were formed from gaseous precursors such as nitrogen oxides, sulfur dioxide, and ammonia, respectively, were small, accounting for less than four percent of the average PM_{10} mass (See Table 4-2). The absolute difference in average ion concentrations between the two sites was more pronounced than in soil-related species, typically a factor of two higher at the East Charleston site. This is probably due to motor vehicle exhaust. The East Charleston site, because it is at a lower elevation and near heavily traveled roadways, is affected to a greater degree by motor vehicle exhaust emissions. The East Charleston air quality monitoring station is the only station that has experienced violations of the carbon monoxide National Ambient Air Quality

Concentrations from Secondary Aerosol Particulate Are Small

Table 4-2

Statistical Summary of PM_{10} Mass and Secondary Aerosols ($\mu g/m^3$) Acquired at the Two Base Sites during the Intensive and Non-Intensive Monitoring Periods between 01/03/95 and 01/28/96

Species	Craig Road					East Charleston Site				
	Average	Std. Dev.	No. in Average	Min.	Max.	Average	Std. Dev.	No. in Average	Min.	Max.
PM_{10} Mass[a]	28.35	17.89	92	00	123.55	33.31	20.97	80	4.71	123.9
NO_3[b]	0.61	0.57	26	0.05	2.31	1.00	0.97	27	0.092	3.52
NO_3[c]	0.25	0.20	19	0.00	0.83	0.55	0.50	20	0.005	1.78
SO_4	1.04	0.60	26	0.16	2.48	1.64	0.84	27	0.39	4.49
NH_4	0.21	0.15	26	0.02	0.53	0.28	0.22	27	0.0071	0.74

[a]Entire data set including every-sixth-day, mini-intensive, and intensive monitoring periods.
[b]Non-volatilized Nitrate
[c]Volatilized Nitrate

Source: Clark County Department of Comprehensive Planning (August 2000).

Standard. On-road motor vehicles are the primary source of carbon monoxide emissions;

8. Based on chemical mass balance (CMB) receptor modeling, fugitive dust accounted for 80-90 percent of the PM_{10}, and motor vehicle exhaust accounted for three to nine percent of the PM_{10} in the Las Vegas Valley;[3]

Receptor Modeling Showed 80-90 Percent of the PM_{10} in the Air Was Dust

9. Elevated PM_{10} concentrations were found to be associated with local construction activities (e.g., housing development or road construction), industrial processes (sand/gravel operations), or silt/dirt on paved road surfaces. When potential fugitive dust sources were visible within one-half kilometer of a sampling site, PM_{10} concentrations were often up to four times higher than PM_{10} concentrations at nearby sites that were not adjacent

[3] Chow, J.C., Watson, J.G., Green, M.C., et al; *Middle- and Neighborhood-Scale Variations of PM_{10} Source Contributions in Las Vegas, Nevada*, Journal of the Air & Waste Management Association, **1999**, 44, 641-654.

to a source. Most of these elevated PM_{10} activities that were recorded during each of the intensive monitoring periods;[4]

10. The current county-wide primary PM_{10} emission inventory agrees qualitatively with the CMB receptor model, attributing 80 percent or more of PM_{10} in the Las Vegas Valley to fugitive dust sources; and

Fugitive Dust Sources Must Be Primary Focus of Controls

11. Sources of fugitive dust (e.g., construction activities and disturbed vacant land) must be the primary focus of PM_{10} control programs.[5]

Source Significance Thresholds for 24-Hour and Annual Standard

A significant source is defined in U. S. EPA's Addendum to General Preamble[6] as a source that contributes more than five $\mu g/m^3$ to a 24-hour violation and more than one $\mu g/m^3$ to an annual violation. Sources with lower contributions to a violation are presumed to be de minimis. In recognition of the fact that geologic materials dominate PM_{10} concentrations in the Las Vegas Valley, the control measures selected by Clark County focus on sources of fugitive dust. The 1998 valley-wide annual emission inventory, the 1998 J. D. Smith annual micro-inventory, the 1998 design day valley wide emission inventory, and the 1999 design day micro-scale inventories show that these sources contribute more than 90 percent of PM_{10} emissions. These results are generally consistent with earlier PM_{10} source receptor studies conducted by the Desert Research Institute.[7]

Motor Vehicle Exhaust is Not a Significant Source

One inconsistency between the PM_{10} source receptor studies[8] and the emission inventories is PM_{10} emissions from motor vehicles. The micro-inventory assessment attributes two percent of the total PM_{10} emissions from this source category, whereas source apportionment for the two sites evaluated for a full year

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[4] Ibid; p. 647.
[5] Ibid; p. 641.
[6] Federal Register, FRL-5052-2, August 16, 1994
[7] Chow, J.C., Watson, J.G., et. al., *Fugitive Dust and Other Source Contributions to PM_{10} in Nevada's Las Vegas Valley*, DRI Document No 4039.2F1; Desert Research Institute, Reno, NV, April 18, 1997
[8] Ibid

in the DRI[9] study attributed 2.75 percent and 9.02 percent to this source category. However, the source apportionment studies did not evaluate PM_{10} levels for an exceedance of either the 24-hour or annual standard at either site. As a result, the contribution of motor vehicle exhaust to PM_{10} concentrations above the standard cannot be specifically determined by the CMB results. The annual and 24-hour emission inventories presented in Chapter 3 and the modeling process described in Appendix K do identify motor vehicle exhaust as an insignificant source. As indicated in conclusion number 11 on page 4-9, sources of fugitive dust must be the primary focus of PM_{10} control programs. Therefore, motor vehicle exhaust is not identified as a significant source for attaining the 24-hour or annual standard (also see Table 4-1, Significant/Insignificant Source Categories). Further discussion of the measures implemented and under consideration to ensure that motor vehicle exhaust remains an insignificant source in the future is presented in Section 4.6.

Secondary Particulate Emissions Are Not a Significant Source

The 1998 annual valley-wide emission inventory indicates that vehicular secondary sulfate emissions were about 408 tons, or 0.24 percent of the total inventory and contributed about 0.1 $\mu g/m^3$ to PM_{10} concentrations. Secondary particulate emissions are therefore not significant in the Las Vegas Valley.

Stationary Point Sources Are Not Significant

Stationary point sources, such as sand and gravel operations; natural-gas-fired utility power plants; asphalt concrete plants; industrial processes; and other stationary sources, generate 1,201 tons per year on a base year (1998) annual valley-wide basis and 3.29 tons per year on a high-wind design day valley-wide basis. The tonnage for this source category is projected to remain consistent through 2006. It is therefore estimated that this source category contributed 0.26 $\mu g/m^3$ to the annual design value of 53 $\mu g/m^3$ in the base year and will also contribute this amount in the attainment year of 2006. The relatively constant emissions from stationary sources are

[9] Chow, J.C., Watson, J.G, et. al.; *Middle- and Neighborhood-Scale Variations of PM_{10} Source Contributions in Las Vegas, Nevada*, Journal of the Air & Waste Management Association. 49, 641-652 June 1999

predicated on current trends for this source category, which show a slight decrease in emissions from 1995 to 1998, and the fact that Best Available Control Technology (BACT) is required for sources that produce more than two tons per year. If the design day 24-hour high-wind day emission total of 931.95 tons per day is equated to the design concentration of 281 $\mu g/m^3$, then stationary source emissions are estimated to contribute 0.96 $\mu g/m^3$ to the design day concentrations These sources would be expected to contribute a similar amount of PM_{10} under design day conditions in 2006. A review of the design day micro-scale inventories indicated that calculated contributions from the Pittman (3.74 $\mu g/m^3$) and Craig Road (3.53 $\mu g/m^3$) sites came close to, but fell below, the U. S. EPA thresholds of presumed significance for this source category. As detailed in Section 4.8.2 of this chapter, Clark County has committed to conducting a PM_{10} saturation study to further evaluate the impacts of these stationary sources on neighborhood-scale PM_{10} concentrations. If these source categories are found to have significant impacts on local PM_{10} concentrations, then Clark County will develop and adopt U. S. EPA-approvable rules that require the implementation of BACT for these sources.

Clark County Will Conduct a PM_{10} Saturation Study to Further Evaluate the Potential Impacts of Stationary Sources

4.3 IDENTIFICATION OF POTENTIAL CONTROL MEASURES

U. S. EPA guidance requires that serious area SIPs provide for the implementation of the best available control measures (BACM) to ensure expeditious attainment of the national PM_{10} standard. For each significant source identified through the emission inventory and rollback modeling process, as described in the previous section, potential RACM and BACM must be identified and analyzed for implementation. The source categories determined to be insignificant, (see Table 4-1) have uncontrolled emissions that are not significant and that are not expected to grow, or that have controls in place to maintain the emissions at an insignificant level in the future. An analysis of these insignificant source categories is provided separately in Section 4-6, and they are not addressed further in this BACM analysis. Because BACM is the best available control measure and RACM is the reasonably

Adoption of BACM Meets the Requirement for RACM as Well

achievable control measure, the adoption of BACM is more stringent than RACM. By adopting BACM, Clark County is fulfilling the RACM requirement.

Research Conducted to Identify Potential Control Measures

Extensive research was conducted to identify potential control measures. Primary sources researched were: U. S. EPA BACM guidance documents; the Maricopa County, Arizona serious area PM_{10} Plan and the BACM and MSM analyses contained therein (which were determined to be the most current and complete references available for BACM analysis); U. S. EPA's Technical Support Document for the Maricopa Serious Area PM_{10} Plan; the South Coast AQMD Serious Area PM_{10} Plan; and previous Clark County PM_{10} Plan submittals. The submitted plans from the remaining areas classified as Serious PM_{10} nonattainment (Coachella Valley, Owens Valley, and San Joaquin Valley, all in California) were also obtained and reviewed. A web search of all the states with Moderate PM_{10} nonattainment areas was conducted to determine if any of the Reasonable Available Control Measures (RACM) implemented by them could be applicable to controlling our significant sources. In addition, the U. S. EPA RACT/BACT/LAER Clearinghouse was thoroughly researched for potential control measures.

As a result of this research, a list of potential BACM was developed for each significant source. The next step in the BACM analysis process is to determine whether those listed control measures could feasibly be applied to reduce emissions of the significant sources in the Las Vegas Valley. In the following sections (Sections 4.3.1 through 4.3.5), tables listing the control measures found for each significant source category are provided; and those measures found to be potentially feasible to control emissions are identified as "Potential BACM." Reasoned justification is provided for those controls discounted from further consideration. Those measures that are identified as Potential BACM will be considered further in the control measure development process in Section 4.4.

4.3.1 Disturbed Vacant Land

Listed below in Table 4-3 are the potential control measures for emissions from disturbed vacant land identified as a result of the research performed as described above.

Table 4-3

Identification of Potential BACM for Disturbed Vacant Land

Control Measure	Action
Limit off-road use of RVs on open land	Potential BACM
Vacant land stabilization	Potential BACM
Construct windbreaks	Potential BACM
Controls on weed abatement	Potential BACM
Dust mitigation plans for vacant parcels greater than ten acres	Not Cost Effective
Dust abatement and management plans for large tracts of governmentally owned lands	Potential BACM

All Potential BACM for Disturbed Vacant Land Were Found to Be Feasible Except One

All potential BACM were found to be technically feasible and cost effective for possible implementation with the exception of one control listed (dust mitigation plans for vacant parcels greater than ten acres), which was eliminated for the following reasons. Requiring dust mitigation plans for individual parcels will not provide any emissions benefits. Soil disturbance will result from surveying of stabilized parcels to certify that the parcel is in conformance with a permit requirement. As a result, a permit requirement could result in an increase in emissions rather than a decrease.

There are approximately 4,900 parcels of land within the BLM disposal area boundary that are equal to or greater than 10 acres in size. These can be grouped as 10 acre parcels (2110), 15 acre parcels (1469), 25 acre parcels (873), 50 acre parcels (337), and 100 acre or larger parcels (145). Cost for developing dust mitigation plans are estimated to be at a minimum $500 each, with an additional minimum cost of $50 per acre for each acre over 10 acres. Therefore, the total first year and annual cost of compliance comes to $4,815,500 for the affected property owners in the BLM disposal area. When land outside the disposal boundary is considered, the total cost would be much higher.

Review of these dust mitigation plans, including field visits, could occur at an estimated average rate of four to five plans per day per enforcement officer. To handle all 4,900 parcels would require four additional enforcement officer positions for the first year and an estimated two positions on a recurring annual bias, with a declining trend if vacant properties are developed. Administrative support staff for handling applications, scheduling, correspondence, and filing is estimated to be three full time equivalent (FTE) positrons with a declining trend to one FTE potential if vacant properties are developed. Assumed cost per each enforcement officer is $60,000 per year and cost for each administrative FTE is $36,000. Total AQD cost for enforcing a dust mitigation plan requirement for vacant parcels comes to $340,000 for the first year. Therefore, total compliance and enforcement cost to implement this program would come to $5,155,500.

Estimates of compliance cost for controlling emissions from disturbed vacant land on an annual basis are set forth in Section 4.5.3.1.6 of the SIP. The low-end cost estimate is $6,933,504 for compliance and the high-end cost is estimated to be $26,072,540. Adding the approximately 5 million additional cost of the dust mitigation plan requirement increases the low end cost estimate by approximately 74 percent and increases the high end cost estimate by approximately 20 percent for no emissions reductions.

Due to Cost Effectiveness, Dust Mitigation Plans Are Not Required for Vacant Land Parcels 10 Acres or

Due to the high cost of implementing dust mitigation plans for vacant parcels ten acres and larger, Clark County is proposing to amend Section 90 of the AQR to require that large land owners with a commutative Large acreage of 10,000 acres or greater of open area or vacant land be required to submit a dust mitigation plan. While this will not reduce emissions, requiring large land owners to complete mitigation plans will be a useful enforcement tool. This commitment is discussed in Section 4.8.3.3 of the SIP. The text of Section 4.4.2 of the SIP has been amended to reflect this commitment.

4.3.2 Unpaved Parking Lots

Research for potential control measures for unpaved parking lots resulted in the list of controls in Table 4-4. Both of the listed control measures were determined to be feasible for further consideration.

Only Two BACM Measures Were Found for Unpaved Parking Lots

Table 4-4

Identification of Potential BACM for Unpaved Parking Lots

Control Measure	Action
Stabilize surface of unpaved parking lots	Potential BACM
Prohibit unpaved parking lots	Potential BACM

4.3.3 Construction Activities

The potential BACM identified by research for control of dust from construction activities are listed in Table 4-5. For several construction activities, Clark County did not find specific control measures adopted in other areas through the potential BACM research. New control measures were developed by Clark County as potential BACM to reduce emissions from these construction activities.

Table 4-5

Identification of Potential BACM for Construction Activities

Control Measure	Action
Strengthen requirements of existing fugitive dust control rules	Potential BACM
Provide for better enforcement of fugitive dust control rules	Potential BACM
Mitigation bond requirement	Potential BACM
Dust control plans for construction/land clearing and demolition	Potential BACM
Dust control monitor required for construction sites having more than 50 acres of actively disturbed area	Potential BACM
Track out control	Potential BACM
Staging areas, equipment storage, and material storage areas	Potential BACM
Use of surfactants or tackifiers	Potential BACM

Table 4-5

Identification of Potential BACM for Construction Activities (continued)

High wind operating restrictions	Potential BACM
Phasing land development	Potential BACM
Stabilize disturbed inactive surfaces	Potential BACM
Dust controls for blasting of soil and rock	Potential BACM
Dust controls for abrasive blasting	Potential BACM
Dust controls for crushing	Potential BACM
Dust controls for landscaping	Potential BACM
Dust controls for paving/subgrade preparation	Potential BACM
Dust controls for screening	Potential BACM
Dust controls for construction traffic	Potential BACM
Dust controls for trenching	Potential BACM
Dust controls for truck loading	Potential BACM
Dust controls for stockpiles	Potential BACM
Require visible emission limits not to exceed 20% opacity	Potential BACM
Prevent visible emissions from crossing property line	Potential BACM
Require upwind/downwind monitoring and limit increase of PM_{10} concentrations at the downwind property line to no more than 50 μg/m^3 over a five-hour period (South Coast Air Quality Management District Rule 403)	Not technologically feasible
Limit visible emissions to 100 feet	Potential BACM

Upwind/Downwind Monitoring Not Feasible

Of the potential BACM for construction activities, only the requirement for upwind/downwind monitoring was determined to be infeasible for further consideration. Two issues, the correct location of a monitoring array and lack of science on which to base a requirement, make this control measure technologically infeasible. The first issue relates to variable wind direction in the Las Vegas valley and the mobile nature of emission sources on a construction site. As noted in the discussion in Chapter 2, wind directions are not constant in the Las Vegas valley. This means that the correct position of an upwind/downwind monitoring array at the site boundary may vary throughout the day, making the measured results unreliable. The emission sources such as earthmovers and graders also make it impossible to correctly locate a monitoring array at the site boundary. Therefore, accurate and repeatable measurements from a fixed site boundary monitoring array for construction activities are not possible.

The second issue is that there is no science on which to equate an upwind/downwind standard to BACM level controls. This is not surprising given the infeasibility of correctly aligning a monitoring array. Other issues such as the timely availability of results and cost of implementation make this measure impractical compared to other alternatives even if the technical approach were feasible. Because of this reasoned justification, further implementation of this control measure was not considered.

4.3.4 Paved Road Dust

The list in Table 4-6 identifies the potential BACM for control of paved road dust. All but one of the measures identified for control of paved road dust were determined to be potential BACM for further consideration. Since roads in the Las Vegas Valley are not sanded or salted for skid control due to the mild climate of the area, the control measure to improve the type or volume of materials used for skid control is not applicable.

Table 4-6

Identification of Potential BACM for Paved Road Dust

Control Measure	Action
Preventing deposition of material onto paved roadways – stabilizing unpaved access points	Potential BACM
Preventing deposition of material onto paved roads – construction track out	Potential BACM
Preventing deposition of material onto paved roads – industrial site track out	Potential BACM
Preventing deposition of material onto paved roads – stabilizing shoulders on paved roads	Potential BACM
Preventing deposition of material onto paved roads – material transport controls – truck covers, freeboard requirement	Potential BACM
Preventing deposition of material onto roads – storm water drainage	Potential BACM

Table 4-6

Identification of Potential BACM for Paved Road Dust (continued)

Cleanup of material spills and erosion-caused deposits	Potential BACM
Routine sweeping/cleaning paved roads	Potential BACM
Use of Pm_{10}-efficient sweepers to clean paved roads	Potential BACM
Use of vacuum crack seal equipment	Potential BACM
Improve specifications/reduce usage of skid control materials	Not Applicable

4.3.5 Unpaved Roads

Research for BACM for unpaved roads resulted in the list of potential controls shown in Table 4-7.

Table 4-7

Identification of Potential BACM for Unpaved Roads

Control Measure	Action
Surface treatment to reduce dust from unpaved roads and alleys	Potential BACM
Prohibition on new unpaved roads in public thoroughfares	Potential BACM
Traffic reduction/speed control for unpaved roads	Potential BACM for construction roads, more stringent BACM implemented for other public and private roads
Prohibition of unpaved haul roads for construction sites	Not technologically feasible

The listed control measures were considered appropriate for further consideration with the exception of the two described below.

Traffic Reduction, Speed Control Not as Stringent a Control Measure on Public, Private Unpaved Roads

The measure to reduce traffic/control speed on unpaved roads was not implemented in lieu of the requirement to pave unpaved roads. Speed enforcement cannot be accurately measured continuously. Paving of unpaved roads can be readily verified and will result in a greater emissions reduction. With the current SIP commitments and emission reduction program in place in Clark County, it is likely that most if not all unpaved roads will be paved by the end of 2006. Use of this control measure as a Best Management Practice (BMP) on a managed construction site is feasible because of the site operator's ability to mandate compliance by employees and subcontractors.

Paving Infeasible on Unpaved Haul Roads

Unpaved haul roads for construction sites are temporary roads that must be removed after completion of the construction activity. The temporary nature of haul roads makes a requirement for paving infeasible because the paving would have to be removed when construction was completed. The removal of paving would generate significant additional emissions at the construction site and would require off-site storage of used paving materials. Generation of additional used paving materials from haul roads would consume additional land resources for stockpiling and would also generate additional PM_{10} emissions where the materials were stockpiled.

4.4 CONTROL MEASURE DEVELOPMENT

Assessment of these potential control measures for each significant source was coordinated by Clark County Department of Comprehensive Planning (CCDCP) staff and AQD staff with support from the Health District Air Quality Division PM Research Advisory Committee (Advisory Committee). The process utilized by Clark County in analyzing and developing air quality control measures provided for the efficient development of feasible and enforceable control measures, and regulations that will expedite attainment of the PM_{10} NAAQS. This process is described in the following paragraphs.

4.4.1 Evaluation And Development Of Control Measures

Evaluation and development of new or enhanced control measures necessary to attain the PM_{10} NAAQS took place over a period of 18 months.

PM_{10} Source Evaluation for Feasible Control Measures

The CCDCP staff evaluated PM_{10} sources that are present in the Las Vegas Valley and evaluated each significant source category for feasible control techniques, potential emission reductions, and cost factors. Control measures for fugitive dust sources were emphasized because coarse fraction particulate emitted from these sources dominated ambient PM_{10} concentrations above the 24-hour and annual NAAQS.

Advisory Committee Assisted in Control Measure Evaluation

The Advisory Committee assisted Clark County staff in control measure evaluation for construction activities by recommending funding for an evaluation of the AQD regulatory program. One of the work tasks in this review entailed an assessment of other regulatory programs for construction activities in the southwestern United States. Air regulatory programs evaluated in the study included Maricopa County, Arizona; Pima County, Arizona; Pinal County, Arizona; South Coast Air Quality Management District (SCAQMD), California; San Joaquin Valley Unified Air Pollution Control District, California; Mojave Desert Air Quality Management District, California; Northern Sierra Air Quality Management District, California; and Butte County Air Quality Management District, California.[10] The program elements that were evaluated for each agency were agency rules and regulations; enforcement efforts; and penalties and fines. The pertinent results of this review are summarized in Table 4-8.

[10] Dames & Moore, et. al.; Review of the Clark County Health District Air Pollution Control Division Construction Activities Program, Final Report, January 2000.

Table 4-8

Summary of Particulate Emission Control Regulations for Construction and Related Activities

District	Applicable Rules	Requirements	Control Measures	Penalties
SCAQMD	Rule 403 – Fugitive Dust	• A person shall not cause visible emissions beyond the property line • Prevent or remove track out of bulk materials	• Watering or • Chemical stabilizers • Required freeboard height on haul trucks	• Creative penalty policy to create an air pollution control benefit • Range: \$1,000-\$18,000

Table 4-8

Summary of Particulate Emission Control Regulations for Construction and Related Activities (continued)

District	Applicable Rules	Requirements	Control Measures	Penalties
SJVUAPCD	1. Rule 8020 – Fugitive Dust for Control of PM_{10} from Construction, Demolition, Excavation, and Extraction 2. Rule 8060 – Fugitive Dust for Control of PM_{10} from Paved and Unpaved Roads	• Use of appropriate dust control measures to limit visible dust emissions (VDE) • City, County and State agencies having jurisdiction over roads submit a report to the District documenting compliance every two years	• Watering or • Chemical stabilizers • Minimum paved shoulder width • Chemical suppressant • Watering	• Maximum fine of $50,000 per day
MOJAQMD	Rule 403 – Fugitive Dust Rule 403-2 – Fugitive Dust Control for the Mojave Desert Planning Area	• A person shall not cause visible emissions beyond the property line • Prevent or remove track out of bulk materials • Implementation of the control measures in the PM_{10} Attain-ment Plan • Prepare a dust control plan if 100 acres or more to be disturbed	• Cover loaded haul vehicles • Watering • Prevent track out • Reduce activity during high wind conditions	• Range: $100-$1,000

Table 4-8

Summary of Particulate Emission Control Regulations for Construction and Related Activities (continued)

District	Applicable Rules	Requirements	Control Measures	Penalties
GBUAPCD*	Rule 431 – Particulate Emissions – Town of Mammoth Lakes	• Restrictions on solid fuel burning • Road Dust Reduction Measure	• Certified appliances • Mandatory curtailment • Street sweeping program	Civil Penalties for number of violations in 12-month period 1st violation: $50 2nd violation: $100 3rd violation: $250 4 or more in a 12- month period: $500 per violation
NSAQMD	Rule 226 – Dust Control	• Control fugitive dust emissions	• Cease operations • Watering • Palliatives • Wind screens • Sweeping • Required freeboard height on haul trucks	• Costs incurred by the District in connection with corrective action shall be assessed against owner of the property. Failure to pay the amount shall result in a lien against the property
BCAQMD	Rule 207 – Fugitive Dust Emissions	• A person shall not cause visible emissions beyond the property line	• Watering • Chemical application	• Range: $120-$5,333
Maricopa County	Rule 310 – Permitting Requirements Rule 310.01 – Fugitive Dust	• Dust control plan for vacant lots, roadways, unpaved roads, and dust creating activities • Track out prevention • High wind dust control plan	• Grizzlies • Wheel washers • Gravel pads • Cease operations • Watering • Chemical application • 3-5 foot-high wind barriers	• Range: $200-$50,000 depending on the severity and duration of the event and the past history of the contractor

* Although this rule is not directly applicable to construction activities, it is included to present an example of a penalty schedule.

Table 4-8

Summary of Particulate Emission Control Regulations for Construction and Related Activities (continued)

District	Applicable Rules	Requirements	Control Measures	Penalties
Pima County	Title 17 – Air Quality Control	• A person shall not cause visible emissions beyond the property line • 40% Opacity	• Watering • Chemical application	• $0 for first NOV • $200- $50,000 for 2 or more NOVs • Un-contested, minor violations - may perform community service in lieu of paying fines
Pinal County	Chapter 2, Article 8 Chapter 4, Article 2	• 40% Opacity		• No violations in winds > 25 mph

Outside Contractors Provided Research on Control Techniques

The CCDCP staff has worked closely with the Advisory Committee and AQD staff to develop the scope of research projects for new control techniques and regulatory approaches. Noteworthy research funded by the Clark County Board of Health on the recommendation of the Advisory Committee includes work on the effectiveness of dust suppressants by UNLV[11] and development of best management practices for controlling dust from construction activities by Dames & Moore.[12] The UNLV research was utilized in the development of stabilized land wind erosion emission factors for the PM_{10} SIP inventory calculations. The study report also provided information on

[11] James, David, et. al., *Field Testing of Dust Suppressants using Portable Wind Tunnel; prepared for the Clark County Health District, Civil and Environmental Engineering Department, University of Nevada, Final Report*, September 8, 1999

[12] Dames & Moore, *Best Management Practices Manual for Dust Control by Soil Type*, document 44499-001-131, prepared for the Clark County Health District Board of Health

stabilization costs. The Dames and Moore report provided the basis for development of the Best Management Practices that are contained in the Section 94 Handbook. The Section 94 Handbook has been incorporated by reference into Section 94 of the Air Quality Regulations. Table 4-9 summarizes other research recommended by the Advisory Committee and funded by the Clark County Health District Board of Health.

Table 4-9

Summary of Projects Funded by the Board of Health per the Recommendation of the PM Advisory Committee

Board of Health Approved Projects	Date of Board Approval	Budget Approved	Target Complete Date	Research Findings
Covered Field Dirt Screen	5/28/98	$11,130	Complete	Constructed prototype device.
Track-Out Study: F Street	3/12/98	$32,725	Complete	Provided recommendations on track out control.
Dump Truck Dust Suppression, Phase III	4/23/98	$39,472	Complete	Achieved approximately 50% emission reductions.
Wind Tunnel Dust Suppressants, Phases I & II	4/23/98 5/28/98	$68,345	Complete	Provided data on the effectiveness of stabilization.
CCCD Eco-Analysis	8/27/98	$16,870	Complete	Not applicable to SIP
Moisture Content for Aggregate Processing	2/25/99	$39,013	Complete	Results applicable to de minimis source category.
Covered Dirt Screen Testing	3/12/99	$10,350	Complete	Prototype device quickly broke down during field test.
Vacant Disturbed Land Pilot Study	3/12/99	$8,508	Complete	Provided data for larger scale study.
Vacant Disturbed Land Pilot Study	3/12/99	$6,540	Complete	Provided data for larger scale study.
Construction Management Plan		$85,168	Complete	Provided the basis for the Section 94 Handbook
Vacant Disturbed Land Inventory		$137,913	12/31/2000	
UNLV Dust Suppressant Study	7/27/00	$35,000		
TOTAL APPROVED PROJECTS		**$491,034**		

4.4.2 Public Workshops

Beginning in September 1999, CCDCP and AQD staff jointly conducted a series of workshops to develop new fugitive dust controls for disturbed open areas and vacant lots. Initially, these regulations were developed as amendments to the existing Section 41 Air Quality Regulations. As draft regulations were developed for other fugitive dust sources, they were also incorporated into Section 41. As a result of public comments made during the workshop process, regulations for the control of disturbed open areas and weed abatement; unpaved roads; unpaved parking lots; and construction activities were separated into individual sections of the Air Quality Regulations in May of 2000. The draft regulations for disturbed open areas were rewritten as a new Section 90. Draft regulations for unpaved roads were rewritten as Section 91. Draft regulations for unpaved parking lots were rewritten as Section 92. Draft regulations for street sweeping equipment, paved road shoulders, and paved medians were developed as Section 93. Draft regulations for enhanced requirements for construction activities became Section 94. A total of 20 workshops were conducted between September 1999 and November 2000 on these draft regulations. Documentation for the workshops is in Appendix F. These workshops were advertised and opened to the public in compliance with NRS 241 Open Meeting Law requirements.

Workshops Held on Fugitive Dust Controls

In the following sections (4.4.2.1 through 4.4.2.5) a summary of the significant issues brought up at the workshops is provided for each of the major topics/significant emission sources that were addressed. A chart is provided for each significant source category that lists the potential BACM from Section 4.3 and indicates the decision resulting from the evaluation of each measure to either develop/strengthen appropriate control measures or to discount the measure from further consideration. A discussion of the implemented control measures is then provided in Section 4.5.

<u>4.4.2.1 Emission Inventory Issues</u>

Emission Inventories Discussed

During these workshops, concern was expressed regarding the draft emission inventories prepared by the CCDCP. Almost all participants believed that the emissions from paved roads were greatly overestimated. The CCDCP staff explained the U. S. EPA approved AP-42 emission algorithm for paved road dust, noted that research on paved road dust emissions was ongoing, and committed to updating the inventories when better emission estimates were available. There was some disagreement among stakeholders over the contribution of unpaved road dust to the inventories. Many felt that this source category might be underestimated in the inventory. Some members of the public also indicated that they thought the estimates of emissions from disturbed open areas were overestimated. There was much discussion on the contribution of construction activities, including the contribution of silt loadings on paved roads from construction activities. CCDCP explained how the emission inventory estimates were developed and has refined the draft emission inventories. The inventories are discussed in Chapter 3 and Appendix B of this SIP.

Emission Inventory Development Discussed in Appendix B

4.4.2.2 Disturbed Open Area/Vacant Lot/Unpaved Parking Lot Issues

Listed below in Table 4-10 are the BACM implemented for emissions from disturbed vacant land and unpaved parking lots identified as a result of the research performed as described above. For a detailed description of the implemented control measures, see Sections 4.5.2.1, 4.5.2.2, 4.5.3.1 and 4.5.3.2.

Table 4-10

BACM for Disturbed Vacant Land and Unpaved Parking Lots

Control Measure	Implemented
Limit off-road use of RVs on open land	Yes
Vacant land stabilization	Yes
Construct windbreaks	Optional
Controls on weed abatement	Yes
Prohibit unpaved parking lots	Proposed
Stabilize surface of unpaved parking lots	Yes
Dust abatement and management plans for large tracts of governmentally owned lands	Partial – See discussion below

Disturbed Open Areas Issues Discussed

Major issues related to the potential control measures for disturbed open areas and vacant lots included 1) the cost to property owners of complying with the proposed requirements, and 2) the liability of property owners to pay the cost of remediating unauthorized dumping and ATV use on their property. Another concern was that local regulations sometimes make it difficult or impossible to get local approval to fence a parcel. Some participants expressed the opinion that it was acceptable to require stabilization and prevent vehicular use on urban vacant lots, but that the regulations should not apply to "open areas." They expressed the view that the County should not adopt regulations that would result in "fencing off the desert."

The use of windbreaks was addressed and they were determined to be suitable as an optional control measure. This option was made subject to approval since requirements that were developed and included in AQR Section 90 to prevent motor vehicle trespass and to stabilize disturbed surfaces are more stringent than a stand alone requirement to construct windbreaks. The placement of windbreaks in terms of both orientation and spacing is critical if windbreaks are to be effective in controlling dust. Where surfaces have been stabilized, windbreaks are not necessary. Therefore, AQR Section 90 does not require that windbreaks be constructed, but leaves this control as an option if approved by the AQD Control Officer and U. S. EPA. Approval is subject to a determination that use of windbreaks as proposed will provide a level of control equivalent to other BACM approved for open areas and disturbed vacant land.

Site-specific dust mitigation plans for large parcels were discussed by CCDCP and AQD staff. As discussed in Section 4.3.1, requiring dust mitigation plans for individual parcels was not found to be cost effective. However, stabilization plans from large property owners with several parcels would be an effective method for enforcing vacant land regulations. This would be especially effective if the parcels had a high potential of being disturbed. As described in Section 4.8.3.3, Clark County is proposing an amendment to AQR Section 90.2.1.3 to require property owners managing over 10,000 acres to prepare dust mitigation plans by January 1, 2002. It was decided that requiring plans would be an enforcement burden, but that large property owners, including governmental entities, would be contacted individually and plans developed for their parcels.

Soil Surface Stability Tests Difficult To Use

The proposed U. S. EPA test methods for soil surface stability, which were used in the Maricopa County Federal Implementation Plan (FIP), were extensively criticized. AQD enforcement staff suggested thatthese tests were too labor intensive to allow for cost-effective enforcement of the regulation. Members of the public said the tests were too complicated for the average property owner to be able
to use in determining if his/her property was in compliance with the regulation. At the end of these discussions, a general consensus evolved that resulted in the adoption of Section 90 of the Air Quality Regulations.

Vacant Lots, Disturbed Open Areas To Be Stabilized; Off-Road Vehicle Use Prohibited

Some of the comments made concerning the requirements for disturbed open areas were also made concerning the proposals to regulate vacant lots. These included comments on cost, test methods, and fencing. Use of unpaved areas for intermittent parking was also discussed at length. At the end of these discussions, a general consensus evolved that resulted in the adoption of Section 92 of the Air Quality Regulations, requiring vacant lots and disturbed open areas to be stabilized and off-road vehicle use prohibited.

Current zoning regulations and development standards for Clark County and the cities of Las Vegas, North Las Vegas, and Henderson generally require paved parking for new development. Consideration was therefore given to prohibiting construction of any new unpaved parking lots. During consideration of this issue, it was noted that requiring paved parking lots for rural public facilities such as trailheads, campgrounds, etc., might conflict with the rural nature of these facilities and require more intensive construction in these rural areas. A consensus evolved to allow stabilization of unpaved parking lots in lieu of a mandatory paving requirement. For urban parking facilities that are used on a year-round basis, it is believed that paving will be the most cost-effective stabilization method. Clark County currently proposes to strengthen this requirement by prohibiting construction of new unpaved parking lots except where a paved parking lot conflicts with rural facilities such as trailheads or campgrounds.

4.4.2.3 Construction Activity Issues

The BACM identified for control of dust from construction activities are listed in Table 4-11. A detailed description of the implemented control measures can be found in Sections 4.5.2.3 and 4.5.3.3.

Table 4-11

BACM for Construction Activities

Control Measure	Implemented
Strengthen requirements of existing fugitive dust control rules	Yes
Provide for better enforcement of fugitive dust control rules	Yes
Mitigation bond requirement to insure implementation of dust control plan	Yes
Dust control plans for construction/land clearing and demolition	Yes
Dust control monitor required for construction sites having more than 50 acres of actively disturbed area	Yes
Track out control	Yes
Staging areas, equipment storage, and material storage areas	Yes
Use of surfactants or tackifiers	Yes
High-wind operating restrictions	Yes
Phasing land development	Yes -- Partial
Stabilized disturbed inactive surfaces	Yes
Dust controls for blasting of soil and rock	Yes
Dust controls for abrasive blasting	Yes
Dust controls for crushing	Yes
Dust controls for landscaping	Yes
Dust controls for paving/subgrade preparation	Yes
Dust controls for screening	Yes
Dust controls for construction traffic	Yes
Dust controls for trenching	Yes
Dust controls for truck loading	Yes
Dust controls for stockpiles	Yes
Require visible emission limits not to exceed 20% opacity	Yes
Limit visible emissions to 100 feet	Yes
Prevent visible emissions from crossing property line	Proposed

For several construction activities, Clark County did not find specific control measures adopted in other areas through the potential BACM research. New control measures were developed by Clark County as potential BACM to reduce emissions from these construction activities.

Construction Activities Control Measures

Extensive discussion was held on developing new and enhanced control measures for construction activities. Stakeholders noted that our minimum fines are the highest in the nation for fugitive dust violations, but that we still are violating the federal air quality standards. It was asserted that the "command and control" approach had not proven effective here. Examples were cited where permit conditions under the current rule did not allow the most efficient or cost-effective control measure to be employed. The need to be able to apply the most appropriate Best Management Practice for the job was emphasized. A suggestion was made to issue only one dust control permit for each project and make the applicant responsible for dust control on the project.

Concerns were expressed regarding the U. S. EPA opacity test. Some participants expressed doubt that it would be possible to comply with this standard when working in difficult soils. CCDCP staff noted that U. S. EPA required a quantitative, verifiable, and repeatable test method that could be related to the reduced emissions that would occur from the effective application of control measures. There was agreement to continue development of better test methods beyond submittal of the SIP.

Study Funded To Develop Test Methods

The Particulate Matter Control Research Advisory Committee (Advisory Committee) has funded a study of test methods that can be used to enforce the dust control standards for construction activities. U. S. EPA has provided additional funding for the study. The study began in early 2001, and it is expected the study will be finalized by August of the same year. The CCDCP has made a SIP commitment to initiate an additional study if the results of this study do not produce test methods that are acceptable. It is anticipated that the current study will result in acceptable test methods. The difficulty in developing acceptable test methods lies in the variety of activities that take place on construction sites and the different soil types present in the Las Vegas Valley.

Site-Specific Dust Mitigation Plans Part of BMP

After extensive discussion, it was generally agreed that the new regulatory program should require site-specific and phase-specific dust control permits for larger projects and that the regulation incorporate an extensive list of BMP that would provide a comprehensive set of BACM to address fugitive dust from construction sites. BMP should generally be selected based on soil type as well as other factors specific to the construction site and activity. One suggestion put forward but not adopted was a limitation on the acreage that could be graded and disturbed at any one time. Opponents of this proposal suggested that in some instances, on very large projects, this requirement could force off-site hauling and stockpiling of fill dirt. This would not be necessary if there was not a limitation on the acreage that could be graded and kept disturbed at any one time. Staff reviewed dust control permits for large projects and determined that these issues were valid. It was also argued that the requirements for stabilizing any areas of a construction site that were disturbed would force developers to minimize disturbed areas to the maximum extent feasible for economic reasons.

Reducing Construction Site Size Threshold Provides No Air Quality Benefit

During the workshop process, it was noted that Maricopa County required dust control permits for all construction sites of one-tenth (0.1) acre or larger, whereas Clark County requires dust control permits for construction sites of one-quarter (0.25) acre or larger, trenching operations of 100 feet or greater, or demolition of structures of 1,000 square feet or greater. In some instances, the latter permit thresholds for dust producing activities may mandate permits on parcels of less than 0.1 acre. Consideration was given to reducing the construction site size threshold to one-tenth (0.1) acre for requiring dust control permits. Most construction activities on these very small sites that do not include trenching or demolition are limited to remodeling. Small-scale remodeling does not typically involve significant dust producing activities. In addition, the Clark County regulation requires that BMP be employed for any dust producing activity that occurs, even when a permit is not required. It was therefore determined that reducing the construction site size threshold for requiring dust control permits would provide no air quality benefits.

Only one potential control measure for construction activities was rejected as infeasible for BACM during the rule development process. Prevention of visible emissions from crossing property lines was discussed at length during the rule development process. This performance standard was determined to be both infeasible and ineffective. For public works agencies and contractors working on road construction projects, this requirement may result in a no-visible-emissions standard due to the close proximity of a property line next to road rights-of-way. The same concern applies to any other work that occurs next to a property line. It would not be possible to comply with the required level of control that this performance standard would mandate under these circumstances.

Visible Emissions Crossing Property Lines Deemed Infeasible, Ineffective

On the other hand, for construction work that occurs on a large section of land, this performance standard may allow almost unlimited emissions. Under these circumstances, this performance standard would provide no air quality benefits. This performance standard was therefore rejected as a BACM measure for construction activities.

As a result of public comments received during the SIP development process, Clark County has reassessed this issue and determined that under some circumstances, this may be an appropriate performance standard. Therefore, Clark County is proposing to amend Section 9.4 of the AQR to incorporate this requirement.

Section 94 Adopted

At the end of these discussions, a general consensus evolved that resulted in the adoption of Section 94 of the Air Quality Regulations and the Section 94 Handbook of Best Management Practices by the Clark County Health District Board of Health.

4.4.2.4 Paved Road Issues

Table 4-12 identifies the potential BACM that were identified for control of paved road dust. For a detailed description of the implemented control measures, see Sections 4.5.2.4 and 4.5.3.4.

Table 4-12

BACM for Paved Road Dust

Control Measure	Implemented
Preventing deposition of material onto paved roadways – stabilizing unpaved access points	Yes
Preventing deposition of material onto paved roads – construction track out	Yes
Preventing deposition of material onto paved roads – industrial site track out	Yes
Use of Pm_{10}-efficient sweepers to clean paved roads	Yes
Use of vacuum crack seal equipment	Yes
Preventing deposition of material onto paved roads – stabilizing shoulders on paved roads	Yes
Preventing deposition of material onto paved roads – material transport controls –truck covers, freeboard requirement	Yes
Preventing deposition of material onto roads – storm water drainage	Yes
Cleanup of material spills and erosion-caused deposits	Yes
Routine sweeping/cleaning of paved roads	Yes

All Street Cleaning Equipment To Be Certified PM-Efficient

Some public works agencies initially expressed concern that the proposed draft regulations would require all new street sweeping equipment to be certified PM-efficient. This concern related to the need to retain some broom-type sweepers in the fleet. This issue was resolved when it was determined that the current list of Certified PM-Efficient Sweepers included broom sweepers. It was also suggested that the regulations allow the use of sweeping equipment that is “equivalent” to certified equipment. The issue of requiring new sweeping equipment for sweeping parking lots to be certified

PM-efficient was discussed at some length. At the end of these discussions, a general consensus evolved that resulted in the adoption of the sweeping requirements in Section 93 of the Air Quality Regulations, which require all street cleaning equipment to be certified.

All of the public works departments have established programs for sweeping frequency in order to maximize the emission reduction benefits from their sweeper resources. These programs are described in Appendix J.

Paved Road Unpaved Shoulder and Median Stabilization Requirements Adopted

The value of requiring paved road unpaved shoulders and medians to be stabilized and the time frame in which this should occur was discussed. Related to this discussion was the desire to preserve horse trails in the road rights-of-way in certain rural areas. Public works agencies indicated that surveying rights-of-way and establishing drainage where these improvements are required will take time and be expensive to resolve in some situations. The costs that could incur for the maintenance of limited access freeway rights-of-way and the difficulty of maintaining these areas were issues raised by the Nevada Department of Transportation (NDOT). At the end of these discussions, a general consensus evolved that resulted in the adoption of paved road unpaved shoulder and median stabilization requirements in Section 93 of the Air Quality Regulations, requiring unstable shoulders and medians to be stabilized within 365 days of discovery. Public works departments are developing plans for shoulder stabilization as described in Section 4.5.2.4.3.

Control measures to control track out from stationary/industrial sources are addressed in Section 4.6.1.1. Stationary sources are classified as an insignificant source category, but control measures to reduce track out onto paved roads are incorporated in the permit conditions for each source.

Vacuum-Type Crack Seal Equipment Must Be Purchased in the Future

Vacuum-type crack seal equipment evaluated by Public Works departments in the valley have been found to be of poor design and did not work well. Evaluation of off-the-shelf equipment available from manufacturers concluded that the current technology needs modification and/or improvement before the equipment ls as an effective means of reducing emissions in the crack sealing process. However, these modifications have been found to be relatively minor and Clark County is proposing to amend AQR Section 93 to require that future purchases of crack seal equipment employ this technology.

<u>4.4.2.5 Unpaved Road Issues</u>

The BACM implemented for unpaved roads are listed in the controls shown in Table 4-13. A detailed description of these control measures is provided in Sections 4.5.2.5 and 4.5.3.5.

Table 4-13

BACM for Unpaved Roads

Control Measure	Implemented
Surface treatment to reduce dust from unpaved roads and alleys	Yes
Prohibition on new unpaved roads in public thoroughfares	Yes
Traffic reduction/speed control for unpaved roads	Yes - For Construction Roads

Unpaved Roads Control Measures

Potential control measures for unpaved roads were extensively discussed, with some participants suggesting that all unpaved roads should be paved and others suggesting that a much higher threshold for vehicle trips should be used for triggering a paving requirement. The time table for bringing unpaved roads into compliance was also discussed at length.

CMAQ Funding Commitment To Pave Unpaved Roads

After extended discussion spanning a number of workshops, a consensus was reached to require paving of all unpaved roads with vehicle traffic of 150 trips per day or greater over a three-year period, with one third of the roads paved each year. The only source from which the level of funding for paving roads can be acquired is through the Congestion Mitigation and Air Quality Improvement program (CMAQ). However, the total funding needed to ensure paving of these roads can only be accrued over a three-year period. The infeasibility of obtaining the funding necessary for this paving program in a shorter time period is a factor that prevents Clark County from demonstrating attainment of the 24-hour standard before 2006.

Funding Constraints Prevent Attainment of the 24-Hour Standard Before 2006

Extended discussions took place on what constituted an unpaved road, who should be responsible in the case of easements, and who should be responsible for roads in public rights-of-way where a public agency has not accepted the road. A majority of participants indicated that they thought that the regulations should be drafted to allow the road-paving offset credits program to continue. At the end of these discussions, a general consensus evolved that resulted in the adoption of Section 91 of the Air Quality Regulations, requiring unpaved roads with greater than 150 ADT to be stabilized.

Unpaved Roads Stabilization Adopted

Toward the end of these workshops, the issue of property owner and developer liability for potential environmental damage from the use of dust suppressant products emerged. As a result of these discussions, Clark County has committed to working with the State of Nevada to facilitate development and adoption of specifications for dust suppressant product use in Nevada.

Dust Suppressant Specifications

4.4.3 Public Hearings and Adoption

After public notice in compliance with NRS 241, a 30-day public comment period was scheduled and public hearing set for March 23, 2000 on amendments to Section 41 for consideration by the Clark County Board of Health. This hearing was continued to the April 27, 2000 meeting of the Clark County Board of Health. After rewriting the draft regulations as amendments to Section 0 and adding Sections 90, 91, 92, 93, and 94, a public hearing was scheduled for the May 25, 2000 meeting of the Clark County Board of Health. This hearing was continued to the June 22, 2000 Board of Health meeting. The draft Sections 93 and 94 were also scheduled for a hearing at the June 22, 2000 Board of Health meeting. On June 22, 2000, the Clark County Board of Health amended Section 0 and adopted Sections 90, 91, 92, 93, and 94. On July 27, 2000, the Section 94 Handbook was scheduled for a public hearing by the Clark County Health District Board of Health on August 24, 2000. The Section 94

AQR Section 0 Amended; Sections 90, 91, 92, 93 and 94 Adopted in 2000

Handbook was subsequently adopted at this meeting. The Clark County Health District Board of Health commenced a public comment period for Revised Sections 0 and 93 on September 28, 2000 and set a public hearing for November 16, 2000. The revised draft Sections 0 and 93 were adopted at the November 16, 2000 meeting of the Clark County Health District Board of Health. Documentation of the public hearing and adoption process is in Appendix F.

4.5 IMPLEMENTED CONTROL MEASURES

4.5.1 Control Measure Terminology

Control Measure Terms Defined

The terms **emission reduction**, **rule penetration**, **rule effectiveness**, and **overall** (rule) **reduction** are used throughout this overview of Clark County control measures. Emission reduction denotes the actual reduction that can be achieved when the control measure is properly applied to a specific activity or source. An example of emission reduction would be the percent reductions achieved when paving an unpaved road. The emission reduction is calculated by dividing the emissions that occur after the control measure is applied by the emissions that occur before the control measure is applied.

Rule Penetration

Rule penetration is the percentage of a total source category that a particular rule will impact. Continuing with the road example, if the rule applies to roads having more than 150 vehicle trips per day, then the rule penetration would be the emissions generated by roads having more than 150 vehicle trips per day as a percentage of the emissions from all of the unpaved roads.

Rule Effectiveness Default of 80 Percent

The term “rule effectiveness” is somewhat misleading. Rule effectiveness is used to denote the rate of compliance with a rule. If, for example, operators of 80 percent of a source category that is subject to a control measure requirement implement the control measure, and comply at all times with its requirements, then this “rule effectiveness” is said to be 80 percent.

The overall reduction for a rule is calculated by multiplying the emission reduction by the rule penetration and multiplying the result by the rule effectiveness. This gives the overall emission reduction that is achieved by implementing the rule.

4.5.2 Adopted Control Measures for the 24-Hour NAAQS

Table 4-14 provides a detailed list of the specific elements of the Clark County control measures adopted or implemented to achieve attainment of the 24-hour PM_{10} NAAQS.

Table 4-14

Significant PM_{10} Sources Control Measures 24-Hour Standard

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Area Sources		
Disturbed Vacant Land	• Prevent Motor Vehicle Access and Stabilize Disturbed Surface. {Section 90.2.1.1(a)} • Stabilize Disturbed Surface greater than 5,000 sq.ft. with Gravel or Dust Palliatives {Section 90.2.1.1(b)} • Discing or Blading areas of 5,000 square feet or larger for weed abatement, apply water both before and during operations {Section 90.2.2.1(a),(b)} • After Discing or Blading occurs, stabilize disturbed surfaces with Gravel, Water, Dust Palliatives, or Paving {Section 90.2.2.1(c)}	36% (2001) 72% (2002+)
Unpaved Parking Lots	• Pave {Section 92.2.1.2(a)} • Apply and Maintain Dust Palliatives {Section 92.2.1.2(b)} • Apply and Maintain Dust Palliatives on Traffic Lanes and apply surface gravel to depth of two inches on Parking Areas {Section 92.2.1.2(c)} • (Proposed) Prohibition of new, unpaved parking lots • (Proposed) Prohibition of dust crossing property line	Wind Erosion 36% (2001) 72% (2002+) Vehicles 24% (2001) 48% (2002+)
Construction Activity Fugitive Dust	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-I) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area {Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7)} • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1)	34 % (2001) 68 % (2003)

Table 4-14

Significant PM_{10} Sources Control Measures 24-Hour Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Construction Activity Fugitive Dust (continued)	• Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100-yard Plume Limit {Section 94.6.8(b)} • (Proposed) 100-foot plume limit • (Proposed) Prohibition on dust crossing property line • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12) • Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17) • Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21)	

Table 4-14

Significant PM_{10} Sources Control Measures 24-Hour Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Construction Activity Fugitive Dust (continued)	♦ Truck Loading (Section 94 Handbook, CST 22)100-yard Plume Limit {Section 94.6.8(b) ♦ (Proposed) Prohibition on the use of dry rotary brushes or blower devices for cleanup of track out	
Windblown Construction Dust	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-I) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100-yard Plume Limit {Section 94.6.8(b)} • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12)	36% (2001) 71% (2002+)

Table 4-14

Significant PM_{10} Sources Control Measures 24-Hour Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Windblown Construction Dust (continued)	• Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15)Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17) • Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22)	
On-Road Mobile Sources		
Paved Road Dust (includes Construction Track-Out)	• Pave or Stabilize four feet of Shoulders (Section 93.2.1.1) • (Proposed) Stabilize eight feet of shoulders on new roads with 3,000 ADT or greater • Pave or Stabilize Medians with solid paving across median (Section 93.2.1.4) • Use PM-Efficient Street Sweepers (Section 93.2.3.1) • Establish routine frequent street sweeping programs • Prevent haul truck track out and spillage (Section 94 Handbook, CSTs 13 & 22) • Prevent mud and dirt track out with wheel shakers, or wheel washers must be employed at Construction Sites to prevent mud and dirt track out onto paved roads (Section 94 Handbook, CST 19-3 & CST 19-4) • Clean up mud and dirt track out at least once daily and when track out extends more than 50 feet	N/A [13]
Unpaved Road Dust	• Pave Unpaved Roads With Traffic ≥ 150 ADT {Section 91.2.1.3(a)}; or • Apply and Maintain Dust Palliatives to Unpaved Roads With Traffic ≥ 150 ADT {Section 91.2.1.3(b)}	Paving Phase-In (2001) -22% (2002) -44% (2003+)-65%

[13] No emission reductions taken for PM-Efficient Street Sweepers. Because there is not a linear relationship between silt loading and emission rates, the actual emission reductions will vary with the roadway mix in each inventory area.

Table 4-14
Significant PM_{10} Sources Control Measures 24-Hour Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Highway Construction Project Activities	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-l) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, Section 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100-yard Plume Limit {Section 94.6.8(b)} • (Proposed) 100-foot plume limit • (Proposed) Prohibition of dust crossing property line • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12)	34% (2001) 68% (2003)

Table 4-14

Significant PM_{10} Sources Control Measures 24-Hour Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Highway Construction Project Activities (continued)	• Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • (Proposed) Prohibition on use of dry rolling brushes or blower devices for cleanup of track out • (Proposed) Acquire only vacuum-type chip seal equipment • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17) • Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22)	
Highway Construction Project-Wind Erosion	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-l) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100-yard Plume Limit {Section 94.6.8(b)} • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3)	36% (2001) 71% (2002+)

Table 4-14

Significant PM_{10} Sources Control Measures 24-Hour Standard (continued)

Source Category	**BACM-Control Measures**	**Overall Reduction Percentage with Control Measures**
Highway Construction Project-Wind Erosion (continued)	• Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12) • Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17) • Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22)	
Vehicle Erosion-Race Activities	• Prevent Motor Vehicle Access and Stabilize Disturbed Surface {Section 90.2.1.1(a)}. • Stabilize Disturbed Surface greater than 5,000 sq.ft. with Gravel or Dust Palliatives {Section 90.2.1.1(b)}.	40% (2001) 79% (2002+)
Wind Erosion-Race Activities	• Prevent Motor Vehicle Access and Stabilize Disturbed Surface {Section 90.2.1.1(a)}. • Stabilize Disturbed surface greater than 5,000 sq.ft. with Gravel or Dust Palliatives {Section 90.2.1.1(b)}.	36% (2001) 72% (2002+)

4.5.2.1 Control Measures For Disturbed Vacant Lands (24-hour Standard)

4.5.2.1.1 Sources Controlled: 1) Publicly and privately owned disturbed open areas and vacant lots. 2) Weed abatement by discing and blading of open areas and vacant lots.

4.5.2.1.2 Implementation Schedule: All requirements became effective on January 1, 2001.

4.5.2.1.3 Description of Control Strategy: This control measure is implemented through Section 90 of the Air Quality Regulations. This regulation requires the implementation of controls for preventing fugitive dust emissions from disturbed open areas and vacant lots with a cumulative disturbed area larger than 5,000 square feet, and for preventing fugitive dust emissions for weed abatement by discing and blading of open areas and vacant lots of 5,000 square feet or larger.

Prevention of Fugitive Dust Emissions

An analysis of Clark County Assessor Records (See Appendix L) determined that less than one percent of vacant land within the BLM disposal boundary was from parcels smaller than 5,000 square feet.

Control measures applicable to disturbed areas consist of the following:

- Preventing motor vehicle access and stabilizing the disturbed surfaces; or
- Applying dust palliatives to disturbed surfaces; or
- Applying and maintaining a uniform surface gravel cover over the disturbed surfaces; or
- Applying and maintaining alternative control approved by U. S. EPA.

Where motor vehicle trespass is occurring on open areas and vacant lots greater than 5,000 square feet, regardless of the amount of cumulative disturbed surface area, owners must take steps to prevent trespass and stabilize the surface. Where greater than 5,000 square feet of cumulatively disturbed surface exists, if owners have not implemented the latter control, they must apply dust palliative (not just water) or gravel.

Control measures for discing and blading consist of the following:

- Applying water before and during discing and blading for weeds; and
- Stabilizing after weed abatement.

Test methods for determining compliance with the regulation’s stabilization requirements consist of the following:

- Drop ball test; or
- Threshold friction velocity test; or
- Rock test method for non-erodible surface elements.

4.5.2.1.4 Technical Feasibility and Environmental Impacts: Similar requirements for disturbed open areas and vacant lots, and for discing and blading, have been implemented in Maricopa County. The major difference between the Clark County regulatory program and the Maricopa County program is that the Clark County Regulations do not provide for revegetation as a control option. Revegetation was not considered to be a generally effective control option in the Las Vegas Valley due to the area’s meteorology. Rainfall occurs very sporadically in the Valley and averages only 4.13 inches per year over an extended time period, as detailed in Chapter 3. This makes establishing self-sustaining vegetation generally infeasible as a method of controlling fugitive dust, unless special efforts are made to ensure adequate application of water and interim soil stabilization. However, the regulation does allow for revegetation and other control options not explicitly provided for in the regulation on a case-by-case basis, subject to approval by the Control Officer and the U. S. EPA Region IX Administrator.

Revegetation Not a Control Option

Use of windbreaks as a control measure for controlling dust from disturbed vacant lands are also subject to approval by the Control Officer and the U. S. EPA Region IX Administrator under this regulation. This allows for review of factors that may affect windbreak performance such as vehicular access, severity of soil disturbance, and windbreak orientation.

Windbreaks as a Control Measure

Clark County is proposing to amend AQR Section 90 to require large property owners managing 10,000 acres or more to develope vacant land stabilization plans. For example, BLM is using satellite data to identify parcels with potential disturbance and hiring an employee to routinely inspect parcels. Nellis Air Force Base has hired a consultant to test their parcels and develop an inspection plan. The public works departments from the various entities have also been contacted by AQD staff and are beginning to develop plans of their own. These voluntary measures allow the AQD staff to prioritize the property owners and work with the owners of the largest number of acres first.

Dust Suppressants as a Control Measure

The controls of choice under this regulation will generally be vehicular access controls and the application of dust suppressants. A number of classes of dust suppressant products are in large-scale use both in the Las Vegas Valley and throughout the United States. They are generally considered to be environmentally innocuous. However, field and laboratory studies evaluating the long-term potential adverse impacts of these products on soil and water are limited, and no studies to evaluate these impacts have been conducted to date in the Las Vegas Valley. Because it is recognized that the requirements set forth in this regulation will significantly increase the use of these dust suppressant products, Clark County has committed to facilitating and participating in research to address these issues. The SIP commitment for this research is in Section 4.8.2.1.

Water Runoff a Concern with the Use of Dust Suppressants

One environmental impact of commonly used dust suppressant materials is the decrease in the permeability of treated soil surfaces and, as a result, increased water runoff during storm events. Although the products protect treated areas from water erosion and reduce downstream siltation from these areas, the increased surface flow may result in additional flood potential downstream. The CCDCP will work with the Clark County Flood Control District to further evaluate these impacts.

4.5.2.1.5 Emission Reductions: All emission reduction computations are based on the 2006 attainment year for the 24-hour NAAQS. The control measure applies

Disturbed Vacant Land Control Measure Effectiveness

to the PM_{10} emission source category "Disturbed Vacant Lands/Unpaved Parking Lots" with a total of 19.3 tons per day of uncontrolled PM_{10} emissions coming from 976 acres of disturbed vacant land. Control measures and emission reductions for unpaved parking lots are addressed under the unpaved parking lots section. The emission reduction, rule penetration, rule effectiveness, and overall reduction for this control measure are detailed in Appendix L, Table L-2, and are shown below:

- Emission Reduction 91 percent;
- Rule Penetration 99 percent;
- Rule Effectiveness 80 percent; and
- Overall Control Reduction 72 percent;

Applying these overall control reductions to the 2006 uncontrolled emissions for this source category yields the following emission reductions:

- Baseline Emissions: 19.3 TPD
- Controlled Emissions: 13.9 TPD
- Emission Reductions: 5.4 TPD

4.5.2.1.6 Control Measure Costs: A range of costs has been calculated for this control measure due to the following factors:

- The rule allows a number of alternative control options that may differ widely in cost;
- The cost for a given option may vary considerably with the size of area to be treated and onsite impacts such as vehicular traffic; and
- Specific site conditions, such as soil type may significantly impact costs.

Stabilizing Unstable Vacant Land Is a Cost-Effective Control Measure

The following control measure cost and assumptions were utilized in developing cost effectiveness estimates:

- Fencing Cost[14] –Acre per year (based on cost of renting fencing): $2,000;
- Stabilization Cost[15] – Acre per application: $500 to $1,500;

[14] Memorandum #08-00 to Clark County Health District Board of Health, May 25, 2000
[15] Ibid

- Number of Applications per year: one to three (assume less expensive material will need to be applied more frequently);
- Cost Range per acre per year: $500 to $2,000; and
- Cost of Enforcement: $540,540.

The public cost of enforcement must also be considered when calculating control measure cost effectiveness. As noted in the discussion of commitments for additional Air Quality Division (AQD) enforcement staffing levels in this chapter, the total cost per year of this expanded effort, with the exception of certain administrative costs, is $780,000.[16] Administrative costs are assumed to be ten percent. It is anticipated that 63 percent of the enhanced enforcement effort will be applied to disturbed vacant land compliance. It is estimated that the total enforcement cost per year attributed to this control measure will be $540,540.[17]

The number of acres of disturbed open areas or vacant lots, including unpaved parking lots, that are subject to these controls are estimated to be 976 acres in the 2006 24-Hour Valley-Wide Emission Inventory (Table E-9). This acreage is multiplied by the low and high control cost per acre ($500 and $2000) to calculate the control measure cost per year. Enforcement cost per year is added to the low and high control costs to get the total control costs range per year. These total costs were divided by 365 to get the low and high end total control cost per day. Dividing these numbers by the emission reductions achieved (5.4 tons per day) yields the cost effectiveness for this control measure.

The Clark County Health District Board of Health has adopted Section 90 of the Air Quality Regulations as RACM and BACM for this emission source category.

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[16] Naylor, M.H., Workplan for PM_{10} Resources Commitment, Prepared for Clark County Health District Board of Health, July 11, 2000.
[17] The estimated cost for enforcing Section 90 is based on the assumption that 63 percent of the new enforcement cost will be allocated to Section 90. Unaccounted administrative costs are estimated to be 10 percent of the operational cost. Therefore, Section 90 enforcement costs are calculated as follows: $780,000x0.63x1.10=$540,540.

	Low	High
Control Measure Cost/Year	$488,000	$1,952,00
Enforcement Cost/Year	$540,540	$540,540
Total Control Cost/Year	$1,028,540	$2,492,540
Total Cost Per Day	$2,818	$ 6,829
Cost Effectiveness	**$522 per ton**	**$1,265 per ton**

Unpaved Parking Lots Control Measures

4.5.2.2 Control Measures For Unpaved Parking Lots (24-Hour Standard)

4.5.2.2.1 Sources Controlled: Unpaved parking lots.

4.5.2.2.2 Implementation Schedule: Control measures must be applied to new parking lots constructed after June 22, 2000. Control measures must be applied to existing parking lots by July 1, 2001.

4.5.2.2.3 Description of Control Strategy: This regulation requires the implementation of controls for preventing fugitive dust emissions from unpaved parking lots that are used for parking, maneuvering, or storing motor vehicles. Parking lots that are utilized intermittently, for a period of 35 days or less during the calendar year, may implement the controls set forth in this regulation only during the period that the parking lot is utilized for vehicle parking. It should be noted, however, that an intermittent-use parking lot would become subject to Section 90 of the Air Quality Regulations during periods the lot was not utilized for vehicle parking.

Control measures applicable to unpaved parking lots consist of the following:

- Paving; or
- Applying and maintaining dust palliatives; or

- Applying and maintaining dust palliatives on traffic lanes and applying and maintaining surface gravel to a depth of two inches on the parking areas; or
- Applying and maintaining alternative controls approved by U. S. EPA.

Stabilization standards include the following:

- Complying with a 20 percent opacity requirement; and
- Maintaining silt loading of no more than 0.33 ounces per square foot; or
- Maintaining silt content of no more than eight percent.

Test methods for determining compliance with the control measures and stabilization standards include an opacity test method and a silt content test method.

4.5.2.2.4 Technical Feasibility and Environmental Impacts: The control measures and stabilization criteria required under this regulation have been implemented in Maricopa County. The Clark County regulation does not permit the use of gravel as a control measure for travel lanes in unpaved parking lots. The requirement that gravel be maintained at a depth of two inches is also unique to the Clark County Regulation. The total area of unpaved parking lots is relatively small and these facilities were therefore inventoried with disturbed open areas. This was done in part because of the difficulty in differentiating between unpaved parking lots and disturbed open areas in many cases. For those unpaved parking facilities that are utilized on a regular basis, paving will probably be the most cost-effective option. It is also expected that in response to the adoption of Section 92, land use planning agencies will not be able to issue variances for paving requirements for future development projects. Where paving requirements have been previously deferred, it is not anticipated that additional deferrals will be granted for existing projects, given the fact that the Section 92 requirements supersede the County and Local Planning Code requirements.

Paving Most Cost-Effective Option

Thus, increased use of dust suppressant products under the provisions of this regulation is expected to be limited. Dust suppressant products would primarily be limited to intermittently used parking facilities and other existing unpaved parking facilities as an interim compliance measure until more permanent and cost-effective paving can be financed.

Use of Dust Suppressants Will Be Limited

4.5.2.2.5 Emission Reductions: Because the extent of unpaved parking lots affected by this regulation has not been determined on a valley-wide basis, emission reductions from this regulation have been calculated using acreage of unpaved parking from the two "worst case" micro-scale areas that contained unpaved parking. A total of 21 acres of unpaved parking was found in the Pittman micro-scale area and 18 acres of unpaved parking was found in the Craig Road micro-scale area. The emission reductions, rule penetration, rule effectiveness, and overall reduction are detailed in Appendix L and shown below:

Emission Reductions Calculated from "Worst Case" Areas

- Emission Reductions-Wind: 91 percent;
- Emission Reductions-Vehicle: 60 percent;
- Rule Penetration-Wind: 99 percent;
- Rule Penetration-Vehicle: 100 percent;
- Rule Effectiveness-Wind: 80 percent;
- Rule Effectiveness-Vehicle: 80 percent;
- Overall Reduction-Wind : 72 percent; and
- Overall Reduction-Vehicle: 48 percent.

Applying these overall control reductions to the calculated emissions from the 39 acres of unpaved parking in the two inventory areas yields the following emission reductions:

- Baseline Emissions (Wind): 1.62 TPD;
- Controlled Emissions (Wind): 0.45 TPD;
- Emission Reductions (Wind): 1.17 TPD;
- Baseline Emissions (Vehicle): 0.034 TPD;
- Controlled Emissions (Vehicle): 0.018 TPD; and
- Emission Reductions (Vehicle): 0.016 TPD.

4.5.2.2.6 Control Measure Costs: A range of costs has been calculated for this control measure due to the following factors:

- The rule allows several alternative control options that may differ significantly in cost;
- The cost for a given option may vary considerably with the size, frequency of use, and intensity of use of the parking lot to be treated; and
- Specific site conditions, such as soil type, may significantly impact costs.

The following control measure costs per acre and assumptions were utilized in developing cost effectiveness estimates:

- Annual Control Measure Cost (Paving):
  $1,722 to $4,300;
- Annual Control Measure Cost (Dust Palliatives):
  $1,000 to $2,000; and
- Annual Control Cost Range:
  $1,000 to $4,300.

The public cost of enforcing the requirements for unpaved parking lots cannot be accurately separated from the cost of compliance enforcement of disturbed open areas and vacant land, but are expected to be a relatively small part of the $540,540 annual enforcement cost for this source category. The public cost of compliance enforcement is, therefore, not considered in this cost assessment for unpaved parking lots.

The cost effectiveness of this control measure for wind-generated emissions is calculated as follows. The number of acres of unpaved parking lots from the micro-scale areas is 39 acres. This acreage is multiplied by the low and high annual control cost per acre ($1000 and $4,300) to get the control measure cost per year. This control cost is divided by 365 to get the low and high end control cost per day. Dividing these numbers by the wind erosion emission reductions achieved (1.17 tons per day) gives the low and high end cost effectiveness from this control measure for wind erosion emissions.

	Low	High
Control Measure Cost/year	$39,000	$167,700
Control Measure Cost/day	$106.85	$459.45
Emission Reductions	1.17 TPD	1.17 TPD
Cost Effectiveness	**$91 per ton**	**$393 per ton**

The cost effectiveness of this control measure for vehicle-generated emissions is calculated as follows. The number of acres of unpaved parking lots from the micro-scale areas is 39 acres. This acreage is multiplied by the low and high annual control cost per acre ($1000 and $4,300) to get the control measure cost per year. This control cost is divided by 365 to get the low and high end control cost per day. Dividing these numbers by the vehicle-generated emission reductions achieved (0.016 tons per day) gives the low and high end cost effectiveness from this control measure for vehicle-generated emissions.

	Low	High
Control Measure Cost/year	$39,000	$167,700
Control Measure Cost/day	$106.85	$459.45
Emission Reductions	0.016 TPD	0.016 TPD
Cost Effectiveness	**$6,678 per ton**	**$28,716 per ton**

The Clark County Health District Board of Health has adopted Section 92 of the Air Quality Regulations as RACM and BACM for this emission source category.

4.5.2.3 Control Measures For Construction Activities (24-hour Standard)

4.5.2.3.1 Sources Controlled: Construction activities and related emissions.

4.5.2.3.2 Implementation Schedule: These control measures must be implemented on construction sites beginning on January 1, 2001.

4.5.2.3.3 Description of Control Strategy: Primary elements of the control measures set forth in Section 94 of the Air Quality Regulations and the companion Section 94 Handbook for Best Management Practices (BMP) are the use of site-specific and phase-specific dust control plans and activity-specific and soil-specific control measure options for each dust-generating activity. This regulatory program is designed to facilitate pre-planning for dust control and the integration of dust

Controlling Dust from Construction Activities

control activities with other work at construction sites while allowing the flexibility to employ the best and most cost-effective control measures for each specific job site. Clark County staff believes that this regulatory program provides a major advancement over other programs that have been implemented to regulate fugitive dust from construction activities and sets the BACM/Most Stringent Measure benchmark.

Section 94 of the Air Quality Regulations (Section 94) contains specific regulatory requirements, including permit requirements, stabilization requirements, administrative requirements, and performance standards. The Section 94 Handbook is a compendium of BMP that has been approved by the Clark County Board of Health for controlling dust from construction activities under varying site-specific conditions. Implementing the appropriate BMPs contained in the Section 94 Handbook will result in compliance with the rule; and the Section 94 Handbook methodologies and procedures will be the basis for enforceable dust permit conditions.

BMP for Construction Activities Developed

This regulatory program is the result of the cumulative efforts of the Advisory Committee, the Clark County Board of Health, the construction industry coalition, CCDCP staff, AQD staff, and the U. S. EPA. It represents a successful example of what can be achieved through a consensus-based regulatory development process. The Advisory Committee finalized a Request for Proposals (RFP) for review of the Clark County Health District air quality program and development of BMP for construction activities in July 1999. Proposals for this work were accepted through August 27, 1999 and the Advisory Committee recommended that the firm of Dames & Moore be retained to perform this work on September 10, 1999. The Clark County Board of Health approved this recommendation. The construction industry was interviewed by Dames & Moore and provided many insightful comments on the current regulatory program. The Advisory Committee provided assistance in the development of BMP for controlling dust. The Advisory Committee accepted the Dames & Moore reports as complete on May 5, 2000 and the

Clark County Board of Health accepted these reports on May 25, 2000. Section 94 of the Air Quality Regulations and the companion Section 94 Handbook for BMP implement the concepts and the control measures recommended in the Dames & Moore reports.

The Section 94 Regulation includes the following permit requirements for construction activities:

- Dust control permits are required for construction activities on sites of 0.25 acres or larger; or
- Trenching projects of 100 feet or greater in length; or
- Demolition of structures 1,000 square feet or larger; and
- A dust control permit and a site-specific dust mitigation plan is required for construction activities on sites of ten acres or more.

As noted above, a site-specific dust mitigation plan must be provided for all construction projects of ten acres or greater. For projects of less than ten acres, a site-specific dust mitigation plan is not required, but appropriate BMPs from the Section 94 Handbook must be incorporated into the permit application and approved by AQD staff. Where dust mitigation plans are submitted, the plans are subject to review and approval by AQD staff. The regulation also obligates permit holders to ensure that contractors and subcontractors abide by the conditions of the approved dust control permit and dust mitigation plan. For a further description of the dust control plan and permit requirements, see Section 6.3.3.3.

General Requirements for Construction Activities

Section 94 implements the following general requirements and standards for construction activities:

- Posting signs which advise the public who to call in the event of a dust problem and where to call to report a dust violation; and
- Employing Best Management Practices (BMP) from the Section 94 Handbook as specified in the approved dust control permit and dust mitigation plan; and

- Requiring a dust control coordinator (monitor) for construction projects having 50 acres or more of actively disturbed area; and
- Handling, transporting, or storing material in a manner that prevents dust plumes from exceeding 20 percent opacity; and
- Maintaining disturbed soil in a condition to minimize wind erosion and particulate emissions 24 hours a day, seven days a week; and
- Ceasing construction activities when wind conditions cause dust emissions to exceed 20 percent opacity; and
- Maintaining dust control until the construction site is completely stabilized by landscaping, paving, or the application and maintenance of a dust palliative or other effective long-term stabilization; and
- Notifying the AQD within ten days after completion of a construction project in order to allow the AQD to verify that stabilization requirements have been met.

Section 94 Enforcement Standards and Requirements

Section 94 contains the following enforcement standards and requirements:

- Requires a surety bond to cover the cost of the dust control measures when three or more violations occur within 180 days; and
- Establishes that non-compliance with BMP as set forth in the approved dust control permit or dust mitigation plan is a violation of the AQD's regulations; and
- Provides that a permit may be revoked or suspended when three notices of violation have been issued; and
- Establishes that generation of a dust plume extending more than 100 yards is a violation; and
- Establishes that the failure to immediately clean up mud and dirt that is tracked out onto a paved road and that extends a cumulative distance of 50 feet or more, or the failure to clean up any track out by the end of the work day, is a violation; and
- Establishes that allowing a dust plume to exceed an opacity of 20 percent is a violation; and
- Establishes that failure to maintain project soils

with adequate crusting is a violation;
- Provides that the Clark County Control Officer may, after giving due notice, take appropriate corrective action to remedy a dust problem where the owner or operator fails to do so and assess the cost to the responsible party; and
- (Proposed) Establishes that the generation of a dust plume more than 100 feet is a violation.

Section 94 also contains the following miscellaneous and administrative requirements:

Section 94 Miscellaneous and Administrative Requirements

- Construction site superintendents or designated alternatives and water truck operators are required to attend the AQD dust control class every three years; and
- Records of construction site self-inspections must be kept for one year or for a six-month period following the project's completion, whichever is longer; and
- Where chemical or organic soil stabilizers are applied, records must indicate the type of product applied, vendor name, and label instructions for approved usage; and the method, frequency, concentration, and quantity of application.

Test methods contained in Section 94 for determining compliance with the control measures and stabilization standards consist of an opacity test method and a drop ball test method. Clark County has contracted with Converse Consultants to develop and field-test improved alternative test methods for monitoring visible emissions.

Section 94 Handbook Defines Dust Control Measures for Different Construction Activities

The Section 94 Handbook of Best Management Practices for Dust Control grew out of efforts to define what control measures were appropriate for different construction activities within the Las Vegas Valley. Due to differences in soil types and the need to control water usage, a "one size fits all" approach was not considered effective and had not worked well in the past. The Section 94 Handbook provides BMPs for dust control that are activity-specific and which may be implemented on a site-specific and phase-specific basis, considering the type of soil at a particular site or location and the soils' potential to emit fugitive dust. Currently , AQD staff are working to develop dust mitigation record-keeping forms that are easy to use, yet detailed enough to demonstrate compliance with each site-specific dust mitigation plan. When finalized, these forms will be incorporated into the Section 94 Handbook. The regulatory requirements for construction activities are contained in Section 94 of the Air Quality Regulations and are described above.

Soil Types Described in Section 94 Handbook

In the Section 94 Handbook, soil types are classified into five categories (high, moderately high, moderately low, low, and slight) based on their Particulate Emission Potential (PEP). PEP is determined by soil silt content (measured by the soil percentage that will pass through a 200-mesh sieve) and optimum moisture content for compaction (measured by the percent moisture necessary to maximize compaction of the soil). The Section 94 Handbook contains a decision flow chart using these two parameters, optimum moisture content and silt content, to calculate PEP for Las Vegas soils. Maps of Clark County and Las Vegas that delineate the five PEP categories are included in the Handbook for projects where the optimum moisture content or silt content is not known. Use of site-specific geotechnical reports or preliminary soil studies are highly encouraged when developing dust mitigation plans for submittal to the AQD.

BMPs Must Be Identified for Dust Mitigation Plans

Subsections of the Section 94 Handbook list the BMP alphabetically by construction activity and then by soil PEP category. Within most construction activity categories there are multiple BMP options which may be implemented to meet the Section 94 requirements for each activity. All BMPs for each activity that will occur at a construction site must be identified in the dust mitigation plan submitted to the AQD or will be specified in the dust control permit that is issued by AQD for the construction project. Dust mitigation plans must be approved by the AQD prior to the issuance of a dust control permit. The BMP selected to meet the requirements of Section 94 must take into account the soil PEP for the area in which the construction activity will occur.

The following categories of construction activities are covered by BMP:

- Backfilling;
- Blasting – Abrasive;
- Blasting – Soil and Rock;
- Clearing and Grubbing;
- Clearing Forms;
- Crushing Operations;
- Cut and Fill Operations;
- Demolition – Implosion;
- Demolition – Mechanical/Hand;
- Disturbed Soil;
- Disturbed Land – Large Tracts;
- Dust Suppressant, Dust Palliative, and Surfactant Selection and Use;
- Importing Soil, Rock, and Other Bulk Materials;
- Landscaping;
- Paving/Subgrade Preparation;
- Screening;
- Staging Area;
- Stockpiles;
- Track Out Prevention;
- Traffic – Construction Related;
- Trenching Operations; and
- Truck Loading.

Non-Listed Control Measures May Be Proposed and Evaluated

Control measures not currently listed in the Handbook may be proposed in the dust mitigation plan. Such measures will be reviewed by the District's staff and evaluated according to the following criteria:

- The control technique is a new or alternative technology that has been shown to be of equal or greater effectiveness in meeting the requirements than the existing BMP; or
- Site logistics do not permit the implementation of the control measure as written; or
- The owner/operator demonstrates that the control measure is technically infeasible due to site-specific or material-specific conditions in that its implementation will not reduce fugitive dust emissions.

At least one of the above criteria must be met before permit deviations from specific soil category BMPs are allowed.

4.5.2.3.4 Technical Feasibility and Environmental Impacts: The regulatory approach implemented by this regulation has been utilized for controlling emissions from stationary sources for many years, but has not been applied to area-source fugitive dust emissions until now. The regulation implements site-specific permitting for large construction sites. The permitting process is designed to allow flexibility in crafting a dust control plan while ensuring that appropriate control measures are applied to all dust-producing activities associated with a construction project. Clark County believes that this regulatory approach will lead to future improvements to dust control technology in the same way that this regulatory approach has facilitated improved control technology for stationary sources.

Permitting Process Allows Flexibility in Dust Control Plan

This Approach Will Lead to Future Improvements in Dust Control

In order to facilitate rule implementation and encourage development of improved methods of dust control for construction activities, the AQD has committed to reviewing and, as appropriate, updating the Section 94 Handbook every six months.

AQD Will Update Handbook Every Six Months

All of the BMPs provided in the Section 94 Handbook have been effectively employed by the construction industry in either the Las Vegas Valley or other parts of the southwestern United States. The unique component of the Section 94 Handbook is the soil characterizations used to predict a soil's PEP category. This was developed utilizing data from 150 soil samples. Since its publication in the Dames & Moore reports, PEP categorization has been employed by the construction industry in the Las Vegas Valley and has been found by the industry to accurately reflect the potential severity of fugitive dust emissions and a soil's response to various control measures. County staff also observed the comparative dustiness of unpaved roads in the Las Vegas Valley and found that the relative dustiness of the road tracked the PEP category of the road surface.

Handbook's PEP Categories a Unique Factor

However, County staff believes that additional refinement of the PEP index would be desirable. If feasible, County staff may collaborate with the research scientists who developed the PEP concept in publishing a paper in a peer-reviewed

County Believes Additional Refinement of PEP Categories Desirable

scientific journal. In addition to getting the concept peer reviewed, and increasing our knowledge base, a journal article would facilitate the utilization of the PEP concept in other nonattainment areas.

Dust Palliative Use Will Increase in Valley

This regulation will result in the increased use of dust palliatives in the Las Vegas Valley. In addition, the regulation will require significant increases in the amount of surfactants and tackifiers that are applied during land clearing, grubbing, and earth-moving operations. The potential impacts of this increased use of dust palliatives and suppressants in the Las Vegas Valley are detailed above under the review of disturbed vacant land. As described under the SIP commitments section in this chapter, Clark County is committed to participating in the funding and coordination of research to determine the potential adverse environmental impacts from the long-term use of dust suppressant materials.

Emission Reductions Quantified for Several Categories

4.5.2.3.5 Emission Reductions: All emission reduction computations are based on the 2006 attainment year for the 24-hour NAAQS. The rule applies to the PM_{10} emission source categories, “Construction Activity Fugitive Dust” and “Windblown Construction Dust.” “Highway Construction Activity Fugitive Dust” and “Highway Construction Projects-Wind Erosion” were broken out separately from other construction activities in the Chapter 3 emission inventories for transportation conformity purposes, but have been included with the other construction activities for the purposes of this analysis. Control factors for highway-related construction activities are identical to those for other types of construction. This control measure applies to all of Clark County, so the actual reductions achieved are greater than those applicable to the Las Vegas Valley and factored into the attainment demonstration. The emission reductions, rule penetration, rule effectiveness, and overall reduction for the year 2006 are shown below.

Emission Reductions:
- Construction Activity Fugitive Dust: 87 percent
- Windblown Construction Dust: 91 percent

Rule Penetration:

- Windblown Construction Dust: 98 percent
- Construction Activity Fugitive Dust: 98 percent;

Rule Effectiveness (2006):

- Construction Activity Fugitive Dust: 80 percent
- Windblown Construction Dust: 80 percent

Overall Reduction (2006):

- Construction Activity Fugitive Dust: 68 percent
- Windblown Construction Dust: 71 percent

Applying these overall control reductions to the uncontrolled emissions from the 14,587 acres under construction in 2006 (Table E-5) provides the controlled emissions and emission reductions shown below for this source category:

- Baseline Emissions (Activity): 45.6 TPD;
- Controlled Emissions (Activity): 14.6 TPD;
- Emission Reductions (Activity): 31.0 TPD;
- Baseline Emissions (Wind): 97.5 TPD;
- Controlled Emissions (Wind): 29.4 TPD; and
- Emission Reductions (Wind): 68.1 TPD.

Costs of Controlling Dust

4.5.2.3.6 Control Measure Costs: Dames & Moore[18] found that the cost of controlling dust during grading on a 40-acre parcel with soils categorized as "Low" for PEP would typically be $1,700 per day, or $43 per acre per day. This cost is predicated on the application of 200,000 gallons of water. The water application rate and cost would double for a parcel with soils classified as "High" for PEP. Therefore, the cost per acre per day for controlling dust from grading operations ranges from $43 per acre per day to $86 per acre per day. The projected acreage of construction occurring valley-wide in 2006 is 14,587 acres as shown in Appendix E, Table E-5. However, not all of this construction acreage is active during the entire year as discussed in Appendix B. Using the average length of construction by type of construction project, the number of acres on any given

[18] Dames & Moore, *An Evaluation of Incorporating Best Management Practices into the Construction Activities Program*, document 44499-001-128, prepared for the Clark County Health District Board of Health, p. 13.

day can be calculated. The acreage under construction in 2006 is 225 acres.

Grading is the most dust-intensive phase of a construction project. Cost estimates for dust control during other phases of a construction project under this control measure have not been developed by industry and are currently not known. Once cost factors have been developed by industry for compliance, a more complete cost analysis can be completed. Because of the unavailability of cost factors for other requirements in the control measure, the cost analysis for this control measure is based on cost effectiveness per acre for control of dust from grading operations and will overestimate the compliance cost for most other types of construction activities.

The cost of enforcement to the local air agency is calculated as follows. The cost of additional AQD enforcement staffing levels for the implementation of this regulation is calculated to be $285,714.[19] The per-day enforcement cost is calculated by dividing this figure by 365, and is approximately $783.

The cost of compliance is calculated by multiplying the cost per day of control by the number of acres per day that must be controlled each day. The low and high control costs range is calculated as follows:

Low Cost: $43 x 225 acres/day = $9,675
High Cost: $80 x 225 acres/day = $19,350

Adding the cost per day of enforcement to the total low and high cost of controls gives the total cost of implementing the control measure. These low and high costs for control measure implementation are $10,458 and $20,132 respectively. Dividing the total control measure implementation cost by the emission reductions achieved by the control measure gives the cost effectiveness for the control measure.

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[19] The estimated cost for enforcing Section 94 is based on the assumption that 33 percent of the new enforcement cost will be allocated to enforcing Section 94. Unaccounted administrative costs are estimated to be 10 percent of the operational cost. Therefore, Section 90 enforcement costs are calculated as follows: $780,000x0.3x1.10=$285,714

These values are set forth below:

	Low	High
Total Cost Per Day	$10,458	$20,132
Emission Reductions (Wind and Activity)	99.1	99.1
Cost Effectiveness	**$106 per ton**	**$203 per ton**

The Clark County Health District Board of Health has adopted Section 94 of the AQR as RACM and BACM for this emission source category.

4.5.2.4 Control Measures For Paved Road Dust (24-Hour Standard)

4.5.2.4.1 Sources Controlled: Paved roads

4.5.2.4.2 Implementation Schedule: The requirements of these control measures became effective on January 1, 2000.

4.5.2.4.3 Description of Control Strategy: These control measures set requirements for design standards for paved road shoulders and medians and set PM efficiency requirements for street sweeping equipment. The control measures for unpaved shoulders and street sweeping equipment are implemented under Section 93 of the AQR. The control measure for reducing track out of mud and dirt from construction sites onto paved roads is implemented under Section 94 of the AQR. The purpose of the shoulder and median design requirements is to reduce silt loading on paved road travel lane surfaces from mud and dirt track on. The U. S. EPA Fugitive Dust BACM guidance document[20] suggests that other benefits from shoulder or curb improvements are reductions in the transfer of dust from exposed road shoulders to road surfaces by vehicle turbulence, wind erosion, and water erosion. An authoritative peer-reviewed study conducted by the Desert Research Institute in Merced County, California, found that the actual entrainment occurring from vehicle wakes was limited and was only measurable from large

Paved Road Dust Control Measures

[20] *Fugitive Dust Background Document*, supra, p 3-11

vehicles traveling at 50 to 60 mph.[21] The primary emphasis of these paved road design standards is, therefore, prevention of mud and dirt track out on to the travel lanes of paved road surfaces.

Medians, Curbs Paved or Stabilized

The regulation requires paving or stabilization of four-foot shoulders beyond the travel lane or the installation of curbs adjacent to the paved section of road. The regulation also requires that medians be paved or stabilized, or be constructed with curbing. Most medians constructed in the Las Vegas Valley already comply with this standard. The regulation provides that medians located in limited access freeway rights-of-way that exceed 5,000 square feet are subject to the provisions of Section 90 (Disturbed Open Areas) in lieu of Section 93.

Preventative Control Measures for Unpaved Shoulders

Preventative control measures for preventing the track out of mud and dirt from unpaved shoulders consist of the following minimum design standards for paved roads:

- Constructing paved shoulders with a minimum width of four feet adjacent to the paved travel lane; or
- (Proposed) Constructing paved road shoulders with a minimum width of eight feet adjacent to travel lanes on new roads with 3,000 ADT or greater; or
- Applying and maintaining dust palliatives for a minimum width of four feet adjacent to the travel lane; or
- Constructing curbing adjacent to the paved travel lane; or
- Constructing paved median for paved roads.

Preventative Control Measures for Unpaved Medians

Preventative control measures for preventing the track out of mud and dirt from unpaved medians consist of the following minimum design standards for paved roads:

- Construct medians with paving; or

[21] Watson, J.G., et. al., *Effectiveness Demonstration of Fugitive Dust Control Methods for Public Unpaved Roads and Unpaved Shoulders of Paved Roads*, DRI Document No. 685-5200.1F1, Desert Research Institute, Reno, Nevada, p 9-2

- Apply and maintain dust palliatives; or
- Construct curbing on the median adjacent to the traffic lane.

Stabilization standards for dust palliative applications consist of the following:

- Complying with a 20 percent opacity requirement; and
- Maintaining silt loading of no more than 0.33 ounces per square foot.

Test methods for determining compliance with the stabilization standards include an opacity test method and a silt content test method.

Section 93 of the AQR sets standards that must be incorporated into any new or modified sections of paved roads during construction. In addition, the public agencies having jurisdiction over public roads in the nonattainment area have committed to developing a plan by February 15, 2002 for upgrading all existing roads to meet the requirements of Section 93 by December 31, 2006. Based on this commitment, it is assumed that all paved roads in the Las Vegas Valley will be in compliance with the Section 93 standards by 2006. In the event a road is discovered that does not meet the requirements of Section 93 and is not included in an agency's plan, then the road must be brought into compliance with the AQR Section 93 requirements within 365 days following the issuance of a corrective action order. If a road is included in an agency's plan but is not scheduled for improvement in a timely fashion, AQD will work with the agency to reprioritize the road.

Public works agencies will ensure the stabilization of the existing inventory of unpaved shoulders of paved road by the end of 2006. Plans will be developed through the following process.

1. Each entity will identify the roadways that have a paved section less than 28', which is the minimal acceptable width for two travel lanes and two four-foot paved shoulders.

2. Once the inventory is complete, the entities will then compare the inventory to their capital improvement program and developer agreements to determine which of the roadways will be brought up to the minimal acceptable width standard or full improvement standards over the next six years.

Paved Road Unstabilized Shoulders Will Be Done by 2006

3. For those roadways that are not to be improved over the next five years, a schedule will be developed for bringing them up to appropriate local standards by the end of 2006. The acceptable standard will be at a minimum either a 28' or 32' paved section. As part of the inventory effort, car counts on the roadways and silt loading measurements of the paved travel lane will be taken on all candidate roadways to determine their contribution to the inventory of PM_{10} attributable to unstabilized shoulders.

The SIP commitment to stabilize unpaved shoulders is described in Section 4.8.3.2.

Certified PM-Efficient Street Sweepers To Be Used for Paved Areas

This regulation also mandates the purchase or leasing of certified PM_{10}-efficient street sweepers for sweeping of paved roads or paved parking lots after January 1, 2001. This requirement applies to both public and private operators of street sweeping equipment. The regulation references South Coast Air Quality Management District (SCAQMD) Rule 1186 certification requirements and the SCAQMD certified equipment list. The urban streets in Clark County are swept on the average of every two weeks. Rural streets are swept somewhat less frequently. Further details on street sweeping frequency are provided in Appendix J and Section 6.3.4.4.

Clark County, the Nevada Department of Transportation, and the cities of Las Vegas, North Las Vegas, and Henderson currently operate a combined total of 72 street sweepers in the Las Vegas metropolitan area. When agencies reviewed their equipment inventories, it was found that most of the equipment already in use was in compliance with this regulation. Equipment lists are provided in Appendix J. Therefore, Clark County has not calculated emission reductions from this control measure for the attainment demonstration.

Clark County has developed an extensive flood control system to minimize property damage and the deposition of materials on roadways caused by storm events. As noted in Chapter 2, precipitation is limited in the Las Vegas Valley, averaging only 4.13 inches per year. However, annual rainfall can vary substantially from year to year and from rainfall event to rainfall event. In general, rainfall events are infrequent but may result in intense precipitation. As a result, the infrastructure for handling storm water is necessarily robust to the extent that minor storms do not generally result in significant off-site deposition of material. The flood control program for the area is directed by the Clark County Regional Flood Control District. The District was created in 1986 and was charged with the responsibility of developing and implementing a comprehensive flood control master plan to alleviate flooding in Clark County. Funding has been provided through voter-approved sales taxes and General Obligation Flood Control Bonds. Since 1987 the District has funded projects totaling over $600 million. Completed facilities include 45 detention basins and approximately 220 miles of channels, washes, and storm drains. Additionally, there are approximately $1.1 billion in flood control facilities identified for future funding.

The natural-event action plans or policies in place in Clark County and the cities of North Las Vegas, Las Vegas, and Henderson to deal with cleanup when a major storm event does occur complement the work of the Flood Control District to reduce flood damage. The plans entail mobilization of all available equipment from unaffected areas to the event location(s) and removal of heavy silt deposits as quickly as possible. Since completion of the flood control system to handle a 100-year storm is years out (pending additional $1.1 billion in funding), there is still the possibility of widespread erosion and deposition from a major storm. The entity plans require quick response and focus maximum resources on the rapid clean up of roadways. These programs are documented in Appendix J.

4.5.2.4.4 Technical Feasibility and Environmental Impacts: Paved road shoulder and median requirements set forth in this regulation for public roads will be met in accordance with the standards in AQR Section 93. Public works agencies consider paving to be the most cost-effective solution to stabilization over an extended period rather than the use of dust suppressants or gravel. Dust suppressants and gravel will most likely be used by public works departments as a temporary measure. Some private operators of paved roads with low traffic volumes may elect to utilize dust suppressants to meet the requirements of this regulation. This control measure will therefore not significantly increase the use of dust suppressants.

Paving Most Cost-Effective Method for Stabilization of Dust

City and county paved road development standards in the Las Vegas Valley already comply with or exceed the design standards set forth in this regulation. Paved public roads are constructed to a lesser standard only when partial improvements are approved for a development project as an interim measure pending additional development in an area. Where road medians are to be incorporated into the final road design, they are almost always paved or curbed, even when partial improvements are authorized.

Sweeper Requirements

The sweeper requirements set forth in this regulation have been implemented by the SCAQMD. Initially, public works agencies expressed concern that no exemptions were included in the regulation to allow for the purchase of broom-type sweepers. The agencies noted that broom sweepers are needed for cleanup of heavy debris deposits after flood events and for certain other task which vacuum-type sweepers cannot perform. A review of the updated SCAQMD-certified street sweeping equipment list indicated that broom sweepers, including models utilized by local agencies, are now certified as PM_{10}-efficient, eliminating this concern. Therefore, it is now technically feasible for an agency's entire sweeper fleet to be certified as PM_{10}-efficient.

4.5.2.4.5 Emission Reductions: All emission reduction computations are based on the 2006 attainment year for the 24-hour NAAQS. Because a very large proportion of the existing fleet of publicly owned and operated street-sweeping equipment in Clark County complies with this regulation, no emission reductions have been taken that would otherwise be achieved through the PM_{10}-efficient sweeper requirements. The emission reductions from this control measure are reflected in the emission inventory baseline. This control measure also applies to private operators of sweeping equipment. The impact of this regulation on these privately owned sweeping fleets is not known, but is likely to be insignificant, and was not factored into this attainment demonstration.

Sweeper Fleets Not Factored In

Entrained/re-entrained fugitive dust emissions from paved roads are dependent on silt loadings deposited on all classes of paved roads from all sources and Vehicle Miles Traveled (VMT) on these roads. Reductions in silt loadings do not result in linear percentage reductions of PM_{10} emissions. Because PM_{10} emissions generated from paved roads are dependent on both silt loadings and VMT for each roadway type, emission reductions must be computed separately by VMT and silt loading for each road class. These computations are detailed in Appendix B. Emission reductions that occur due to the reductions in silt loadings from these control measures must likewise be calculated separately by VMT and road type. Standard emission reductions, rule penetration, rule effectiveness, and overall reduction percentages therefore cannot be applied to these reductions in the standard form. Emission reduction calculations for entrained/re-entrained road dust are detailed in Appendix L.

Paved Road Dust Emissions Dependent on Silt Loading and VMT

The controlled and uncontrolled entrained/re-entrained fugitive dust emission for paved roads from the 2006 valley-wide 24-hour emission inventory taken from Chapter 5 are as follows:

- Baseline Emissions: 161.70 TPD;
- Controlled Emissions: 114.86 TPD; and
- Emission Reductions: 46.84 TPD.

These emission reductions include reductions from silt loading from all control measures except street sweeping, including reduced deposition from other sources, improving unstabilized shoulders, and reduced track out from construction activities.

Reduced deposition of particulate matter onto paved roads occurs from control measures applied to disturbed open areas, construction activities, and unpaved roads. This reduced deposition onto paved roads results in lower paved road silt loadings which in turn results in lower entrained/re-entrained PM_{10} emissions from the paved roads. The weighted composite of the emission reductions from disturbed open areas, construction activities, and unpaved roads is an approximate overall reduction of 75 percent. If the silt loading value is reduced by 75 percent in proportion to emission reductions from other sources, then factoring the reduced silt loading values into the paved roads emission equation would yield an approximate reduction of 60 percent in paved road emissions. However, a linear relationship between local fugitive dust source emissions and silt loading has not been established. Clark County has therefore estimated the reductions from roadway silt loadings gained from the reduced fugitive emissions from other sources to be 30 percent. This estimate is based on the professional judgment of the CCDCP air planning staff observing local conditions and is documented in Appendix L. Staff believes that the actual reductions are likely to be greater, but that this conservative estimate is warranted due to the lack of empirical data. The total PM_{10} emission reductions from paved roads that are gained from reduced emissions from open areas, construction activities, and unpaved roads are detailed in Appendix L, Table L-15 and summarized below:

Reduced PM_{10} Emissions from Paved Road Dust Not Linearly Related to Silt Loading Reduction

- Baseline Emissions: 122.58 TPD;
- Controlled Emissions: 97.92 TPD; and
- Emission Reductions: 24.66 TPD.

Note that these reductions do not include reductions from improving unpaved shoulders or reducing track out from construction activities.

Four roadway categories in Clark County contain road segments without improved shoulders. Based on the Dames & Moore Silt Loading Measurements study,[22] it was determined that the silt loadings for roadways

[22] Dames & Moore, *Silt Loading Measurements for Clark County Paved Roads*, document 44429-001-131, prepared for the Clark County Regional Transportation Commission, March 16, 2000

without improved shoulders are 1.34 g/m^2 for major and minor arterials and 24.7 g/m^2 for collectors and local roadways. The respective silt loadings from Table B-15 for these roadways with improved shoulders are 1.04 g/m^2 for minor arterials, 0.49 g/m^2 for major arterials, 0.86 g/m^3 for collectors, and 1.70 g/m^3 for local streets.

As paved road shoulders are improved and silt loadings decline, it is necessary to reapportion VMT from the higher silt loading values to the lower silt loading values in computing emissions. Section 93 rule effectiveness and rule penetration were estimated at 95 percent for the improvement of existing unpaved shoulders. Therefore, 90 percent of roadways that currently do not have improved shoulders would have improved shoulders in 2006. The total paved road dust emissions from this category would therefore be calculated with 90 percent of the daily VMT traveling on roadways with improvements and ten percent traveling on roadways without improved shoulders. These emissions are detailed in Appendix L, Table L-16, and summarized below:

- Uncontrolled Emissions
  -No Shoulders Improved: 37.96 TPD;
- Potentially Controlled Emissions
  -All Shoulders Improved: 13.63 TPD;
- Actual Controlled Emissions
  -90 percent of Shoulders Improved: 16.04 TPD; and
- Emission Reductions: 21.92 TPD.

Actual controlled emissions are calculated from the uncontrolled emissions and potentially controlled emissions as follows:

Total Emissions = 0.9(13.63 tons) + 0.1(37.96 tons)
= 16.04 (tons per day).

4.5.2.4.6 Control Measure Cost: The cost of compliance with this control measure will vary depending on the control measure approach utilized, but is estimated as follows:

- Cost Per Mile Per Year Using Paving:
  $2,500 to $25,000;

- Cost Per Mile Per Day Using Paving:
  $6.85 to $68.49;
- Cost Per Mile Per Year Using Dust Palliatives:
  $1,100 to $3,200;
- Cost Per Mile Per Day Using Dust Palliatives:
  $3.01 to $8.77;
- Miles of Shoulder Improvements:
  444 miles.

Paved Road Control Costs

Low end and high end costs of compliance are estimated by multiplying the estimated cost of shoulder improvements by the number of miles of shoulder improvements required. These shoulder improvements will be constructed under public works improvement plans and the cost of enforcement is expected to be minor. Enforcement cost has therefore not been included in the total cost for implementation of this control measure.

	Low	High
Total Cost per Day	$1,336.44	$30,409.56
Emission Reductions	21.92 TPD	21.92 TPD
Cost Effectiveness	**$61 per ton**	**$1,387 per ton**

The Clark County Health District Board of Health has adopted Section 93 and Section 94 of the AQR as RACM and BACM for this emission source category.

<u>4.5.2.5 Control Measures For Unpaved Road Dust (24-hour Standard)</u>

4.5.2.5.1 Sources Controlled: All publicly and privately owned unpaved roads, including unpaved alleys, unpaved easement roads, and unpaved access roads.

4.5.2.5.2 Implementation Schedule: The requirements of this regulation became effective on June 22, 2000 for the construction of new publicly owned and maintained and privately owned unpaved roads. Owners and/or operators of existing unpaved roads having vehicular traffic of 150 vehicle trips or more per day are required to apply control measures to one-third of the total road miles by June 1, 2001; apply control measures to two-thirds of the total road miles by June 1, 2002; and apply control measures to all unpaved roads having vehicular traffic of 150 vehicle miles or more per day by June 1, 2003.

Unpaved Road Control Measures

4.5.2.5.3 Description of Control Strategy: This regulation requires the implementation of controls for preventing fugitive dust emissions for unpaved roads. Control measures applicable to unpaved roads consist of the following:

- Paving; or
- Applying and maintaining dust palliatives; or
- Applying and maintaining alternative controls approved by U. S. EPA.

In addition, the regulation does not allow the construction of unpaved roads in public thoroughfares after June 22, 2000, unless the unpaved road is an interim component of an active paving project.

Stabilization standards include the following:

- Compliance with a 20 percent opacity requirement; <u>and</u>
- Maintenance of a silt loading of no more than 0.33 ounces per square foot; or
- Maintenance of silt content of no greater than 6 percent.

Test methods for determining compliance with the control measures and stabilization standards include an opacity test method and a silt content test method.

It is estimated that approximately 64 miles of the 259-mile total base year inventory of publicly owned and maintained unpaved roads have 150 or more trips per day. However, this estimate is based on current traffic counts and the actual vehicle travel may be subject to seasonal variation. In order to comply with this regulatory program, Clark County and the cities of Las Vegas, North Las Vegas, and Henderson have obligated Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds (including local match) over the next three years to pave publicly

Entities Have Obligated CMAQ Funds To Pave Publicly Owned Unpaved Roads

owned unpaved roads. The entities settled upon paving as the most cost-effective method of addressing the PM_{10} emissions resulting from the publicly owned and maintained roadways. Even though this is the most expensive alternative, it has the lowest maintenance cost, and will provide for longer life facilities. This funding commitment will ensure the public agencies can comply with the regulation.

It is the intention of the respective public agencies to pave all roads with average vehicle trips of 150 or more per day. As part of either the development of the bid package, or as part of the construction agreement, 24-hour car counts will be obtained on each segment to be paved. During construction, silt-loading tests will be obtained for each segment. Each entity is in the process of determining the ownership of the unpaved roadways. As these are determined, they will be placed in the database described below, and these will become the basis of the bid packages.

Clark County is in the process of preparing an extranet website that will contain information on the roads that have been designated as publicly owned and maintained which local governments will be paving. The inventory of unpaved roads was developed by the respective public works departments after extensive review of the existing roadway network. Information on the website will be available to all governmental agencies at the local, regional, state, and federal level. The SIP commitment for unpaved roads is described in Section 4.8.3.

Inventory of Privately Owned Unpaved Roads Show None with Greater than 50 VMT

The miles of privately owned unpaved roads have not been inventoried in detail, but public works staff from Clark County and the cities of Las Vegas, North Las Vegas, and Henderson have found a total of 45 miles of privately owned unpaved roads in the nonattainment area. Of these, 40.5 miles are located in the BLM Disposal Boundary area. None of these privately owned unpaved roads had traffic volumes greater than 50 ADT. As set forth under the commitments section of this chapter, Clark County is committing to develop an improved inventory of these privately owned unpaved roads.

4.5.2.5.4 Technical Feasibility and Environmental Impacts: The control measures and stabilization criteria required under this regulation have been implemented in Maricopa County, Arizona except that the Maricopa County regulation allows the use of gravel as a control measure. Although gravel is listed as a control measure for unpaved roads in the Fugitive Dust Technical Information Document,[23] experience in Clark County has shown that this control measure is not effective in the Las Vegas Valley. Both Clark County and Maricopa County use similar activity thresholds for unpaved roads, except that the Maricopa Rule only applies to publicly owned unpaved roads. Both areas also have programs in place that will result in the paving of some unpaved roads with less than 150 ADT.

Gravel Not Effective in Clark County

A concern of public works agencies during the development of this program was that if the time frame for implementing this control measure was shortened to one or two years, then funding would not be available to implement the program. Costs could also escalate significantly, making acquisition of sufficient funding even more difficult. Costs would be expected to increase significantly under an accelerated program because of the limited number of contractors in the region performing this class of work. The time lines and requirements of the adopted regulatory program are not expected to significantly inflate road paving costs.

Cost Issues

Because public agencies are planning to comply with the provisions of this regulation by paving, this regulation is not expected to significantly increase the use of dust suppressant products. Incidental drainage improvements constructed with the road improvements mandated under this regulation will help to address silt loading on paved roads and storm water runoff issues.

4.5.2.5.5 Emission Reductions: The rule applies to the PM_{10} emission source category "unpaved road dust" with a total of 55.11 TPD of PM_{10} emissions coming

[23] *Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures*, EPA-450/2-92-004; U. S. Environmental Protection Agency; Research Triangle Park, 1992; pp 3-15, 3-16

from 259 miles of unpaved roads in 2006. However, 66 percent of these emissions come from 64 miles of unpaved roads having vehicle travel of 150 or more trips per day. This source category contributes approximately 13.95 percent of the total valley-wide PM_{10} emissions.

Unpaved Roads Emission Reductions

Paving as a control measure is calculated to provide a 99 percent emission reduction. The rule penetration for this control measure, based on the 150 or more vehicle trips per day action threshold, is:

- Rule Penetration-2001 (1/3 of all roads paved): 22 percent;
- Rule Penetration-2002 (2/3 of all roads paved): 44 percent; and
- Rule Penetration-2003 (all roads paved): 66 percent.

This regulation will primarily apply to public agencies. None of the privately owned unpaved roads currently inventoried meet the 150 ADT threshold. Public works agencies are developing a compliance program that is subject to public review and that will allow government agencies to track program progress through the extranet. Progress reports must also be submitted to the AQD on an annual basis. The rule effectiveness of this measure is projected to be 99 percent, due to the strength of the commitment, its financial backing, and the priority the agencies are giving to compliance. The overall control reduction for this source category is 65 percent.

Emission reductions from the 2006 24-hour inventory are shown below:

- Baseline Emissions: 55.11 TPD;
- Controlled Emissions: 19.50 TPD; and
- Emission Reductions: 35.61 TPD.

4.5.2.5.6 Control Measure Costs: The following control measure cost and assumptions were utilized in developing cost effectiveness estimates:

- Paving Cost[24] - Per mile per year $50,000;

[24] Per year cost calculated assuming a five-year life span for paved roads.

- Paving Cost[25] - Per mile per day: $137;
- Annual Cost of Enforcement: $25,740; and
- Daily Cost of Enforcement: $70.

The number of miles of unpaved roads that are subject to this control measure is estimated to be 64 miles in the valley-wide emission inventory. Applying the control cost of $137 per day to this road mileage results in total paving cost of $8,768 per day.

Unpaved Roads Control Costs

The public cost of enforcement must be included when calculating control measure cost effectiveness. As noted in the discussion of commitments for additional AQD enforcement staffing levels in this chapter, the total cost of this expanded effort for Sections 90 through 94, excluding certain administrative costs, is $780,000.[26] Adjusting for administrative cost, it is estimated that the total enforcement cost attributed to this regulation will be $25,740.[27] Dividing this amount by 365 yields the daily cost of enforcement ($70 per day). Adding the cost per day of paving and cost per day of enforcement yields the total cost per day of implementing this control measure.

Dividing the total cost per day of control measure implementation by the emission reductions achieved per day by the control measure yields the cost effectiveness for this control measure.

	Paving
Total Cost per Day	$8,838
Emission Reductions	35.61 TPD
Cost Effectiveness	**$248 per ton**

Although this cost effectiveness value is favorable, several issues make acceleration or expansion of this

[25] Per day cost calculated by dividing per year cost by 365.
[26] Naylor, M.H., *Workplan for PM_{10} Resources Commitment*, Prepared for Clark County Health District Board of Health, July 11, 2000.
[27] The estimated cost for enforcing Section 91 is based on the assumption that 3 percent of the new enforcement cost will be allocated to Section 91. Unaccounted administrative costs are estimated to be 10 percent of the operational cost. Therefore, Section 91 enforcement costs are calculated as follows: $780,000x0.03x1.10=$25,740.

program infeasible. These costs are predicated on the use of all CMAQ funding not allocated to other proposals in the Las Vegas Valley over the next three years, and do not include interest costs that would be incurred if the program were expanded beyond what can be financed with CMAQ funding.

Expansion of this Program Is Infeasible Beyond Current Commitment

The Clark County Health District Board of Health has adopted Section 91 of the Air Quality Regulations as RACM and BACM for this source category.

<u>4.5.2.6 Control Measures For Race Tracks (24-Hour Standard)</u>

4.5.2.6.1 Sources Controlled: Dirt race tracks on publicly and privately owned disturbed open areas and vacant lots.

4.5.2.6.2 Implementation Schedule: All requirements become effective on January 1, 2001.

4.5.2.6.3 Description of Control Strategy: This control measure is implemented through Section 90 of the Air Quality Regulations. This regulation requires the implementation of controls for preventing fugitive dust emissions from disturbed open areas and vacant lots with a cumulative disturbed area larger than 5,000 square feet. Although the regulation does not specifically prohibit dirt race tracks per se, it is not possible to allow operation of off-road vehicles, including “dirt bikes” and “all terrain vehicles” (ATVs) on open areas and vacant lots and remain in compliance with the regulation.

Dirt Race Track Control Measures

Where motor vehicle trespass is occurring on open areas and vacant lots greater than 5,000 square feet, regardless of the amount of cumulative disturbed surface area, owners must take steps to prevent trespass and stabilize the surface. Where greater than 5,000 square feet of cumulatively disturbed surface exists, if owners have not implemented the latter control, they must apply dust palliative (not just water) or gravel.

Control measures applicable to disturbed areas consist of the following:

- Preventing motor vehicle access, including dirt bike and all terrain vehicle access, and stabilizing the disturbed surfaces; or
- Applying dust palliatives to disturbed surfaces; or
- Applying and maintaining a uniform surface gravel cover over the disturbed surfaces; or
- Applying and maintaining alternative control approved by U. S. EPA.

Test methods for determining compliance with the regulation's stabilization requirements consist of the following:

- Drop ball test; or
- Threshold friction velocity test; or
- Rock test method for non-erodible surface elements.

4.5.2.6.4 Technical Feasibility and Environmental Impacts: Much of the discussion under *Technical Feasibility and Environmental Impacts* in the *Control Measures For Unpaved Parking Lots (24-Hour Standard)* section is also applicable to this control measure. As noted in that discussion, the controls of choice under this regulation will generally be vehicular access controls and the application of dust suppressants. Application of dust suppressants will not be economical if off-road vehicle use is allowed to occur. To the extent that ATV use is presently occurring in the Las Vegas Valley urban area, their use will be sharply curtailed due to the associated economic cost of these activities under this regulation. Where property owners find that their property is impacted by ATV use, access restrictions will be the preferred control measure of choice.

Access Controls Preferred Control Measure

4.5.2.6.5 Emission Reductions: "Race tracks" were found to have significant impacts at the Craig Road and Green Valley micro-inventory sites. These activities occurred where ATV users identified a vacant parcel that was unfenced and unposted and placed some old tires on the site to form a "race track." The emission reduction, rule penetration, rule effectiveness, and overall reduction for this control measure are detailed in Appendix L and are shown below:

Race Track Wind Erosion

- Emission Reduction 91percent;
- Rule Penetration 99percent;
- Rule Effectiveness 80 percent;
- Overall Control Reduction 72 percent;

Race Track Vehicles

- Emission Reduction 100 percent;
- Rule Penetration 99 percent;
- Rule Effectiveness 80 percent; and
- Overall Control Reduction 79 percent.

Applying these overall control reductions to the 2006 uncontrolled emissions for this source category yields the following emission reductions:

RACE TRACKS	Uncontrolled Emissions Tons/Day	Controlled Emissions Tons/Day	Emission Reductions Tons/Day
CRAIG ROAD			
Wind Erosion	1.71	0.48	1.23
Emissions	0.72	0.15	0.57
GREEN VALLEY			
Wind Erosion	1.08	0.30	0.78
Emissions	0.18	0.04	0.14

Recreational Vehicle Use Is Sporadic and of Limited Scale

Off-road racing is sufficiently miniscule in scale as to not warrant a separate category in the valley-wide inventories. To the extent that "dirt bike" and "all terrain vehicle" use disturbs open areas and vacant parcels in the urban area, they are accounted for in the disturbed vacant land inventories. Developing a separate inventory for this source category is very difficult due to the sporadic nature of this activity, most of which occurs on property without the property owner's permission.[28]

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[28] Testimony and complaints about unauthorized off-road vehicle use were heard at a number of the workshops on disturbed vacant land and unpaved road rules. In addition, when surveying county-owned land for surface stabilization, County staff observed "dirt bike" and "all terrain vehicle" use occurring in areas where this activity was clearly not authorized.

In reviewing BLM permits for off-road racing events on BLM land, it was found that no off-road racing events were approved by BLM in the nonattainment area during the past year. Currently BLM is working to establish off-road racing courses outside the nonattainment area. Courses within the nonattainment area are permanently closed.

4.5.2.6.6 Control Measure Costs: The control measure cost discussion in the *Control Measures For Disturbed Vacant Lands (24-Hour Standard)* section is also applicable to this control measure.

4.5.3 Adopted Control Measures For The Annual NAAQS

Table 4-15 (pages 4-83 – 4-88) provides a detailed list of the specific elements of the Clark County control measures adopted or implemented to achieve attainment of the annual PM_{10} NAAQS.

4.5.3.1 Control Measures For Disturbed Vacant Lands (Annual Standard)

Disturbed Vacant Lands Control Measures

4.5.3.1.1Sources Controlled: 1) Publicly and privately owned disturbed open areas and vacant lots. 2) Weed abatement by discing and blading of open areas and vacant lots.

4.5.3.1.2 Implementation Schedule: All requirements became effective on January 1, 2001.

4.5.3.1.3 Description of Control Strategy: See *Description Of Control Strategy* discussion in *Control Measures For Disturbed Vacant Lands (24-Hour Standard)* Section 4.5.2.1.2.

4.5.3.1.4 Technical Feasibility and Environmental Impacts: See *Technical Feasibility and Environmental Impacts* discussion in *Control Measures For Disturbed Vacant Lands (24-Hour Standard)* Section 4.5.2.1.3.

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard

Source Category	BACM Control Measures	Overall Reduction Percentage with Control Measures
Area Sources		
Disturbed Vacant Lands	• Prevent Motor Vehicle Access and Stabilize Disturbed Surface {Section 90.2.1.1(a)} • Stabilize Disturbed Surface greater than 5,000 sq.ft. with Gravel or Dust Palliatives {Section 90.2.1.1(b)} • Discing or Blading areas of 5,000 square feet or larger for weed abatement, apply water both before and during operations {Section 90.2.2.1(a),(b)} • After Discing or Blading occurs, stabilize disturbed surfaces with Gravel, Water, Dust Palliatives, or Paving {Section 90.2.2.1(c)}	36% (2001) 72% (2002 +)
Unpaved Parking Lots	• Pave {Section 92.2.1.2(a)} • Apply and Maintain Dust Palliatives {Section 92.2.1.2(b)} • Apply and Maintain Dust Palliatives on Traffic Lanes and apply surface gravel to depth of two inches on Parking Areas {Section 92.2.1.2(c)} • (Proposed) Prohibition of new unpaved parking lots • (Proposed) Prohibition of dust crossing property line	Wind Erosion 36% (2001) 72% (2002+) Vehicles 24% (2001) 48% (2006)
Construction Activity Fugitive Dust	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-I) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11)	34% (2001) 68% (2003+)

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard (continued)

Source Category	**BACM-Control Measures**	**Overall Reduction Percentage with Control Measures**
Construction Activity Fugitive Dust (continued)	• 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100-yard Plume Limit {Section 94.6.8(b)} • (Proposed) 100-foot plume limit • (Proposed) Prohibition of dust crossing property line • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12) • Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17) • Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22) • (Proposed) Prohibition on use of dry rotary brushes or blower devices to clean up track out	

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Windblown Construction Dust	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-I) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100 yard Plume Limit {Section 94.6.8(b)} • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12) • Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17)	36% (2001) 71% (2002+)

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard (continued)

Source Category	BACM Control Measures	Overall Reduction Percentage with Control Measures
Windblown Construction Dust (continued)	• Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22)	
On-Road Mobile Sources		
Paved Road Dust (includes Construction Track Out)	• Pave or Stabilize four feet of Shoulders (Section 93.2.1.1) • (Proposed) Stabilize eight feet of shoulders on new roads with 3,000 ADT or greater • Pave or Stabilize Medians with solid paving across median (Section 93.2.1.4) • Use PM-Efficient Street Sweepers (Section 93.2.3.1) • Prevent mud and dirt track out with wheel shakers, or wheel washers must be employed at Construction Sites to prevent mud and dirt track out onto paved roads (Section 94 Handbook, CST 19-3 & CST 19-4) • Clean up mud and dirt track out once every 24 hours and when track out extends more than 50 feet	N/A [29]
Unpaved Road Dust	• Pave Unpaved Roads With Traffic ≥ 150 ADT {Section 91.2.1.3(a)}; or • Apply and Maintain Dust Palliatives to Unpaved Roads With Traffic ≥ 150 ADT {Section 91.2.1.3(b)}	Paving Phase-In (2001) – 22% (2002) – 44% (2003+) – 65%
Highway Construction Project Activities	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-l) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12) • Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9)	34% (2001) 63% (2003 +)

[29] No emission reductions taken for PM-Efficient Street Sweepers. Because there is not a linear relationship between silt loading and emission rates, the actual emission reductions will vary with the roadway mix in each inventory area.

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Highway Construction Project Activities (continued)	• Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100 yard Plume Limit {Section 94.6.8(b)} • (Proposed) 100-foot plume limit • (Proposed) Prohibition of dust crossing property line • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12) • Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17) • Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22) • (Proposed) Prohibition on use of dry rotary brushes or blower devices for clean up of track out • (Proposed) Acquire only vacuum type chip seal equipment	
Highway Construction Project-Wind Erosion	• Apply Dust Suppressant (water) throughout construction site to stabilize soil (Section 94 Handbook, CST 10-I) • Apply Dust Palliative on soils based on soil type (Section 94 Handbook, CST 12)	36% (2001) 71% (2002 +)

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Highway Construction Project-Wind Erosion (continued)	• Traffic Control in Construction Area (Section 94 Handbook, CST 10-2, CST 20-1, CST 19 Requirements & CST19-7) • Use tarps or other suitable enclosures on haul truck (Section 94 Handbook, CST 13-1) • Stabilize surface with materials that will prevent track out of mud and dirt to the Paved section, with wheel shakers, wheel washers {Section 94 Handbook, CST 19-3, 19-4 and Section 94.6.8.(c)} • Permits Required for Construction Activities (Section 94.4.1) • Public Information Signage Required (Section 94.4.5) • Site-Specific Dust Mitigation Plan Required for Projects of ten acres or greater in size (Section 94.4.9) • Dust Control Monitor Required for Construction Activity having 50 acres or more of actively Disturbed Soil (Section 94.4.11) • 20% Opacity Limit on Dust Emissions {Section 94.5.2 & 94.6.8(d)} • 100 yard Plume Limit {Section 94.6.8(b)} • Controls Required on site at all times, whether or not Construction Activity is occurring (Section 94.5.3) • Backfilling (Section 94 Handbook, CST 1) • Blasting – Abrasive (Section 94 Handbook, CST 2) • Blasting – Soil and Rock (Section 94 Handbook, CST 3) • Clearing and Grubbing (Section 94 Handbook, CST 4) • Clearing Forms (Section 94 Handbook, CST 5) • Crushing (Section 94 Handbook, CST 6) • Cut and Fill (Section 94 Handbook, CST 7) • Demolitions – Implosion (Section 94 Handbook, CST 8) • Demolitions – Mechanical/Manual (Section 94 Handbook, CST 9) • Disturbed Land Large Tracts (Section 94 Handbook, CST 11) • Dust Suppressant, Dust Palliative, and Surfactant Selection and Use (Section 94 Handbook, CST 12) • Landscaping (Section 94 Handbook, CST 14) • Paving/Subgrade Preparation (Section 94 Handbook, CST 15) • Screening (Section 94 Handbook, CST 16) • Staging Areas (Section 94 Handbook, CST 17)	

Table 4-15

Significant PM_{10} Sources Control Measures-Annual Standard (continued)

Source Category	BACM-Control Measures	Overall Reduction Percentage with Control Measures
Highway Construction Project-Wind Erosion (continued)	• Stockpiles (Section 94 Handbook, CST 18) • Traffic – Construction Related (Section 94 Handbook, CST 20) • Trenching (Section 94 Handbook, CST 21) • Truck Loading (Section 94 Handbook, CST 22)	

4.5.3.1.5 Emission Reductions: All emission reduction computations are based on the 2001 attainment year for the annual NAAQS. The control measure applies to the PM_{10} emission source category "Disturbed Vacant Lands/Unpaved Parking Lots" with a total of 48,500 TPY of uncontrolled PM_{10} emissions coming from 2,430 acres of disturbed vacant land. Control measures and emission reductions for unpaved parking lots are addressed under the unpaved parking lots section. The emission reduction, rule penetration, rule effectiveness, and overall reduction for this control measure are detailed in Appendix L and are shown below:

- Emission Reduction 91 percent;
- Rule Penetration 99 percent;
- Rule Effectiveness 40 percent; and
- Overall Control Reduction 36 percent.

Applying these overall control reduction to the 2001 emissions for this source category yields the following emission reductions:

Emission Reductions from Disturbed Vacant Land

- Baseline Emissions: 33,100 TPY
- Controlled Emissions: 21,184 TPY
- Emission Reductions: 11,916 TPY

4.5.3.1.6 Control Measure Costs: A range of costs has been calculated for this regulation due to the following factors:

- The rule allows a number of alternative control options that may differ widely in cost;
- The cost for a given option may vary considerably with the size of area to be treated and onsite impacts such as vehicular traffic; and
- Specific site conditions such as soil type may significantly impact costs.

The following control measure costs and assumptions were utilized in developing cost effectiveness estimates:

Disturbed Vacant Land Control Costs

- Fencing Cost[30] –Acre per year (based on cost of renting fencing) $2,000;
- Stabilization Cost[31] – Acre per application: $500 to $1,500;
- Number of Applications per year: one to three (assume less expensive material will need to be applied more frequently);
- Cost Range per acre per year: $500 to $2,000; and
- Cost of Enforcement: $540,540.

Public cost of enforcement must also be considered when calculating control measure cost effectiveness. As noted in the discussion of commitments for additional Air Quality Division (AQD) enforcement staffing levels in this chapter, the total cost per year of this expanded effort, with the exception of certain administrative costs, is $780,000.[32] Adjusting for the administrative cost and assuming 63 percent of the enhanced enforcement effort will be applied to disturbed vacant lands, it is estimated that the total enforcement cost per year

[30] Memorandum #08-00 to Clark County Health District Board of Health, May 25, 2000
[31] Ibid.
[32] Naylor, M.H., *Workplan for PM_{10} Resources Commitment*, Prepared for Clark County Health District Board of Health, July 11, 2000.

attributed to this control measure will be $540,540.[33] The number of acres of disturbed open areas or vacant lots that are subject to these control measures is estimated to be 12,766 acres[34] in the 2001 annual valley-wide emission inventory (Appendix E, Table E-9). This acreage is multiplied by the low and high cost per acre ($500 and $2,000) to calculate the control measure cost per year. Enforcement cost per year is added to the low end and high end control cost to calculate the total control cost per year. Dividing these numbers by the emission reductions (11,916 TPY) yields the cost effectiveness for this control measure.

Therefore, applying the above control cost to the acreage subject to the control measure on the per-day basis yields the following cost factors.

	Low	High
Control Measure Cost/Year	$6,383,000	$25,532,000
Enforcement Cost/Year	$540,540	$540,540
Total Control Cost/Year	$6,923,540	$26,072,540
Cost Effectiveness	**$581 per ton**	**$2,188 per ton**

The Clark County Health District Board of Health has adopted Section 90 of the Air Quality Regulations as RACM and BACM for this emission source category.

<u>4.5.3.2 Control Measures For Unpaved Parking Lots (Annual Standard)</u>

4.5.3.2.1 Sources Controlled: Unpaved parking lots.

4.5.3.2.2 Implementation Schedule: Control measures must be applied to new parking lots constructed after June 22, 2000. Control measures must be applied to existing parking lots by July 1, 2001.

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[33] The estimated cost for enforcing Section 90 is based on the assumption that 63 percent of the new enforcement cost will be allocated to Section 90. Unaccounted administrative costs are estimated to be ten percent of the operational cost. Therefore, Section 90 enforcement costs are calculated as follows: $780,000x0.63x1.10=$540,540

[34] This acreage includes unpaved parking lots.

4.5.3.2.3 Description of Control Strategy: See *Description Of Control Strategy* discussion in *Control Measures For Unpaved Parking Lots (24-Hour Standard)* Section 4.5.2.2.3.

4.5.3.2.4 Technical Feasibility and Environmental Impacts: See *Technical Feasibility and Environmental Impacts* discussion in *Control Measures For Unpaved Parking Lots (24-Hour Standard)* Section 4.5.2.2.4.

4.5.3.2.5 Emission Reductions: Because the extent of unpaved parking lots affected by this regulation has not been determined on a valley-wide basis, emission reductions from this regulation were calculated using acreage of unpaved parking from the two "worst case" micro-scale areas that contained unpaved parking. A total of 21 acres of unpaved parking was found in the Pittman micro-scale area and 18 acres of unpaved parking was found in the Craig Road micro-scale area. The emission reductions, rule penetration, rule effectiveness, and overall reduction are detailed in Appendix L and shown below for the year 2001:

Unpaved Parking Lots Control Measures

- Emission Reductions-Wind: 91 percent;
- Emission Reductions-Vehicle: 60 percent;
- Rule Penetration-Wind: 99 percent;
- Rule Penetration-Vehicle: 100 percent;
- Rule Effectiveness-Wind: 40 percent;
- Rule Effectiveness-Vehicle 40 percent;
- Overall Reduction-Wind: 36 percent; and
- Overall Reduction-Vehicle: 24 percent.

The uncontrolled baseline emissions, controlled emissions, and emission reductions for wind and vehicle emissions from the 39 acres of unpaved parking are listed below. Emissions from the two micro-scale sites were calculated on a daily basis for the design day; therefore, the emissions have been "annualized" by multiplying by 365. These emission estimates are assumed to overestimate emissions from this source category.

- Baseline Emissions (Wind): 591.3 TPY
- Controlled Emissions (Wind): 378.4 TPY
- Emission Reductions (Wind): 212.9 TPY

- Baseline Emissions (Vehicle): 12.41 TPY
- Controlled Emissions (Vehicle): 9.41 TPY
- Emission Reductions (Vehicle): 2.99 TPY

4.5.3.2.6 Control Measure Costs: A range of costs has been calculated for this control measure due to the following factors:

- The rule allows several alternative control options that may differ significantly in cost;
- The cost for a given option may vary considerably with the size, frequency of use, and intensity of use of the parking lot to be treated; and
- Specific site conditions, such as soil type, may significantly impact costs.

The following control measure costs and assumptions were utilized in developing cost-effectiveness estimates:

- Annual Control Measure Cost (Paving): $1,722 to $4,300;
- Annual Control Measure Cost (Dust Palliatives): $1,000 to $2,000; and
- Annual Control Cost Range: $1,000 to $4,300.

Emission Reductions from Unpaved Parking Lots

The public cost of enforcing the requirements for unpaved parking lots cannot be accurately separated from the cost of compliance enforcement of disturbed open areas and vacant land, but are expected to be a relatively small part of the $540,540 annual enforcement cost for this source category. The public cost of compliance enforcement is not considered in this cost assessment for unpaved parking lots.

The cost effectiveness of this control measure for wind-generated emissions is calculated as follows. The number of acres of unpaved parking lots from the micro-scale areas is 39 acres. This acreage is multiplied by the low and high annual control cost per acre ($1000 and $4,300) to get the control measure cost per year. Dividing these numbers by the wind erosion emission reductions achieved (212.9 tons per year) gives the low and high end cost effectiveness from this control measure for wind- generated emissions from unpaved parking lots.

	Low	High
Control Measure Cost/Year	$39,000	$167,700
Emission Reductions	212.9 TPY	212.9 TPY
Cost Effectiveness	**$183 per ton**	**$788 per ton**

Cost Effectiveness for Unpaved Parking Lots

The cost effectiveness of this control measure for vehicle-generated emissions is calculated as follows. The number of acres of unpaved parking lots from the micro-scale areas is 39 acres. This acreage is multiplied by the low and high annual control cost per acre ($1000 and $4,300) to get the control measure cost per year. Dividing these numbers by the vehicle-generated emission reductions achieved (2.99 tons per year) gives the low and high end cost effectiveness from this control measure for vehicle-generated emissions.

	Low	High
Control Measure Cost/Year	$39,000	$167,700
Emission Reductions	2.99 TPY	2.99 TPY
Cost Effectiveness	**$13,044 per ton**	**$56,087 per ton**

The Clark County Health District Board of Health has adopted Section 92 of the Air Quality Regulations as RACM and BACM for this emission source category.

4.5.3.3 Control Measures For Construction Activities (Annual Standard)

4.5.3.3.1 Sources Controlled: Construction activities and related emissions.

Construction Activities Control Measures

4.5.3.3.2 Implementation Schedule: These control measures must be implemented on construction sites beginning on January 1, 2001.

4.5.3.3.3 Description of Control Strategy: See *Description Of Control Strategy* discussion in *Control Measures For Construction Activities (24-Hour Standard)* Section 4.5.2.3.3.

4.5.3.3.4 Technical Feasibility and Environmental Impacts: See *Technical Feasibility and Environmental Impacts* discussion in *Control Measures For Construction Activities (24-Hour Standard)* Section 4.5.2.3.4.

4.5.3.3.5 Emission Reductions: All emission reduction computations are based on the 2001 attainment year for the annual NAAQS. The rule applies to the PM_{10} emission source categories "Construction Activity Fugitive Dust" and "Windblown Construction Dust." "Highway Construction Activity Fugitive Dust" and "Highway Construction Projects-Wind Erosion" were broken out separately from other construction activities in the Chapter 3 emission inventories for transportation conformity purposes, but have been included with the other construction activities for the purposes of this analysis. Control factors for highway-related construction activities are identical to those for other types of construction. This control measure applies to all of Clark County, so the actual reductions achieved are greater than those applicable to the Las Vegas Valley and factored into the attainment demonstration. The emission reductions, rule penetration, rule effectiveness, and overall reduction for the year 2001 are shown below:

Emission Reductions:

- Construction Activity Fugitive Dust: 80 percent;
- Windblown Construction Dust: 91 percent;

Rule Penetration:

- Construction Activity Fugitive Dust: 98 percent;
- Windblown Construction Dust: 98 percent;

Rule Effectiveness (2001):

- Construction Activity Fugitive Dust: 40 percent;
- Windblown Construction Dust: 40 percent;

Overall Reduction (2001):

- Construction Activity Fugitive Dust: 32 percent;
- Windblown Construction Dust: 36 percent;[a]

[a] As noted in Appendix L, wind erosion emissions from construction sites were calculated assuming a percentage of each construction site was already controlled under regulations (i.e., RACM) already in place and not measures adopted as part of the SIP. Therefore, the percent reduction calculated for the

SIP- adopted measures is applied to those portions of the site not already being controlled. Therefore, actual emission reductions achieved are less than the reductions that would be achieved by applying the control measure to an uncontrolled source.

Construction Activity Emission Reductions

Applying these overall control reductions to the 2001 annual uncontrolled emissions yields the following emission reductions:

- Baseline Emissions (Activity): 25,891 TPY
- Controlled Emissions-(Activity): 17,088 TPY
- Emission Reductions-(Activity): 8,803 TPY

- Baseline Emissions (Wind): 19,851 TPY
- Controlled Emissions-(Wind): 12,812 TPY
- Emission Reductions-(Wind): 7,039 TPY

4.5.3.3.6 Control Measure Cost: Dames & Moore[35] found that the cost of controlling dust during grading on a 40 acre parcel with soils categorized as "Low" for PEP would typically be $1,700 per day, or $43 per acre per day. This cost is predicated on the application of 200,000 gallons of water. The water application rate and cost would double for a parcel with soils categorized as "High" for PEP. Therefore, the cost per acre per day for controlling dust from grading operations ranges from $43 per acre per day to $86 per acre per day. The projected acreage of construction occurring valley-wide in 2001 is 22,691 acres as shown in Appendix E, Table E-5. However, not all of this construction acreage is active during the entire year as discussed in Appendix B. Using the average length of construction by type of construction project, the number of acres on any given day can be calculated. The acreage under construction in 2001 averages 350 acres per day.

Construction Activity Control Costs

Grading is the most dust-intensive phase of a construction project. Cost estimates for dust

[35] Dames & Moore, *An Evaluation of Incorporating Best Management Practices into the Construction Activities Program,* document 44499-001-128, prepared for the Clark County Health District Board of Health, p. 13

control during other phases of a construction project under this control measure have not been developed by industry and are currently not known. Once cost factors have been developed by industry for compliance, a more detailed cost analysis can be completed. Because of the unavailability of cost factors for other requirements in the control measure, the cost analysis for this control measure is based on cost effectiveness per acre for control of dust from grading operations and will overestimate the compliance cost for most other types of construction activities.

The cost of enforcement to the local air agency is calculated as follows. The cost of additional AQD enforcement staffing levels for the implementation of this regulation is calculated to be $285,714 per year.[36] The annual cost of compliance per acre is calculated by multiplying the low and high cost per day by 365. These annual costs per acre controlled are $15,965 and $31,390 respectively. The cost of compliance is calculated by multiplying the cost per year of control by the number of acres per day that must be controlled each day. The low and high control costs are calculated as follows:

> Low Cost: $15,695 x 350 acres = $5,493,250;
> and
> High Cost: $31,390 x 350 acres = $10,986,500.

Adding the cost per year of enforcement to the total low and high cost of controls gives the total cost of implementing the control measure. These low and high costs for control measure implementation are $5,778,964 and $11,272,214 respectively. Dividing the total control measure implementation cost by the emission reductions achieved by the control measure gives the cost effectiveness for the control measure.

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[36] The estimated cost for enforcing Section 94 is based on the assumption that 33 percent of the new enforcement cost will be allocated to enforcing Section 94. Unaccounted administrative costs are estimated to be ten percent of the operational cost. Therefore, Section 90 enforcement costs are calculated as follows: $780,000x0.3x1.10=$285,714.

	Low	High
Total Cost Per Day	$5,778,964	$11,272,214
Emission Reductions (Wind and Activity)	15,842 tons	15,842 tons
Cost Effectiveness	**$365 per ton**	**$712 per ton**

The Clark County Health District Board of Health has adopted Section 94 of the AQR as RACM and BACM for this emission source category.

<u>4.5.3.4 Control Measures For Paved Road Dust (Annual Standard)</u>

4.5.3.4.1 Sources Controlled: Paved roads.

4.5.3.4.2 Implementation Schedule: The requirements of these control measures became effective on January 1, 2000.

4.5.3.4.3 Description of Control Strategy: See *Description Of Control Strategy* discussion in *Control Measures For Paved Road Dust (24-Hour Standard)* Section 4.5.2.4.3.

Paved Road Dust Control Measures

4.5.3.4.4 Technical Feasibility and Environmental Impacts: See Technical Feasibility and Environmental Impacts discussion in Control Measures For Paved Road Dust (24-Hour Standard) Section 4.5.2.4.4.

4.5.3.4.5 Emission Reductions: All emission reduction computations are based on the 2001 attainment year for the annual NAAQS. Because a very large proportion of the existing fleet of publicly owned and operated street-sweeping equipment in Clark County complies with this regulation, no emission reductions have been taken that would otherwise be achieved through the PM_{10}-efficient sweeper requirements. The emission reductions from this control measure are reflected in the emission inventory baseline. This control measure also applies to private operators of sweeping equipment. The impact of this regulation on these privately owned sweeping fleets is not known, but is likely to be insignificant, and was not factored into this attainment demonstration.

Sweeper Fleets Not Factored In

Paved Road Dust Emissions Dependent on Silt Loading and VMT

Entrained/re-entrained fugitive dust emissions from paved roads are dependent on silt loadings deposited on all classes of paved roads from all sources and Vehicle Miles Traveled (VMT) on these roads. Reductions in silt loadings do not result in linear percentage reductions of PM_{10} emissions. Because PM_{10} emissions generated from paved roads are dependent on both silt loadings and VMT for each roadway type, emission reductions must be computed separately by VMT and silt loading for each road class. The attainment demonstration for the annual standard is based on the J. D. Smith micro-scale site. The valley-wide annual emission inventory was based on the J. D. Smith micro-scale site. The reduction in silt loading that will occur in 2001 due to reduced deposition from emissions from other sources is 15 percent. When the 15 percent silt reduction was applied to the paved road miles with improved shoulders by class and VMT mix at the J. D. Smith micro-scale site, a ten percent reduction in overall emissions was achieved. In order to ensure consistency between the valley-wide 2001 annual emission inventory and the J. D. Smith attainment demonstration, the same overall emission reduction was applied to the paved road emissions in the valley-wide inventory. This is a conservative approach in that applying the 15 percent silt reduction to the valley-wide road mix would result in somewhat larger emission reductions.

Because there were not unimproved shoulders in the J. D. Smith micro-scale site boundary, no reductions were taken in the valley-wide emission inventory for the improvement of unimproved shoulders.

Emission Reductions from Paved Roads

The controlled and uncontrolled entrained/re-entrained fugitive dust emission for paved roads from the 2001 Valley-Wide Annual Emission Inventory that are presented in Chapter 5 and Appendix L are shown below:

- Total Uncontrolled Paved Road Emissions: 55,350 TPY
- Total Controlled Paved Road Emissions: 50,239 TPY
- Uncontrolled Paved Road Dust Emissions: 41,115 TPY

- Controlled Paved Road Dust Emissions:
  37,004 TPY

[a] Total uncontrolled and controlled paved road emissions include emissions that result from unimproved shoulders throughout the valley. This emission source was not controlled in the annual 2001 valley-wide inventory in order to maintain consistency with the J. D. Smith attainment demonstration.

4.5.3.4.6 Control Measure Costs: No emission reduction credit was taken for improving unimproved shoulders or for utilization of certified PM-efficient street sweeping equipment in the 2001 Annual Valley-Wide emission inventory. Therefore, cost effectiveness of these control measures was not evaluated.

The Clark County Health District Board of Health has adopted Section 93 and Section 94 of the AQR as RACM and BACM for this emission source category.

4.5.3.5 Control Measures For Unpaved Road Dust (Annual Standard)

4.5.3.5.1 Sources Controlled: All publicly and privately owned unpaved roads, including unpaved alleys, unpaved easement roads, and unpaved access roads.

4.5.3.5.2 Implementation Schedule: The requirements of this regulation became effective on June 22, 2000 for the construction of new publicly owned and maintained and privately owned unpaved roads. Owners and/or operators of existing unpaved roads having vehicular traffic of 150 vehicle trips or more per day are required to apply control measures to one-third of the total road miles by June 1, 2001; apply control measures to two-thirds of the total road miles by June 1, 2002; and apply control measures to all unpaved roads having vehicular traffic of 150 vehicle miles or more per day by June 1, 2003.

Publicly, Privately Owned Unpaved Roads Dust Control Measures

4.5.3.5.3 Description of Control Strategy: See *Description Of Control Strategy* discussion in *Control Measures For Unpaved Road Dust (24-Hour Standard)* Section 4.5.2.5.3.

4.5.3.5.4 Technical Feasibility and Environmental Impacts: See *Technical Feasibility and Environmental Impacts* discussion in *Control Measures For Unpaved Road Dust (24-Hour Standard)* Section 4.5.2.5.4.

4.5.3.5.5 Emission Reductions: The rule applies to the PM_{10} emission source category "unpaved road dust" with total PM_{10} emissions of 18,932 TPY in the PM_{10} 2001 Annual Valley-Wide Emission Inventory. The attainment demonstration for the annual standard is based on the J. D. Smith micro-scale site. Therefore, the valley-wide annual emission inventory was based on the J. D. Smith micro-scale site. No unpaved roads with greater than 150 vehicle trips per day were located within the J. D. Smith micro-scale inventory area so no reduction from this source category was calculated for the J. D. Smith annual inventory. As the valley-wide annual attainment is based upon the attainment at the J. D. Smith monitoring station and the controls implemented within this micro-scale area, no reduction in unpaved road dust was applied to the valley-wide annual inventory in 2001 for purposes of attainment demonstration. This is a conservative estimate, as rules regarding the paving of unpaved roads over 150 vehicle trips per day will be in place and enforced during 2001.

Unpaved Road Dust Emissions

4.5.3.5.6 Control Measure Costs: No emission reduction credit was taken for paving unpaved roads in the annual attainment demonstration or included in the PM_{10} 2001 Annual Valley-Wide Emission Inventory. Therefore, cost effectiveness of these control measures was not evaluated.

4.6 INSIGNIFICANT SOURCE CATEGORIES

Insignificant Sources Contribute Less Than One $\mu g/m^3$

The determination of source significance is based primarily on the J. D. Smith annual inventory and the 24-hour micro-scale inventories at the five representative sites, supplemented by reviews of the 1998 valley-wide 24-hour emission inventory, the 1998 valley-wide annual emission inventory, and Chemical Mass Balance (CMB) modeling. A significant source is defined in U. S. EPA's Addendum to General Preamble,[37] as a source that contributes more than five $\mu g/m^3$ to a 24-hour violation and more than one $\mu g/m^3$ to

[37] Federal Register, FRL-5052-2, August 16, 1994

an annual violation. Sources with lower contributions to a violation are presumed to be de minimis.

4.6.1 De Minimis Source Categories – 24-Hour PM_{10} NAAQS

Applying the above criteria, the anthropogenic source categories shown in Table 4-16 are found to be de minimis for the 24-hour PM_{10} NAAQS in the 1998 base year.

Table 4-16

De Minimis Source Categories – 24-Hour NAAQS

SOURCE CATEGORY	Craig Road 24-Hour (µg/m³)	East Flamingo 24-Hour (µg/m³)	Green Valley 24-Hour (µg/m³)	J.D. Smith 24-Hour (µg/m³)	Pittman 24-Hour (µg/m³)	24-Hour Valley-Wide (µg/m³)
STATIONARY SOURCES	3.53	0.13	1.34	0.08	3.74	
Sand & Gravel Operations						0.50
Utilities – Natural Gas						0.16
Asphalt Concrete Manufacture						0.14
Industrial Processes						0.06
Other Stationary Point Sources						0.10
Small Point Sources						0.15
Residential Firewood						0.24
Residential Natural Gas						0.05
Commercial Natural Gas						0.03
Industrial Natural Gas						0.01
NG – Purchased at the source-Carried by SWG						0.17
Structural/Vehicle/Wildfires						0.01
Charbroiling/Meat Cooking						0.60
NONROAD MOBILE SOURCES						
Airport Support Equipment						0.03
Commercial Equipment						0.00
Construction and Mining Equipment						0.29
Lawn & Garden Equipment						0.01
Railroad Equipment						0.01
Recreational Equipment						0.00
McCarran International Airport						0.20
Henderson Executive Airport						0.00
North Las Vegas Municipal Airport						0.02
Nellis Air Force Base						0.03

Table 4-16

De Minimis Source Categories – 24-Hour NAAQS (continued)

ONROAD MOBLE SOURCES						
Vehicular Sulfate PM						0.32
Vehicular Tire Wear						0.07
Vehicular Brake Wear						0.11
Vehicular Exhaust (Carbon PM)	1.47	1.68	0.55	1.66	0.62	0.28

4.6.1.1 Stationary Sources

As shown in Chapter 3, stationary sources, including sand and gravel operations; natural gas-fired utility power plants; asphalt concrete plants; industrial processes; and other stationary sources, generated 3.29 tons per day valley-wide during the 24-hour design day. The tonnage for this source category is projected to remain unchanged through 2006. By equating the 1998 base year 24-hour design day emission total of 931.95 tons per day with the design concentration (which occurred in 1998) of 281 $\mu g/m^3$ and allowing for the background concentration of 10.5 $\mu g/m^3$, the contribution of all stationary source emissions to the design day concentration is calculated to be 0.95 $\mu g/m^3$. Stationary point sources are projected to contribute the same PM_{10} mass to the 24-hour design day in 2006.

At the micro-scale level, a review of the design day micro-inventories indicated that stationary source emissions at the Pittman (3.68 $\mu g/m^3$) and Craig Road (3.53 $\mu g/m^3$) monitoring sites came close to, but fell below, the U. S. EPA thresholds of presumed significance for this source category.

The relatively constant emissions from stationary sources are predicated on 1) current trends for this source category, which show a slight decrease in emissions from 1994 to 1998; 2) the fact that BACT controls are required for new and modified sources which produce more than two tons; and 3) Lowest Achievable Emission Reductions (LAER) that are required for all major sources which have been constructed or modified after September 26,1996.

BACT Required for Stationary Sources with a Potential To Emit Greater than Two Tons

Declining rates of population growth and construction activity would be expected to decrease activity levels in the sand and gravel operations and asphalt concrete manufacturing categories. To the extent that other stationary source categories may grow in proportion to the overall population, the BACT and LAER requirements will ensure that all stationary point source emissions will remain at the de minimis level.

The requirements for BACT controls for potential emissions over two tons and LAER requirements for all new and modified sources with the potential to emit more than 70 tons of PM_{10} are set forth under Section 12 of the AQR. Section 12 was formally approved by the U. S. EPA as part of the Nevada SIP on May 11, 1999.[38] In addition to a stationary source's emission units, the Section 12 BACT requirements also apply to all fugitive emissions generated by the permitted facility. The definition of BACT found in the first sentence of AQR Section 0 - Definitions, indicates that BACT is the "maximum degree of reduction for each pollutant ... which the Control Officer, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable ... for control of such pollutant." Clark County interprets this to mean that the level of control representative of BACT for permitted sources with fugitive emissions is no less stringent than that required to meet BACM for those fugitive sources. Fugitive emissions at a stationary source are those not emitted through a stack or duct and, therefore, include PM_{10} sources such as disturbed vacant lands, unpaved roads/haul roads, and track out onto paved roads. Stationary sources are required to apply BACT to their fugitive dust sources to be at least as stringent as the standards in the applicable Regulations 90, 91, 92, and 94.

All Major PM_{10} Sources Required To Apply BACT or LAER

The requirement to apply BACT to fugitive dust sources is established by the conditions contained in the Authority to Construct Certificate issued by the Control Officer in accordance with the provisions of Section 12.

[38] Federal Register, Vol. 64. No. 90, May 11, 1999, pages 25210 - 25213

All sources with the potential to emit of 70 tons or greater in the PM_{10} nonattainment area are listed below:

Wells Cargo – LAER;
Nevada Power-Sunrise (including the State regulated sources) – BACT;
Nevada Power-Clark – BACT;
James Hardie Gypsum – BACT;
Chemical Lime Henderson – BACT;
Timet – BACT; and
CSR West – BACT.

Wells Cargo, Inc. is currently undergoing a permit modification that will require either BACT or LAER for all PM_{10} emission units at the facility. Currently, the facility has some emission units that meet the BACT standard.

In addition to stationary sources, the AQD also issues permits to sources with a potential to emit greater than one ton but less than 15 tons that are located at a site less than 365 continuous days. The sources are issued variable location permits (VLPs) and must also meet stringent control standards. The following permit conditions for VLPs are contained in AQD guidelines:

VLPs Also Required to Have BACT

- Minimum moisture content of processed materials of 1.5 percent; and
- Haul roads controlled to 90 percent by use of water, dust suppressants, sealing or paving.

Beginning January 1, 2001 a new requirement for disturbed soil to pass the test standards adopted in Section 90 of the AQR was added to the guidelines. Currently, the requirements for material being handled or stockpiled to have a 1.5 percent minimum moisture content and loose soil to be stabilized are being incorporated into VLP permits.

The AQD does have a program for minor source emission reduction credits that is administered locally. Credits are usually generated by paving unpaved roads. The credits are then used to offset minor source emissions by a 2-to-1 ratio as described in Section 12 of the AQR. Credits are not pollutant specific and reductions of one pollutant can be used to offset a different and sometimes unrelated pollutant. For example, emission reduction credits generated by paving a road and reducing PM_{10} emissions by 100 tons can be used to offset 50 tons of carbon monoxide emissions. This program is not used for major sources and has not been used to determine emission inventories or as part of the rollback modeling in this SIP. However, the requirement for offsets for new or modified minor sources may be a further deterrent for an increase in emissions because emission increases would require offsets and the facility would incur additional expenses.

Minor Source Emission Reduction Credits Administrated Locally

In addition to Section 12 of the Air Quality Regulations, Section 445.389 of the Nevada Administrative Code (NAC) prohibits the construction or modification of fossil-fuel-powered electricity generation plants in Hydrographic Basin 212 and the city limits of Boulder City. This requirement will further limit the potential for additional emissions from stationary sources.

State Law Prohibits New Fossil-Fuel-Powered Power Plants in the Nonattainment Area

Two of the source categories projected to increase in proportion to population growth, structural/vehicle fires/wild fires and residential natural gas, are very small sources that will remain far below the de minimis level. The charbroiling/meat cooking source category is larger, but emissions from the sources with potential to emit greater than two tons within this category are subject to BACT requirements under Section 12.

Residential firewood combustion is projected to increase in proportion to population growth. New fireplaces are restricted to U. S. EPA Certified Phase II wood burning stoves or cleaner alternative non-wood burning devices such as gas logs. These requirements are implemented through Clark County Ordinance 1249, City of Las Vegas Ordinance 3538, City of North Las Vegas Ordinance 1020, and City of Henderson Ordinance 1997. These control measures will prevent emissions from this source category from approaching or exceeding the de minimis source threshold level for this source category.

Residential Fireplaces Restricted Under County Ordinance

As detailed under the commitments section of this chapter, Clark County has committed to conducting a

PM_{10} saturation study to further evaluate the impacts of stationary sources on neighborhood scale PM_{10} concentrations. If stationary sources are found to have significant impacts on neighborhood PM_{10} concentrations, then Clark County will develop and adopt U. S. EPA approvable rules that require the implementation of BACT for all stationary sources.

4.6.1.2 Nonroad Mobile

The de minimis source categories in the nonroad mobile sources grouping are projected to remain relatively constant, grow in proportion with population growth, or grow in proportion to airport activity. Of these source categories, only two contribute more then 0.03 $\mu g/m^3$ to the 1998 base year 24-hour design value. These are the construction and mining category and McCarran International Airport. Construction and mining equipment is projected to grow in proportion to population growth. This source category contributed 0.29 $\mu g/m^3$ to the 1998 base year 24-hour design value and is projected to contribute 0.94 $\mu g/m^3$ to the 2006 attainment year 24-hour design value. This is a conservative projection. Actual use of construction equipment by 2006 could actually decline in proportion with the declining growth rate. Emissions from McCarran International Airport contributed 0.20 $\mu g/m^3$ to the 1998 base year 24-hour design value. Emissions from McCarran will decline in 2006 due to aircraft gate electrification and use of newer lower-emission aircraft at the facility.

Projected Emissions of Nonroad Mobile Sources Stay Below the Level of Significance in 2006

4.6.1.3 Onroad Mobile

Onroad mobile de minimis sources include vehicular sulfate particulate, vehicular tire wear, vehicular brake wear, and vehicular exhaust (carbon particulate). These contribute 0.32 $\mu g/m^3$, 0.07 $\mu g/m^3$, 0.11 $\mu g/m^3$, and 0.28 $\mu g/m^3$ respectively to the 1998 base year 24-hour design value. Projected increases in vehicle miles traveled are shown for each road category in Table E-14 of Appendix E. Vehicles are expected to produce less particulate and sulfate emissions per mile traveled in 2006 than in the 1998 base year based on emission factors in the Mobile5b and Part5 models. These emission factors are developed using federal automotive exhaust standards. Applying these factors, it is found that there will be a slight decrease in

Vehicle Exhaust, Tire Wear, and Brake Emissions Remain De Minimis in 2006

emissions from the vehicular sulfate and vehicular exhaust categories in 2006 and a slight increase in emissions from the tire wear and brake wear categories.

4.6.2 De Minimis Source Categories – Annual PM_{10} NAAQS

Determination of source significance for the Annual PM_{10} NAAQS was based primarily on the 1998 annual micro-inventory at the J. D. Smith representative site and 1998 Base Year Valley-Wide PM_{10} Annual Inventory and supplemented by review of CMB modeling. A significant source is defined in U. S. EPA's Addendum to General Preamble[39] as a source that contributes one $\mu g/m^3$ or more to an annual violation. Sources with lower contributions to a violation are presumed to be de minimis.

Applying the above criteria, the source categories shown in Table 4-17 are found to be de minimis for the annual PM_{10} NAAQS in the 1998 base year.

[39] Federal Register, FRL-5052-2, August 16, 1994

Table 4-17

De Minimis Source Categories – Annual NAAQS

SOURCE CATEGORY	J. D. Smith Annual ($\mu g/m^3$)	Valley-Wide Annual ($\mu g/m^3$)
STATIONARY SOURCES	0.05	
Sand & Gravel Operations		0.13
Utilities – Natural Gas		0.04
Asphalt Concrete Manufacture		0.04
Industrial Processes		0.02
Other Stationary Point Sources		0.03
Small Point Sources		0.04
Residential Firewood		0.02
Residential Natural Gas		0.01
Commercial Natural Gas		0.01
Industrial Natural Gas		0.00
NG – Purchased at the source-Carried by SWG		0.04
Structural/Vehicle/Wildfires		0.00
Charbroiling/Meat Cooking		0.16
NONROAD MOBILE SOURCES		
Airport Support Equipment		0.01
Commercial Equipment		0.00
Construction and Mining Equipment		0.08
Lawn & Garden Equipment		0.00
Railroad Equipment		0.00

Table 4-17

De Minimis Source Categories – Annual NAAQS (continued)

Recreational Equipment		0.00
McCarran International Airport		0.05
Henderson Executive Airport		0.00
North Las Vegas Municipal Airport		0.00
Nellis Air Force Base		0.01
ONROAD MOBLE SOURCES		
Vehicular Sulfate PM		0.09
Vehicular Tire Wear		0.02
Vehicular Brake Wear		0.03
Vehicular Exhaust (Carbon PM)	0.29	0.08

4.6.2.1 Motor Vehicle Exhaust

There are two categories of motor vehicle exhaust: on-road and non-road. The on-road category includes tailpipe and tire wear emissions of primary PM_{10} from on-road vehicles including both gasoline and diesel-powered passenger cars, light-, medium-, and heavy-duty trucks, buses, and motorcycles. The 1998 base year inventory shows total emissions from these sources to be 1,399 tons per year.

The non-road category includes various "off-road" equipment that use a variety of engine types and fuels. Examples are construction equipment; lawn and garden equipment; railroad equipment; recreational equipment; and airport equipment. Total PM_{10} emissions from these sources in the 1998 base year inventory are 737 tons per year.

Motor Vehicle Exhaust Likely To Stay De Minimis Because of Federal Controls

Measures to control vehicle emissions have been implemented at the national, state and local level. The following describe the measures implemented that reduce motor vehicle exhaust emissions in the Las Vegas Valley. Most of the state and local measures were implemented to reduce carbon monoxide emissions, and are documented in the Las Vegas Valley Carbon Monoxide State Implementation Plan dated August, 2000. Reduced particulate emission benefits from these measures are often negligible, and the reductions are generally not quantifiable due to limitations in available models, specifically the U. S. EPA Part5 model.

Since 1994, U. S. EPA standards limited the sulfur content of diesel fuel for on-road diesel vehicles to 0.05 percent by weight (500 ppm). Concurrently, Clark County adopted the 500 ppm low-sulfur diesel standard for all diesel fuel sold in Clark County (District Board of Health Regulations, Section 29, December 16, 1993). This rule, although not changing on-road diesel fuel composition, has reduced the non-road diesel fuel sulfur content by 85 percent from an uncontrolled average of approximately 3,300 ppm. The PM_{10} emission benefits from this measure and related costs cannot be calculated. Added costs, if any, are absorbed by the users.

District Board of Health Air Quality Regulations, Section 45, September 26, 1991, limits the idling of diesel truck or diesel bus engines to no more than 15 minutes.

Nevada Administrative Code (NAC) 445B.576 restricts visible emissions from both gasoline and diesel-powered motor vehicles, and also prohibits idling the engine of a diesel truck or bus for more than 15 minutes. A program for the control of emissions from motor vehicles is established in Nevada Revised Statutes 445B.700 to 445B.845 and implemented in NAC 445B.400-774. The following vehicle inspection programs are established under these statutes:

Annual Smog Checks Required for Light-Duty Motor Vehicles

> Light-duty motor vehicles powered by diesel engines are required to pass an annual emission test in order to be registered in Clark County. The inspection criteria are established in Nevada Administrative Code (NAC) 445B.587, which includes a tampering inspection and an opacity test phase.
>
> NAC 445B.737-774 addresses the control of emissions from onroad heavy-duty motor vehicles. It establishes a program for random roadside smoke opacity testing utilizing the Society of Automotive Engineers Procedure SAE J1667, Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles. In addition to the smoke opacity test, criteria for inspection for tampered or defective conditions are also established to determine that the vehicle's emission control system is operating correctly.

The State's Motor Vehicle Inspection Maintenance Program is provided for in NAC 445B.400-735. The provisions apply to all gasoline-powered motor vehicles, model year 1968 or later, that reside in the Las Vegas Valley.

Additional local programs implemented to reduce emissions from gasoline motor vehicles specifically as

The State Department of Motor Vehicles and Public Safety has committed to implement a remote sensing program in the Las Vegas Valley which will target 50 percent of the motor vehicles operating in Las Vegas in 2001 and increase to 90 percent of the local motor vehicle fleet by 2011.[40] This commitment will provide substantial air quality benefits and assist in attaining/maintaining national ambient air quality standards.

Additional state programs, other than vehicle inspections, established to reduce motor vehicle emissions include:

Alternative Fuel Program Mandated by State Law

An alternative fuel vehicle program, established under NAC 486A, which requires state and local government agencies to acquire cleaner burning alternative fuel vehicles. For fiscal year 1999-2000 the rule required all regulated agencies to purchase qualifying alternative fuel vehicles at the rate of 75 percent of all vehicle purchases. The rate increases to 90 percent for FY 2000-2001, and remains at 90 percent for future years.

The State Department of Motor Vehicles has established a "Smoking Vehicle Hotline" program in the Las Vegas Valley. Citizens can report smoking vehicles to the department to help identify and have repaired excessively smoking vehicles.

A lower Reid Vapor Pressure (RVP) requirement for gasoline was established in 1995 in NAC 590.065. Also a carbon monoxide control measure, this action lowered the RVP limit of gasoline from 11.0 psi to 9.0 psi.

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[40] Letter from the Nevada Department of Motor Vehicles and Public Safety, August 28, 1995

carbon monoxide control measures include a wintertime Clean Burning Gasoline (CBG) program and an oxygenated gasoline program.

Wintertime Clean Burning Gasoline Program Helps To Reduce Sulfur Emissions and Increase Catalytic Converter Efficiency

> CBG is a low-sulfur and low-aromatic fuel which helps to increase catalytic converter efficiency, resulting in lower CO as well as other emissions. District Board of Health Air Quality Regulations, Section 54, April 22, 1999, implemented the CBG program beginning October 1, 1999.

The Clark County oxygenated fuel program requires that all gasoline sold in the County during the winter season (October 1 to March 31) contain 3.5 percent oxygen by weight, the maximum amount allowed. This mandate is being satisfied by the use of ethanol in lieu of MTBE. Air Quality Regulation, Section 53, September 27, 1997, governs this program.

RTC Has Implemented Transportation Control Measures

The Regional Transportation Commission of Clark County has implemented Transportation Control Measures/Travel Demand Management (TCM/TDM) to reduce vehicle emissions and offset growth in vehicle miles traveled (VMT). The following voluntary control measures are being implemented: employer based commuter incentive programs; telecommuting; and area-wide ridesharing programs.

In addition to these state and local measures implemented to reduce mobile source emissions, U. S. EPA has initiated or has proposed actions that will further reduce emissions from diesel vehicles, both on and off road, in the future:

Heavy-Duty Diesel Truck and Bus Engine Standards

> Standards for on-road heavy-duty truck and bus engines were established for model years 1987-2003. These standards, following the reduced sulfur content requirement (500 ppm) beginning in 1994, significantly reduce PM_{10} emissions and some NO_x. In 1997, U. S. EPA adopted new standards for the 2004 model heavy-duty engines, with the goal of further reducing NO_x emissions.
>
> In May 2000, U. S. EPA announced proposed emission standards for model year 2007 and later heavy-duty highway engines. The proposal includes

two components: 1) diesel fuel regulation, and 2) emission standards. The fuel provisions would reduce the sulfur content in on-highway diesel fuel to 15 ppm, down from the current 500 ppm, beginning in 2006. New engine standards would be phased in beginning in 2007. The super-low-sulfur diesel is the "technology enabler" necessary to the further development of advanced exhaust emission technologies that will reduce particulate matter emissions by 90 percent and NO_x by 95 percent in 2030.

Stricter Heavy-Duty Diesel Truck and Bus Engine Standards Begin in 2007

U. S. EPA's off-road engine regulations are structured as a three-tiered progression to low emissions. Each tier involves a phase in (by horsepower rating) over several years. Tier 1 standards phase in from 1996 to 2000. A more stringent Tier 2 standard for all engine sizes take effect from 2001 to 2006, and yet more stringent Tier 3 standards for engines rated over 50 hp phase in from 2006 to 2008. The Tier 3 standards are expected to lead to emission control technologies for off-road engines that will be similar to the 2004 controls for highway heavy-duty engines.

U. S. EPA Has Regulations for Diesel Fuel Composition

The U. S. EPA regulations that improve diesel fuel composition and diesel engine emissions have been and will continue to be the most effective measures for reducing emissions of particulate and other pollutants from diesel engines. These programs are complemented by state and local programs as described above to contribute to the larger emission reductions that will be realized from the full implementation of the U. S. EPA emission reduction programs. When U. S. EPA-approved methodologies are available for calculating emission reductions from these programs, Clark County will complete an analysis and propose a SIP revision as appropriate.

Several Research Projects Are Funded

Although there are numerous programs initiated or in development to reduce vehicle emissions, there is limited information or guidance on methods to quantify the benefits that will be realized in terms of particulate matter reductions and their subsequent impact on improving ambient air quality. Several research projects are funded and in progress that are expected to provide better information about the contributions of specific sources of particulate in the Las Vegas Valley, and to identify potential control measures to reduce future emissions. These studies are discussed in more detail in this chapter in Section 4.7.

<u>4.6.2.2 Stationary Sources</u>

J. D. Smith is the only monitoring station with an annual average exceeding the NAAQS. Stationary sources in the J. D. Smith micro-scale area generated 6.3 tons per year in the 1998 base year (see Chapter 3) and contributed 0.05 $\mu g/m^3$ to the annual design concentration. The stationary source contribution is derived by equating the J. D. Smith 1998 base year emission total of 4,511 tons per year with the design concentration of 53 $\mu g/m^3$ and allowing for a background concentration of 16.5 $\mu g/m^3$. The tonnage for this source category is projected to remain consistent through 2006. Stationary point sources would be expected to contribute a similar mass (0.05 $\mu g/m^3$) of PM_{10} to the annual design value in 2006.

Stationary Sources Contribute Less than One $\mu g/m^3$ to the Annual Average

As shown in Chapter 3, stationary point sources, which include sand and gravel operations; natural gas-fired utility power plants; asphalt concrete plants; industrial processes; and other stationary sources, generated 1,201 tons per year on an annual valley wide basis in the 1998 base year. The tonnage for this source category is projected to remain consistent through 2006. By equating the 1998 base year annual emission total of 171,755 tons per year with the design concentration of 53 $\mu g/m^3$ and allowing for a background concentration of 16.5 $\mu g/m^3$, total stationary source emissions are estimated to contribute 0.26 $\mu g/m^3$ to the design day concentration. Stationary point sources would be expected to contribute a similar amount of PM_{10} annual design value 2006.

Stationary Source Emissions in the Nonattainment Area Not Projected To Increase

Stationary sources are not expected to increase in future years for the same reasons discussed for the 24-hour standard: 1) current trends for this source category, which show a slight decrease in emissions from 1994 to 1998; 2) the fact that BACT controls are required for sources which produce more than two tons; 3) Lowest Achievable Emission Reductions (LAER) are required for all major sources which have been constructed or modified after September 26, 1996.

Residential firewood emissions, residential natural gas emissions, structural/vehicle/wildfires, and charbroiling/meat cooking, are projected to increase in proportion to the projected population growth as detailed in Table E-1 of Appendix E. Of the four emission sources projected to increase in proportion with the projected population growth, only one contributes more than 0.05 $\mu g/m^3$ to the annual design value on a valley-wide basis. Charbroiling and meat cooking contribute 0.16 $\mu g/m^3$ to the annual design value. In 2001 and 2006 charbroiling and meat cooking will contribute 0.19 $\mu g/m^3$ and 0.32 $\mu g/m^3$ respectively to the annual design values. New emissions from the larger sources within this category are subject to BACT requirements under Section 12, ensuring that this source category will not exceed the de minimis source threshold in the 2001 or 2006 attainment years.

Residential Firewood Emissions Not Expected To Become Significant

The residential firewood combustion source category is also subject to non-federal controls. This source category is projected to increase in proportion to population growth, but only contributes 0.02 $\mu g/m^3$ to the 1998 base year annual design value. This small source category is subject to the requirements of Clark County Ordinance1249, City of Las Vegas Ordinance 3538, City of North Las Vegas Ordinance 1020, and City of Henderson Ordinance 1997. These ordinances restrict new fireplaces to U. S. EPA Certified Phase II wood burning stoves or cleaner alternative non-wood burning devices such as gas logs. Even in the face of potential cost increases for alternative home heating fuels, these control measures will limit emissions from this source category to levels that are far below the de minimis source threshold.

4.6.2.3 Nonroad Mobile

Construction and Mining Equipment Largest Nonroad Mobile Contributor to PM_{10} Emissions Other than Airports

The de minimis source categories within the nonroad mobile source category grouping are projected to remain relatively constant, grow in proportion with population growth, or grow in proportion to aviation activity as detailed in Table E-1 of Appendix E. Nellis Air Force Base emissions will remain constant. Of these source categories, the highest emissions are generated from construction and mining equipment and McCarran International Airport. Construction and mining equipment is projected to grow in proportion to population growth and contributes 0.08 $\mu g/m^3$ to the 1998 annual base year, 0.09 $\mu g/m^3$ to the 2001 annual design value, and 0.15 $\mu g/m^3$ to the 2006 annual design value. Actual use of construction equipment is likely to decline in proportion with the declining growth rate. Emissions from McCarran International Airport contribute 0.05 $\mu g/m^3$ to the 1998 base year annual design value. These emissions will decline in future years due to aircraft gate electrification and use of newer, lower-emission aircraft.

<u>4.6.2.4 Onroad Mobile</u>

Onroad mobile de minimis sources include vehicular tire wear and vehicular brake wear. These contribute 0.02 $\mu g/m^3$, and 0.03 $\mu g/m^3$ respectively to the 1998 base year annual design value. Projected increases in vehicle miles traveled are shown for each road category in Table E-14 of Appendix E. These emission factors were generated using the Mobile5b and Part5 models. These models show a slight increase in emissions from the tire wear and brake wear categories in future years, contributing 0.02 $\mu g/m^3$ and 0.03 $\mu g/m^3$ in 2001 and 0.04 $\mu g/m^3$ and 0.06 $\mu g/m^3$ in 2006.

4.6.3 Contingency Measures

Contingency Measures Have Been Identified by the Clark County Health District Board of Health

Clark County Health District Board of Health adopted Resolution #03-00 on July 27, 2000 committing the Clark County Health District to evaluating the following candidate contingency measures for an assessment of suitability:

- Reduce the site-specific dust mitigation plan requirements for construction activities from ten acres to five acres;
- Require paving/stabilization of all unpaved roads with average daily traffic (ADT) equal to or exceeding 100 trips;
- Provide for at least two additional field enforcement officers above and beyond those staff increases committed to in the State Implementation Plan;

- Increase minimum penalties for violations or Air Quality Regulations for fugitive dust; and
- Reduce the size threshold for requiring a dust control monitor (coordinator) at construction sites.

The entire set of contingency measures provided in Section 4.6.3 will be automatically implemented if Clark County fails to meet the projected 2003 emissions reduction milestone. The emissions reduction benefit form these measures is 1,373 tons (Appendix B), which exceeds the 19.07 TPY emission reduction increment.

4.7 CLARK COUNTY AIR QUALITY PROGRAMS

4.7.1 Clark County Educational Programs

4.7.1.1 Dust Control Class

The Air Quality Division (AQD) conducts a Dust Control Class for permit compliance education and public education. The class was initiated in 1997 and initially used as a remedial or corrective requirement for violators of the Section 41 fugitive dust regulation.

Dust Control Class Required To Obtain a Dust Control Permit

In early 1998, the scope of the class was expanded to include a more thorough discussion of preventative measures. The requirement to complete the Dust Control Class was extended to include the on-site superintendents or construction foremen for each new dust control permit issued. Interested members of the public have also attended the class. Those completing the class successfully receive a Certificate of Training and a photo-identification attendance card. The Dust Control Class is instructed by AQD Enforcement Officers and by contract instructors.

The class has been presented on numerous occasions to large employee groups of construction contracting companies, public utilities, and public agencies. When presented in this manner, the class discussion is modified to focus on the specific activities of the company or group.

The AQD is in the process of shifting the focus of the dust control class to Section 94 of the Air Quality Regulations and the Section 94 Handbook. Special classes are being conducted to familiarize the construction industry with these new requirements.

4.7.1.2 Small Business Assistance Program

The AQD has contracted with the University of Nevada, Reno Business Education Program to work with small businesses to explain AQD Air Quality Regulations and foster compliance.

4.7.1.3 Clark County Conservation District Education Program

The AQD has contracted with the Clark County Conservation District of Southern Nevada to develop an informational brochure that has been mailed to property owners who may be impacted by Section 90 requirements.

The AQD is currently assessing the feasibility of additional roles for the Conservation District. These might include acting as advisors to property owners on how to avoid receiving a corrective action order and/or how to best respond to a corrective action order.

4.7.1.4 Construction Industry Training Programs

Some of the building trade associations in the Las Vegas Valley have indicated that they will be providing training materials and/or classes to their members on Section 94 and the Section 94 Handbook. These efforts are being developed on a voluntary basis by the industry in cooperation with the AQD.

4.7.1.5 Environmental Monitoring for Public Access and Community Tracking (EMPACT) Project

The Las Vegas Valley EMPACT Website provides public access to time-relevant environmental data including air quality, water quality, and meteorological information. Hourly updates from the AQD monitoring network are available for all recorded levels of CO, PM_{10}, and ozone, as well as site-specific meteorological data. Relevant health information related to the levels of pollution is also displayed in a format that is easily understood.

EMPACT Funded by U. S. EPA

The Las Vegas Valley EMPACT Website was developed with funding assistance from the U. S. EPA

EMPACT program. The grant was awarded on a joint Nevada application by the CCDCP, the City of Las Vegas, and the National Weather Service. The CCDCP served as project coordinator for the website development, with funding provided to its project partners that included the AQD; the Conservation District of Southern Nevada; the University of Nevada, Las Vegas; and the Desert Research Institute.

4.7.1.6 Visibility Assessment and Time-Relevant Reporting

This ongoing study is funded via an EMPACT Grant from U. S. EPA and a grant from the Department of Motor Vehicles. This study provides time-relevant visibility data which can be accessed by the public via the internet. The study report will characterize visibility in the Las Vegas Valley in regards to spatial, diurnal, weekday/weekend, and seasonal patterns. An assessment of sources contributing to urban haze will be conducted as part of the study. Work will be coordinated with the SNAQS (See Section 4.7.2.1).

4.7.1.7 Dust Control Product and Equipment Trade Shows

Dust control product applicators, dust control product manufacturers, equipment manufacturers, building trade associations, and UNLV have indicated an interest in participating in dust control products and equipment trade show. The SCAQMD, San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD), and Mojave Desert AQMD have all successfully co-sponsored air pollution control product and equipment shows that were focused on different target groups.

Dust Suppressant Product Shows Provide a Great Deal of Information in One Place

The SCAQMD event was focused primarily on fugitive dust sources and included equipment such as street sweepers and dust suppressant products. The SJVUAPCD co-sponsored three events that were targeted primarily at the agricultural industry and emphasized dust suppressant products. The Mojave Desert AQMD sponsored two shows that were more general in scope and targeted all types of air pollution control equipment and products.

Clark County will explore the feasibility of organizing and co-sponsoring a dust control product and equipment show in the Las Vegas Valley. The targeted audience for the event would be the construction industry, public works agencies, and members of the general public.

4.7.2 Clark County Air Quality Research

Continuing Research in Clark County

4.7.2.1 Southern Nevada Air Quality Study (SNAQS)

This study is currently ongoing and focuses on measurement of primary particulate matter emissions from motor vehicle exhaust using LIDAR technology. Development of a GIS-based transportation model for the Las Vegas Valley and determining the frequency and magnitude of $PM_{2.5}$ transported into the Las Vegas Valley are components of the study. This study has been funded by the Federal Transit Administration.

4.7.2.2 Quantification of Vehicular Emissions in the Las Vegas Valley Air Basin and Impacts on Air Quality

This ongoing study is coordinated with the SNAQS and is funded by the Nevada Department of Motor Vehicles under the sponsorship of the CCDCP. The focus of the study is development of a vehicle registration information data base that is linked to emission measurements conducted as part of the SNAQS. This data base will allow researchers to draw conclusions on the profiles of high-emitting vehicles, their geographic concentrations, the effectiveness of the current smog check program, and to develop effective control strategies for reducing emissions from on-road gasoline and diesel vehicles.

4.7.2.3 Chemical Characterization of $PM_{2.5}$ in the Las Vegas Valley

This ongoing study is coordinated with the SNAQS and is funded by the Nevada Department of Motor Vehicles under the sponsorship of the CCDCP. The objectives of this study are characterization of the chemical composition of $PM_{2.5}$ in the Las Vegas Valley, estimation of the contribution of major source types to $PM_{2.5}$ concentrations and urban haze, the contributions of transported constituents to $PM_{2.5}$ concentrations and urban haze, and the fraction of dust in $PM_{2.5}$ and PM_{10} particulate concentrations. $PM_{2.5}$ samples will be taken at an urban and background site every third day for a one-year period. PM_{10} samples will be taken every sixth day from a co-located PM_{10} sampler at the urban site.

4.8 CLARK COUNTY AIR QUALITY SIP COMMITMENTS

4.8.1 Commitment For Additional Staffing Levels and Enhanced Enforcement Efforts

The AQD currently employs one enforcement supervisor, seven enforcement officers, one senior administrative clerk, one administrative clerk, and one administrative secretary to enforce former Section 17 (Dust Control Permit for Construction) and Section 41 (Fugitive Dust). The AQD has committed to hiring 15 additional staff to implement and enforce Sections 90, 91, 92, 93, and 94 with Resolution 02-00, dated July 27, 2000.[41] A new compliance team, titled Dust Mitigation and Prevention (DMAP), has been formed and will have ten new positions to focus on Sections 90, 91, 92, and 93 of the Air Quality Regulations. These positions will include a supervisor, clerical, secretarial support, field enforcement, and one half-time attorney. An additional five new staff members will be hired to augment the existing construction activity program, as the newly adopted Section 94 supplements and strengthens the existing Sections 17 and 41 of the Air Quality Regulations. The five new positions for the construction program will include one person to handle additional construction permit processing, an additional clerical position, and three additional enforcement officers.

Additional Enforcement Staff Will Be Hired

Costs incurred for the additional personnel and equipment (but not including phones, computers, and certain administrative costs) are estimated to be $780,000 for the first year. Targeted funding sources are a dust control permit fee increase of $15 per acre (from $90 per acre to $105), redirecting funding from the PM_{10} Emission Control Research Account, and increased funding from the Clark County general fund. The dust control permit fee was approved by the

An Increase in Dust Control Permit Fees Will Help Defray the Costs of Additional Staff

[41] See Appendix H

Clark County Health District Board of Health on December 14, 2000. The CCHD is currently seeking office space for the new staff positions. Ramp-up of additional staff will occur during 2001, and all new positions will be filled by December 31, 2001. The control measure effectiveness values utilized in this SIP are predicated on this schedule.

Violations of the Air Quality Regulations are heard by hearing officers who can make findings of violation and assess penalties. The AQD currently has five Board of Health-appointed hearing officers. Implementation of the new regulations in conjunction with these enhanced enforcement efforts may result in the need for additional hearing officers.

The AQD will identify and prioritize areas for inspection. The initial focus areas for inspection will be areas of Hydrographic Basin 212 characterized as having a high degree of soil disturbance.

4.8.2 Clark County Research Commitments

4.8.2.1 Participation in Funding Dust Suppressant Multi-Media Studies

Dust Suppressants and Their Effects Will Be Studied

Clark County Health District will participate in funding and coordination of research to determine the potential for multi-media adverse environmental impacts from the long-term use of dust suppressant products. UNLV has recently obtained funding from local agencies for conducting a field study to evaluate potential long-term water quality impacts from the use of several classes of dust suppressant products. The study will evaluate impacts to both surface water runoff from treated areas and water that has percolated through a treated area. The AQD has provided partial funding for this study and AQD and CCDCP staff are assisting UNLV in coordinating this work with research planned by the U. S. EPA. The results of the study are anticipated to be available before the end of 2003.

4.8.2.2 Commitment to Conduct a PM_{10} Saturation Study

Clark County Department of Comprehensive Planning will conduct a PM_{10} saturation study that will begin in

2004 and be completed by the 2006 RFP Plan deadline. The focus of the study will be on neighborhood impacts of major sources, particulate concentrations in geographic locations not well covered by the current monitoring network due to growth within the valley, and inter-basin intra-basin transport during high wind events. The study will be conducted in later years to measure the impacts of growth in future years. In addition to the primary objectives of the study, the results will be utilized in future evaluations of the National Ambient Monitoring Network (NAMS), State and Local Air Quality Monitoring Network (SLAMS), and Special Purpose Location (SPL) monitoring network.

Commitments To Improve Emission Inventories

4.8.2.3 Commitment to Develop An Improved Inventory of Unpaved Roads

Clark County Department of Comprehensive Planning will develop an improved inventory of unpaved roads. The inventory for publicly maintained roads will be developed by Clark County Public Works, City of North Las Vegas Public Works, City of Las Vegas Public Works, and City of Henderson Public Works departments and will be completed by the first quarter of 2002. The inventory of unpaved private roads will be completed by CCDCP using either satellite data or aerial photography by March of 2003.

4.8.2.4 Commitment to Develop An Improved Disturbed Vacant Land and Construction Inventory

Clark County Department of Comprehensive Planning will pursue development of an improved inventory of disturbed vacant land and construction activities. The vacant land inventory will be developed using satellite data and ground truthing. It will be completed by June of 2003. The construction activities inventory will be developed using the AQD dust permitting data base, the Clark County's GIS system and aerial photographs. The construction inventory update will be completed by the end of 2002.

4.8.2.5 Commitment to Develop Improved Emission Factors for Native Desert and Disturbed Areas

The emission factors for native desert used in the PM_{10} plan were developed by UNLV based on data developed with the UNLV wind tunnel. When these test were conducted, the U. S. EPA test for soil surface characterization had not been developed. Because both undisturbed native desert and disturbed areas account for a major part of the PM_{10} emissions that are generated during high wind conditions, a refinement of the emission factors for these sources is warranted. Clark County Department of Comprehensive Planning anticipates moving forward with additional studies to develop refined emission factors in 2003, with completion of the studies expected by the end of 2005.

4.8.2.6 Commitment to Track Silt Loadings on Paved Roads

Clark County Department of Comprehensive Planning will conduct additional measurements of silt loadings on paved roads in order to update the paved roads emission inventory and evaluate the effectiveness of control measures for reducing silt loading on paved roads. Silt loading measurements will begin in the fourth quarter of 2001 and be conducted quarterly though June of 2006.

4.8.2.7 Commitment to Establish Test Methods for Section 94

Commitment to Research Development of a Better Construction Activities Test Method

If an acceptable test method has not been developed and adopted into Section 94 by September 1, 2001, Clark County will fund additional research up to $100,000 to develop an acceptable test method. It is Clark County's intention that a contractor will be selected by November 1, 2001. If a test method that is acceptable to U. S. EPA under its BACM and enforceability criteria has not been incorporated into Section 94 by November 1, 2002, the opacity test method for unpaved roads in Section 91 will be presented to the governing board for adoption in December of 2002 for all non-process, intermittent construction site fugitive dust generating activities.

4.8.2.8 Commitment to Update Emission Inventories

Clark County will revise the entire PM_{10} emission inventories for the attainment year in 2003 and 2006 to coincide with the Reasonable Further Progress reports. If the emission inventories are significantly different than in this SIP, particularly if the differences would affect the attainment demonstration, the SIP will be adjusted to reflect the revised PM_{10} emission inventories. If the SIP inventory requires adjustment, it will be resubmitted for approval to U. S. EPA with the Reasonable Further Progress/milestone reports that include revising conformity budgets and re-evaluation of control measures if necessary. The existing approved SIP and conformity budgets will remain in place until such time as a new SIP is approved.

4.8.2.9 Commitment to Revise Air Quality Regulations

The following proposed language for revision to the Air Quality Regulations will move forward in the rule development and adoption process, with rule revisions to be brought to the Clark County Health District Board of Health for approval at the regularly scheduled meeting in August of 2001.

Revisions to Air Quality Regulations Moving Forward in The Rule Process

Section 90.2.1.3 –**Dust Mitigation Plan Required**:

> OWNERS AND/OR OPERATORS of OPEN AREAS AND VACANT LOTS having a cumulative area of 10,000 acres or greater must submit a dust mitigation plan to the Air Quality Division for approval by January 1, 2002 in a format prescribed by the CONTROL OFFICER.

Section 92.2.1.1 **Revised Section:**

> No UNPAVED PARKING LOTS may be constructed after the adoption of this Subsection except as provided in Subsection 92.2.1.1 (a) and (b) below:
>
> (a) The requirements of Subsection 92.2.1.1 shall not be applicable to parking lots for rural public facilities such as trailheads, campgrounds, and similar facilities where paved parking lots would conflict with the rural nature of these facilities; and
>
> (b) The unpaved parking lot is stabilized in accordance with Subsection 92.2.1.2 (b) through (d)

Section 92.2.1.4 – **Prohibition of Dust Over Property Line:**

No OWNER AND/OR OPERATOR of an unpaved parking lot shall permit a dust plume from an unpaved parking lot to cross a property line, provided however, that this requirement shall not be applicable where the owner and/or operator has applied BEST AVAILABLE CONTROL MEASURES provided for in this regulation.

Section 93.2.1.2 **New Section**:

New CONSTRUCTION, MODIFICATION, or approvals of PAVED roads on which vehicular traffic is equal to or greater than 3,000 vehicles per day shall be constructed with a PAVED travel section, and eight (8) feet of stabilized shoulder adjacent to the PAVED travel section where right-of-way is available for the stabilized shoulder. Where right-of-way is not available for the full eight (8) feet of stabilized shoulder, curbing shall be installed adjacent to the shoulder. Stabilized shoulders must be maintained in compliance with the stabilization standards set forth in Subsection 93.2.1.7 of this Regulation.

Section 93.2.2 and Section 93.2.3 **New Sections**:

93.2.2 **Equipment Prohibition:** The use of dry rotary brushes and blower devices for removal of dirt, rock, or other debris from a paved road is expressly prohibited, except where preceded or accompanied by sufficient wetting to limit the visible emissions to an opacity of not greater that 20% opacity as set forth in Subsection 93.5.1.1

93.2.3 **Crack Seal Equipment Requirements:** After adoption of this Subsection, any OWNER AND/OR OPERATOR which utilizes crack seal equipment shall acquire or contract to acquire only vacuum type crack seal equipment.

Section 94.5.4 **New Section:**

No person shall cause or permit the handling, transporting, or storage of any material in a manner that allows any dust plume to extend more than 100 feet, horizontally or vertically, from the point of origin or allow any dust plume to cross a property line, provided however, that the requirements of this Subsection shall not be applicable where BEST AVAILABLE CONTROL MEASURES required by this Regulation are fully implemented.

Section 94.5.9 **New Section:**

Equipment Prohibition: The use of dry rotary brushes and blower devices for removal of deposited mud/dirt carryout from a paved road is expressly prohibited, except where preceded or accompanied by sufficient wetting to limit the visible emissions to an opacity of not greater than 20% opacity as set forth in Subsection 94.9.2.

4.8.3 Control Measure Commitments

4.8.3.1 Commitment to Pave Unpaved Roads

Unpaved roads with identified ADT of 150 or greater will be paved by Clark County Public Works, City of North Las Vegas Public Works, City of Las Vegas Public Works, and City of Henderson Public Works by using CMAQ funds by June 1, 2003. The City of Las Vegas has made an additional commitment to pave all unpaved roads within their jurisdiction by the end of 2006. An extranet web site tracking the paving of the unpaved roads will be established by April 30, 2001 and maintained until all unpaved roads with greater than 150 ADT have been paved. Although this commitment does not include unpaved roads less than 150 ADT outside the City of Las Vegas, unpaved roads with less than 150 ADT have and may continue to be paved as part of the local ERC program. Annual updates on the progress of

Commitment To Pave Greater than 150 ADT Unpaved Roads

paving all roads will be submitted to Clark County AQD and U. S. EPA.

4.8.3.2 Commitment to Stabilize Shoulders of Paved Roads

Commitment To Stabilize Shoulders by the End of 2006

Nevada Department of Transportation, Clark County Public Works, City of North Las Vegas Public Works, City of Las Vegas Public Works, and City of Henderson Public Works departments will identify the roadways in their respective jurisdictions that have a paved section less than 28 feet. For roadways that are not to be improved over the next five years, emission estimates using a consistent methodology will be calculated by each entity in conjunction with CCDCP. The shoulder improvements and road paving for unpaved roads with less than 150 ADT will be prioritized by each entity for their respective jurisdictions based upon emission estimates. At a minimum, funds will be obligated to improve 33 miles of paved roads with unstabilized shoulders to meet Section 93 standards by December 31, 2003 and all unstabilized shoulders will be improved to meet Section standards by December 31, 2006.

The prioritized list of shoulder improvements to meet Section 93 standards and paving of unpaved roads with less than 150 ADT, and identified funding sources will be incorporated into a plan by each entity for their respective jurisdictions. Plans will be completed by February 15, 2002. Annual updates on the progress of stabilizing shoulders will be submitted to Clark County AQD and U. S. EPA.

The current (fiscal year 2001 through fiscal year 2003) Transportation Improvement Program (TIP) commits the use of CMAQ funds not to exceed $25 million to meet the PM_{10} SIP commitments. This will result in the obligation of these funds to roadway shoulder improvements and to the paving of unpaved roads by June 30, 2003, in accordance with each entity's plan. The CMAQ funds beyond fiscal year 2003 will be first committed to the carbon monoxide transportation demand management (TDM) program, and then the necessary funds will be committed to complete each entity's plan for stabilizing shoulders and paving unpaved roads by December 31, 2006.

4.8.4 Commitment to Encourage Adoption of Dust Suppressant Product Specifications

Development of Dust Suppressant Product Specification a Priority

The issue of unintended adverse environmental impacts is noted in the discussion of the Section 90 requirements for disturbed open areas. As noted in the analysis, the risks, while thought to be slight, are real. The absence of a product standard also prevents product applicators, contractors, developers, and public agencies from including approved product specifications in purchase contracts and bid specifications. Because of the scope of this undertaking and the clear applicability to areas outside Clark County, the County believes that development of the standard and the implementation of a limited field testing program needs to be done at the state or federal level. As set forth under research commitments, Clark County is committed to assisting in the funding and coordination of research studies that are needed to develop appropriate product specifications. Clark County will also work with the NDEP and U. S. EPA Region IX to facilitate the adoption of dust control product specifications and a dust control product field testing program.

Clark County is an active participant of the dust palliatives working group and has helped to sponsor the activities of the working group. Clark County will continue to support the working group until dust palliative standards are adopted at the state or federal level.

4.9 SUMMARY OF CLARK COUNTY CONTROL MEASURES AND AIR QUALITY PROGRAMS

As indicated in the introduction to this chapter, Clark County's PM_{10} is dominated by geologic materials from fugitive dust area sources. Therefore, the focus of this SIP is on control of these area dust sources:

disturbed open areas, construction activities, paved roads, and unpaved roads. These controls are implemented through Sections 90, 91, 92, 93, and 94 of the AQD Air Quality Regulations. These regulations are very comprehensive and contain a number of innovative concepts that Clark County believes will substantially reduce emissions from these sources. In particular, Clark County believes that the provisions of Section 94 (Construction Activities) and the companion Section 94 Handbook will set the standard by which other fugitive dust control regulatory programs will be judged in the future.

Some uncertainties in elements of the SIP are noted. The emission inventory for unpaved roads is acknowledged to have some omissions and the inventory for disturbed open areas needs to be updated regularly. Certain major sources might have air quality impacts on nearby neighborhood areas. Certain emission factors for sources that are of critical importance in the Las Vegas Valley may require further verification. This SIP puts forward a series of ambitious research programs to address these uncertainties.

This SIP demonstrates that all significant sources of PM_{10} in the Las Vegas Valley will have BACM applied at the earliest practicable date. These measures also meet the U. S. EPA requirements for RACM.

4.10 PLAN IMPLEMENTATION

Clark County Has the Authority to Implement the SIP

The State of Nevada program for the control of air pollution is established in Chapter 445B of the Nevada Revised Statutes (NRS). NRS 445B.100 states that it is the public policy of the State of Nevada and the purpose of NRS 445B.100 to 445B.640, inclusive, to achieve and maintain levels of air quality which will protect human health and safety. NRS 445B.500 delegates the authority to the District Board of Health of Clark County to establish a program for the control of air pollution and administer the program within its jurisdiction. The District Board of Health of Clark County adopted Air Quality Regulation, Section 2 designating the Board of Health as the Air Pollution Control Board of Clark County and the incorporated cities in Clark County. It establishes the Board's authority to establish such emission control requirements as may be necessary to prevent, abate, or control air pollution, to establish procedures and compliance schedules to enforce those regulations, to levy penalties and to seek criminal fines against violators. Appendix L provides details on AQD dust control enforcement programs.

The District Board of Health of Clark County ensures that the resources needed to implement the air quality program are provided. Future year resource requirements are projected as follows:

FY 2001-2002	$12,133,422
FY 2003-2004	$12,573,490
FY 2005-2006	$15,079,268

The State of Nevada Has Oversight

The State of Nevada has the responsibility for ensuring the adequate implementation of the Clark County air pollution control program. Assurances for this requirement are satisfied through NRS 445B.520 which allows the State Environmental Commission to supersede a County's program in instances when the Commission determines that a local air quality program is inadequate.

CHAPTER 5: DEMONSTRATION OF ATTAINMENT OF PM_{10} NATIONAL AMBIENT AIR QUALITY STANDARDS

5.1 INTRODUCTION

The purpose of this PM_{10} State Implementation Plan is to assess whether control measures adopted since 1998 (Reasonably Achievable Control Measures [RACM] and Best Available Control Measures [BACM]) reduce PM_{10} emissions sufficiently to demonstrate attainment of the annual and 24-hour national ambient air quality standards for PM_{10} no later than December 31, 2001. This attainment demonstration, or test, must show that the nonattainment region will reach attainment by the end of 2001. As demonstrated in this chapter of the SIP, the annual standard will be attained in 2001 but the 24-hour NAAQS cannot be attained until 2006. An explanation of why Clark County projects attainment of the 24-hour standard in 2006 instead of the current deadline of 2001 specified by the Clean Air Act (Act) is found in Chapter 7.

The modeling process used to demonstrate attainment is described in Appendix K. There are several key elements for attainment demonstration, including an assessment of future air quality conditions, a summary of committed control measure impacts, and projected attainment status. Future air quality conditions were described in Chapter 3. The control measures that have been adopted are described in Chapter 4. This chapter addresses the impacts of the control measures and the projected attainment status. This chapter also addresses reasonable further progress and the transportation conformity budget.

5.2 DESIGN VALUE SELECTION

In accordance with U. S. EPA serious area guidance, representative 24-hour and annual average PM_{10} concentrations are needed to estimate the amount of emission reductions required to demonstrate attainment of the standards. These high concentrations, referred to as design values, are used to determine the type and level of controls needed to attain both standards. They represent the “starting point” for ambient levels of PM_{10} and determine the quantity of reductions necessary to meet the standards. For example, if the design value for the annual standard is 53 $\mu g/m^3$, the State Implementation Plan (SIP) measures must result in at least a 3 $\mu g/m^3$ reduction to meet the standard.

5.2.1 Annual Design Value Concentration

The base year design value for the Las Vegas Valley nonattainment area, determined with 1997, 1998, and 1999 PM_{10} monitoring data, is 53 $\mu g/m^3$ for the annual standard. The development of the annual design concentration is relatively straightforward. If one or more years of ambient PM_{10} measurements are available for a site, the design concentration is the average of the observed annual arithmetic means.[1] The annual arithmetic means were averaged for all monitoring stations described in Chapter 2. The only station where the average of the means from 1997 through 1999 exceeded the annual NAAQS was J. D. Smith/McDaniel. The McDaniel station was moved during the evaluation period due to the loss of the lease for the site, and the monitor was located at the nearby J. D. Smith Middle School. The site is now referred to as the J. D. Smith site. The average of the annual arithmetic mean is 53 $\mu g/m^3$. Therefore, the base year annual design value concentration will be 53 $\mu g/m^3$.

Annual Design Value is 53 $\mu g/m^3$

The base year design value, in conjunction with the increase or decrease of emissions from 1998 to 2001, are then used to project attainment year concentrations or design values in 2001. The U. S. EPA recommends a combination of receptor and

[1] *PM_{10} Guideline Document*, United States Environmental Protection Agency, Office of Air Quality Planning and Standards; Research Triangle Park, North Carolina, April 1993.

dispersion models combined with reliable emission projections to model attainment with national ambient air quality standards in a future year.

Accurately Modeling PM_{10} Ambient Concentrations for Future Years Is Problematic

However, accurately modeling PM_{10} air quality in a future year in accordance with U. S. EPA recommendations is a difficult objective. Problem areas remain with respect to both emission inventories and modeling techniques. There are circumstances where receptor models are not capable of quantifying absolute PM_{10} emission estimates (such as urban locations where a large fraction of particulate emissions are from non-traditional sources like construction operations, unpaved roads, and wind-blown fugitive dust). Dispersion models also have limitations. For example, as part of the Las Vegas Valley PM_{10} Study, the Desert Research Institute attempted to model PM_{10} emissions within a micro-scale area of the valley's nonattainment area utilizing the Chemical Mass Balance (CMB) receptor model,[2] the Fugitive Dust Model (FDM), and the Industrial Source Complex 3 (ISC3) Gaussian plume dispersion model.[3] The receptor modeling results attributed over 80 percent of the ambient concentration to fugitive dust sources, but could not distinguish between the fugitive dust sources. Uncertainties regarding emission rates, in terms of timing and location (e.g., construction activities versus paved road dust) present problems in obtaining valid results from dispersion models. These issues are discussed in more detail in Appendix K.

Therefore, the projected annual design value for 2001 (as an indicator of attainment) will be derived by changing the base year design concentration of 53 $\mu g/m^3$ by the same percentage as the change between the total amount of PM_{10} emissions emitted throughout the valley between 1998 and 2001. This application assumes that as valley-wide

[2] *Fugitive Dust and Other Source Contributions to PM_{10} in Nevada's Las Vegas Valley. Vol. II, Draft Final Report*, Desert Research Institute, Reno, Nevada, August 30, 1996.
[3] *Fugitive Dust and Other Source Contributions to PM_{10} in Nevada's Las Vegas Valley. Vol. II, Final Report*, Desert Research Institute, Reno, Nevada, April 18, 1997.

PM_{10} emissions change, then so would design concentrations. In other words, there would be a proportional relationship between emissions and ambient concentration. This methodology is commonly known as the proportional rollback model.

Although Emissions Are Lower in 2001 Than in 1998, the Design Value Is Held at 53 $\mu g/m^3$

Tables 3-3 and 3-8 indicate that emissions generated in 2001 would be slightly lower than those generated in 1998. The lower emission estimates are based on a decrease in vacant land. Vacant land acreage is anticipated to decrease as development within the BLM disposal area continues. Although these numbers are the best estimates available, there are no guarantees the vacant land will be developed. Due to the uncertainty regarding the number of acres of vacant land and the corresponding emissions from this source, the proportional ambient concentration may not be reduced by the amount projected by the emissions inventory. Therefore, as a conservative, health-protective step, the projected annual design value will not be lowered but will be set at 53 $\mu g/m^3$.

5.2.2 24-Hour Design Day Concentrations

Design Values Stay the Same for the Micro-Scale Sites

The development of the 24-hour design concentrations was more complex than the annual average. Appendix A details the 24-hour design value selection process. The design values exceed the 24-hour NAAQS at five monitoring stations in Hydrographic Basin 212: Craig Road, East Flamingo, Green Valley, J. D. Smith, and Pittman. The design value for each site and the date it was monitored is presented in Table 3-6. These sites are representative of typical conditions and sources that lead to high levels of PM_{10} in the BLM disposal area. Other sites within the BLM disposal area with similar sources surrounding them may be present or develop as growth continues within the nonattainment area. In that event, these sites could be utilized to represent the sources affecting PM_{10} levels in these areas and the impact of the implementation of the SIP control measures. As these sites are considered representative of potential future areas, neither the emissions inventories nor the design values were projected for 2001. Reviewing the meteorological conditions on the days these design values were recorded, the design values occurred when:

- hourly average winds exceeded 15 mph;
- wind speeds exceeded the threshold friction velocity for soils within the Las Vegas Valley;
- climatological conditions did not meet the Natural Event definition; and
- PM_{10} precursors (compounds leading to condensable and secondary particulate formation) did not play a major role in the violations of the NAAQS.

The Valley-Wide 24-Hour Design Value Is 281 $\mu g/m^3$

In addition to the design value for each of the five monitoring sites where violations of the NAAQS were measured, a valley-wide design value was also developed for the purposes of the attainment demonstration and the development of a transportation conformity budget. Consistent with U. S. EPA policy, the 24-hour valley-wide design value was chosen on the basis that it was the third highest of each of the highest 24-hour concentrations measured in a calendar year. It is the highest concentration measured in 1998, the annual base year; and the day it was measured, December 21, 1998, is in roughly the same time frame as the other 24-hour design days. The 24-hour design value for the valley-wide inventory is 281 $\mu g/m^3$.

As with the annual valley-wide inventory, the total emissions for the design day presented in Table 3-5 are higher than the total 2001 emissions. Again, this change is based largely on the acres of vacant land that are anticipated being developed between 1998 and 2001. As previously mentioned, the emissions are based upon assumptions that may or may not be realized. Therefore, as a conservative, health-protective step, the projected valley-wide 24-hour design value will not be lowered but will be set at 281 $\mu g/m^3$. This is a conservative approach because the higher design value will require greater controls than a lower design value that would be calculated based upon the lower projected emissions.

5.3 RELATING DESIGN VALUES TO EMISSION INVENTORIES

Due to problems with dispersion and receptor models described earlier, the proportional rollback method was applied to estimate the relationship between region-wide PM_{10} emissions and sampled PM_{10} concentrations. The rollback method assumes ambient PM_{10} concentrations in excess of background values are proportional to region-wide emissions. As stated previously, the design day concentration of 281 $\mu g/m^3$ is considered proportional to the 24-hour valley-wide inventory although it was measured at only one site. The annual emissions inventory will be reduced by the same percentage for each source as the control measures will reduce emissions in the J. D. Smith micro-inventory area for the sources that appear in both inventories. The annual design value of 53 $\mu g/m^3$ will be used for the J. D. Smith annual inventory and the valley-wide inventory.

Proportional Rollback Modeling Will Be Performed for Five Micro-Scale Sites as Well as Valley-Wide

To ensure the proportional rollback modeling results were sound enough to evaluate controls needed to attain the NAAQS on a valley-wide basis, five additional micro-scale inventories (micro-inventories) were completed at the five sites where design concentrations exceeded the 24-hour NAAQS. The 24-hour micro-scale inventories are related to the values measured at the respective monitoring location and the same rollback method will be used to demonstrate attainment.

Tables 5-1 through 5-8 demonstrate the proportional rollback modeling results for the attainment year of 2001 using the design values as described above. These models present the impact on, or contribution to, the design concentrations in 2001 before any proposed PM_{10} control reductions take place.

Table 5-1

2001 Annual BLM Disposal Area Uncontrolled PM_{10} Emissions, Percent Contribution and Concentration

SOURCES	PM_{10} (tons/year)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Stationary Point Sources			
Sand & Gravel Operations	627	0.37	0.13
Utilities – Natural Gas	199	0.12	0.04
Asphalt Concrete Manufacture	171	0.10	0.04
Industrial Processes	80	0.05	0.02
Other Sources	124	0.07	0.03
Total	1,201	0.70	0.26
Stationary Area Sources			
Small Point Sources	184	0.11	0.04
Residential Firewood	89	0.05	0.02
Residential Natural Gas	79	0.05	0.02
Commercial Natural Gas	33.2	0.02	0.01
Industrial Natural Gas	14	0.01	0.00
NG – Purchased at the Source – Carried by SWG	210	0.12	0.04
Structural / Vehicle Fires / Wild Fires	20	0.01	0.00
Charbroiling / Meat Cooking	889	0.52	0.19
Disturbed Vacant Lands / Unpaved Parking Lots	33,100	19.40	7.08
Native Desert Fugitive Dust	9,520	5.58	2.04
Stabilized Vacant Lands Dust	3,640	2.13	0.78
Construction Activity Fugitive Dust	23,109	13.54	4.94
Windblown Construction Dust	18,381	10.77	3.93
Total	89,269	52.32	19.10
Nonroad Mobile Sources			
Airport Support Equipment	44	0.03	0.01
Commercial Equipment	0.3	0.00	0.00
Construction & Mining Equipment	428	0.25	0.09
Lawn & Garden Equipment	15	0.01	0.00
Railroad Equipment	17	0.01	0.00
Recreational Equipment	1.0	0.00	0.00
McCarran International Airport	297	0.17	0.06
Henderson Executive Airport	7	0.00	0.00
North Las Vegas Municipal Airport	27	0.02	0.01
Nellis Air Force Base	31.9	0.02	0.01
Total	867	0.51	0.19
Onroad Mobile Sources			
Paved Road Dust (Includes Construction Track Out)	55,005	32.24	11.77
Unpaved Road Dust	18,932	11.10	4.05
Highway Construction Projects Activities	2,782	1.63	0.60
Highway Construction Projects – Wind Erosion	1,470	0.86	0.31
Vehicular Sulfate PM	489	0.29	0.10
Vehicular Tire Wear	100	0.07	0.02
Vehicular Brake Wear	163	0.10	0.03
Vehicular Exhaust	346	0.20	0.07
Total	79,287	46.47	16.96
Background*			**16.5**
Total	**170,625**	**100.00%**	**53**

*Background includes 13 $\mu g/m^3$ annual average concentration measured at the Jean monitoring station and 3.5 $\mu g/m^3$ of secondary particulate.

Table 5-2

J. D. Smith 2001 Annual Uncontrolled Emissions Inventory and Design Concentration Contributions

Source Category	2001 Emissions (tons)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Vacant Land	213.4	3.99	1.46
Native Desert	2.1	0.04	0.01
Unstable	206.0	3.85	1.41
Stabilized	5.3	0.10	0.04
Construction	302.7	5.66	2.06
Wind Erosion	109.8	2.05	0.75
Construction Activities	186.6	3.49	1.27
Track Out	7.9	0.15	0.05
Unpaved Road Dust	1.8	0.03	0.01
Paved Road Dust	4,789	89.50	32.67
Vehicles			
PM_{10}	35.9	0.67	0.24
SOx	51.9	-	-
NOx	2,262.3	-	-
Stationary Sources			
PM_{10}	6.3	0.12	0.04
SOx	1.6	-	-
NOx	55.2	-	-
Background*			16.5
TOTAL			
PM_{10}	5,350.7		53
SOx	53.5		
NOx	2,317.5		

*Background includes 13 $\mu g/m^3$ annual average concentration measured at the Jean monitoring station and 3.5 $\mu g/m^3$ of secondary particulate.

Table 5-3

2001 24-Hour BLM Disposal Area Uncontrolled PM_{10} Emissions, Percent Contribution, and Concentration

SOURCES	PM_{10} (tons/day)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Stationary Point Sources			
Sand & Gravel Operations	1.72	0.24	0.65
Utilities – Natural Gas	0.55	0.08	0.20
Asphalt Concrete Manufacture	0.47	0.07	0.18
Industrial Processes	0.22	0.03	0.08
Other Sources	0.34	0.05	0.13
Total	3.29	0.46	1.24
Stationary Area Sources			
Small Point Sources	0.50	0.07	0.19
Residential Firewood	0.96	0.13	0.36
Residential Natural Gas	0.22	0.03	0.08
Commercial Natural Gas	0.09	0.01	0.03
Industrial Natural Gas	0.04	0.01	0.01
NG – Purchased at the Source – Carried by SWG	0.58	0.08	0.22
Structural / Vehicle Fires / Wild Fires	0.06	0.01	0.02
Charbroiling / Meat Cooking	2.44	0.34	0.92
Disturbed Vacant Lands / Unpaved Parking Lots	253	35.15	95.08
Native Desert Fugitive Dust	0.00	0.00	0.00
Stabilized Vacant Lands Dust	28.00	3.89	10.52
Construction Activity Fugitive Dust	63.31	8.80	23.79
Windblown Construction Dust	140.53	19.52	52.81
Total	489.72	68.04	184.04
Nonroad Mobile Sources			
Airport Support Equipment	0.12	0.02	0.05
Commercial Equipment	0.00	0.00	0.00
Construction & Mining Equipment	1.17	0.16	0.44
Lawn & Garden Equipment	0.04	0.01	0.02
Railroad Equipment	0.05	0.01	0.02
Recreational Equipment	0.00	0.00	0.00
McCarran International Airport	0.81	0.11	0.31
Henderson Executive Airport	0.02	0.00	0.01
North Las Vegas Municipal Airport	0.07	0.01	0.03
Nellis Air Force Base	0.09	0.01	0.03
Total	2.38	0.33	0.89
Onroad Mobile Sources			
Paved Road Dust (Includes Construction Track Out)	150.70	20.94	56.63
Unpaved Road Dust	51.87	7.21	19.49
Highway Construction Projects Activities	7.62	1.06	2.86
Highway Construction Projects – Wind Erosion	11.20	1.56	4.21
Vehicular Sulfate PM	1.34	0.19	0.50
Vehicular Tire Wear	0.27	0.04	0.10
Vehicular Brake Wear	0.45	0.06	0.17
Vehicular Exhaust	0.95	0.13	0.36
Total	224.40	31.18	84.33
Background*			**10.5**
Total	**719.78**	**100.00%**	**281**

*Background includes 7 $\mu g/m^3$ 24-hour concentration measured at the Boulder City monitoring station on December 21, 1998, and 3.5 $\mu g/m^3$ of secondary particulate.

Table 5-4

Craig Road 24-Hour Uncontrolled Emissions Inventory and Design Concentration Contributions*

Source Category	Emissions (tons)	Percent Contribution	Impact on Design Concentration (μg/m^3)
Vacant Land	4.82	30.79	69.74
Native Desert	-	-	-
Unstable	4.32	27.60	62.51
Stabilized	0.50	3.19	7.23
Construction	3.43	21.91	49.63
Wind Erosion	2.72	17.38	39.36
Construction Activities	0.68	4.34	9.84
Track Out	0.03	0.19	0.43
Unpaved Road Dust	0.14	0.89	2.03
Paved Road Dust	3.98	25.42	57.59
Unpaved Parking	0.514	3.28	7.44
Wind Erosion	0.51	3.26	7.38
Vehicles	0.004	0.03	0.06
Race Tracks	2.43	15.52	35.16
Wind Erosion	1.71	10.92	24.74
Vehicles	0.72	4.60	10.42
Vehicles			
PM_{10}	0.1	0.64	1.45
SOx	0.05	-	-
NOx	2.36	-	-
Stationary Sources			
PM_{10}	0.24	1.53	3.47
SOx	0.0004	-	-
NOx	0.0583	-	-
Background**			27.5
TOTAL			
PM_{10}	15.65		254
SOx	0.0504		
NOx	2.418		

*This inventory was prepared to represent the sources within two kilometers of the Craig Road monitoring station on the design day at this site. The relative contribution is based upon the design value of 254 μg/m^3. The inventory is considered to be representative of areas with the highest recorded PM_{10} values.

**Background includes 24 μg/m^3 24-hour concentration measured at the Jean monitoring station on January 20, 1999, and 3.5 μg/m^3 of secondary particulate.

Table 5-5

East Flamingo 24-Hour Uncontrolled Emissions Inventory and Design Concentration Contributions*

Source Category	Emissions (tons)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Vacant Land	2.912	24.38	36.70
Native Desert	0.141	1.18	1.78
Unstable	2.68	22.44	33.77
Stabilized	0.091	0.76	1.15
Construction	3.92	32.83	49.40
Wind Erosion	3.56	29.81	44.87
Construction Activities	0.32	2.68	4.03
Track Out	0.04	0.33	0.50
Unpaved Road Dust	0.01	0.08	0.13
Paved Road Dust	4.96	41.53	62.51
Vehicles			
PM_{10}	0.13	1.09	1.64
SOx	0.06	-	-
NOx	3.22	-	-
Stationary Sources			
PM_{10}	0.01	0.08	0.13
SOx	0.001	-	-
NOx	0.14	-	-
Background**			38.5
TOTAL			
PM_{10}	11.942		189
SOx	0.061		
NOx	3.36		

*This inventory was prepared to represent the sources within two kilometers of the East Flamingo monitoring station on the design day at this site. The relative contribution is based upon the design value of 189 $\mu g/m^3$. The inventory is considered to be representative of areas with the highest recorded PM_{10} values.

**Background includes 35 $\mu g/m^3$ 24-hour concentration measured at the Jean monitoring station on March 30, 1999, and 3.5 $\mu g/m^3$ of secondary particulate.

Table 5-6

Green Valley 24-Hour Uncontrolled Emissions Inventory and Design Concentration Contributions*

Source Category	Emissions (tons)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Vacant Land	7.33	21.83	57.09
Native Desert	-	-	-
Unstable	7.29	21.71	56.78
Stabilized	0.04	0.12	0.31
Construction	21.19	63.11	165.03
Wind Erosion	18.3	54.50	142.52
Construction Activities	2.85	8.49	22.20
Track Out	0.04	0.12	0.31
Unpaved Road Dust	0.017	0.05	0.13
Paved Road Dust	3.54	10.54	27.57
Race Tracks	1.26	3.75	9.81
Wind Erosion	1.08	3.22	8.41
Vehicles	0.18	0.54	1.40
Vehicles			
PM_{10}	0.07	0.21	0.55
SOx	0.03	-	-
NOx	1.64	-	-
Stationary Sources			
PM_{10}	0.17	0.51	1.32
SOx	0.19	-	-
NOx	0.02	-	-
Background**			19.5
TOTAL			
PM_{10}	33.577		281
Sox	0.22		
Nox	1.66		

*This inventory was prepared to represent the sources within two kilometers of the Green Valley monitoring station on the design day at this site. The relative contribution is based upon the design value of 281 $\mu g/m^3$. The inventory is considered to be representative of areas with the highest recorded PM_{10} values.

**Background includes 16 $\mu g/m^3$ 24-hour concentration measured at the Jean monitoring station on February 25, 1999, and 3.5 $\mu g/m^3$ of secondary particulate.

Table 5-7

J. D. Smith 24-Hour Uncontrolled Emissions Inventory and Design Concentration Contributions*

Source Category	Emissions (tons)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Vacant Land	10.08	36.56	63.06
Native Desert	0.63	2.28	3.94
Unstable	9.4	34.09	58.81
Stabilized	0.05	0.18	0.31
Construction	5.52	20.02	34.53
Wind Erosion	5.1	18.50	31.91
Construction Activities	0.35	1.27	2.19
Track Out	0.07	0.25	0.44
Unpaved Road Dust	0.004	0.01	0.03
Paved Road Dust	11.63	42.18	72.76
Vehicles			
PM_{10}	0.26	0.94	1.63
SOx	0.13	-	-
NOx	6.6	-	-
Stationary Sources			
PM_{10}	0.08	0.29	0.50
SOx	0.002	-	-
NOx	0.12	-	-
Background**			45.5
TOTAL			
PM_{10}	27.574		218
Sox	0.132		
Nox	6.72		

*This inventory was prepared to represent the sources within two kilometers of the J. D. Smith monitoring station on the design day at this site. The relative contribution is based upon the design value of 218 $\mu g/m^3$. The inventory is considered to be representative of areas with the highest recorded PM_{10} values.

**Background includes 42 $\mu g/m^3$ 24-hour concentration measured at the Walter Johnson monitoring station on March 31, 1999, and 3.5 $\mu g/m^3$ of secondary particulate.

Table 5-8

Pittman 24-Hour Uncontrolled Emissions Inventory and Design Concentration Contributions*

Source Category	Emissions (tons)	Percent Contribution	Impact on Design Concentration ($\mu g/m^3$)
Vacant Land	13.16	67.07	134.48
Native Desert	-	-	-
Unstable	12.9	65.75	131.83
Stabilized	0.26	1.33	2.66
Construction	1.32	6.73	13.49
Wind Erosion	1.12	5.71	11.45
Construction Activities	0.19	0.97	1.94
Track Out	0.01	0.05	0.10
Unpaved Road Dust	0.66	3.36	6.74
Paved Road Dust	2.92	14.88	29.84
Unpaved Parking	1.14	5.81	11.65
Wind Erosion	1.11	5.66	11.34
Vehicles	0.03	0.15	0.31
Vehicles			
PM_{10}	0.06	0.31	0.61
SOx	0.03	-	-
NOx	1.51	-	-
Stationary Sources			
PM_{10}	0.36	1.83	3.68
SOx	0.02	-	-
NOx	0.19	-	-
Background**			38.5
TOTAL			
PM_{10}	19.62		239
Sox	0.05		
Nox	1.7		

*This inventory was prepared to represent the sources within two kilometers of the Pittman monitoring station on the design day at this site. The relative contribution is based upon the design value of 239 $\mu g/m^3$. The inventory is considered to be representative of areas with the highest recorded PM_{10} values.

**Background includes 35 $\mu g/m^3$ 24-hour concentration measured at the Jean monitoring station on March 30, 1999, and 3.5 $\mu g/m^3$ of secondary particulate.

5.4 PM_{10} EMISSION LEVELS FOR ATTAINMENT OF THE NAAQS

Annual Emissions Levels Determined by Percent Reduction Required at J. D. Smith Site

In order to attain the annual standard by December 31, 2001, the projected annual design value (53 $\mu g/m^3$) depicted in Tables 5-1 and 5-2 would need to be reduced by 5.66 percent, for a total reduction of 3 $\mu g/m^3$. Because there are five representative sites and a valley-wide emissions inventory, there are six 24-hour design values. The relative impact from sources differs based upon the individual site parameters or valley-wide characteristic. For example, paved road dust contributes over 42 percent of the total emissions for the J. D. Smith micro-scale area and only about 11 percent to the emissions surrounding the Green Valley monitoring station. As shown in Table 5-9, the percent reduction to attain the 24-hour NAAQS (150 $\mu g/m^3$) varies among the sites chosen by between 20.6 and 46.6 percent, for a total reduction of between 39 and 131 $\mu g/m^3$.

The background concentration for the annual design year was determined by comparing the annual concentrations measured in 1998 at the 16 monitoring stations within and near the nonattainment area (see Figure 2-1). The lowest measured annual average concentration was considered background. The location of the monitoring station with the lowest annual average was reviewed to ensure the monitor was located generally upwind of the nonattainment area. The lowest annual average concentration was measured at the Jean site, which is located southeast of the nonattainment area. As predominant winds are from the southeast (Figures 2-4 through 2-6), the annual average concentration of 13 $\mu g/m^3$ was used for the ambient background for the annual inventories.

A similar process was used to determine the ambient background concentration for the 24-hour design days. The PM_{10} concentration measured at each of the Clark County Air Quality Division (AQD) monitoring stations for each of the design days was reviewed to determine the lowest measured concentration in the area. When the lowest concentration had been determined, the wind roses for the design day (Appendix D) were reviewed to ensure the minimum measurement had occurred at a station upwind of each of the representative stations. The ambient background concentrations are listed for each 24-hour inventory in Tables 5-3 through 5-8.

Regional Background Concentrations Assumed to be Constant

Background concentrations are assumed to be consistent or unchanging from year to year and are not subject or amenable to control strategies. This is due to the fact that background sources are mostly natural PM_{10} sources that are not within the ability of the SIP to control. An example would be wind-blown dust from parcels of native desert not within the BLM disposal area. Consequently, control measures and/or reductions are limited to man-made PM_{10} emission sources. Fortunately, reduction in man-made sources of PM_{10} will allow the area to attain the standards. Accordingly, man-made influences on the annual design concentrations must be reduced 8.2 percent. The reduction from man-made sources for the attainment of the 24-hour standard varies between 25.9 and 48.4 percent, as shown in Table 5-9. The higher reductions from man-made sources are necessary since almost 25 percent of the annual emissions and up to 19.2 percent of the daily emissions in 2001 are uncontrollable (natural). The proportional rollback method allows the establishment of emission levels to demonstrate attainment for all design values: annual, 24-hour micro-scale, and 24-hour valley-wide.

Table 5-9

24-Hour Attainment Percent and Concentration Reductions

Location	Design Value ($\mu g/m^3$)	Percent Reduction for Attainment	Concentration Reduction for Attainment ($\mu g/m^3$)	Percent Reduction From Man-made Sources
Valley-wide	281	46.6	131	48.4
Craig Road	254	40.9	104	45.9
East Flamingo	189	20.6	39	25.9
Green Valley	281	46.6	131	50.1
J. D. Smith	218	31.2	68	39.4
Pittman	239	37.2	89	44.4

5.4.1 Annual Attainment Levels

Table 5-1 depicts a projected 2001 valley-wide emission inventory of 170,625 tons of PM_{10}. A reduction of 5.66 percent, or 9,657 tons, is needed to attain the annual standard of 50 $\mu g/m^3$. The PM_{10} emissions allowed during calendar year 2001 on a valley-wide basis without exceeding the annual standard would be 160,968 tons for all sources including background conditions, or 156,634 tons for man-made sources applying the proportional relationship between valley-wide emissions and the projected design concentration as previously described.

The annual emission inventory for 2001 for the J. D. Smith micro-inventory area depicted in Table 5-2 is 5,351 tons of PM_{10}. A reduction of 5.66 percent, or 303 tons, is needed to attain the annual standard of 50 $\mu g/m^3$. The estimated amount of PM_{10} that can be emitted during calendar year 2001 within the micro-inventory area without an exceedance of the 24-hour NAAQS would be 5,048 tons for all sources including background conditions, or 4,912 tons for man-made sources.

5.4.2 24-Hour Attainment Levels

24-Hour Attainment Levels Vary by Site

Table 5-10 depicts the projected 24-hour attainment levels for the valley and the five micro-scale sites in 2001. The reduction percentages presented in Table 5-9 are applied to the appropriate source categories, and the reduction of tons of PM_{10} emitted for each location are also presented. Table 5-10 expresses the same information as Table 5-9 in terms of tons/day rather than percentages. The estimated number of tons emitted on the design day is summarized in the second column of the table. The reduction in emissions required to demonstrate attainment from all sources is summarized in the third column. The fourth column presents the reduction from man-made sources to reach attainment, and the last column presents the tons/day that may be emitted and attainment of the 24-hour NAAQS established. The estimated emissions after implementation of the control measures cannot exceed the values in the last column at each location for a successful attainment demonstration.

Table 5-10

24-Hour PM_{10} Attainment Levels by Location

Location	Design Day Emission Inventory (tons)	Reduction to Meet 24-Hour NAAQS (tons)	Reduction from Man-made Sources to Meet 24-Hour NAAQS (tons)	24-Hour Attainment Levels to Meet NAAQS (tons)
Valley-wide	719.78	335.42	348.37	371.41
Craig Road	15.65	6.40	7.18	8.47
East Flamingo	11.94	2.46	3.09	8.85
Green Valley	33.58	15.65	16.82	16.76
J. D. Smith	27.57	8.60	10.86	16.71
Pittman	19.62	7.30	8.71	10.91

5.5 ATTAINMENT DEMONSTRATIONS

Chapter 4 noted the control initiatives implemented since the 1998 base year. These initiatives are projected to reduce PM_{10} emissions from disturbed vacant land, construction, paved roads, unpaved roads, unpaved parking lots, and race tracks. The predicted emissions with the proposed control initiatives are the basis for the attainment demonstrations. Calculations for controlled inventories are presented in Appendix L.

5.5.1 Annual Attainment Demonstration in 2001

The valley-wide annual emissions inventory with control measure reductions as applied to the J. D. Smith micro-scale inventory and corresponding PM_{10} concentration is depicted in Table 5-11. The reductions correspond to an overall decrease of 31,942 tons, enough to demonstrate attainment by a wide margin. Since there is a proportional relationship between emissions and concentrations, these valley-wide emission reductions are also expected to reduce the annual concentration by 7 $\mu g/m^3$ to 46 $\mu g/m^3$, depending on the location.

As shown in Table 5-11, these reductions are adequate to reach attainment of the annual standard of 50 $\mu g/m^3$. The anticipated ambient concentration of 46 $\mu g/m^3$ is below the ambient standard and even with a small degree of uncertainty regarding the inventory, the attainment demonstration is sound. The attainment levels in Table 5-11 are not intended to be source specific. Specifically, the individual stationary sources may vary over time, or the exact number of acres that are vacant or under construction may vary. Despite small variations in individual sources, the total valley-wide emissions are anticipated to remain at or below the projections shown in Table 5-11.

With SIP Adopted Controls, the Annual Concentration Will Be Reduced to 46.1 $\mu g/m^3$

Table 5-11

2001 Annual BLM Disposal Area Controlled PM_{10} Emissions and Attainment Concentration Contributions

SOURCES	PM_{10} (TPY)	Controlled PM_{10} (TPY)	Percent Reduction	Impact on Attainment Concentration ($\mu g/m^3$)
Stationary Point Sources				
Sand & Gravel Operations	627	627	0.00	0.13
Utilities – Natural Gas	199	199	0.00	0.04
Asphalt Concrete Manufacture	171	171	0.00	0.04
Industrial Processes	80	80	0.00	0.02
Other Sources	124	124	0.00	0.03
Total	1,201	1,201	0.00	0.26
Stationary Area Sources				
Small Point Sources	184	184	0.00	0.04
Residential Firewood	89	89	0.00	0.02
Residential Natural Gas	79	79	0.00	0.02
Commercial Natural Gas	33.2	33.2	0.00	0.01
Industrial Natural Gas	14	14	0.00	0.00
NG – Purchased at the Source – Carried by SWG	210	210	0.00	0.04
Structural / Vehicle Fires / Wild Fires	20	20	0.00	0.00
Charbroiling / Meat Cooking	889	889	0.00	0.19
Disturbed Vacant Lands / Unpaved Parking Lots	33,100	21,184	-36.00	4.53
Native Desert Fugitive Dust	9,520	9,520	0.00	2.04
Stabilized Vacant Lands Dust	3,640	3,640	0.00	0.78
Construction Activity Fugitive Dust	23,109	15,252	-34.00	3.26
Windblown Construction Dust	18,381	11,861	-35.47	2.54
Total	89,269	62,976	-30.23	13.47
Nonroad Mobile Sources				
Airport Support Equipment	44	44	0.00	0.01
Commercial Equipment	0.3	0.3	0.00	0.00
Construction & Mining Equipment	428	428	0.00	0.09
Lawn & Garden Equipment	15	15	0.00	0.00
Railroad Equipment	17	17	0.00	0.00
Recreational Equipment	1.0	1.0	0.00	0.00
McCarran International Airport	297	297	0.00	0.06
Henderson Executive Airport	7	7	0.00	0.00
North Las Vegas Municipal Airport	27	27	0.00	0.01
Nellis Air Force Base	31.9	31.9	0.00	0.01
Total	867	867	0.00	0.19
Onroad Mobile Sources				
Paved Road Dust (Includes Construction Track Out)	55,005	50,822	-7.61	10.87
Unpaved Road Dust	18,932	18,932	0.00	4.05
Highway Construction Projects Activities	2,782	1,836	-34.00	0.39
Highway Construction Projects – Wind Erosion	1,470	951	-35.29	0.20
Vehicular Sulfate PM	489	489	0.00	0.10
Vehicular Tire Wear	100	100	0.00	0.02
Vehicular Brake Wear	163	163	0.00	0.03
Vehicular Exhaust	346	346	0.00	0.07
Total	79,287	73,638	-7.12	15.75
Background				**16.5**
Total	**170,625**	**138,683**	**-18.95**	**46.20**

As the only monitoring station where violations of the annual NAAQS have occurred, an attainment demonstration was conducted using the J. D. Smith micro-scale inventory. As depicted in Table 5-12, the micro-scale emissions are reduced by over 12 percent. Since there is a proportional relationship between emissions and concentrations, these emission reductions are also expected to reduce the annual concentration by almost 5 $\mu g/m^3$, with a projected 2001 ambient concentration of 48.5 $\mu g/m^3$. The projected value, with SIP PM_{10} controls implemented, is below the national annual standard. Even with some uncertainty regarding the emissions inventory, the attainment demonstration is conservative in that there is a margin between the NAAQS and the projected attainment year concentration.

5.5.2 24-Hour Attainment Demonstration in 2006

Chapter 4 noted that control measures recently adopted as part of this SIP are projected to reduce PM_{10} from vacant land, construction sites, unpaved parking, race tracks, and paved road dust. Most of the control measures will be fully implemented by the end of 2003. These controls were applied to the 2001 projected 24-hour emission inventory for the BLM disposal area. As presented in Table 5-13, the controls as partially implemented in 2001 will not reduce emissions to a level below the 24-hour NAAQS. Therefore, an extension of the attainment date for the 24-hour NAAQS is being requested. This request is presented in Chapter 7 of the SIP. The extension is being requested to 2006. Most of the controls will be in place by the end of 2003, reducing emissions below the 24-hour NAAQS for three years ending in 2006. The 2006 24-hour BLM disposal area inventory with SIP-adopted controls fully implemented is presented in Table 5-14. The controls were also applied to all five of the micro-scale inventories for the areas surrounding the five monitoring stations where exceedances of the national 24-hour standard were recorded.

With Fully Adopted Controls 24-Hour Attainment Can Be Reached at All Micro-Scale Sites and Valley-Wide

Table 5-12

J. D. Smith 2006 Annual Controlled Emissions Inventory and Attainment Concentration Contributions

Source Category	Uncontrolled 2006 Emissions (tons)	Controlled 2006 Emissions (tons)	Percent Reduction*	Impact on Attainment Concentration ($\mu g/m^3$)
Vacant Land	213.4	139.3	-34.7	0.95
Native Desert	2.1	2.1	0.00	0.01
Unstable	206.0	131.8	-36.00	0.90
Stabilized	5.3	5.3	0.00	0.04
Construction	302.7	201.3	-33.50	1.37
Wind Erosion	109.8	71.1	-36.00	0.48
Construction Activities	186.6	123.2	-34.00	0.84
Track Out	7.9	7.1	-11.00	0.05
Unpaved Road Dust	1.8	1.8	0.00	0.01
Paved Road Dust	4,789	4,311	-10.00	29.41
Vehicles				
PM_{10}	35.9	35.9	0.00	0.24
SOx	51.9	51.9	-	-
NOx	2,262	2,262	-	-
Stationary Sources				
PM_{10}	6.3	6.3	0.00	0.04
SOx	1.6	1.6	-	-
NOx	55.2	55.2	-	-
Background				16.5
TOTAL				
PM_{10}	5,350.7	4,695.5	-12.25	48.5
SOx	53.5			
NOx	2,317.5			

* Sources with zero percent reduction may in fact have controls in place that are reducing PM_{10} emissions. The zero percent figure represents the fact that these sources are not being controlled further as part of the SIP commitments.

Table 5-13

2001 24-Hour BLM Disposal Area Controlled PM_{10} Emissions and Ambient Concentration Contributions

SOURCES	PM_{10} (TPD)	Controlled PM_{10} (TPD)	Percent Reduction	Impact on Ambient Concentration ($\mu g/m^3$)
Stationary Point Sources				
Sand & Gravel Operations	1.72	1.72	0.00	0.65
Utilities – Natural Gas	0.55	0.55	0.00	0.20
Asphalt Concrete Manufacture	0.47	0.47	0.00	0.18
Industrial Processes	0.22	0.22	0.00	0.08
Other Sources	0.34	0.34	0.00	0.13
Total	3.29	3.29	0.00	1.24
Stationary Area Sources				
Small Point Sources	0.50	0.50	0.00	0.19
Residential Firewood	0.96	0.96	0.00	0.36
Residential Natural Gas	0.22	0.22	0.00	0.08
Commercial Natural Gas	0.09	0.09	0.00	0.03
Industrial Natural Gas	0.04	0.04	0.00	0.01
NG – Purchased at the Source – Carried by SWG	0.58	0.58	0.00	0.22
Structural / Vehicle Fires / Wild Fires	0.06	0.06	0.00	0.02
Charbroiling / Meat Cooking	2.44	2.44	0.00	0.92
Disturbed Vacant Lands / Unpaved Parking Lots	253	161.92	-36.00	60.85
Native Desert Fugitive Dust	0.00	0.00	0.00	0.00
Stabilized Vacant Lands Dust	28.00	28.00	0.00	10.52
Construction Activity Fugitive Dust	63.31	41.79	-34.00	15.70
Windblown Construction Dust	140.53	90.69	-35.00	34.06
Total	489.72	327.27	-33.00	122.99
Nonroad Mobile Sources				
Airport Support Equipment	0.12	0.12	0.00	0.05
Commercial Equipment	0.00	0.00	0.00	0.00
Construction & Mining Equipment	1.17	1.17	0.00	0.44
Lawn & Garden Equipment	0.04	0.04	0.00	0.02
Railroad Equipment	0.05	0.05	0.00	0.02
Recreational Equipment	0.00	0.00	0.00	0.00
McCarran International Airport	0.81	0.81	0.00	0.31
Henderson Executive Airport	0.02	0.02	0.00	0.01
North Las Vegas Municipal Airport	0.07	0.07	0.00	0.03
Nellis Air Force Base	0.09	0.09	0.00	0.03
Total	2.38	2.38	0.00	0.89
Onroad Mobile Sources				
Paved Road Dust (Includes Construction Track Out)	150.70	139.35	-7.53	52.37
Unpaved Road Dust	51.87	40.69	-21.55	15.29
Highway Construction Projects Activities	7.62	5.03	-34.00	1.89
Highway Construction Projects – Wind Erosion	11.20	7.27	-35.09	2.73
Vehicular Sulfate PM	1.34	1.34	0.00	0.50
Vehicular Tire Wear	0.27	0.27	0.00	0.10
Vehicular Brake Wear	0.45	0.45	0.00	0.17
Vehicular Exhaust	0.95	0.95	0.00	0.36
Total	224.40	195.31	-12.91	73.41
Background				**10.5**
Total	**719.78**	**528.29**	**-26.53**	**209.04**

Table 5-14

2006 24-Hour BLM Disposal Area Controlled PM_{10} Emissions and Attainment Concentration Contributions

SOURCES	PM_{10} (TPD)	Controlled PM_{10} (TPD)	Percent Reduction	Impact on Attainment Concentration ($\mu g/m^3$)
Stationary Point Sources				
Sand & Gravel Operations	1.72	1.72	0.00	1.18
Utilities – Natural Gas	0.55	0.55	0.00	0.37
Asphalt Concrete Manufacture	0.47	0.47	0.00	0.32
Industrial Processes	0.22	0.22	0.00	0.15
Other Sources	0.34	0.34	0.00	0.23
Total	3.29	3.29	0.00	2.25
Stationary Area Sources				
Small Point Sources	0.50	0.50	0.00	0.35
Residential Firewood	1.12	1.12	0.00	0.77
Residential Natural Gas	0.25	0.25	0.00	0.17
Commercial Natural Gas	0.09	0.09	0.00	0.06
Industrial Natural Gas	0.04	0.04	0.00	0.03
NG – Purchased at the Source – Carried by SWG	0.58	0.58	0.00	0.39
Structural / Vehicle Fires / Wild Fires	0.07	0.07	0.00	0.04
Charbroiling / Meat Cooking	2.84	2.84	0.00	1.94
Disturbed Vacant Lands / Unpaved Parking Lots	19.30	5.40	-72.00	3.70
Native Desert Fugitive Dust	0.00	0.00	0.00	0.00
Stabilized Vacant Lands Dust	1.09	1.09	0.00	0.75
Construction Activity Fugitive Dust	40.70	13.02	-68.00	8.93
Windblown Construction Dust	90.34	27.20	-69.89	18.64
Total	156.91	52.00	-66.73	35.77
Nonroad Mobile Sources				
Airport Support Equipment	0.14	0.14	0.00	0.10
Commercial Equipment	0.00	0.00	0.00	0.00
Construction & Mining Equipment	1.36	1.36	0.00	0.94
Lawn & Garden Equipment	0.05	0.05	0.00	0.03
Railroad Equipment	0.05	0.05	0.00	0.04
Recreational Equipment	0.00	0.00	0.00	0.00
McCarran International Airport	0.57	0.57	0.00	0.39
Henderson Executive Airport	0.02	0.02	0.00	0.01
North Las Vegas Municipal Airport	0.07	0.07	0.00	0.05
Nellis Air Force Base	0.09	0.09	0.00	0.06
Total	2.36	2.36	0.00	1.62
Onroad Mobile Sources				
Paved Road Dust (Includes Construction Track Out)	161.70	114.86	-28.97	78.71
Unpaved Road Dust	55.11	19.50	-64.61	13.36
Highway Construction Projects Activities	4.90	1.57	-68.00	1.07
Highway Construction Projects – Wind Erosion	7.20	2.22	-69.17	1.52
Vehicular Sulfate PM	1.52	1.52	0.00	1.04
Vehicular Tire Wear	0.32	0.32	0.00	0.22
Vehicular Brake Wear	0.51	0.51	0.00	0.35
Vehicular Exhaust	0.91	0.91	0.00	0.62
Total	232.16	141.40	-39.09	96.90
Background				**10.5**
Total	**394.72**	**199.25**	**-49.52**	**147.04**

Applying the proportional relationship, the valley-wide 24-hour concentration impacts are reduced by over 60 percent (67.93 $\mu g/m^3$) due to construction emission reductions and 28.97 percent (32.1 $\mu g/m^3$) due to paved street network PM_{10} reductions. In addition to the other control measures, these reductions equal an overall decrease in the 24-hour predicted concentration of 134 $\mu g/m^3$ as shown in Table 5-14. The overall reduction is almost 50 percent, and the predicted ambient concentration of 147.04 $\mu g/m^3$ is sufficiently below the national 24-hour standard of 150 $\mu g/m^3$ to clearly demonstrate attainment. Additional reductions in the future are anticipated from federal mobile source rulemaking. Reductions from federal rules were not factored into the SIP.

24-Hour Valley-Wide Concentration of 147.04 $\mu g/m^3$ in 2006

The reductions described in Chapter 4 were also applied to the five representative micro-scale inventories surrounding the five ambient monitoring sites where violations of the 24-hour national standard were measured. The sources in the micro-scale inventories varied as well as their relative contributions, due in part to meteorology and the amount of construction in the areas. The reductions and the predicted impacts are depicted for each site in Tables 5-15 through 5-19.

The overall percent reduction at each of the sites ranged from 47.68 to 64.92. The predicted ambient impacts after controls were well below the national 24-hour standard of 150 $\mu g/m^3$. The 2006 controlled concentrations ranged from 111.23 $\mu g/m^3$ to 134.03 $\mu g/m^3$, allowing sufficient margin to demonstrate attainment at each site. The attainment demonstration at the five representative sites shows that as growth continues in the nonattainment area, the SIP-adopted control measures will reduce PM_{10} concentrations at other sites where PM_{10} sources are present.

Overall Percent Reduction for Micro-Scale Inventories Ranged from 48 to 65

Table 5-15

Craig Road 24-Hour Emissions Inventory and Attainment Concentration Contributions

Source Category	Uncontrolled Emissions (tons)	Controlled Emissions (tons)	Percent Reduction*	Impact on Attainment Concentration** ($\mu g/m^3$)
Vacant Land	4.82	1.71	-65.00	24.74
Native Desert	-	-	-	-
Unstable	4.32	1.21	-72.00	17.50
Stabilized	0.50	0.50	0.00	7.23
Construction	3.43	1.03	-70.00	14.90
Wind Erosion	2.72	0.79	-71.00	11.41
Construction Activities	0.68	0.22	-68.00	3.15
Track Out	0.03	0.02	-22.00	0.34
Unpaved Road Dust	0.14	0.14	0.00	2.03
Paved Road Dust	3.98	2.71	-32.00	39.21
Unpaved Parking	0.514	0.14	-72.00	2.10
Wind Erosion	0.51	0.14	-72.00	2.07
Vehicles	0.004	0.00	-48.00	0.03
Race Tracks	2.43	0.63	-74.00	9.12
Wind Erosion	1.71	0.48	-72.00	6.93
Vehicles	0.72	0.15	-79.00	2.19
Vehicles				
PM_{10}	0.1	0.10	0.00	1.45
SOx	0.05	0.05	-	-
NOx	2.36	2.36	-	-
Stationary Sources				
PM_{10}	0.24	0.24	0.00	3.47
SOx	0.0004	0.0004	-	-
NOx	0.0583	0.0583	-	-
Background				27.5
TOTAL				
PM_{10}	15.65	6.70	-57.17	124.50
SOx	0.0504	0.0504		
NOx	2.418	2.418		

* Sources with zero percent reduction may in fact have controls in place that are reducing PM_{10} emissions. The zero percent figure represents the fact that these sources are not being controlled further as part of the SIP commitments.

**After implementation of control measures adopted as part of this SIP.

Table 5-16

East Flamingo 24-Hour Emissions Inventory and Attainment Concentration Contributions

Source Category	Uncontrolled Emissions (tons)	Controlled Emissions (tons)	Percent Reduction*	Impact on Attainment Concentration** ($\mu g/m^3$)
Vacant Land	2.912	0.98	-66.26	12.38
Native Desert	0.141	0.14	0.00	1.78
Unstable	2.68	0.75	-72.00	9.46
Stabilized	0.091	0.09	0.00	1.15
Construction	3.92	1.17	-70.26	14.69
Wind Erosion	3.56	1.03	-71.00	13.01
Construction Activities	0.32	0.10	-68.00	1.29
Track Out	0.04	0.03	-22.00	0.39
Unpaved Road Dust	0.01	0.01	0.00	0.13
Paved Road Dust	4.96	3.95	-20.36	49.78
Vehicles				
PM_{10}	0.13	0.13	0.00	1.64
SOx	0.06	0.06	-	-
NOx	3.22	3.22	-	-
Stationary Sources				
PM_{10}	0.01	0.01	0.00	0.13
SOx	0.001	0.001	-	-
NOx	0.14	0.14	-	-
Background				38.5
TOTAL				
PM_{10}	11.942	6.248	-47.68	117.25
SOx	0.061	0.061		
NOx	3.36	3.36		

* Sources with zero percent reduction may in fact have controls in place that are reducing PM_{10} emissions. The zero percent figure represents the fact that these sources are not being controlled further as part of the SIP commitments.

**After implementation of control measures adopted as part of this SIP.

Table 5-17

Green Valley 24-Hour Emissions Inventory and Attainment Concentration Contributions

Source Category	Uncontrolled Emissions (tons)	Controlled Emissions (tons)	Percent Reduction*	Impact on Attainment Concentration** ($\mu g/m^3$)
Vacant Land	7.33	2.08	-71.61	16.21
Native Desert	-	-	-	-
Unstable	7.29	2.04	-72.00	15.90
Stabilized	0.04	0.04	0.00	0.31
Construction	21.19	6.25	-70.50	48.68
Wind Erosion	18.3	5.31	-71.00	41.33
Construction Activities	2.85	0.91	-68.00	7.10
Track Out	0.04	0.03	-22.00	0.24
Unpaved Road Dust	0.017	0.02	0.00	0.13
Paved Road Dust	3.54	2.85	-19.49	22.20
Race Tracks	1.26	0.34	-73.00	2.65
Wind Erosion	1.08	0.30	-72.00	2.36
Vehicles	0.18	0.04	-79.00	0.29
Vehicles				
PM_{10}	0.07	0.07	0.00	0.55
SOx	0.03	0.03	-	-
NOx	1.64	1.64	-	-
Stationary Sources				
PM_{10}	0.17	0.17	0.00	1.32
SOx	0.19	0.19	-	-
NOx	0.02	0.02	-	-
Background				19.5
TOTAL				
PM_{10}	33.577	11.779	-64.92	111.23
SOx	0.22	0.22		
NOx	1.66	1.66		

* Sources with zero percent reduction may in fact have controls in place that are reducing PM_{10} emissions. The zero percent figure represents the fact that these sources are not being controlled further as part of the SIP commitments.

**After implementation of control measures adopted as part of this SIP.

Table 5-18

J. D. Smith 24-Hour Emissions Inventory and Attainment Concentration Contributions

Source Category	Uncontrolled Emissions (tons)	Controlled Emissions (tons)	Percent Reduction*	Impact on Attainment Concentration** ($\mu g/m^3$)
Vacant Land	10.08	3.31	-67.14	20.72
Native Desert	0.63	0.63	0.00	3.94
Unstable	9.4	2.63	-72.00	16.47
Stabilized	0.05	0.05	0.00	0.31
Construction	5.52	1.65	-70.19	10.29
Wind Erosion	5.1	1.48	-71.00	9.25
Construction Activities	0.35	0.11	-68.00	0.70
Track Out	0.07	0.05	-22.00	0.34
Unpaved Road Dust	0.004	0.00	0.00	0.03
Paved Road Dust	11.63	8.85	-23.90	55.36
Vehicles				
PM_{10}	0.26	0.26	0.00	1.63
SOx	0.13	0.13	-	-
NOx	6.6	6.6	-	-
Stationary Sources				
PM_{10}	0.08	0.08	0.00	0.50
SOx	0.002	0.002	-	-
NOx	0.12	0.12	-	-
Background				45.5
TOTAL				
PM_{10}	27.574	14.152	-48.68	134.03
SOx	0.132	0.132		
NOx	6.72	6.72		

* Sources with zero percent reduction may in fact have controls in place that are reducing PM_{10} emissions. The zero percent figure represents the fact that these sources are not being controlled further as part of the SIP commitments.

** After implementation of control measures adopted as part of this SIP.

Table 5-19

Pittman 24-Hour Emissions Inventory and Attainment Concentration Contributions

Source Category	Uncontrolled Emissions (tons)	Controlled Emissions (tons)	Percent Reduction*	Impact on Attainment Concentration** ($\mu g/m^3$)
Vacant Land	13.16	3.87	-70.58	39.57
Native Desert	-	-	-	-
Unstable	12.9	3.61	-72.00	36.91
Stabilized	0.26	0.26	0.00	2.66
Construction	1.32	.039	-70.20	4.02
Wind Erosion	1.12	0.32	-71.00	3.32
Construction Activities	0.19	0.06	-68.00	0.62
Track Out	0.01	0.01	-22.00	0.08
Unpaved Road Dust	0.66	0.66	0.00	6.74
Paved Road Dust	2.92	2.23	-23.63	22.79
Unpaved Parking	1.14	0.33	-71.37	3.34
Wind Erosion	1.11	0.31	-72.00	3.18
Vehicles	0.03	0.02	-48.00	0.16
Vehicles				
PM_{10}	0.06	0.06	0.00	0.61
SOx	0.03	0.03	-	-
NOx	1.51	1.51	-	-
Stationary Sources				
PM_{10}	0.36	0.36	0.00	3.68
SOx	0.02	0.02	-	-
NOx	0.19	0.19	-	-
Background				38.5
TOTAL				
PM_{10}	19.62	7.9018	-59.73	119.25
SOx	0.05	0.05		
NOx	1.7	1.7		

* Sources with zero percent reduction may in fact have controls in place that are reducing PM_{10} emissions. The zero percent figure represents the fact that these sources are not being controlled further as part of the SIP commitments.

**After implementation of control measures adopted as part of this SIP.

5.6 REASONABLE FURTHER PROGRESS

Part D of the Clean Air Act, Section 171, indicates that the term "Reasonable Further Progress" means "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may be reasonably required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date." The modeling results presented in this chapter support the conclusion that the Clark County Nonattainment Area will meet the PM_{10} 24-hour standard by the attainment date of December 31, 2006.

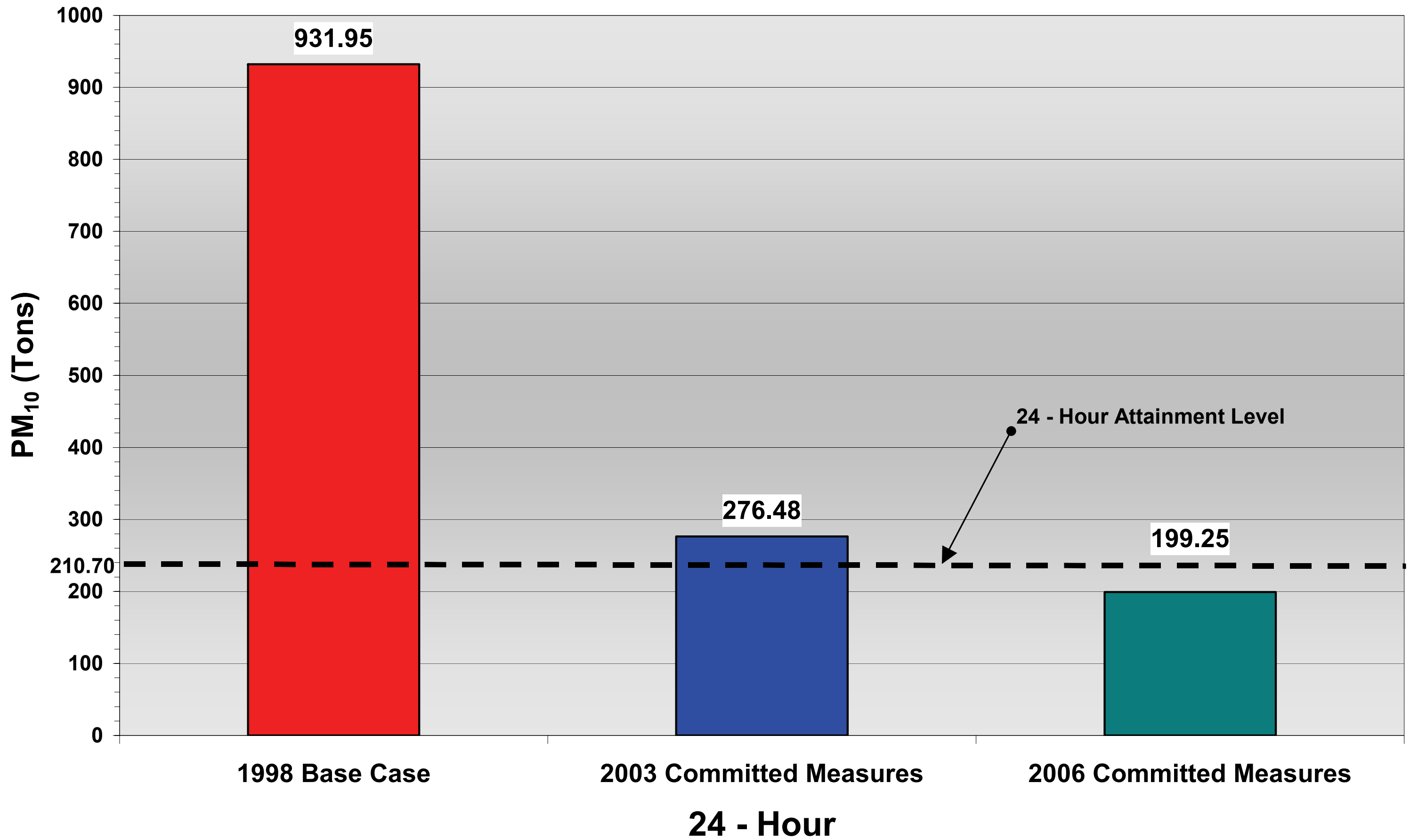
According to the General Preamble, the PM_{10} nonattainment area SIP must include quantitative milestones which are to be achieved every three years until the area is redesignated attainment and which demonstrate reasonable further progress (RFP) toward attainment by the applicable date. The quantitative milestones allow progress to be quantified or measured. Specifically, states should identify and submit quantitative milestones providing for the amount of emission reductions adequate to achieve the NAAQS by the attainment date. Reasonable further progress should be met by showing incremental emission reductions generally sufficient to maintain linear progress towards attainment. The milestone achievement dates analyzed in this plan are 2003 and 2006. These milestones have been addressed by quantifying emission reductions which result from the implementation of the committed control measures after predicted growth has occurred.

Reasonable Further Progress Report Due in 2003

The emissions in the base case (1998), 2003, and 2006 controlled emission inventories were used to develop the RFP analysis shown in Figure 5-1. Detailed calculations are presented in Appendix M. The adopted control measures used to calculate emission reductions were evaluated on a cumulative basis to estimate the total valley-wide emissions for 2003 and 2006. In general, full implementation of the control measures described in Chapter 4 was assumed. This is consistent with

Figure 5-1

Reasonable Further Progress Analysis - 24-Hour NAAQS



the implementation schedules contained in the rules and the Clark County Air Quality Division (AQD) schedules for increasing rule-related activities. See Chapter 4 for a discussion of rule implementation and effectiveness, including schedules of implementation and estimated cost of controls. Details on the emission inventory and rollback calculations are presented in Appendices B, E, and M. The projected emission reductions from the control measures result in daily emissions of 276.48 tons and 199.25 tons in 2003 and 2006 respectively. The 77.23 tons-per-day reduction in emissions from 2003 to 2006 satisfies the RFP requirement.

Emissions Reductions Between the Base Year (1998) and 2006 Are Anticipated to Show Reasonable Further Progress

5.7 2006 MOBILE SOURCE EMISSIONS BUDGET

In accordance with the 1990 Clean Air Act Amendments (Amendments), conformity requirements are intended to ensure that transportation activities do not result in air quality degradation. Section 176 of the Amendments requires that transportation plans, programs, and projects conform to applicable air quality plans before the transportation action is approved by a Metropolitan Planning Organization (MPO). The designated MPO for Clark County is the Regional Transportation Commission as designated by the agreement among general purposes local governments and the Governor of Nevada (July 8, 1981).

Section 176(c) provides the framework for ensuring that federal actions conform to air quality plans under Section 110. Conformity to an implementation plan means that proposed activities must not:

(1) cause or contribute to any new violation or any standard in any area;
(2) increase the frequency or severity of any existing violation of any standard in any area; or
(3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

For nonattainment areas required to demonstrate reasonable further progress and attainment, U. S. EPA requires that the State Implementation Plan (SIP) contain documentation of the motor vehicle emissions on which the attainment demonstration is based. The amount of mobile source emissions utilized in the attainment demonstration becomes the "emission budget" for highway and transit vehicles. The transportation plans and programs produced by the transportation planning process are required to result in emissions that are within the budget.

The Valley-Wide 24-Hour Mobile Source Emissions Budget Will Vary Depending on the Year

The proportional rollback modeling utilized in this SIP demonstrates attainment of the annual NAAQS in 2001 and the 24-hour NAAQS in 2006. The mobile source emissions budget will be based upon the annual standard budget until 2003. A reasonable further progress demonstration has been completed for 2003. The mobile source emissions budget for the annual attainment was compared to the reasonable further progress budget for the 24-hour standard, and the smaller of the two budgets (2003 milestone) will be used for transportation conformity purposes beginning in 2003. The mobile source emissions budget for attainment of the 24-hour standard has been compared to the mobile source emissions budget for annual attainment. The smaller of the two budgets will be used for transportation conformity purposes to ensure attainment of both standards beginning in 2006. The projections in the valley-wide modeling attainment demonstration indicate that with plan implementation, the total daily PM_{10} emissions in 2001 for all sources in the BLM disposal area would be 528.29 tons per day. Details of the 2006 projections are presented in Appendix E. For conformity purposes, the motor vehicle emissions budget includes:

- regional re-entrained dust from travel on paved roads;
- vehicular exhaust;
- vehicular brake wear;
- vehicular tire wear;
- travel on unpaved roads; and
- road construction.

The Initial Transportation Conformity Budget Will Be Set at 201.75 Tons Per Day

The onroad mobile portion of the budget, which includes emissions from paved road dust; vehicle exhaust; vehicle brake and tire wear; and travel on unpaved roads is 194.11 tons per day. Total highway construction emissions in 2001 are estimated to be 7.64 tons per day. Together, these emissions comprise the motor vehicle emissions budget for PM_{10} of 201.75 tons per day. Since the inventory of emissions from stationary sources participating in the emission reduction credit (ERC) program has not been reduced to account for ERC credits, the reduction in emissions from the paving of unpaved roads is a true reduction of emissions into the airshed. For the analysis year 2003, the budget will change to 155.77 tons per day. Beginning in analysis year 2006, the mobile source emissions budget of 141.41 tons per day will be used for transportation conformity purposes. The development of the mobile source emissions budget is explained in detail in Appendix N.

This budget will be compared to the 2003 RFP budget and the 2006 attainment budget during future years and adjusted as necessary to ensure attainment of both the annual and 24-hour PM_{10} NAAQS. The lower budget will be used when the annual and 24-hour mobile source emission budgets differ.

It is important to note that no additional conformity budgets are established with respect to the micro-scale or micro-inventory modeling. The micro-inventory analysis addresses attainment of the 24-hour standard at representative monitoring sites only. The U. S. EPA transportation conformity regulations do not require sub-area budgets to be established if the implementation plan estimates future emissions by geographic sub-area of the nonattainment area. According to federal statute, (November 24, 1993, Federal Register, page 62194), the emissions budget applies as a ceiling on emissions in the year for which it is defined, and for all subsequent years. The transportation conformity budget will remain in place until a different budget for another year is defined or until a future SIP revision modifies the budget.

5.8 ATTAINMENT DEMONSTRATION SUMMARY

SIP-Adopted Control Measures for Significant Sources Are Adequate to Demonstrate Attainment of the 24-Hour and Annual NAAQS for PM_{10}

Man-made source categories that contribute significantly to the annual design value of 53 $\mu g/m^3$ (defined as greater than one $\mu g/m^3$)[1] identified in Table 5-1 are disturbed vacant land, construction activities (including wind erosion), paved road dust, and unpaved roads. Similarly, significant man-made sources contributing to the 24-hour design day values (defined as sources contributing greater than five $\mu g/m^3$) identified in Tables 5-3 through 5-8 include these sources and unpaved parking and race tracks.

An attainment demonstration for the annual standard (50 $\mu g/m^3$) during the calendar year of 2001 was successful due to the implementation of control measures, developed as part of this SIP, to control PM_{10} from construction activities, wind erosion from disturbed vacant land, and silt loading on paved roads. The 24-hour attainment demonstration was similarly successful for high wind days by December 31, 2006 because of the control measures adopted as part of this SIP for PM_{10}. Emissions from significant sources that are not affected by high winds were also controlled to reduce emissions regardless of wind conditions. These controls will reduce emissions from construction activities, wind erosion from disturbed vacant land, unpaved roads, silt loading on paved roads, and unpaved parking. Race tracks are controlled using the same measures that address disturbed vacant land. Chapter 7 addresses the request for an extension of the 24-hour NAAQS attainment date to 2006.

CHAPTER 6: MOST STRINGENT CONTROL MEASURE ANALYSIS

6.1 INTRODUCTION

Annual PM_{10} Standard Attained by December 2001

The attainment demonstration presented in Chapter 5 concludes that the Annual National Ambient Air Quality Standard (NAAQS) for PM_{10} will be attained by the December 31, 2001 deadline established by the 1990 Clean Air Act Amendments (CAAA). The 24-Hour NAAQS for PM_{10}, however, was found to be not achievable until 2006, and it was determined that an extension of the deadline would be needed.

Clean Air Act Criteria for Extension of Attainment Date

Section 188(e) of the CAAA allows U. S. EPA to extend the Serious Area attainment date up to five years upon application of the state if certain requirements are satisfied. Among these are that the Serious Area plan contains the most stringent measures (MSMs) included in any state implementation plan, or achieved in practice in any state, and that can be feasibly implemented in the nonattainment area. The plan must also include a demonstration of attainment by the most expeditious alternative date practicable but no later than December 31, 2006.

Plan Contains Most Stringent Control Measures Implemented in any State

The purpose of this chapter is to provide documentation that this PM_{10} State Implementation Plan (SIP) does include the Most Stringent Measures (MSMs) that are included in the implementation plan of any state, or are achieved in practice in any state, and can feasibly be implemented in the Las Vegas Valley nonattainment area. Chapter 7 addresses the formal request for an extension of the attainment date for the 24-hour PM_{10} NAAQS from December 31, 2001 to December 31, 2006.

6.2 THE MOST STRINGENT MEASURE REQUIREMENT

To date, U. S. EPA has not issued any policy or regulation interpreting the attainment date extension requirement for urban areas such as the Las Vegas Valley. It has, however, provided preliminary interpretation of the section 188(e) requirements in the proposed approval of the Maricopa County, Arizona PM_{10} Serious Area Plan (65 FR 19967-19969, April 13, 2000). Our approach to satisfying the MSM requirement is based on the discussion provided by U. S. EPA in this proposed rule and as further described below.

Most Stringent Measures Must Achieve the Maximum Degree of Emissions Reduction that Has Been Achieved in Other States

U. S. EPA states that the requirement for most stringent measures is similar to the requirement for the Best Available Control Measures (BACM). BACM is defined to be, among other things, the maximum degree of emission reduction achievable from a source or source category which is determined on a case-by-case basis considering energy, economic, and environmental impacts. A similar definition was proposed for a most stringent measure as follows: the maximum degree of emission reduction that has been required or achieved from a source or source category in other SIPs or in practice in other states and can feasibly be implemented in the area.

Given the similarity between the BACM implementation and MSM requirements, U. S. EPA noted that the process for determining MSM should follow a process similar to determining BACM, with the added step of comparing the potentially most stringent measure against the measures already adopted in the area to determine if the existing measures are most stringent. The following five steps were thus proposed by U. S. EPA for determining MSM:

Five Steps Used to Determine MSM

1. Develop a detailed emission inventory of PM_{10} sources and source categories;

2. Model to evaluate the impact on PM_{10} concentrations over the standards of the various source categories to determine which are significant for the purposes of adopting MSM;

3. Identify the potentially most stringent measures in other implementation plans or used in practice in other states for each significant source category and, for each measure, determine their technological and economic feasibility for the area;

4. Compare the potentially most stringent measures for each significant source category against the measures, if any, already adopted for that source category; and

5. Provide for the adoption and expeditious implementation of any MSM that is more stringent than existing measures or, in lieu of adoption, provide a reasoned justification for rejecting the potential MSM.

Significant Sources Are Addressed in BACM Analysis

Steps one and two are the same steps prescribed for the BACM analysis as provided in Chapter 4. The emissions inventories and modeling work addressed in that chapter were reevaluated and determined to apply to the MSM analysis. The significant sources that contribute to exceedances of the 24-hour PM_{10} standard, and are thus significant for the purpose of adopting MSM, are the same as for BACM (see Table 4-1) and are included in the following five source categories:

- Disturbed vacant lands;
- Unpaved parking lots;
- Construction activities;
- Paved road dust; and
- Unpaved road dust.

For each of these significant sources, BACM were identified and implemented to ensure expeditious attainment of the national PM_{10} standard. Those sources determined to be insignificant were not considered further for BACM application.

Two Approaches for Considering Additional Controls

Because BACM is defined as the best level of control for an area, it is possible that satisfying the MSM requirement would result in no more controls and no more emissions reductions than result from BACM implementation. U. S. EPA interprets the strategy in the nonattainment provisions of the Act as requiring the application of more stringent control measures where feasible to offset longer attainment time frames such as Clark County is requesting. Two ways were offered as means to identify additional controls that could result in a reduced time frame needed to achieve attainment. One is to reduce the threshold for what is considered a de minimis (insignificant) source, and the second is to reassess any BACM measures rejected during the BACM analysis because they could not be implemented by the BACM implementation deadline.

Elimination of All Insignificant Source Contributions Will Not Advance Attainment Date

We evaluated the insignificant source contributions to determine if new or additional controls (as noted in Chapter 4, some controls are already in effect for insignificant sources) could be implemented for the insignificant sources that would contribute to expediting the attainment date. The Valley-Wide 2001 24-Hour Inventory, Table L-21, shows a total mass contribution after controls of 209 $\mu g/m^3$ against the standard of 150 $\mu g/m^3$. The total contribution of all insignificant sources, those identified in Table 4-1, is 5.1 $\mu g/m^3$. Eliminating 100 percent of the insignificant source contributions would have no effect on achieving earlier attainment of the 150 $\mu g/m^3$ standard. The same analysis was made for the 2003 inventory (see Chapter 5) which showed the total controlled concentration to be 184.2 $\mu g/m^3$, with the insignificant sources contributing 13.1 $\mu g/m^3$. Again, eliminating all insignificant source contributions would not help advance the attainment date as the remaining concentration would still be 171 $\mu g/m^3$ against the 150 $\mu g/m^3$ standard. Since it is necessary to attain three consecutive years of data within the 150 $\mu g/m^3$ standard in order to demonstrate attainment of the national standard, the earliest date for attainment would still be December 31, 2006, our requested extension date, even if all insignificant source emissions were 100 percent controlled. We therefore conclude that applying MSM to the de minimis source categories cannot meaningfully expedite attainment, and these sources are not further analyzed for MSM.

Insignificant Sources Were Not Further Analyzed for MSM

No Potential BACM Control Measures Were Rejected Due to the Implementation Deadline

The second means listed for identifying possible additional controls is also not applicable. The initial date for BACM implementation was February 8, 1997, and there are no potential BACM control measures to reconsider now that were rejected because of the BACM implementation deadline.

The third step in determining MSM involves identifying the potentially most stringent measures. The extensive research that was done to identify potential BACM to be considered for implementation in the Las Vegas Valley was also used to identify potential MSM. The research effort is described in the Section 4.3, Identification of Potential Control Measures.

Close Attention Was Given to Control Measures in Other PM_{10} Serious Nonattainment Areas

Generally, Clark County found the control measures implemented by the five PM_{10} serious nonattainment areas are potentially the most stringent measures in use for control of the same or similar significant sources requiring control in the Las Vegas Valley. Close attention was given to the controls implemented by each of these areas, with particular attention paid to the Maricopa Rules 310 and 310.1, amended February 16, 2000; the South Coast Rule 403, amended December 11, 1998; and the BACM/MSM Analysis contained in U. S. EPA's Technical Support Document for the Maricopa Serious Area PM_{10} Plan, dated April 6, 2000.

The remaining steps in the process for determining MSM are addressed in the following analysis.

6.3 THE MOST STRINGENT MEASURE ANALYSIS

A Summary Table Is Provided for Each MSM Analysis

A most stringent measure analysis was performed for each of the five significant source categories (disturbed vacant lands, unpaved parking lots, construction activities, paved roads, and unpaved roads) similar to the BACM analysis in Chapter 4. A summary table is presented for each source category listing those measures found to be potentially the most stringent measures implemented by others. The measures implemented by Clark County are listed for comparison. A discussion of the comparative analysis of the measures accompanies each table. Each analysis includes a determination of the relative stringency of the measures as they apply to the source category. If necessary, additional MSMs are identified for implementation, or a reasoned justification for rejecting potentially more stringent measures is provided.

6.3.1 Disturbed Vacant Lands

For Disturbed Vacant Lands, two categories of control measures were found to be potential MSMs.

Stabilization measures and weed abatement are addressed in the following paragraphs.

Controls for Stabilization and Weed Abatement

6.3.1.1 Stabilization Requirements for Disturbed Vacant Lands

The Maricopa Association of Governments (MAG) BACM and MSM analyses that are contained in the MAG SIP for PM_{10} (MAG Plan) cited in this chapter noted two regulations that contained this control measure. These were the South Coast Air Quality Management District (SCAQMD) Rule 403 and Clark County Section 41. The U.S. EPA determined that Maricopa Rule 310.01 was more stringent than Clark County Section 41.[1] Following the MAG BACM and MSM analysis, SCAQMD has updated Rule 403 and Maricopa County has updated Rule 310.01. As a result, Clark County compared the requirements for this source category that are contained in the Clark County Air Quality Regulations (AQR) Section 90 to the Maricopa Rule 310.01 and the updated SCAQMD Rule 403. The requirements are summarized in Table 6-1.

[1] Technical Support Document (*Notice of Proposed Rulemaking on the MAG Serious Area PM_{10} SIP for the Maricopa County Non-Attainment Area*), U.S. EPA-Region IX, April 6, 2000.

Table 6-1

Summary of Stabilization Requirements for Disturbed Vacant Lands

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 90.2.2.1(a) AQR § 90.2.2.1(b) AQR § 90.2.2.1(c) AQR § 90.4	• Disturbed areas Σ 5,000 sq. ft., prevent motor vehicle access and stabilize with water, dust suppressants, or gravel • Disturbed areas Σ 5,000 sq. ft., stabilize with water, dust suppressants, or gravel • Disturbed areas Σ 5,000 sq. ft., apply and maintain AQD/U. S. EPA approved control measure • All stabilization subject to drop ball, TFV,[b] or rock test • (Proposed) Dust mitigation plans for property owners with 10,000 acres or greater
Maricopa Co., Arizona	Rule 310.01 § 301.1 § 302.1 § 302.2	• Disturbed areas impacted by motor vehicles Σ 4,356 sq. ft., prevent motor vehicle access; or stabilize with dust suppressants or gravel; or apply and maintain an U. S. EPA approved alternative control measure • Disturbed areas not impacted by motor vehicles Σ 21,780 sq. ft., stabilize dust suppressants or gravel; or apply and maintain an U. S. EPA approved alternative control measure • All stabilization subject to drop ball, TFV,[b] vegetation cover, or rock test
SCAQMD,[a] California	403(d)(1)	• Disturbed areas must be controlled to prevent visible emissions from crossing the property line during winds of P 25 mph

[a] South Coast Air Quality Management District (SCAQMD)
[b] Threshold Friction Velocity test

Clark County and Maricopa County Requirements Very Similar

The requirements of Clark County AQR Section 90 and Maricopa Rule 310.01 are very similar. For disturbed open areas and vacant lots that have been disturbed by vehicular traffic, the threshold for stabilization is effectively identical. Maricopa County uses a threshold of 4,300 square feet for stabilization, whereas Clark County sets the threshold at 5,000 square feet. Clark County selected the 5,000 square foot threshold because the area dimensions of 50 by 100 can be easily estimated by inspectors and property owners in the field. The 4,300 square foot area equates to “0.1 acre” that is specified in the Maricopa rule. A query of the Clark County Assessor’s database, which includes all parcels and improvement valuations in Clark County, found that the vacant land contained in parcels of less than 5,000 square feet made up less than one percent

Less than One Percent of Vacant Land in Parcels Of 5,000 Square Feet Or Less

of the vacant land contained in the BLM disposal boundary.

Maricopa Rule 310 requires that motor vehicle trespass or access be prevented on any lot greater than 0.1 acre when over 500 cumulative feet of surface has been disturbed. In lieu of preventing trespass in such a situation, the owner may apply surface gravel or chemical/organic stabilizers to all disturbed areas. If 0.5 acre or more of disturbed surface area exists, the owner must stabilize the disturbed surface area. Water is only an option where motor vehicle trespass is prevented by barriers. (Where there is no evidence of vehicle trespass, such as when a lot has been weed abated, preventing trespass is not required and the lot may be stabilized by water.) Clark County's Rule 90 is generally equivalent except for vacant land where motor vehicle trespass/access is occurring. In this situation, Section 90 is more stringent because there is no explicit exemption for lots greater than 5,000 square feet that have less than 500 cumulative feet of disturbed surface.

Section 90 Is More Stringent than Maricopa County Rule 310

For open areas not disturbed by vehicular traffic, Clark County retains the 5,000 square foot area threshold for stabilization, whereas Maricopa Rule 310.01 sets the threshold for stabilization at 21,780 square feet (0.5 acre). The SCAQMD Rule 403 also uses the 0.5 acre threshold for all for disturbed areas zoned for residential uses.

The SCAQMD Rule 403(d)(1) utilizes a performance standard of no visible emissions over a property line in lieu of specific stabilization standards and test methods as set forth in the Clark County and Maricopa rules. Clark County believes that the specific stabilization standards contained the Clark County/Maricopa rules provide significantly greater air quality benefits.

SCAQMD Uses a Property Line Visible Emissions Standard

The Clark County approach allows for proactive, year-round enforcement of the control measure, whereas the SCAQMD control measure can only be enforced during a wind event. Because of distance to property line issues, it might be possible to comply with the SCAQMD control measure by only stabilizing the outer perimeter area of a large disturbed area in some instances.

Clark County Provides for Proactive Year-Round Enforcement

The Clark County control measure requires stabilization of disturbed areas subject to the control measure within 30 days of discovery. The Maricopa control measures mandate stabilization within 60 days of "initial discovery." The SCAQMD control measure does not specifically address this issue as the regulation appears to be more geared toward construction activities.

Stabilization Required in 30 Days of Discovery

Test methods for stabilization contained in the Clark County and Maricopa regulations are identical except that the Clark County regulations do not contain test methods for vegetation cover. Vegetation is not allowed as a stabilization method, except with U. S. EPA approval as an alternative stabilization method.

Test Methods

Based on the comparison of requirements discussed above, Clark County finds that the requirements in Section 90 of the AQR for disturbed open areas and vacant lands are of equivalent stringency as the Maricopa Rule 310.01 for disturbed open areas and vacant lots impacted by vehicular traffic, and more stringent than the SCAQMD Rule 403. For disturbed open areas and vacant lots not impacted by motor vehicles, Clark County finds that Section 90 of the AQR is more stringent than both Maricopa Rule 310.01 and SCAQMD Rule 403.

Clark County Requirements Equivalent to Maricopa County

6.3.1.2 Dust Control for Weed Abatement by Discing or Blading

The MAG Plan noted one regulation that contained this control measure. This was SCAQMD Rule 403. Following completion of the MAG Plan, SCAQMD has updated Rule 403, but has not changed the requirements for weed abatement. Maricopa County has adopted Rule 310 with specific provisions for weed abatement by discing or blading. Clark County compared these Maricopa requirements for weed abatement with the requirements contained in the Clark County AQR Section 90 and the updated SCAQMD Rule 403. A summary of these requirements is shown in Table 6-2.

Two Programs Evaluated for Weed Abatement by Discing or Blading

Table 6-2

Summary of Weed Abatement Requirements for Open Areas and Vacant Lands

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 90.2.2.1(a), (b) AQR § 90.2.2.1(c) AQR § 90.4	• Weed abatement of areas Σ 5,000 sq. ft. by discing or blading: apply water prior to and during discing and blading • After discing or blading occurs, stabilize disturbed surfaces with gravel, water, dust palliatives, or paving • All stabilization subject to drop ball, TFV,[b] or rock test
Maricopa Co., Arizona	Rule 310 § 308.8 § 308.8 § 302.3	• Weed abatement of areas Σ 4,356 sq. ft. by discing or blading: apply water prior to and during discing and blading • After discing or blading occurs, stabilize disturbed surfaces with gravel, water, dust palliatives, or paving • All stabilization subject to drop ball, TFV,[b] rock test, or vegetative cover test
SCAQMD, California	Rule 403(d)(1) & 403(h)(H)	• Disturbed areas must be controlled to prevent visible emissions from crossing the property line during winds of P 25 mph

[b] Threshold Friction Velocity test

The requirements for weed abatement by discing or blading contained in Clark County AQR Section 90 and Maricopa Rule 310 are virtually identical in terms of the stabilization methods and test methods utilized. The Maricopa Rule uses a slightly lower action threshold of 4,300 square feet for weed abatement, whereas Clark County sets the threshold at 5,000 square feet. Clark County selected the 5,000 square foot threshold because the area dimensions of 50 by 100 feet can be easily estimated by inspectors and property owners in the field. The 4,300 square foot area equates to "0.1 acre" that is specified in the Maricopa rule. Clark County believes that in terms of air quality benefits, the two action thresholds for stabilization are equivalent. A query of the Clark County Assessor's database, which includes all parcels and improvement valuations in Clark County, found that the vacant land contained in parcels of less than 5,000 square feet made up less than one percent of the vacant land contained in the BLM disposal boundary.

Test Methods

Maricopa Rule 310 classes weed abatement by discing or blading as an “earth moving” operation and requires a dust control permit to disc or blade any area of 4,300 square feet or larger. Strictly speaking, this is an enforcement mechanism rather than a control measure. Clark County is implementing an aggressive enforcement and educational program to ensure compliance with Section 90 of the AQR and does not believe that any additional air quality benefits could be achieved by implementing a permitting program.

Maricopa County Requires a Dust Control Plan for Discing or Blading

In addition to the stabilization methods permitted in the Clark County Regulation, the Maricopa rule also allows for the use of vegetative cover as a stabilization method. This provision could weaken the Maricopa Rule if proper techniques are not utilized because of the difficulties in establishing vegetation in a dry desert climate and the time needed for vegetative cover to achieve sufficient growth to provide protective cover.

Use of Vegetative Cover

The SCAQMD Rule 403(d)(1) utilizes a performance standard of no visible emissions over a property line in lieu of specific work practice standards and test methods as set forth in the Clark County and Maricopa rules. As discussed in the stabilization section, Clark County does not believe that the property line performance standard will be effective in some instances or technologically feasible for dust-producing operations that occur next to a property line. The use of this performance standard was rejected as technologically infeasible by Clark County on this basis. The South Coast Rule also contains a number of exemptions in Subsection 403(h)(H) that are not included in the Maricopa and Clark County control measures.

SCAQMD Visible Emissions Limit

Based on the comparison of requirements discussed above, Clark County finds that the requirements in Section 90 of the AQR for weed abatement by discing and blading are of equivalent stringency as the Maricopa Rule 310 and more stringent than the SCAQMD Rule 403.

Clark County Requirements of Equivalent Stringency

6.3.2 Unpaved Parking Lots

The set of control measures for stabilizing unpaved parking lots identified as potential MSM are shown in Table 6-3 along with the control measures adopted by Clark County. An MSM analysis discussion follows.

Table 6-3

Summary of Stabilization Requirements for Unpaved Parking Lots

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 92.2.1 AQR § 90.2.1.2(a) AQR § 90.2.1.2(b) AQR § 90.2.1.2(c) AQR § 90.2.1 AQR § 92.4	Stabilize <u>all</u> unpaved parking lots utilized more than 35 days per year with one of the following methods: • Pave; or • Stabilize with dust palliatives; or • Stabilize with dust palliatives in travel lanes and 2" of uniformly applied gravel in parking areas. For parking lots used intermittently for ≤ 35 days/year, stabilize as above during parking use and stabilize pursuant to AQR Section 90 during non-parking use • All stabilization subject to 20 % opacity test method <u>and</u> maintenance of silt loading of < 0.33 oz/ft^2 <u>or</u> surface silt content of ≤ 8 % • (Proposed) Prohibitions on new unpaved parking lots • (Proposed) Prohibition on dust crossing over a property line
Maricopa Co., Arizona	Rule 310.01 § 301.1 § 302.1 § 303.2	Stabilize unpaved parking lots ≥ 5,000 sq. ft. utilized more than 35 days per year with one of the following methods: • Pave; or • Stabilize with dust suppressants; or • Uniformly apply and maintain surface gravel. For parking lots used intermittently for ≤ 35 days/year, stabilize as above during parking use • All stabilization subject to 20 % opacity test method <u>and</u> maintenance of silt loading of < 0.33 oz/ft^2 <u>or</u> surface silt content of ≤ 8 %
SCAQMD, California	403(d)(1)	• Disturbed areas must be controlled to prevent visible emissions from crossing the property line during winds of < 25 mph • Apply water
SJVUAPCD California	Regulation 8070	Stabilize unpaved parking lots ≥ 43,560 sq. ft. when used for parking with one of the following methods: • Stabilize by applying water at least one time per day; or • Stabilize with dust suppressants at the manufacturers recommended rate for road applications; or • Uniformly apply gravel to completely cover the area treated.

6.3.2.1 Stabilization Requirements for Unpaved Parking Lots

The MAG Plan did not identify any MSMs for unpaved parking lots that are not associated with construction sites.[2] Clark County notes that the SCAQMD Rule 403 is not specific to construction activities and would be applicable to unpaved parking lots that are not part of a construction activity. In addition, Regulation 8070 adopted by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) addresses unpaved parking lots that are not utilized as part of a construction activity. In addition, Maricopa County has adopted Rule 310.01 to address unpaved parking lots.

Other States' Control Measures

The requirements for unpaved parking lots contained in Clark County AQR Section 92 and Maricopa Rule 310.01 are virtually identical in terms of the stabilization methods and test methods used. The Clark County Rule applies to all unpaved parking lots, whereas the Maricopa Rule exempts small unpaved parking lots of 5,000 square feet or less by definition (see 310.01 § 215). Both rules use identical performance standards for visible emissions and surface silt on unpaved parking lots.

Parking Lots Covered by Requirements

Stabilization methods allowed by the Clark County and Maricopa rules vary slightly. The Clark County requirements are somewhat more restrictive on the use of gravel than Maricopa. Specifically, Clark County does not allow use of gravel on travel lanes of unpaved parking lots and requires two inches of gravel to be uniformly applied on parking areas. Although the Maricopa requirements are non-specific on the application of gravel for unpaved parking lots, the visible emissions and surface silt requirements contained in the Maricopa rule will generally ensure that gravel is applied effectively.

Stabilization Methods

As noted at the beginning of this section, the SCAQMD Rule 403 is nonspecific for unpaved parking lots. However, under Subsection 403(d)(1), operators of unpaved parking lots are required to prevent visible emissions from crossing a property line when wind speeds are 25 miles per hour or less. Clark County has

SCAQMD Requirements

[2] Ibid.

proposed a prohibition on dust crossing over a property line from unpaved parking lots.

SJVUAPCD Requirements

The SJVUAPCD Rule 8070 uses a loose action threshold of one acre (43,560 square feet) for stabilization of unpaved parking lots, and stabilization is only required on days when the parking lot is actually in use. The prescribed stabilization methods do not have any type of performance standard and, therefore, are of limited effectiveness. Prescribed stabilization methods include the application of water at least once per day, the application of chemical dust suppressants, and the application of gravel. Because Rule 8070 contains no performance standard for either visible emissions or surface stabilization, regulatory compliance is achieved with minimal application of one of the prescribed stabilization methods without consideration for its actual effectiveness. Clark County believes that this control measure provides very limited air quality benefits.

Clark County Requirements Marginally More Stringent

Based on the comparison of requirements discussed above, Clark County believes that the requirements in Section 92 of the AQR for unpaved parking lots are marginally more stringent than the requirements of Maricopa Rule 310 and more stringent than the requirements contained in the SCAQMD Rule 403 or SJVUAPCD Rule 8070.

6.3.3 Construction Activities

Research of the source categories included in construction activities produced a comprehensive set of potential most stringent measures. For analysis purposes, these measures have been grouped into a total of 13 different categories. A separate summary table of the potential MSMs implemented by other jurisdictions and those implemented by Clark County is provided for each category, as is an MSM analysis of the measures in the group. These analyses begin in Section 6.3.3.1.

The Maricopa Plan identified the following MSMs for these source categories:

- Dust control plans for construction/land clearing;
- Dust control measures for material storage piles;
- Bulk material rapid stabilization;
- Traffic rerouting or rapid cleanup of dust deposits on paved roads;
- Prohibition of work site unpaved haul roads/parking/staging areas;
- Weed abatement operations
- Require dust control plans for all grading permit activities; and
- Implement high-wind condition BACMs.

Potential Most Stringent Measures for Construction

Clark County found that prohibiting unpaved haul roads, parking areas, and staging areas was technologically infeasible. In addition, weed abatement is not considered a construction activity under the Clark County regulatory program, but rather maintenance of disturbed vacant land. The Clark County control measure for this activity was discussed earlier in this Chapter. Where brush and vegetation are cleared for construction purposes, this activity is addressed under the terms "land clearing" or "grubbing."

Prohibiting Unpaved Haul Roads Infeasible

The potential MSM measures discussed in the Maricopa Plan predominately originate from SCAQMD Rule 403. Requirements from Imperial County Regulation VIII and Mojave Desert Air Quality Management District (MDAQMD) Rule 403 are also noted. In the Technical Support Document for the Maricopa Serious Area PM_{10} Plan (TSD),[3] the U. S. EPA identified additional potential MSMs from permit conditions that are being implemented in Clark County under previous AQR Section 17. The work practices cited in the TSD have been expanded and incorporated into the Section 94 Handbook which has been adopted by the Clark County Health District Board of Health for compliance with the requirements of AQR Section 94. Clark County also conducted a survey of construction activity controls which have been implemented in the southwestern United States.[4] The results of this survey are summarized in Table 4-3.

Potential Sources of Most Stringent Measures

[3] Technical Support Document, supra
[4] Dames & Moore, et. al., supra

6.3.3.1 Soil Specific Requirements for Use of Surfactants and Tackifiers

The Clark County Section 94 Handbook of Best Management Practices for Dust Control (Section 94 Handbook) sets forth soil-specific requirements for the use of surfactants and tackifiers. These requirements are summarized in Table 6-4.

This Requirement Is Unique to Clark County

Table 6-4

Summary of Soil Specific Requirements for Use of Surfactants and Tackifiers

Agency	Rule #	Requirements
Clark County, Nevada	Section 94 Handbook, Figure 4-1 Section 10-4	• Classifies soil as having a low, moderate low, moderate high, or high emissions potential based on soil silt content and optimum moisture content • Specific requirements for use of tackifiers & surfactants with moderate high and high soil types
No other agencies are implementing this control measure		

6.3.3.2 Requirement for Dust Control Monitor (Manager) at Large Construction Sites

Table 6-5 summarizes the Clark County requirement for a dedicated person as a designated dust control monitor for large construction projects. Construction projects with 50 acres or greater of active, disturbed area are required to have a dust monitor.

This Requirement Is Unique to Clark County

Table 6-5

Summary of Requirements for Dust Control Monitor (Manager) at Large Construction Sites

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.4.11	• Dust control monitor required for Projects with Σ 50 acres of actively disturbed area • Requirement remains in place until less than 50 acres are actively disturbed and previously disturbed areas have long-term stabilization in place
No other agencies are implementing this control measure		

6.3.3.3 Site Specific Dust Control Plan and Permit Requirements

Requirements for site-specific dust control plans and/or permitting requirements are summarized in Table 6-6.

Table 6-6

Summary of Site-Specific Dust Mitigation Plan and Permit Requirements

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.4.8 AQR § 94.6.8(a) AQR § 94.6.7(d) AQR § 94.4.9 Section 94 Handbook AQR § 94.4.9 & AQR § 94.6.8(a) AQR § 94.6.7(d)	• Dust Control Permit required with BMP for any soil-disturbing activities, based on site-specific project conditions where construction site ≥ 10 acres, trenching Θ 100 ft., demolition > 100 ft. • Failure to implement BMP on permit a violation • Conducting a dust-producing activity for which no BMP specified in permit • Site-specific, soil-specific, and phase-specific dust mitigation plan implementing BMP required where disturbed area/construction site ≥ 10 acres, trenching > 1 mile, demolition with explosives • Failure to comply with approved plan a violation of dust control permit • Conducting a dust-producing activity for which no BMP specified in plan a violation
Maricopa Co., Arizona	Rule 310, § 303 et. sec. § 304.3	• Dust control plan required for operations that entail earthmoving of more Σ0.1 acre • Implement one primary and one contingency control for each fugitive dust source from Tables 1& 2
SCAQMD, California	Rule 403(f)(B)	• Dust emissions control plan required for operations that entail ≥ 50 acres of disturbed land or ≥ 5,000 cubic yards of material. • Plan must identify all sources of fugitive dust • Plan must implement at least one control measure for all sources of fugitive dust
MDAQMD,[a] California	Rule 403-1(C) Rule 403-2(C)(3)	• Dust control plan for construction/demolition source, maintain natural topography to extent possible • Dust control plan for construction source disturbing 100 or more acres • Describe applicable dust control measures • Provide stabilized access to the site as soon as possible (prior to project completion) • Maintain natural topography to extent possible • Construct parking lots and paved roads first, as feasible • Construct upwind portions of project first, where feasible

[a] Mojave Desert Air Quality Management District (MDAQMD)

The Clark County dust control permit process serves a function similar to the Maricopa requirement for submission of dust control plans. Both processes are designed to implement control measures required under provisions of the respective rules. Clark County does not require submission of site-specific dust mitigation plans for projects under ten acres or which meet other criteria detailed in Table 6-6 in order to expedite processing the permits. A "boilerplate" plan may be used instead. The applicant must provide the information on all dust-producing activities and proposed control measures (BMP) as is required for the Maricopa Dust Control Plan. Moreover, as noted in Table 6-6, an operator is in violation of Section 94 of the AQR if he or she engages in a dust-producing activity that is not covered under the approved permit. The Maricopa action threshold of 0.1 acre is more stringent than the Clark County requirement of 0.25 acre for obtaining a dust control permit. However, the Clark County control measure contains additional requirements that may trigger the permit requirement for a smaller site and BACM is still required.

Clark County and Maricopa County Require Site-Specific Review of Projects

The Clark County requirement for submission of a dust mitigation plan is a matter of detail and degree over and above the requirement to obtain a dust control permit. The requirement for a dust mitigation plan is intended to put additional emphasis on soil specificity and phasing for larger projects. Where required, the dust mitigation plan is made an integral part of the dust control permit.

Clark County Dust Mitigation Plan Places Additional Emphasis on Soil Specificity and Phasing

The key element of any dust control permit or dust control/mitigation plan is the stringency, comprehensiveness, and appropriateness of the control program put forward in the permit or plan. Both the Clark County dust control permit and dust mitigation plan requirements are based on implementation of the Section 94 Handbook. Clark County believes that this compendium of control measures for all types of construction activities exceed any other set of control measure requirements in terms of comprehensiveness, effectiveness, and stringency. Although elements of the Maricopa dust control plan process are more stringent than the Clark County dust control permit/dust mitigation plan program, the overall stringency and benefits of the Clark County program equals the Maricopa program

Clark County Surpasses Other Programs in Terms of Comprehensiveness, Effectiveness, and Stringency

for smaller projects and exceeds the Maricopa program for larger projects.

SCAQMD Dust Control Plan Requirements

The SCAQMD emission control plan requirements require submission of a emission control plan for projects of greater than 50 acres. The plan must identify all fugitive dust sources and specify mitigation measures. However, the menu of mitigation measures provided for in the SCAQMD Rule 403 are less comprehensive than those found in the Clark County Section 94 Handbook, and Rule 403 also lacks the visible emission limits contained in Section 94 of the AQR. These factors make the Clark County dust control permit/dust mitigation plan program significantly more stringent than the SCAQMD emission control plan requirements.

MDAQMD Dust Control Plan Requirements

The MDAQMD Rule 403-1 requires a dust control plan for any construction/demolition project and includes a requirement for maintaining the natural topography to the extent possible. The MDAQMD Rule 403-2 requires a dust control plan for projects of 100 acres or larger. The plan must identify applicable control measures, and the plan requirements specify special conditions for these large projects. These include providing stabilized access to the site as soon as possible (but prior to project completion); maintenance of natural topography to extent possible; constructing parking lots and paved roads first (as feasible); and constructing upwind portions of project first where feasible. The Clark County BMPs include stabilizing access roads for the duration of the project and applying paving as soon as possible to all future roadway areas. The air quality benefits and technical feasibility of maintaining the natural topography to the extent possible is not known for Clark County, but is thought to be very small.

Overall, the Clark County dust control permit/dust mitigation plan program provides a significantly more stringent program than the combined elements of MDAQMD Rule 403-1 and 403-2.

6.3.3.4 Visible Emission Limits

Requirements for limiting visible emissions from construction activities in Clark County and other areas are summarized in Table 6-7.

Table 6-7

Summary of Requirements for Limiting Visible Emissions

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.5.2 AQR § 94.6.8(d) AQR § 94.6.8(b)	• Limit visible emissions from all construction activities to P 20 % opacity • Limit visible dust plume from all construction activities to P 100 yards • (Proposed) Limit a visible dust plume to less than 100 feet • (Proposed) Prohibit dust from crossing a property line
Maricopa Co., Arizona	Rule 310, § 301	• Limit visible emissions from all construction activities to P 20 % opacity
SCAQMD, California	Rule 403(d)(1) & Table 2 (1a-1)	• Prevent visible emissions from all construction activities from crossing property line • Limit visible dust plume from all earth-moving activities to ≤ 100 feet
SMAQMD,[a] California	Rule 403	• Take every reasonable precaution to prevent visible emissions construction activities from crossing property line

[a] Sacramento Metropolitan Air Quality Management District (SMAQMD)

Primary Clark County Visible Emissions Limit 20 Percent Opacity

Section 94 of the Clark County AQR contain two limits on visible emissions from construction activities. The primary performance standard is the requirement that visible emissions not exceed an opacity reading of 20 percent based on 12 or 24 time-averaged readings taken at 15-second intervals. A secondary requirement is that visible plumes not extend for more than 100 yards. Although this standard is considered relatively easy to enforce, the relationship between the plume length standard and degree of control is less certain than that of the opacity standard. Clark County has therefore retained the plume length standard as a secondary means of establishing that excessive emissions are occurring. Clark County has also proposed two new requirements where BACM has not been fully implemented. The first is to limit a visible dust plume to less than then 100 feet. The second is to prohibit dust from crossing a property boundary.

Maricopa County Visible Emissions Limit 20 Percent Opacity

Maricopa County Rule 310 contains a 20 percent opacity limitation that is identical to the Clark County requirement. The SCAQMD contains a plume length limitation of 100 feet as an alternative to conducting upwind/downwind monitoring and a requirement that no visible emissions be permitted to cross a property line. The Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 403 contains a requirement that "reasonable precautions" be taken to prevent dust from crossing a property line. As previously discussed in this chapter, Clark County rejected the prevention of dust crossing a property line as technologically infeasible. The SCAQMD 100-foot limit on dust plume length is clearly more stringent than the 100-yard requirement contained in the Clark County control measure. However, because of the uncertainties related to the level of control achieved by this requirement, Clark County believes that the 20 percent opacity requirement implemented in AQR Section 94 is of equal or greater stringency than the SCAQMD requirement and provides better air quality benefits.

SCAQMD Imposes 100-Foot Plume Length Limit

Clark County's Requirements Are of Equal or Greater Stringency

6.3.3.5 BACM Required 24 Hours a Day, Seven Days a Week

Requirements for maintaining dust control at construction sites 24 hours a day, seven days a week, are summarized in Table 6-8. Clark County finds the intent and application of these control measures to be equally stringent.

Table 6-8

Summary of Requirements for Applying BACM 24 Hours a Day, Seven Days a Week

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.5.2	• Maintain BACM throughout the site for the duration of the project to limit wind erosion and particulate emissions • BACM required 24 hours a day, seven days a week
Maricopa Co., Arizona	Rule 310, § 304.3	• Control measures to be applied to all actual and potential fugitive dust sources, before, after, and while conducting any dust-generating operation, including weekends, after work hours, and on holidays

6.3.3.6 Cessation of Construction Activities During High Winds

Clark County and Maricopa County Requirements Are Equally Stringent

The Clark County requirements for ceasing construction activities that contribute to a violation and related requirements from other areas are summarized in Table 6-9.

Table 6-9

Summary of Requirements for High Wind Conditions

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.5.4	• Requires cessation of all activities that cause fugitive dust emissions to exceed 20 % opacity in spite of the use of BACM • Requires that watering equipment continue to operate during high-wind conditions
Maricopa Co., Arizona	Rule 310, § 300.1 Table 2 BACM 1A	• Provides that winds over 25 mph shall be an "affirmative defense" where dust emissions exceed 20 % opacity and all applicable BACM have been implemented • High wind BACM mandates cessation of dust generating activities after 60-minute average of winds Θ25 mph
SCAQMD, California	Rule 410.1(d)	• Requires that additional dust mitigation measures be implemented for disturbed areas and storage and handling of bulk materials, and requires cessation of agricultural tilling when winds exceed 25 mph

Clark County Requirements

Clark County is the only agency that has implemented an unconditional requirement to cease dust-generating construction activities when high-wind conditions overwhelm BACM controls for these activities. The Clark County requirement sets the most stringent standard possible for high winds because no lower wind speed limit is set under which construction activities cannot be halted when wind overwhelms the BACM for dust-generating activities. In addition, the requirement specifically mandates that water trucks and water pulls continue to operate after other dust-producing activities have been curtailed.

Maricopa County Rule 310 provides that winds over 25 mph can be used as an "affirmative defense" in an enforcement action where all applicable BACM has been applied and the 20 percent opacity limit has been violated. However, the rule does not mandate cessation of dust-producing activities in order to utilize this defense. However, BACM No. 1A from the high-wind BACM table requires that dust-generating activities cease when the average wind speed exceeds 25 miles per hour over a 60-minute period. This BACM for high wind effectively sets a curtailment requirement for high winds. However, this curtailment wind threshold is significantly less stringent than the Clark County threshold and will also be harder to enforce. In addition, the Clark County control measure requires that water applications continue after dust-producing activities have been halted. The Maricopa County BACM do not include this requirement. Clark County finds the requirements of AQR Section 94.5.4 to be more stringent than Rule 310, Section 301.1 for curtailing emissions during high-wind conditions at construction sites.

When High Winds Overwhelm BACM Controls, Construction Activities Must Cease

Maricopa County Requirements

The SCAQMD Rule 403.1 requires that additional dust mitigation measures be employed for disturbed areas when wind speeds exceed 25 mph. However, the rule does not mandate cessation of construction activities during high winds. Therefore, Clark County finds the requirements of AQR Section 94.5.4 to be more stringent than Rule 403.1 for curtailing emissions during high-wind conditions.

6.3.3.7 Control Measures for Stabilizing Disturbed Soil

Requirements for stabilizing disturbed soil are summarized in Table 6-10.

Clark County Stabilization Measures Are the Most Stringent

Clark County has implemented an extensive and integrated set of control measures for disturbed areas of construction sites. These measures are implemented in conjunction with Clark County's dust control permit and dust mitigation plan requirements, and the AQR Section 94 requirement that emissions be controlled 24 hours a day, seven days a week. Both short-term and long-term stabilization are addressed in the BMP. The two other agencies with the most extensive control measure requirements for construction site disturbed areas are Maricopa County and SCAQMD. Based on a comparison of these measures, it appears that Clark

County requirements are the most stringent for this control of disturbed soil.

Clark County's Requirements Are the Most Stringent

Table 6-10

Summary of Control Measures for Stabilizing Disturbed Soil

Agency	Rule #	Requirements
Clark County, Nevada		**Visible Emission Limits:**
	AQR Section 94.6.8(d)	• Limit visible emissions from all construction activities to P 20 % opacity
	AQR Section 94.6.8(b)	• Limit visible dust plume from all construction activities from extending more than 100 yards
	Section 94 Handbook CST 10	• (Proposed) Limit visible emission plumes to less then 100 feet
		• (Proposed) Prohibit dust from crossing a property line
		Requirements for All Projects:
	CST 10-1	• Stabilize disturbed soil throughout construction site
		• Stabilize disturbed soil between structures
		Control Measures for All Soil Types:
	CST 10-2	• Apply water to stabilize disturbed soil throughout construction site
	CST 10-3	• Limit vehicle traffic and disturbance on soils where possible
	CST 10-4	• If interior block walls are planned, install as early in the construction as possible
	CST 10-5	• Apply dust palliative based on soil type
	CST 10-6	**Control Measures For Specific Soil Types:**
	CST 10-7	• Apply palliative such as gypsum mulch (high soil)
		• Install perimeter wind barrier (high soil)
	CST 11	• Apply water to stabilize disturbed soils - soils must be kept in a damp, crusted, or covered condition (moderate high, moderate low and low soils)
		Requirements for Large Tracts:
	CST 11-1	• Stabilize soil to comply with drop ball, TFV, or rock test
		• Prevent access to limit soil disturbance
		Control Measures for All Soil Types-Large Tracts:
	CST 11-2	• Prevent access by fencing, ditches, vegetation, berms, or other suitable barrier or means approved by the Control Officer
	CST 11-3	• Install perimeter wind barriers three (3) to five (5) feet high made of material with a porosity of 50 % or less
	CST 11-4	• Plant perimeter vegetation early. Use of native and drought-tolerant plants with greater than 50 % silhouette area is encouraged
	CST 11-5	• Stabilize disturbed soil with dust palliative for long-term stabilization
	CST 11-6	• Stabilize disturbed soil with vegetation for long-term stabilization

Table 6-10

Summary of Control Measures for Stabilizing Disturbed Soil (continued)

Agency	Rule #	Requirements
Maricopa Co., Arizona	Rule 310, Section 301 Section 302.3	• Pave or apply surface rock for long-term stabilization • Limit visible fugitive dust emissions ≤ 20 % opacity • For inactive disturbed areas, stabilize soil to comply with drop ball, TFV, vegetative cover, or rock test
SCAQMD, California	Rule 403(d)(1)	• Prevent visible emissions from disturbed surface area from crossing a property line
	Rule 403, Table 2 (3a)	• Apply water to at least 80 % of all inactive disturbed surface areas on a daily basis when there is evidence of wind-driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; or
	Rule 403, Table 2 (3b)	• Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; or
	Rule 403, Table 2 (3c)	• Establish a vegetative ground cover within 21 days after active operations have ceased - ground cover must be of sufficient density to expose less than 30 % of unstabilized ground within 90 days of planting, and at all times thereafter; or
	Rule 403, Table 2 (3d)	• Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas

6.3.3.8 Control Measures for Stabilizing Construction Haul Roads and Traffic Areas

Requirements for stabilizing construction haul roads and traffic areas are summarized in Table 6-11.

Table 6-11

Summary of Control Measures for Stabilizing Construction Haul Roads and Traffic Areas

Agency	Rule #	Requirements
Clark County, Nevada	Section 94 Handbook CST 20	• Stabilize all off-road traffic and paving areas (all projects)
		• Stabilize all haul routes (all projects)
	CST 20-1	• Limit vehicle speeds to 15 mph (Note: Use of bumps or dips for speed control is encouraged)
	CST 20-2	• Apply paving as soon as possible to all future roadway areas
		• Apply water to haul routes to stabilize
	CST 20-3	• Apply dust palliative to haul routes to stabilize
	CST 20-4	• Apply gravel to off-road traffic and parking areas and maintain in a stabilized condition
	CST 20-5	
	CST 20-6	• Apply gravel to haul routes and maintain in a stabilized condition
	CST 20-7	• Apply recycled asphalt (or other suitable material) to off-road traffic and parking areas and maintain in a stabilized condition
	CST 20-8	• Apply water to off-road traffic and parking areas and maintain in a stabilized condition
	CST 20-9	• Apply a dust palliative (designed for vehicle traffic) to off-road traffic and parking areas and maintain in a stabilized condition
	CST 20-10	• Supplement dust palliative or aggregate applications with watering, if necessary
Maricopa Co., Arizona	Rule 310, § 308.4 & Table 1 § 302.2	• Limit vehicle speed to 15 miles per hour or less and limit vehicular trips to no more than 20 per day • Apply water so that the surface is visibly moist and subsection 302.2 of this rule is met • Pave • Apply and maintain gravel, recycled asphalt, or other suitable material in compliance with subsection 302.2 of this rule • Apply a suitable dust suppressant in compliance with subsection 302.2 of this rule

Table 6-11

Summary of Control Measures for Stabilizing Construction Haul Roads and Traffic Areas (continued)

Agency	Rule #	Requirements
SCAQMD, California	Rule 403	• Water all roads used for any vehicular traffic at least once per every two hours of active operations [three times per normal eight hour work day]; or • Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; or • Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface
SJVUAPCD, California	Rule 8020 § 5.3	• Apply sufficient water to on-site roads and off-site access roads to limit opacity to ≥ 40 % • Apply chemical dust suppressant to on-site roads and off-site access roads to limit opacity to ≥ 40 %
MDAQMD, California	Rule 403-2(C)(3)	• Provide stabilized access to the site as soon as possible (prior to project completion) • Construct parking lots and paved roads first, as feasible

Controls Apply to On-Site Haul Roads and Off-Site Access Roads

The Clark County, Maricopa County, and SJVUAPCD control measures for unpaved haul roads and traffic areas apply to both on-site and off-site access roads. The MDAQMD control measure also requires the stabilization of access roads as soon as possible, but before completion of the construction site. Both Clark County and Maricopa County require that visible emissions from traffic areas, haul roads, and access roads not exceed an opacity of 20 percent. The SJVUAPCD requires that visible emissions from these sources be limited to an opacity of 40 percent. The SCAQMD sets a fairly aggressive set of prescriptive requirements in lieu of upwind/downwind monitoring. The MDAQMD does not set performance standards in Rule 403-2.

Maricopa County Implements a Silt-Loading Stabilization Standard

Both the Maricopa and Clark County rules include a surface silt-loading stabilization standard. Maricopa Rule 310 allows compliance with either a silt content standard of six percent or a silt loading standard of 0.33 oz/ft^2. The Section 94 Handbook definition of "stabilized" provides that unpaved haul roads must comply with the AQR 91 stabilization standards and test methods. These standards include a 20 percent opacity standard, and either a maximum silt content standard of six percent or a silt loading standard of 0.33 oz/ft^2. Therefore, the same stabilization standards apply for unpaved haul roads in both Clark County and Maricopa County.

The Section 94 Handbook Includes Ten Specific Control Methods for Haul Roads

Beyond the basic requirement that on-site and off-site unpaved haul roads and traffic areas be stabilized as required to comply with visible emission limits of the regulation, the Clark County Section 94 Handbook provides ten specific control methods that may be required as appropriate in a dust control permit/dust mitigation plan. The Maricopa County Rule 310 mandates that one primary and one contingency measure be implemented from five options provided in Rule 310, Table 1.

The Clark County Requirements Are of Equal Stringency to Other BACM/MSM

Based on this overall assessment, Clark County believes that the AQR Section 94 Handbook control measures for off-site access roads, on-site haul roads, and traffic areas are of equal stringency to the Maricopa County requirements and more stringent than the SCAQMD, SJVUAPCD, and MDAQMD requirements.

6.3.3.9 Control Measures for Track Out Prevention

Requirements for preventing track out from construction activities are summarized in Table 6-12.

Clark County Has Implemented a Comprehensive Set of Track Out Prevention and Cleanup Measures

In order to limit track out onto paved roads, Clark County has implemented a comprehensive program of mandatory track out control. Traffic must be controlled to ensure that all traffic utilizes track out control devices to facilitate the cleanup of track out from a limited number of points. Stringent track out cleanup requirements and record-keeping requirements are in place to facilitate verification that required track out prevention/cleanup requirements have been met. A comprehensive menu of track out control options are provided which can be selected or required on a site-specific and phase-specific basis.

Table 6-12

Summary of Control Measures for Preventing Track Out from Construction Activities

Agency	Rule #	Requirements
Clark County, Nevada	Section 94 Handbook, CST 19	**Requirements for All Projects** • Install and maintain track out control devices in effective condition at all access points where paved and unpaved access or travel routes intersect • All exiting traffic must be routed over selected track out control device(s) • Track out must be cleaned daily, at minimum • Immediately clean track out from paved surfaces when it extends 50 feet or more • Track out conditions, including preventive and corrective measures, must be recorded daily for every day that the construction project access is used by vehicles • (Proposed) Prohibition on the use of dry rotary brushes and blower devices to clean up track out
		Control Measures For All Soil Types
	CST 19-1	• Pave construction activities roadways as early as possible
	CST 19-2	• Install gravel pad(s) consisting of 1” to 3” rough diameter, clean, well-graded gravel or crushed rock (location of gravel pads must be identified on project map). Minimum dimensions must be 30 feet wide by three inches deep, and, at minimum, 50 feet or the length of the longest haul truck, whichever is greater. Re-screen, wash, or apply additional rock in gravel pad to maintain effectiveness
	CST 19-3	• Install wheel shakers in the event that track out cannot be controlled with gravel pads. Clean wheel shakers on a regular basis to maintain effectiveness
	CST 19-4	• Install wheel washer in the event that track out cannot be controlled with gravel pad and wheel shakers. Maintain wheel washers on a regular basis to maintain effectiveness
	CST 19-5	• Install wheel shakers as primary control measures in addition to or in place of gravel pads
	CST 19-6	• Install wheel washer as primary control measures in addition to or in place of wheel shakers and gravel pads
	CST 19-7	• Limit site accessibility to routes with track out control devices in place by installing effective barriers on unprotected routes
	CST 19-8	• Record track out conditions and cleanup actions in daily project records

Table 6-12

Summary of Control Measures for Preventing Track Out from Construction Activities (continued)

Agency	Rule #	Requirements
Maricopa Co., Arizona	Rule 310, § 308.3(a) & Table 1	**Install A Suitable Track Out Control Device At All Exits Onto a Public Roadway** • Install a grizzly or wheel wash system at all access points • At all access points, install a gravel pad at least 30 feet wide, 50 feet long, and six inches deep • Pave starting from the point of intersection with a paved public roadway and extending for a centerline distance of at least 100 feet and a width of at least 20 feet **Cleanup spillage, carry-out, erosion, and/or track out on the following time schedule:** • Immediately, when spillage, carry-out, and/or track out extends a cumulative distance of 50 linear feet or more; or • At the end of the work day, when spillage, carry-out, erosion, and/or track out are other than the spillage, carry-out, erosion, and/or track out described above, in subsection 308.3(b)(1) of this rule

Table 6-12

Summary of Control Measures for Preventing Track Out from Construction Activities (continued)

Agency	Rule #	Requirements
SCAQMD, California	Rule 403(d)(5)(A) or	**Prevention and Removal Option A** • Prevent or remove within one hour the track out of bulk material onto public paved roadways as a result of operations
	Rule 403(d)(5)(B) & Table 3	**Prevention and Removal Option B** • Prevent the track out of bulk material onto public paved roadways as a result of operations and remove such material any time track out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations; and • Remove all visible roadway dust tracked out upon public paved roadways as a result of active operations at the conclusion of each work day when active operations cease
		Track out Control Devices Required For Use With Option B
	Table 3 (1)	• Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface, and extending for a centerline distance of at least 100 feet and a width of at least 20 feet; or
	Table 3 (2)	• Pave from the point of intersection with the public paved road surface, and extending for a centerline distance of at least 25 feet and a width of at least 20 feet, and install a track out control device immediately adjacent to the paved surface such that exiting vehicles do not travel on any unpaved road surface after passing through the track out control device; or
	Table 3 (3)	• Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used
SJVUAPCD, California	Rule 8020 § 5.4	• Limit or remove the accumulation of mud or dirt from public paved roads at the end of the work day, or at a minimum of once every 24 hours when operations are occurring
	Rule 8020 § 5.4.1	• The use of dry rotary brushes prohibited without sufficient wetting to limit visible emissions to ≤ 40 % opacity
	Rule 8020 § 5.4.2	• The use of blower devices for removal of deposited material is prohibited
	Rule 8020 § 5.4.3	• The use of track out control devices such as paved access aprons, gravel strips, and wheel washers is strongly encouraged

Clark County, Maricopa County, and SCAQMD implement identical requirements for the cleanup of track out of mud and dirt. The basic requirement is the immediate cleanup of track out when track out exceeds 50 feet in length; or, at a minimum, daily at the end of the work day when active operations cease. The SJVUAPCD Rule 8020 includes the requirement for cleaning up track out once every 24 hours, but lacks the additional requirement that track out be cleaned when the accumulated mud and dirt exceeds 50 feet in length.

Clark County, Maricopa County, and SCAQMD Implement Identical Cleanup Requirements

The SCAQMD Rule 403 provides an alternative option of track out cleanup once every hour. This option eliminates the requirement that track out devices be maintained at exits. The Maricopa regulation provides an exemption for the use of track out control devices for projects with less than five acres of disturbed area or for projects where less than 100 cubic yards of bulk materials are hauled on or off site per day. The Clark County program does not contain this exemption. Where track out devices are used, the SCAQMD offers the option of paving 100 feet or paving at least 25 feet and installing a track out control device next to the paving. With regard to the track out control device options prescribed under the Clark County and Maricopa County programs, the options provided are similar and appear to be of similar effectiveness. In certain requirements (for example, the minimum depth of six inches of gravel in gravel pads), the Maricopa County minimum standard appears to be somewhat more stringent. Clark County adopted a smaller minimum depth of three inches in order to minimize problems with vehicle tires digging into the gravel pad. However, the Clark County requirement that the gravel be maintained in a clean condition ensures that gravel pads meeting the Clark County standard will be at least as effective as these meeting the Maricopa standard. The SJVUAPCD Rule 8020 “strongly encourages” the use of track out control devices, but does not require their use under the regulation.

Other Options and Exemptions

Track Out Control Requirements

The SJVUAPCD Rule contains a unique prohibition on the use of dry rotary brushes and blower devices for the cleanup of track out. These prohibitions compensate to some degree for the fact that the SJVUAPCD regulation does not have a visible emissions standard for all construction-related activities. Specific prohibitions on dry rotary brushes, blower devices, and other similar equipment are not necessary in the Clark County and Maricopa County programs because these types of equipment could not be used without violating these agencies' 20 percent opacity standard for visible emissions. However, in response to public comments made during the SIP development process, Clark County has proposed to formalize this prohibition in Sections 93 and 94 of the AQR.

20 Percent Opacity Limit Precludes Use of Dry Rotary Brushes and Blower Devices

In terms of overall comprehensiveness, integration, and degree of control, Clark County finds the AQR Section 94 Handbook track out control program as stringent as, and potentially more stringent than, the Maricopa County program. The Clark County program is somewhat more stringent than the SCAQMD program and significantly more stringent than the SJVUAPCD program for this control measure.

Clark County Requirements Potentially More Stringent than Other BACM/MSM

<u>6.3.3.10 Control Measures for Truck Loading</u>

Requirements for preventing particulate emissions from truck loading are summarized in Table 6-13.

Clark County has implemented a comprehensive soil-specific program for controlling particulate emissions from loading bulk material into trucks. This program includes general work practices for handling bulk materials, and specific control measures for controlling emissions from soils that are hydrophobic or which have a high silt content. Hydrophobic soils make dust control using water difficult to achieve. This is in contrast to the SCAQMD that is able to use a 12 percent moisture standard due to the soil types characteristic to that area. Soils in Clark County have been determined to have an optimum moisture for compaction varying from less than five percent to 19 percent. Some soils cannot hold enough water to reach a 12 percent moisture content while other soils would not be adequately controlled with a 12 percent moisture content. The types of soils in the Las Vegas Valley make use of a 12 percent moisture requirement less effective a control than the opacity standard.[5] The controlling standard for Clark County,

Clark County Requirements Should Achieve Greater Air Quality Benefits in Practice

[5] Dames & Moore Group Company, "*An Evaluation of Incorporating Best Management Practices into the Construction Activities Program.*" A report submitted to Clark County Particulate Matter Emissions Control Research Advisory Committee. May 5, 2000.

and that incorporated in the Maricopa County program, is the 20 percent opacity standard, which overall is a more effective control due to the variety of soil types present in those regions. Although the Maricopa County and SCAQMD requirements may achieve similar air quality benefits when properly implemented, the comprehensive work practices implemented by the Clark County program (which include visible emissions limits, requirements for all projects, control measures for all soils, and control measures for specific soil categories) should achieve greater air quality benefits in practice and are considered more stringent.

Table 6-13

Summary of Control Measures for Preventing Particulate Emissions from Truck Loading

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.5.2 AQR § 94.6.8(d) AQR § 94.6.8(b)	**Visible Emissions Limits** • Limit visible emissions from all construction activities to ≤ 20 % opacity • Limit visible dust plume from all construction activities to 100 yards • (Proposed) Limit visible dust plume to 100 feet • (Proposed) Limit visible emissions from crossing a property line
	Section 94 Handbook - CST 22	**Requirements for All Projects** • Cover all loads on public roadways
	CST 22-1 CST 22-2	**Control Measures For All Soil Types** • Empty loader bucket slowly • Keep loader bucket close to the truck to minimize the drop height while dumping
	CST 22-3 CST 22-4 CST 22-5 CST 22-6 CST 22-7 CST 22-8	**Control Measures For Specific Soil Types** • Mix material with water and surfactant mixture prior to loading (high soils) • Spray material with water and surfactant mixture while loading (high soils) • Mix material with water and tackifier mixture prior to loading (moderate high soils) • Spray material with water and tackifier mixture while loading (moderate high soils) • Mix material with water prior to loading (moderate low and low soils) • Spray material with water while loading (moderate low and low soils)
Maricopa Co., Arizona	Rule 310, § 301	• During stacking, loading, and unloading operations, apply water as necessary to limit visible emissions to ≤ 20 % opacity
	§ 308.6(a)	• During stacking, loading, and unloading operations, apply water as necessary to maintain compliance with the 20 % opacity limit

Table 6-13

Summary of Control Measures for Preventing Particulate Emissions from Truck Loading (Continued)

SCAQMD, California	Rule 403(d)(1) Table 2 (1a)	• Prevent visible emissions from all construction activities from crossing property line • Maintain soil moisture content at a minimum of 12 % as determined by ASTM method

6.3.3.11 Control Measures for Importing Soil, Rock, and Other Bulk Materials

Requirements for preventing particulate emissions from importing soil, rock, and other bulk materials are summarized in Table 6-14.

Table 6-14

Summary of Control Measures for Preventing Particulate Emissions from Importing Soil, Rock, and Other Bulk Materials

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.5.2 AQR § 94.6.8(d) AQR § 94.6.8(b)	**Visible Emissions Limits** • Limit visible emissions from all construction activities to ≤ 20 % opacity • Limit visible dust plume from all construction activities to 100 yards
	Section 94 Handbook	**Requirements for All Projects** • Determine PEP of imported material • Stabilize material while transporting to prevent fugitive dust emissions • Implement Truck Loading BMP (CST 22) • Stabilize material while unloading to prevent fugitive dust emissions • Stabilize material while loading to prevent fugitive dust emissions • Install suitable devices to prevent track out (CST 19) **Control Measures For All Soil Types**
	CST 13-1	• Use tarps or other suitable enclosures on haul trucks
	CST 13-2	• Maintain three to six inches of freeboard to minimize spillage
	CST 13-3	• Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage
	CST 13-4	• Clean wheels and undercarriage of haul trucks prior to leaving construction site
	CST 13-5	• Limit vehicular speeds to 15 mph on the work site
	CST 13-6	• Keep soils at optimum moisture content while actively handling
		• (Proposed) Limit visible dust plume to < 100 feet • (Proposed) Prohibition on dust plume from crossing a property line

Table 6-14

Summary of Control Measures for Preventing Particulate Emissions from Importing Soil, Rock, and Other Bulk Materials (continued)

Agency	Rule #	Requirements
Maricopa Co., Arizona	Rule 310, § 301 § 308.6(a)	• During stacking, loading, and unloading operations, apply water as necessary to limit visible emissions to ≤ 20 % opacity • During stacking, loading, and unloading operations, apply water as necessary to maintain compliance with the 20 % opacity limit **Bulk Material Hauling Off Site Onto Paved Public Roadways:** • Load all haul trucks such that the freeboard is not less than three inches; and • Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s); and • Cover all haul trucks with a tarp or other suitable closure; and • Before the empty haul truck leaves the site, clean the interior of the cargo compartment or cover the cargo compartment **Bulk Material Hauling On Site Within The Boundaries Of The Work Site** (Applicable when crossing a public roadway upon which the public is allowed to travel while construction is underway) • Load all haul trucks such that the freeboard is not less than three inches; and • Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s); and • Install a suitable track out control device that controls and prevents track out and/or removes particulate matter from tires and the exterior surfaces of haul trucks and/or motor vehicles that traverse such work site

Clark County Requirements Are of Equal Stringency as Other BACM/MSM

Both Clark County and Maricopa County have implemented a comprehensive program for controlling particulate emissions from hauling bulk material, such as soil and rocks, that is well integrated with other control measures such as track out control and truck loading. No other programs evaluated by Clark County came close to being as comprehensive and providing the air quality benefits of these two programs. The Clark County program provides some soil-specific work practices that are not included in the Maricopa County program. In addition to meeting a 20 percent opacity standard for hauling activities, haul trucks must either be covered while carrying loads on site, maintain three to six inches of freeboard, or keep soils at their optimum moisture content. Trucks must be cleaned and checked for leaks before leaving the site over a track out control device. The Maricopa County program also makes most of these work practices mandatory, except that freeboard is required to be not less than three inches, and the use of tarps or keeping materials at optimum moisture content are not options. Clark County believes both programs will provide equivalent air quality benefits and are of equivalent stringency.

6.3.3.12 Control Measures for Stockpiles

Requirements for preventing particulate emissions from storage piles are summarized in Table 6-15.

As shown by the Table 6-15 summary, both the Clark County and Maricopa County programs implement very stringent requirements for stockpiles. The Clark County program is very comprehensive and includes special control measures for difficult soils. The standard for stabilizing inactive stockpiles is defined in the Section 94 Handbook, which by definition requires compliance with the AQR Section 90.2 stabilization standards. The Maricopa County program includes rigorous stabilization standards that are somewhat less flexible than the options provided for in the Clark County program but which will be effective at controlling emissions. Clark County believes both programs are equally stringent in terms of air quality benefits achieved.

Clark County Program Emphasizes Comprehensiveness and Flexibility

The Imperial County Air Pollution Control District (IMAPCD) Rule 403 includes a control option of spraying the storage pile with water 15 minutes prior to handling that is not included in the Clark County and Maricopa County programs. However, the Clark County BMP of handling soil at optimum moisture content is equal to or more stringent than the Imperial County presoaking requirement. The SCAQMD Rule 403 requirements are generally less stringent than the Clark County and Maricopa County programs.

Clark County Requirements Are of Equal Stringency as Other BACM/MSM

Table 6-15

Summary of Control Measures for Preventing Particulate Emissions from Stockpiles

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.5.2 AQR § 94.6.8(d) AQR § 94.6.8(b) Section 94 Handbook CST 18 CST 18-1 CST 18-2 CST 18-3 CST 18-4 CST 18-5 CST 18-6 CST 18-7 CST 18-8 CST 18-9 CST 18-10	**Visible Emissions Limits** • Limit visible emissions from all construction activities to ≤ 20 % opacity • Limit visible dust plume from all construction activities to 100 yards • (Proposed) Limit visual dust plume 100 feet • (Proposed) Prohibition on dust crossing a property line **Requirements for All Projects** • Stabilize stockpiles • Stockpiles located within 100 yards of occupied buildings must not be constructed over eight (8) feet in height • Stockpiles over eight (8) feet high and not covered must have a road bladed to the top to allow water truck/pull access or must have a sprinkler irrigation system installed that is capable of complete stockpile coverage **Control Measures For All Soil Types** • Stockpile at optimum moisture content • Remove material from the downwind side of the stockpile • To the extent possible, maintain stockpile to avoid steep sides or faces • Stabilize material in stockpile and surrounding area following stockpile-related activity **Control Measures For Specific Soil Types** • Apply water and surfactant during stacking, loading and unloading operations (high soils) • Apply palliative to all outer surfaces of the stockpile (high soils) • Provide and maintain wind barriers on three (3) sides of the pile, whose length is no less than equal to the length of the pile, whose distance from the pile is no more than twice the height of the pile, whose height is equal to the pile height, and made of material with a porosity of 50 % or less (high soils) • Apply temporary cover or screen in lieu of wind barrier (high soils) • Apply water and tackifier during stacking, loading, and unloading operations (moderate high soils) • Apply palliative to all outer surfaces of the stockpile (moderate high soils)

Table 6-15

Summary of Control Measures for Preventing Particulate Emissions from Stockpiles (continued)

Agency	Rule #	Requirements
Clark County, Nevada (continued)	CST 18-11	• Provide and maintain wind barriers on three sides of the pile, whose length is no less than equal to the length of the pile, whose distance from the pile is no more than twice the height of the pile, whose height is equal to the pile height, and made of material with a porosity of 50 % or less (moderate high soils)
	CST 18-12	• Apply palliative and provide wind barriers on three sides of the pile as high as the pile and made of material with a porosity of 50 % or less (moderate high soils)
	CST 18-13	• Apply water during stacking, loading, and unloading operations (moderate low & low soils)
Maricopa Co., Arizona	Rule 310, § 301 & § 308.6(a)	• During stacking, loading, and unloading operations, apply water as necessary to limit visible emissions to ≤ 20 % opacity
	§ 308.6(b)	**When not conducting stacking, loading, and unloading operations, comply with one of the following work practices:** • Cover open storage piles with tarps, plastic, or other material to prevent wind from removing the coverings; or • Apply water to maintain a soil moisture content at a minimum of 12 %, as determined by ASTM method or maintain at least 70 % of optimum moisture content where the optimum moisture is less than 12 %; or • Stabilize storage pile surface by 1) maintaining visible crust; or 2) maintaining compliance with TFV standards; or 3) maintain vegetative cover per test methods; or 4) maintaining ≥ 10 cover of sheltering elements; or 5) compliance with approved alternative test method • Construct and maintain wind barriers, storage silos, or a three-sided enclosure with walls, whose length is no less than equal to the length of the pile, whose distance from the pile is no more than twice the height of the pile, whose height is equal to the pile height, and whose porosity is no more than 50 %. Where this option is utilized, the moisture or stabilization requirements set forth above are still applicable

Table 6-15

Summary of Control Measures for Preventing Particulate Emissions from Stockpiles (continued)

Agency	Rule #	Requirements
IMAPCD,[a] California	403(I)(4)(a) 403(I)(4)(b) 403(I)(4)(c)	• Spray with water 15 minutes prior to handling and/or at points of transfer • Chemical/physical stabilization • Protect from wind erosion by sheltering or enclosing the operation and transfer line
SCAQMD, California	Rule 403(d)(1) Table 2 (5a) Table 2 (5b) Table 2 (5c) Table 2 (5d)	• Prevent visible emissions from all construction activities from crossing property line • Apply chemical stabilizers; or • Apply water to at least 80 [70] percent of the surface area of all open storage piles on a daily basis when there is evidence of wind-driven fugitive dust; or • Install temporary coverings; or • Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile

[a] Imperial County Air Pollution Control District (IMAPCD)

6.3.3.13 Control Measures for Cut and Fill Operations

Requirements for cut and fill operations, including grading and earthmoving, are summarized in Table 6-16.

Clark County Requires Specific Best Management Practices Based on Soil Categories

Clark County Section 94 of the AQR provides that all cut and fill operations maintain visible emissions limits for construction activities and employ applicable BMP from the Section 94 Handbook. Applicable BMP for cut and fill operations are found in Section 7 of the Section 94 Handbook. Section 7 includes practices applicable to all projects, practices specific to soil categories, and practices applicable to all soils. Practices applicable to all projects include presoaking and stabilization of soils prior to cut and fill activities; stabilization during cut and fill activities; and stabilizing after cut and fill activities Soils in the high category are to be presoaked to the depth of the cut with a water and surfactant mixture. Soils in the medium high category are to be presoaked to the depth of the cut with a water and tackifier mixture.

Soils in the other two categories may be soaked to the depth of the cut with water. Six additional control options which may be employed selectively are provided for all soils.

Table 6-16

Summary of Control Measures for Cut and Fill Operations

Agency	Rule #	Requirements
Clark County, Nevada	AQR § 94.6.8(d) AQR § 94.6.8(b) Section 94 Handbook CST 07 CST 07-1 CST 07-2 CST 07-3 CST 07-4 CST 07-5 CST 07-6 CST 07-7 CST 07-8 CST 07-9	**Visible Emission Limits** • Limit visible emissions from all construction activities to ≤ 20 % opacity • Limit visible dust plume from all construction activities from extending more than ≥ 100 yards • (Proposed) Limit visible plume from extending ≥ 100 feet • (Proposed) Prohibition on visible plume crossing a property line **Requirements for All Projects:** • Presoak soils • Stabilize soils prior to cut and fill activities • Stabilize soil during cut and fill activities • Stabilize soil after cut and fill activities **Control Measures Applicable to All Soils:** • Pre-water with sprinklers or wobblers to allow time for penetration • Pre-water with water trucks or water pulls to allow time for penetration • Dig a test hole to depth of cut or equipment penetration to determine if soils are moist at depth. Continue to pre-water if not moist to depth of cut • Use water truck/pull to water soils to depth of cut prior to subsequent cuts • Apply water to form crust on soil following fill and compaction • Apply dust palliative to form crust on soil following fill and compaction **Control Measures for Specific Soil Types:** • Pre-water with water and surfactant mixture until soil is moist to a depth of cut or equipment penetration (high soils) • Pre-water with water and tackifier mixture until soil is moist to a depth of cut or equipment penetration (medium high soils) • Water until soil is moist to a depth of cut or equipment penetration (moderate low, low)

Table 6-16

Summary of Control Measures for Cut and Fill Operations (continued)

Agency	Rule #	Requirements
Maricopa Co., Arizona	Rule 310, § 301 & Table 1	**Disturbed Surface Areas - Pre-Activity:** • 1D Pre-water site to the depth of cuts • 2D Phase work to reduce the amount of disturbed surface areas at any one time **During Dust Generating Operations:** • 3D Apply water or other suitable dust suppressant, in compliance with 20 % Opacity Limit of Rule 310 • 4D Apply water as necessary to maintain a soil moisture content at a minimum of 12 %, as determined by ASTM Method D2216-98 or other equivalent as approved by the Control Officer and the Administrator of U. S. EPA. For areas which have an optimum moisture content for compaction of less than 12 %, as determined by ASTM Method D1557-91(1998) or other equivalent approved by the Control Officer and the Administrator of U. S. EPA, maintain at least 70 % of the optimum soil moisture content • 5D Construct fences or 3 foot - 5 foot high-wind barriers with 50 % or less porosity adjacent to roadways or urban areas that reduce the amount of windblown material leaving a site. If constructing fences or wind barriers, must also implement 3D or 4D above

Table 6-16

Summary of Control Measures for Cut and Fill Operations (continued)

Agency	Rule #	Requirements
SCAQMD, California	Rule 403 Table 2	**Earth-moving (except cut and fill; and mining)** • Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations; or • For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction **Earth-moving - Construction fill areas** • Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations **Earth-moving - Construction cut areas and mining operations** • Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors

Maricopa County Requirements

The Maricopa County Rule 310 includes a visible emissions limit based on opacity, disturbed surface area pre-activity requirements, and dust-generating operations requirements. Although less specific to cut and fill operations than the Clark County requirements, the Maricopa County requirements generally achieve the same efforts in terms of presoaking and moisture penetration, control during operations, and control after operations with one significant difference. The Maricopa County regulation relies on moisture content, whereas the Clark County regulation emphasizes custom application of surfactants and tackifiers on difficult soils by specific soil category. The Section 94 Handbook provides specific guidance on which product (surfactant or tackifier) is needed to achieve control. Although the moisture standards contained in the Maricopa County regulation make the establishment of a violation fairly straightforward, Clark County believes that the customized approach to achieving moisture penetration and particulate control will result in greater overall emission reductions and air quality benefits.

SCAQMD Requirements

The SCAQMD Rule 403 provides requirements for general earthmoving, construction fill areas, and construction cut areas. For earthmoving operations, a moisture content and plume length limit of 100 feet are mandated. For construction fill areas, a moisture content requirement and the requirement that compaction be completed as expeditiously as possible is applicable. For construction cut areas, watering must occur as necessary to prevent a visible plume from extending more than 100 feet.

Clark County Requirements Equal or Exceed other BACM/MSM

Based on this assessment, Clark County finds that AQR Section 94 Handbook, Section 7 practices are of equal or greater stringency than the Maricopa County Rule 310 and of greater stringency than SCAQMD Rule 403 for construction cut and fill operations.

6.3.4 Paved Roads

There Are Two Categories of Control Measures for Paved Roads

Control measures to reduce emissions from paved roads are broken into two categories. The first category of controls reduces silt loading by limiting the deposition of materials on the roadway. Measures to limit deposition include stabilizing unpaved shoulders and preventing track out. These measures are analyzed in the next two sections. The second group of control measures involve the cleanup or removal of material already deposited on the roads. The list of potential MSMs and the MSM analysis for these measures are in Sections 6.3.4.3 through 6.3.4.5.

6.3.4.1 Control Measures for Stabilization of Unpaved Shoulders on Paved Roads

Requirements for stabilization of unpaved shoulders on paved roads are summarized in Table 6-17.

Table 6- 17

Summary of Stabilization Requirements for Unpaved Shoulders on Paved Roads

Agency	Rule #	Requirements
Clark County, Nevada	AQR Section 93.2.1.1 & Section 93.2.1.5 AQR Section 93.2.2	**New & Modified Paved Roads** • Pave 4 ft. shoulders; or • Stabilize 4 ft. shoulders with dust palliative and maintain silt loading of < 0.33 oz/ft^2 and prevent visible emissions from exceeding 20 % opacity; or • Stabilize 4 ft. shoulders with 2 inches of gravel • (Proposed) Stabilize shoulders 8 feet or provide curbing on roads with ≥ 3,000 ADT **Existing Paved Roads** • Pave or stabilize shoulders within 365 days of discovery of non-compliance • SIP commitment to have all shoulders paved or stabilized by 12/31/06
SJVAQMD	Rule 8060 Section 5.1.1	**New & Modified Paved Roads** • Paved roads with Annual Average ADT ≥ 500, pave or stabilize 4 ft. shoulders • Paved roads with Annual Average ADT ≥ 3000, pave or stabilize 8 ft. shoulders **Existing Paved Roads** • No requirements
SCAQMD,[a] California	Rule 1186(e)(1)(A)	**New Construction or Widening of Paved Roads** • Paved roads with Annual Average ADT ≥ 500, pave or stabilize 4 ft. shoulders • Paved roads with Annual Average ADT ≥ 3000, pave or stabilize 8 ft. shoulders **Existing Paved Roads** • No requirements
Maricopa Co., Arizona	None	**New & Modified Paved Roads** • No regulatory requirements • SIP commitment to upgrade roads based on local improvement programs

[a] South Coast Air Quality Management District (SCAQMD)

Clark County Road Shoulder Requirements

Clark County has implemented the only program to eliminate unstabilized shoulders on all paved roads to reduce track on of mud and dirt. Both the SJVUAPCD and SCAQMD have implemented requirements for paving or stabilizing new and modified roads, but no other program has included provisions for bringing existing paved roads up to minimum standards for shoulders. The SJVUAPCD and SCAQMD regulations also require eight feet of paving or stabilization for roads with ADT of greater than or equal to 3,000 based on AASHTO standards. Clark County does not believe that this issue constitutes a significant weakness in the Clark County program, but is proposing to adopt this for new roads as well. Because the Clark County program addresses existing paved roads, interim stabilization of paved road shoulders will be needed pending road improvements that will occur under capital improvement programs. Based on this assessment, Clark County believes that the Clark County program has a greater overall stringency than other programs which have implemented this control measure.

Stringency of Clark County Requirements Exceed Other BACM/MSM

6.3.4.2 Control Measures for Prevention of Track Out Onto Paved Roads

Requirements for preventing track out onto paved roads are summarized in Table 6-18.

Table 6- 18

Summary of Requirements for Prevention of Track Out Onto Paved Roads

Agency	Rule #	Requirements
Clark County, Nevada	AQR Section 94.6.8(d) AQR Section 94.6.8(b) Section 94 Handbook Section 19	**Visible Emission Limits** • Limit visible emissions from all construction activities to ≤ 20 % opacity • Limit visible dust plume from all construction activities from extending more than 100 yards • (Proposed) Limit visible dust plum from construction activities from extending more than 100 feet • (Proposed) Prohibition of visible dust plume from crossing a property line **Requirements for All Projects** • Install and maintain track out control devices in effective condition at all access points where paved and unpaved access or travel routes intersect • All exiting traffic must be routed over selected track out control device(s) • Track out must be cleaned daily, at minimum • Immediately clean track out from paved surfaces when it extends 50 feet or more • (Proposed) Prohibition on use of dry rotary brushes or blower devices for the clean up of track out

Table 6- 18

Summary of Requirements for Prevention of Track Out Onto Paved Roads (continued)

Clark County, Nevada (continued)		• Track out conditions, including preventive and corrective measures, must be recorded daily for every day that the construction project access is used by vehicles
	Section 94 Handbook	**Control Measures For All Soil Types**
	CST 19-1	• Pave construction activities roadways as early as possible
	CST 19-2	• Install gravel pad(s) consisting of 1” to 3” rough diameter, clean, well-graded gravel or crushed rock (location of gravel pads must be identified on project map). Minimum dimensions must be 30 feet wide by three inches deep, and, at minimum, 50’ or the length of the longest haul truck, whichever is greater. Re-screen, wash, or apply additional rock in gravel pad to maintain effectiveness
	CST 19-3	• Install wheel shakers in the event that track out cannot be controlled with gravel pads. Clean wheel shakers on a regular basis to maintain effectiveness
	CST 19-4	• Install wheel washers in the event that track out cannot be controlled with gravel pad and wheel shakers. Maintain wheel washers on a regular basis to maintain effectiveness
	CST 19-5	• Install wheel shakers as primary control measures in addition to or in place of gravel pads
	CST 19-6	• Install wheel washers as primary control measures in addition to or in place of wheel shakers and gravel pads
	CST 19-7	• Limit site accessibility to routes with track out control devices in place by installing effective barriers on unprotected routes
	CST 19-8	• Record track out conditions and cleanup actions in daily project records
	CST 13-1	• Use tarps or other suitable enclosures on haul trucks
	CST 13-2	• Maintain three (3) to six (6) inches of freeboard to minimize spillage
	CST 13-3	• Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage
	CST 13-4	• Clean wheels and undercarriage of haul trucks prior to leaving construction site
	CST 13-5	• Limit vehicular speeds to 15 mph on the work site
	CST 13-6	• Keep soils at optimum moisture content while actively handling

Table 6- 18

Summary of Requirements for Prevention of Track Out Onto Paved Roads (continued)

Agency	Rule #	Requirements
Maricopa Co., Arizona	Rule 310 § 301 & Rule 310.01 § 306	**Visible Emissions Limit** • Control dust to comply with 20 % opacity limit
	Rule 310 § 308.3(a) & Table 1	**Install A Suitable Track Out Control Device At All Exits Onto a Public Roadway** • Install a suitable track out device such as a grizzly or wheel wash system at all access points • Install a gravel pad at least 30 feet wide, 50 feet long, and six inches deep • Pave starting from the point of intersection with a paved public roadway and extending for a centerline distance of at least 100 feet and a width of at least 20 feet
	Rule 310 § 308.3	**Cleanup spillage, carry-out, erosion, and/or track out on the following time schedule:** • Immediately, when spillage, carry-out, and/or track out extends a cumulative distance of 50 linear feet or more; or • At the end of the work day, when spillage, carry-out, erosion, and/or track out are other than the spillage, carry-out, erosion, and/or track out described above, in subsection 308.3(b)(1) of this rule
	Rule 310 § 308.1	**Bulk Material Hauling Off site Onto Paved Public Roadways:** • Load all haul trucks such that the freeboard is not less than three inches; and • Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s); and • Cover all haul trucks with a tarp or other suitable closure; and • Before the empty haul truck leaves the site, clean the interior of the cargo compartment or cover the cargo compartment

Table 6- 18
Summary of Requirements for Prevention of Track Out Onto Paved Roads (continued)

Agency	Rule #	Requirements
Maricopa Co., Arizona (continued)	Rule 310 § 308.2	**Bulk Material Hauling On Site Within The Boundaries Of The Work Site** (Applicable when crossing a public roadway upon which the public is allowed to travel while construction is underway) • Load all haul trucks such that the freeboard is not less than three inches; and • Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s); and • Install a suitable track out control device that controls and prevents track out and/or removes particulate matter from tires and the exterior surfaces of haul trucks and/or motor vehicles that traverse such work site • Cleanup of deposited material within 24 hours of discovery
SCAQMD, California	Rule 403(d)(5)(A) or Rule 403(d)(5)(B) & Table 3 Table 3 (1) Table 3 (2) Table 3 (3)	**Prevention and Removal Option A** • Prevent or remove within one hour the track out of bulk material onto public paved roadways as a result of operations **Prevention and Removal Option B** • Prevent the track out of bulk material onto public paved roadways as a result of operations and remove such material any time track out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations; and • Remove all visible roadway dust tracked out upon public paved roadways as a result of active operations at the conclusion of each work day when active operations cease **Track out Control Devices Required For Use With Option B** • Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of intersection with the public paved surface, and extending for a centerline distance of at least 100 feet and a width of at least 20 feet; or • Pave from the point of intersection with the public paved road surface, and extending for a centerline distance of at least 25 feet and a width of at least 20 feet, and install a track out control device immediately adjacent to the paved surface such that exiting vehicles do not travel on any unpaved road surface after passing through the track out control device; or Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used

Both Clark County and Maricopa County have an extensive set of requirements in place to prevent mud and dirt track out onto paved roads. The Clark County measures include visible emissions limits and measures specific for each construction activity taking into account soil characteristics. These measures are integrated in the new AQR Section 94 Handbook. The comprehensiveness of both programs for controlling track out, while not identical, result in similar overall control effectiveness. As addressed previously in Section 6.3.3.9, the overall analysis of the programs to control track out concluded that the Clark County program is as stringent as the Maricopa program and more stringent than that implemented by the SCAQMD.

6.3.4.3 Control Measures for Acquisition of PM_{10}-Efficient Sweepers

Requirements for acquiring PM_{10}-Efficient Street Sweepers for use on paved roads and paved parking lots are summarized in Table 6-19.

Table 6- 19

Summary of Requirements for Acquisition of PM_{10}-Efficient Sweepers for Use on Paved Roads and Paved Parking Lots

Agency	Rule #	Requirements
Clark County, Nevada	AQR Section 93.2.3 & Section 93.2.3.1	• Requires purchase or lease of PM_{10}-efficient street sweepers for sweeping streets or paved parking lots
SCAQMD,[a] California	Rule 1186(d)(2)	• Requires government agencies to purchase or lease PM_{10}-efficient street sweepers for sweeping streets
Maricopa Co., Arizona	SIP Commitment	• Commitment by cities, towns, and the County to purchase PM_{10}-efficient street sweepers • Allocation of $3.8 million in CMAQ funds to support program

[a] South Coast Air Quality Management District (SCAQMD)

Most Public Agency Sweeper Fleets Comply with Standard

In reviewing the sweeping equipment utilized by public agencies in Clark County, it was determined that most of the equipment operated by public agencies already complied with the certification requirements for PM_{10}-efficient street sweeping equipment. The Clark County regulatory program goes one step beyond other programs for this control measure by making the requirement applicable to private operators and equipment used on parking lots.

Clark County, therefore, believes that this is the most stringent program for this control measure.

6.3.4.4 Control Measures for Street Sweeping Frequency

Programs for frequent street sweeping are summarized in Table 6-20.

Table 6-20

Summary of Street Sweeping Frequency for Paved Roads

Area	Agency	Sweeping Program
Clark County, Nevada	Clark County Public Works	• All classes of roads are swept every 7 to 10 days
	City of Henderson	• High silt roads are swept once a week. Other roads are swept twice monthly
	City of Las Vegas	• All classes of roads are swept every 2 weeks. Problem areas, such as roads around active construction sites, are swept more frequently, typically once per week
	City of North Las Vegas	• All roads are swept twice monthly
	State of Nevada	• All freeways in Clark County are swept once a week • All arterials under state jurisdiction in Clark County are swept once a month
Maricopa Co., Arizona	Maricopa Association of Governments	• Commitment to allocate $3.8 million CMAQ funds for PM-efficient sweepers • Funding dispersed competitively based on commitment to utilize equipment. Program designed to encourage additional sweeping efforts by local agencies
	City of Avondale	• Conducts routine sweeping of residential streets
	Town of Carefree	• Program for sweeping streets as necessary
	Town of Cave Creek	• Sweeps streets twice a year utilizing rented sweepers • Also utilizes two water trucks to flush paved roads as needed
	City of Chandler	• Has increased street sweeping on residential streets to once every 30 days and arterial streets to once every 14 days • Downtown streets are swept once a week
	City of El Mirage	• Sweeps streets four times a year using contractors
	Town of Fountain Hills	• Sweeps streets on a frequent basis
	Town of Gilbert	• Downtown area streets are swept once a week • Residential streets are swept once a month
	City of Glendale	• Regularly sweeps streets using mechanical broom sweepers

Table 6-20

Summary of Street Sweeping Frequency for Paved Roads (continued)

Area	Agency	Sweeping Program
Maricopa Co., Arizona (continued)	City of Goodyear	• Sweeps streets on a daily basis using a mechanical broom sweeper
	City of Mesa	• Conducts periodic sweeping of residential and major arterial streets
	City of Paradise Valley	• Initiating an enhanced street sweeping program. Program goal is to sweep every street once every six weeks. Currently, streets are swept once every 3 months
	City of Peoria	• All streets are currently swept once a month. The City is working to increase the sweeping frequency to once every two weeks
	City of Phoenix	• Conducts periodic sweeping of residential and major arterial streets. The City will continue to consider new PM-efficient street sweeping equipment
	Town of Queen Creek	• Sweeps all curb and gutter streets four times per year
	City of Scottsdale	• Sweeps all curbed miles of residential streets approximately once every three weeks • Commuter streets are swept once per week • Downtown streets are swept twice per week • City will continue to consider new PM-efficient street sweeping equipment
	City of Surprise	• Sweeps streets once every ten working days • Heavily traveled arterials are swept more frequently as needed
	City of Tempe	• Routinely sweeps all streets. Streets in the downtown are flushed after special events
	City of Tolleson	• Pursuant to Zoning Ordinance, Article IV, the City commits to strengthen its commitment to increase the frequency of street sweeping
	Town of Wickenburg	• Routinely sweeps all paved streets
	Town of Youngtown	• Ongoing monthly program of sweeping public streets
	Arizona Department of Transportation	• Provides for street sweeping on state highways through intergovernmental agreements and contractors. These efforts are supplemented by ad hoc sweeping performed by state personnel using state-owned equipment

Based on the information contained in the Maricopa County SIP, the sweeping programs implemented in Clark County provide for more frequent street sweeping overall than programs implemented in Maricopa County. When the ratio of PM-efficient street sweeping equipment is factored into this analysis, the Clark County programs provide for much greater emissions reductions than equivalent programs in Maricopa County.

Clark County Program More Stringent

6.3.4.5 Control Measures for Cleanup of Deposition from Natural Events and Spills

Requirements and programs for the cleanup of deposited materials from natural events and spills onto paved roads are summarized in Table 6-21.

Table 6- 21

Summary of Requirements and Programs for Cleanup of Natural Events and Spills onto Paved Roads

Area	Rule #	Requirements
Clark County, Nevada	Clark County Public Works	• On average, cleanup of deposition from natural events and spills initiated within 15 to 30 minutes of the call for assistance during work hours and one hour or less after hours. Natural events such as major floods require additional time to mobilize. The magnitude of events varies widely, precluding characterization in terms of average cleanup time. Truck spills may require as little as one hour or as much as six hours for cleanup
	City of Henderson	• When natural events result in high silt loadings, loaders and dump trucks are employed to remove the heaviest debris, followed by broom sweepers, followed by regenerative air sweepers. Truck spills are responded to within four hours and cleanup continues until the work is completed.
	City of Las Vegas	• The City of Las Vegas responds immediately to any large-scale storm event. Cleaning continues around the clock until all storm-related debris and sediment are removed

Table 6- 21

Summary of Requirements and Programs for Cleanup of Natural Events and Spills onto Paved Roads (continued)

Area	Rule #	Requirements
Clark County, Nevada (continued)	City of North Las Vegas	• The Roadway Maintenance Division begins response to storm events with sweepers and other necessary equipment immediately. All paved roadways impacted by storm events are swept within 48 hours following the event. Truck spills are responded to immediately during work hours and within one hour after hours
	State of Nevada, Department of Transportation	• Where exceptional events and spills occur, the District immediately applies all necessary manpower and equipment to mitigate the situation
Maricopa Co., Arizona	Rule 310.01 § 306	• Cleanup of deposited material within 24 hours of discovery or prior to resumption of traffic on pavement where the pavement area has been closed to traffic
SCAQMD, California	Rule 1186(d)(1)	• Public agencies must begin removal of visible roadway accumulations on public paved roads within 72 hours of notification

Maricopa County has adopted requirements for rapid cleanup of erosion-caused deposition of bulk materials onto paved surfaces. Under these requirements, material cleanup must begin within 24 hours of identification or prior to reopening of a road to traffic where the road has been closed. These cleanup requirements are not limited to public roads; they apply to all paved surfaces. The SCAQMD has implemented rapid cleanup requirements under Rule 1186. The South Coast requirements entail initiating cleanup within 72 hours of discovery and apply only to public paved roads.

Clark County Has Implemented an Extensive Set of Requirements for Construction Activities

In Clark County, all Public Works agencies have action plans or policies in place to facilitate the rapid cleanup of materials deposited on paved roads by storms and spills as summarized in Table 6-21. However major storm events do occur that cause extensive damage and deposition of material on roadways. It is not technologically feasible for cleanup of major storm events to be completed within 24 hours in all situations due to the extent of damage experienced.

Clark County Experiences Limited Impacts from Erosion Deposition

Clark County has also developed an extensive flood control system to minimize the impact of natural events. As noted in Chapter 2, precipitation is limited in the Las Vegas Valley and averages only 4.13 inches per year. However, annual rainfall can vary substantially from year to year and from rainfall event to rainfall event. In general, rainfall events are infrequent but may result in intense precipitation. As a result, the infrastructure for handling storm water is necessarily robust to the extent that minor storms do not generally result in significant off-site deposition of material. The flood control program for the area is directed by the Clark County Regional Flood Control District. The District was created in 1986 and was charged with the responsibility of developing and implementing a comprehensive flood control master plan to alleviate flooding in Clark County. Funding has been provided through voter-approved sales taxes and General Obligation Flood Control Bonds. Since 1987 the District has funded projects totaling over $600 million. Completed facilities include 45 detention basins and approximately 220 miles of channels, washes, and storm drains. Additionally, there are approximately $1.1 billion in flood control facilities identified in the Master Plan for future funding.

Public Works Agencies Have Contingency Plans in Place for Flood Events

The natural event action plans or policies in place in Clark County and the cities of North Las Vegas, Las Vegas, and Henderson to deal with cleanup when a major storm event does occur complement the work of the Flood Control District. The plans entail mobilization of all available equipment from unaffected areas to the event location(s) and removal of heavy silt deposits as quickly as possible. Since completion of the flood control system to handle a 100-year storm is years out (pending an additional $1.1 billion in funding), there is still the possibility of widespread erosion and deposition from a major storm. The entities' plans require quick response and focus maximum resources on the cleanup of roadways. However, time periods for initiating and completing cleanup of all silt deposits are not established since they may vary significantly from storm to storm.

Clark County Contingency Plans Are Effective

The existing Clark County cleanup programs have proven effective in practice. In July 2000, a 100-year flood event which caused significant flooding and property damage occurred in the Las Vegas Valley. Public agencies expeditiously commenced cleanup of road debris in accordance with their response plans. During the two weeks following the event, while silt moisture was high, PM_{10} concentrations declined. All storm water deposits were cleaned up before they became sufficiently dry to cause elevated PM_{10} concentrations. Air quality standards were not exceeded and monitored concentrations were normal for that time period. Therefore, Clark County believes that its programs for cleanup of silt loading on paved roads are of equivalent stringency to those in other areas.

6.3.5 Unpaved Roads

The potential MSMs for paving or stabilizing unpaved roads are identified and analyzed in the following section.

6.3.5.1 Control Measures for Paving Or Stabilizing Unpaved Roads

Requirements for paving or stabilizing unpaved roads in Maricopa County and Clark County are summarized in Table 6-22. There were no other programs found for unpaved roads that were nearly as stringent as those implemented in these two areas.

Table 6- 22

Summary of Requirements for Paving or Stabilizing Unpaved Roads

Agency	Rule #	Requirements
Clark County, Nevada	AQR Section 91.2.1	• Pave or apply and maintain dust palliatives to stabilize all new unpaved roads constructed after June 22, 2000
	AQR Section 91.2.1.1	• Pave or apply and maintain dust palliatives to stabilize all existing unpaved roads with ADT ≥ 150 by June 1, 2003
	SIP Commitment	• Allocation of CMAQ funding to pave publicly owned and maintained unpaved roads over a three-year period ending June 1, 2003
	AQR Section 91.2.1.2	• Prohibition on construction of new unpaved roads or alleys in public thoroughfares after June 22, 2000
City of Las Vegas		• Commitment to pave all unpaved roads by the end of 2006

Table 6- 22

Summary of Requirements for Paving or Stabilizing Unpaved Roads (continued)

Maricopa Co., Arizona	Rule 310.01, Section 303 SIP Commitment SIP Commitment SIP Commitment	• Pave or apply and maintain dust palliatives to stabilize all existing unpaved roads with ADT ≥ 150 by June 10, 2004 • SIP commitment of public agencies to accept dedication of certain privately owned unpaved roads • Public agencies develop and implement programs to stabilize unpaved roads • Design standard restrictions on new unpaved roads

Both Maricopa and Clark County have developed comprehensive programs for stabilizing unpaved roads utilizing a combination of regulations and SIP commitments by the various jurisdictions to implement control measures. There are a few distinctions between the two programs. Clark County Regulation 91 requires stabilization of all new unpaved roads constructed after June 2000, and prohibits construction of new unpaved roads or alleys in public thoroughfares after June 2000. Maricopa Rule 310.01 does not have the new unpaved roads prohibition, but the requirement to stabilize unpaved roads with ADT greater than 150 by June 2004 would apply. Also, Maricopa depends on the jurisdictions to establish unpaved road restrictions through design standards or other locally adopted stabilization requirements which are identified in their SIP commitments. Most jurisdictions have established requirements that limit or prevent the building of new unpaved roads, particularly roads serving new subdivisions and commercial and residential developments. Clark County Rule 91 requirements for new unpaved roads are more comprehensive as they specifically prohibit new unpaved roads and apply uniformly to all jurisdictions in the nonattainment area.

Maricopa Rule 310.01 requires stabilization of existing unpaved roads with an ADT greater than 150 by June 2004. AQR Section 91 has the same stabilization requirement but with an earlier completion date of June 2003, and there is a SIP commitment to allocate Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds to all jurisdictions as needed to pave publicly owned and maintained roads by that date. The Maricopa jurisdictions made a variety of SIP commitments ranging from the City of Phoenix commitment to pave all unpaved roads regardless of ADT, to others like Maricopa County that committed to meet the 2004 deadline to pave public roads with ADT greater than 150. The City of Las Vegas has made a commitment to pave all unpaved public roads regardless of ADT. Clark County also has an established Emissions Reduction Credit (ERC) program that, although not a SIP commitment, provides credits for paving roads below 150 ADT. Although it is not possible to quantify the overall impact of these various SIP commitments, the conclusion is that the Clark County unpaved roads requirement is at least as stringent as Maricopa's due to the earlier completion date established for paving roads over 150 ADT, the commitment to pave roads versus using other less efficient stabilization methods, and having programs identified that will result in paving roads with less than 150 ADT.

Clark County Requirements Are More Stringent than Other States' BACM/MSM

Overall, the combined effects of AQR Section 91 and the SIP commitments result in a program to reduce emissions from unpaved roads in Clark County that is at least as stringent as the program established in Maricopa County, and more stringent than any program implemented in other states.

6.4 MOST STRINGENT MEASURE SUMMARY

This Chapter provided documentation to satisfy the most stringent measure (MSM) requirement established by the CAAA, Section 188(e) as one of the requirements necessary to support a request for extension of the Serious Area PM_{10} attainment date beyond the established December 31, 2001 deadline.

Clark County followed U. S. EPA's proposed policy for demonstrating the inclusion of the most stringent measures in the SIP as provided in Federal Register Notice 65 FR 19968, dated April 13, 2000. A five-step process for determining MSM, similar to that used for BACM determinations, was utilized. A complete analysis comparing the potentially most stringent measures that are included in the implementation plan of any state, or are achieved in practice in any state against the control measures implemented in the Las Vegas area was accomplished and fully documented. Through this analysis and comparison, it has been demonstrated that the maximum degree of emission reduction that has been required or achieved from a source or source category in other SIPs or in practice in other states, and that can be feasibly implemented in the Las Vegas area, has been achieved by the implemented control measures.

Clark County Followed U. S. EPA's Proposed Policy in Evaluating MSM

The next chapter addresses the formal request for extension of the 24-hour PM_{10} NAAQS attainment date to December 31, 2006.

CHAPTER 7 - REQUEST FOR EXTENSION OF THE ATTAINMENT DATE FOR PM_{10}

7.1 INTRODUCTION

Formal Request for Extension of Attainment Deadline

Clark County is requesting an extension of the attainment date for the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS). Section 188(e) of the 1990 Clean Air Act Amendments (CAAA) allows the U.S. EPA to extend the "Serious Area" attainment date up to five years upon application by the State if certain requirements are satisfied. The purpose of this chapter, in addition to formalizing the request for the extension, is to present supporting documentation that the extension request is warranted and CAAA requirements for granting an extension are met.

Extension of Attainment Date Not Necessary for Annual Standard

Extension of Attainment Date to 2006 Requested for 24-Hour Standard

The PM_{10} health standards are set at 150 micrograms per cubic meter ($\mu g/m^3$) for a 24-hour period average, and 50 $\mu g/m^3$ for an annual average. The expected timeline for attaining these health standards are different. In the case of the annual average health standard, attainment can be demonstrated by the CAAA-required date of December 31, 2001. The 24-hour health standard is more problematic and attainment is not expected until 2006. A full five-year extension of the attainment date from 2001 to 2006 is requested for the 24-hour health standard.

7.2 REQUIREMENTS FOR AN EXTENSION

Clean Air Act Criteria for Granting an Extension

Section 188(e) of the 1990 CAAA allows the U.S. EPA to extend the attainment date for a serious area for up to five years beyond 2001 if attainment by 2001 is impracticable. In addition to a formal request to the U.S. EPA for an extension, the requirements for an extension include the following:

1. Compliance with requirements and commitments applicable to the Las Vegas Valley in the State Implementation Plan (SIP);

2. A demonstration that attainment by 2001 is impracticable;

3. Documentation that measures included in the SIP are as stringent as the Most Stringent Measures (MSM) that have been implemented by any state and/or achieved in practice in any state and are feasible for the area; and

4. A demonstration that the expected attainment date is the most expeditious alternative date practicable.

7.3 COMPLIANCE WITH ALL REQUIREMENTS AND COMMITMENTS

This State Implementation Plan (SIP) for the Las Vegas Valley complies with all requirements in sections 172 and 189 of the 1990 CAAA relating to "serious" PM_{10} nonattainment areas. Chapter 4 documents adoption and implementation of control measures designed to attain PM_{10} National Ambient Air Quality Standards (NAAQS) at the earliest practicable date. These control measures constitute Reasonably Available Control Measures (RACM) and Best Available Control Measures (BACM) for all significant sources of PM_{10}. Chapter 4 and corresponding appendices also present documentation on the public hearing process, implemented control measures, and SIP commitments.

The SIP Complies with All Requirements for an Extension

Chapter 3 and Chapter 5, along with corresponding appendices, present emissions inventories, emissions projections, and attainment demonstration modeling in accordance with U.S. EPA regulations, guideline documents, and policies. A demonstration that attainment of the 24-hour standard by 2001 is impracticable is presented in the next section.

7.4 ATTAINMENT OF PM_{10} NAAQS BY 2001 IS IMPRACTICABLE

Subsequent sections present both quantitative and qualitative documentation that attainment of the 24-hour PM_{10} NAAQS by 2001 is impracticable. PM_{10} emission estimates and projections of emissions and concentrations for 2001 are derived from the proportional rollback approach, which was discussed at length in Chapters 3, 4, and 5. The implementation schedule for control measures and expected 24-hour concentrations in 2001 are discussed below.

Fugitive Dust Sources Dominated the PM_{10} Emission Inventory

Since PM_{10} in the Las Vegas Valley is dominated by geologic materials from fugitive dust area sources, the focus of this SIP has been on the control of dust from the following significant area sources: disturbed open areas, construction activities, paved roads, and unpaved roads. Controls on these sources are implemented through the newly adopted Sections 90, 91, 92, 93, and 94 of the Clark County Health District's Air Quality Regulations. These regulations are all in effect as of January 1, 2001.

The emission reductions resulting from the regulations are sufficient to achieve attainment of the annual PM_{10} Standard by the CAAA-established deadline. However, additional time is necessary to achieve the reductions needed to attain the 24-hour standard as detailed below.

New Enforcement Staff Will be Hired and Trained in 2001

As described in the SIP Commitments Section of Chapter 4, the Health District has committed to hiring 15 additional staff in order to implement and enforce the new regulations. A ten-member compliance team will be formed to focus on Sections 90, 91, 92, and 93, while five new staff members will be added to strengthen the existing construction activities programs and to implement Section 94 requirements. The process of funding, hiring, training, and utilizing the additional staff has already begun, and will be completed during calendar year 2001.

The control measure effectiveness values utilized in this SIP are predicated on this schedule. The Overall Control Measure Reductions column in Table 4-14 reflects the significant increase in control measure effectiveness from 2001 to 2002 that will be realized from the work activities of the additional staff. Earlier realization of these reductions is not practicable due to the time required to hire and train new staff to the proficiency level needed to effectively implement the additional dust control programs.

Unpaved Roads with Greater Than 150 ADT Will be Paved by the End of 2003

The control measure for unpaved road dust as described in Chapter 4 prohibits the construction of new unpaved roads, and a SIP commitment has been made to establish a schedule to pave all existing publicly owned unpaved roads with an ADT of 150 or greater by June 30, 2003. Clark County and the cities of Las Vegas, North Las Vegas, and Henderson have obligated over $25 million in Congestion Mitigation and Air Quality (CMAQ) funds (including local match) over the next three years for the paving program. The funding commitment will support completing approximately one-third of the total paving requirement each year from 2001 through 2003. The overall control reduction percentage from this control measure will increase from 22 percent in 2001 to 65 percent in 2003. The maximum benefit that will be realized at the end of 2003 cannot practicably be achieved earlier due to funding limitations in each year.

The 24-Hour NAAQS Cannot be Attained in 2001

Chapter 5, utilizing the implementation schedule for controls and expected emission reductions that will be achieved, provides quantitative documentation that PM_{10} emissions and corresponding concentrations are not sufficiently reduced to allow for attainment of the 24-hour PM_{10} health standard by 2001. More specifically, valley-wide proportional rollback modeling for 2001 and the resulting inventory presented in Appendix L, Table L-21, Valley-wide 2001 24-Hour Inventory, demonstrate that the projected 24-hour PM_{10} concentrations in 2001 will be 209 micrograms per cubic meter after controls are applied. Although this represents a significant reduction from the projected design day concentration of 281 μg/m3, it is still far short of the 150 μg/m3 standard. The 150 μg/m^3 24–hour standard cannot practicably be achieved by the end of 2001.

7.5 DOCUMENTATION ON INCLUSION OF MOST STRINGENT MEASURES (MSM)

Chapter 6 provides the MSM analysis in accordance with U.S. EPA's proposed policy for satisfying the Section 188(e) requirements. Documentation was presented showing that the PM_{10} controls contained in this State Implementation Plan for the Las Vegas Valley are as stringent as those included in implementation plans of any state, or achieved in practice in any state, that can feasibly be implemented in the Las Vegas Valley.

RACM/BACM Adopted in Clark County are the Most Stringent Control Measures

Chapter 4 documented the control measure development and implementation process that resulted in the best available control measures (BACM) being applied to control significant PM_{10} sources. The process for identifying MSMs was similar to BACM except for one additional step that compared potential MSMs with those measures adopted for the Las Vegas Valley.

The MSM analysis in Chapter 6 demonstrated that the maximum degree of emission reduction that has been required or achieved from a source or source category in other SIPs or in practice in other states, and that can be feasibly implemented in the Las Vegas area, has been achieved by the implemented control measures.

7.6 DEMONSTRATION THAT 2006 IS THE MOST EXPEDITIOUS ALTERNATIVE DATE PRACTICABLE FOR ATTAINMENT OF THE 24-HOUR PM_{10} NAAQS

In order to determine if 2006 is the most expeditious alternative date for attainment of the

24-hour NAAQS, Chapter 5 presented a Reasonable Further Progress (RFP) Analysis for 2003. The following sections discuss the results of the RFP analysis and present the expected 24-hour concentrations in the proposed attainment year of 2006.

7.6.1 Expected 24-Hour Concentrations in 2003

Reasonable Further Progress was Demonstrated for 2003

In Section 7.4, information was provided to document the impracticability of attaining the 24-hour standard by 2001. It was noted that control measure effectiveness would improve significantly after 2001 when the commitment to increase staffing at the Health District's Air Quality Division is completed. Unpaved road emissions would be reduced through the program to pave roads over a three-year period from 2001 to 2003, with the maximum reduction rate achieved by the end of 2003. An analysis of the progress towards attainment was conducted for the end of 2003 to quantify the emission reductions achieved. The results of the Reasonable Further Progress Analysis are depicted in Figure 5-2 which shows projected tons of emissions for 2003 and 2006 after quantifying emission reductions which result from the implementation of the committed control measures.

The projected 2003 emissions level of 277 tons represents a reduction of more than 70 percent from the base year 1998 emissions. Additional reductions of approximately 25 percent are required to reach the attainment level of 206 tons per day. The greater-than-50 percent reduction of emissions toward the attainment level by 2003 does demonstrate reasonable further progress, and also illustrates the impracticability of achieving attainment earlier than 2006.

Appendix M further documents the progress toward attainment with a detailed breakdown of the inventory projections for 2003. The overall control measure reductions applied to the 2003 inventory are the same as applied to the 2006 emission inventory except for unimproved shoulders on paved roads, which will not be fully implemented by 2003. These control measure reductions are described in detail in Appendix L. SIP commitments for paving unpaved shoulders are described in Section 4.8. Participating state and local entities are committed to prepare a plan that will identify and prioritize paving requirements for unpaved shoulders as well as unpaved roads with an ADT of less than 150. Beyond fiscal year 2003, and after completion of the program to pave unpaved roads with an ADT of greater than 150, CMAQ funds will be allocated as necessary to complete each entity's plan for stabilizing shoulders and paving unpaved roads by December 31, 2006.

2006 is the Most Expedient Date to Attain the 24-Hour Standard

Chapter 4 addresses the process that will be followed by public works agencies to develop a detailed plan for the stabilization of unimproved shoulders on paved roads. This program will be accomplished with CMAQ funds after the commitment to pave unpaved roads is completed in 2003, with the paving of the unstable shoulders to be completed by the end of 2006.

7.6.2 Expected 24-Hour Concentrations in 2006 and the Attainment Demonstration

The expected 24-hour concentrations on a valley-wide and micro-area basis are presented in Chapter 5 for the 2006 attainment year. The proportional rollback modeling indicates that 24-hour concentrations on a valley-wide and micro-area basis are below the 24-hour PM_{10} NAAQS (150 micrograms per cubic meter). Combined with the need for three years of air quality monitoring data to account for year-to-year variability in meteorological conditions, the attainment demonstration in Chapter 5 is clear documentation that 2006 is the most expeditious alternative date for attainment of the 24-hour PM_{10} standard.

7.7 SUMMARY

This chapter is a formal request for an extension of the attainment date for the 24-hour PM_{10} NAAQS. A five-year extension of the attainment date from

Formal Request for a Five-Year Extension of the Attainment Date for the 24-Hour PM_{10} NAAQS

2001 to 2006 is requested for the 24-hour PM_{10} NAAQS. Section 188(e) of the 1990 Clean Air Act Amendments (CAAA) allows the U.S. EPA to extend the "Serious Area" attainment date up to five years from 2001 upon application by the state if certain requirements are satisfied. Documentation of the following requirements were provided:

1. A demonstration that attainment by 2001 is impracticable;

2. Compliance with requirements and commitments applicable to the Las Vegas Valley in the SIP;

3. Documentation that the control measures included in the SIP are as stringent as the most stringent measures in the implementation plan of any state and/or achieved in practice in any state that are feasible for the area; and

4. A demonstration that the 2006 attainment date is the most expeditious alternative date practicable.

All of the issues discussed in this Chapter underscore the need and reasonableness of a five-year extension of the attainment date for the 24-hour PM_{10} NAAQS.