Redesignation Request and Maintenance Plan for Particulate Matter (PM_{10})

Clark County, Nevada

Protecting the air we share

Air Quality

August 2012

APPROVED BY THE CLARK COUNTY BOARD OF COMMISSIONERS

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EXECUTIVE SUMMARY

This *Request for Redesignation and Maintenance Plan for Particulate Matter (PM_{10})* is a formal request by Clark County, through its Department of Air Quality, to the U.S. Environmental Protection Agency (EPA) to redesignate the Clark County PM_{10} nonattainment area to attainment for the 1987 24-hour National Ambient Air Quality Standard (NAAQS). The plan summarizes the progress in attaining the PM_{10} standard, demonstrates that all Clean Air Act and Clean Air Act Amendment requirements for attainment have been met, and presents a plan to assure continued maintenance over the next 10 years.

In 1990, EPA designated the Las Vegas Valley, Hydrographic Area 212 (HA 212) in Clark County, as being in "moderate" nonattainment of the 24-hour PM_{10} NAAQS. In 1993, EPA reclassified HA 212 as a "serious" nonattainment area because Clark County could not demonstrate attainment by the required date of December 1994.

In June 2001, Clark County submitted a PM_{10} State Implementation Plan (SIP) that met federal requirements for serious PM_{10} nonattainment areas. The SIP demonstrated that the adoption and implementation of Best Available Control Measures for fugitive sources and continuation of controls for stationary sources would result in attainment of the 24-hour NAAQS by December 31, 2006. Although the Act required the SIP demonstrate attainment of the PM_{10} NAAQS no later than December 31, 2001, EPA granted Clark County a five-year extension for the 24-hour attainment date. Final EPA approval of the Clark County PM_{10} SIP became effective in July 2004.

In June 2007, Clark County submitted the *PM_{10} Milestone Achievement Report*, prepared in accordance with 40 CFR Part 52. The report documents Clark County's attainment of the 24-hour PM_{10} NAAQS by the applicable date of December 31, 2006. In August 2010, EPA published a determination of attainment for PM_{10} for the Las Vegas Valley in the *Federal Register*.

Following on that success, this maintenance plan provides a PM_{10} attainment demonstration that uses the most recently adopted planning variables, including those approved by the Regional Transportation Commission of Southern Nevada, which is the designated Metropolitan Planning Organization for the Las Vegas urban area. The plan also provides revised emission inventories and motor vehicle emissions budgets.

After EPA approval, this plan will become federally enforceable and will determine how Clark County will maintain the 1987 PM_{10} NAAQS through 2023. Once approved, the budgets in this plan will be the projected budgets used to determine transportation conformity in future regional transportation plans.

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ACRONYMS AND ABBREVIATIONS

Acronyms

AQR	Clark County Air Quality Regulation
AQS	Air Quality System
BACM	Best Available Control Measures
BCC	Clark County Board of County Commissioners
BLM	Bureau of Land Management
BMP	best management practices
CAA	Clean Air Act
CFR	Code of Federal Regulations
EI	emission inventory
EPA	U.S. Environmental Protection Agency
ERC	emission reduction credit
FR	*Federal Register*
HA	Hydrographic Area
MVEB	motor vehicle emission budget
NAAQS	National Ambient Air Quality Standards
NDEP	Nevada Division of Environmental Protection
NEAP	Natural Events Action Plan
NRS	Nevada Revised Statues
RTC	Regional Transportation Commission of Southern Nevada
SIP	state implementation plan
VMT	vehicle miles traveled

Abbreviations

mph	miles per hour
$PM_{2.5}$	particulate matter less than 2.5 microns in mean aerodynamic diameter
PM_{10}	particulate matter less than 10 microns in mean aerodynamic diameter
tpd	tons per day
$\mu g/m^3$	micrograms per cubic meter
µm	microns

1.0 INTRODUCTION

1.1 INTRODUCTION

Clark County, in coordination with the Nevada Division of Environmental Protection (NDEP), requests that the U.S. Environmental Protection Agency (EPA) redesignate the Clark County nonattainment area, Hydrographic Area (HA) 212, to attainment status for particulate matter less than 10 microns (µm) in diameter (PM_{10}) under the 1987 PM_{10} 24-hour National Ambient Air Quality Standard (NAAQS).

To complete this redesignation request and maintenance plan in accordance with EPA guidance, Clark County inventoried emissions of PM_{10} for the baseline year (2008) and projected those emissions outward to 2015 and 2023. The inventories were adjusted to reflect federal, state, and local rules on PM_{10} emissions that have already been adopted or implemented. These controls were shown to reduce overall PM_{10} emissions through the maintenance year (2023).

1.2 CHARACTERISTICS AND HEALTH EFFECTS

"Particulate matter" is a general term used to describe a complex group of airborne solid, liquid, and semi volatile materials of various sizes and compositions. Primary PM is emitted directly into the atmosphere from anthropogenic activities, such as agricultural operations, industrial processes, construction and demolition activities, and entrainment of road dust into the air, and nonanthropogenic activities, such as windblown dust and ash from forest fires. Secondary PM is formed in the atmosphere from (predominantly gaseous) combustion by-product precursors, such as nitrogen oxides and volatile organic compounds. The overwhelming majority of airborne PM in Clark County is primary PM; the major source is fugitive windblown dust, with contributions from entrained road dust and construction activities.

Particulate size is a critical characteristic of PM that primarily determines the location of its deposition along the respiratory system. EPA has established two types of PM air quality standards, one for PM_{10} and one for $PM_{2.5}$. (The latter refers to the subset of PM_{10} with an aerodynamic diameter smaller than 2.5 µm.)

PM_{10} has a detrimental effect on human health because it can accumulate in the respiratory system. Short-term exposure can irritate the lungs and may cause immune system responses, resulting in lung constriction that produces shortness of breath and coughing. Larger particles deposit in the upper respiratory tract; smaller particles travel deep into the lungs and are retained longer.

Long-term, low-level PM_{10} exposure may cause cancer and premature death. Those with a history of asthma or chronic lung disease are especially sensitive to these effects. The elderly or those with heart conditions may also have severe reactions, since the resulting lack of oxygen may strain the heart.

1.3 NATIONAL AMBIENT AIR QUALITY STANDARDS

On July 1, 1987, EPA revised the PM NAAQS (Volume 52, page 34634 of the *Federal Register* (52 FR 24634)). The previous standards addressed total suspended particulates, without regard to size; the revised standards addressed only particles having an aerodynamic diameter of 10 μm or less. EPA determined that these microscopic particles can be inhaled deep into the lungs and present a hazard to public health when concentrations exceed certain levels. Both annual-averaged and 24-hour averaged PM_{10} standards were promulgated; however, EPA revoked the annual-averaged standard in 2006 (71 FR 61144). The current PM_{10} (primary) standard retains only the 24-hour averaging time, at a level of 150 micrograms per cubic meter ($\mu g/m^3$).

1.4 HISTORY OF CLARK COUNTY NONATTAINMENT AREA

After passage of the 1990 Clean Air Act Amendments, EPA designated all areas previously classified as Group I areas as "moderate" nonattainment areas, including HA 212 (CAA §107(d)(4)(B)). EPA required these moderate nonattainment areas to submit a state implementation plan (SIP) by November 1991 that would demonstrate attainment of the PM_{10} NAAQS by December 1994. Because of unprecedented growth, high-wind events, and other factors, Clark County could not demonstrate attainment by the required date, and EPA reclassified HA 212 as a "serious" nonattainment area on January 8, 1993 (58 FR 3334). In 1997, a PM_{10} SIP revision was submitted. In December 2000, the Clark County Board of County Commissioners (BCC) requested that the state formally withdraw all previously submitted SIPs and addenda because none demonstrated attainment of the NAAQS.

Section 110 of the Clean Air Act (CAA) requires that states not meeting the NAAQS submit a SIP detailing programs to bring the nonattainment area into attainment. After completing comprehensive research and work programs to address the problems identified in the 1997 PM_{10} SIP revision, Clark County submitted a new SIP to EPA in June 2001 that met federal requirements for remediating serious PM_{10} nonattainment areas. This new SIP demonstrated that the adoption and implementation of Best Available Control Measures (BACM) for fugitive sources and continuation of controls for stationary sources would result in attainment of the annual average PM_{10} NAAQS by 2001 and attainment of the 24-hour NAAQS by December 31, 2006. Although the CAA required the SIP demonstrate attainment of the PM_{10} NAAQS no later than December 31, 2001, EPA granted Clark County a five-year extension for the 24-hour attainment date. Clark County supported its extension request with a Most Stringent Measure control analysis that showed the emission control programs proposed for the valley were at least as stringent, if not more so, than control programs implemented in other nonattainment areas.

In June 2004, EPA published final approval of the PM_{10} SIP (69 FR 32273). In June 2007, Clark County submitted a milestone achievement report that described the county's progress in implementing the SIP (DAQEM 2007a). In August 2010, EPA determined HA 212 had attained the PM_{10} NAAQS (75 FR 45485).

With submittal of this redesignation request and maintenance plan, Clark County is requesting that EPA designate Clark County in attainment of the PM_{10} NAAQS.

1.4.1 Nonattainment Area

Figure 1-1 depicts the PM_{10} nonattainment area established by EPA (HA 212), which is roughly 1,500 square miles, largely under federal control, and includes the:

- City of Las Vegas
- City of North Las Vegas
- City of Henderson
- Unincorporated urban areas of Clark County
- Desert National Wildlife Refuge lands
- Humboldt-Toiyabe National Forest lands
- Red Rock Canyon National Conservation Area
- Nellis Air Force Base
- Nellis Bombing and Gunnery Range
- Nellis Small Arms Range
- Clark County Shooting Range
- Las Vegas Paiute Indian Reservation
- Spring Mountain State Park
- Lake Mead National Recreational Area.

More than 80 percent of the land in Nevada is under federal jurisdiction, most of it managed by the Bureau of Land Management (BLM). In 1998, Congress passed the Southern Nevada Public Land Management Act, which allowed BLM to sell, trade, or lease public land within a specific area around Las Vegas. There was an amendment to this boundary in 2003, and minor adjustments thereafter. The area currently comprises 327,047 acres and is known as the BLM disposal area (Figure 1-2). Lands controlled by the federal government outside this area remain in a native or managed state, and the disposal boundary can only be changed by an act of Congress.

Because the BLM disposal area contains nearly all of the anthropogenic sources and sensitive receptors within the nonattainment area, it was used for the attainment demonstration in the EPA-approved PM_{10} SIP and in this maintenance plan.

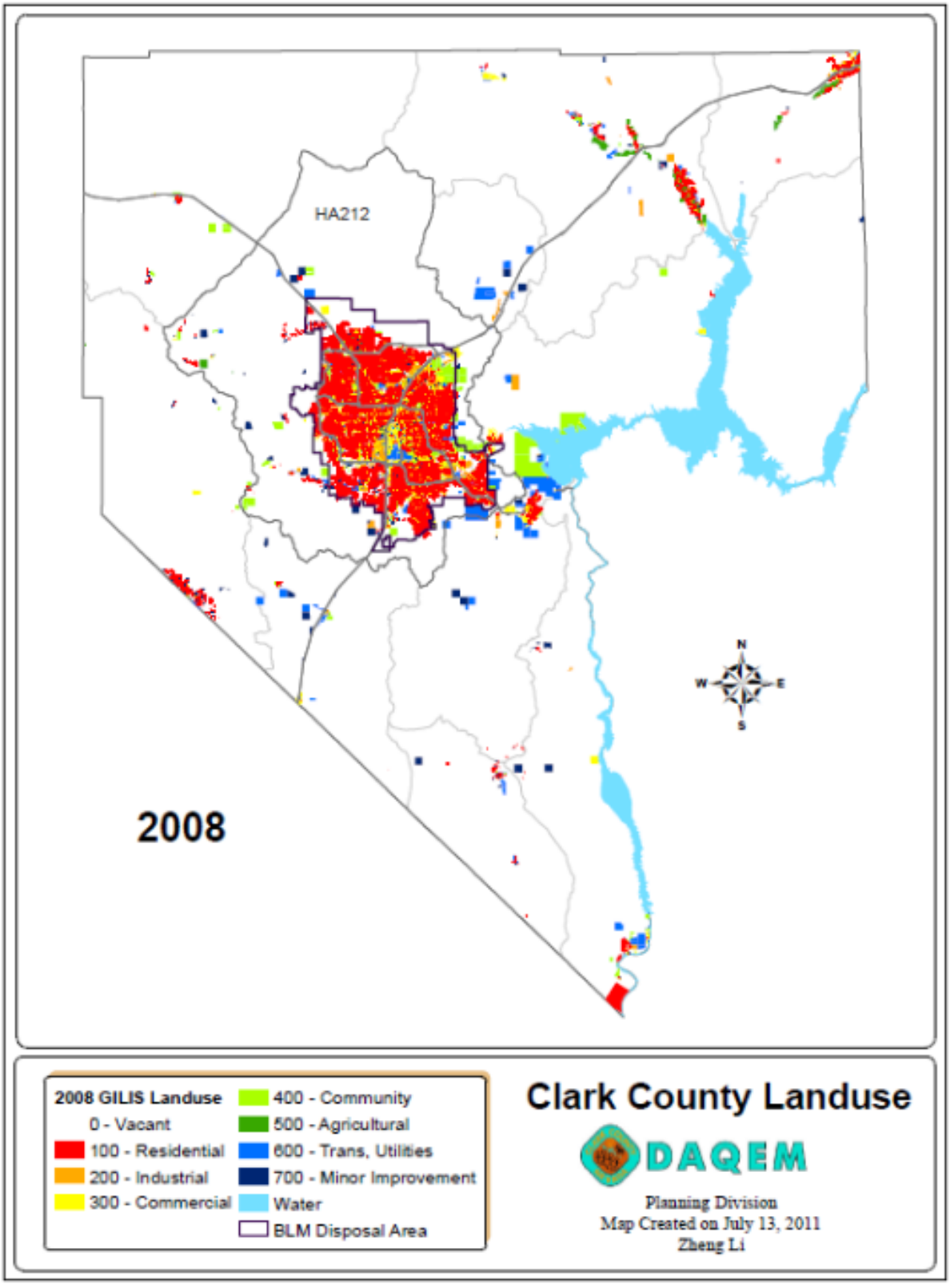

Figure 1-1. Clark County PM_{10} Nonattainment Area (HA 212).

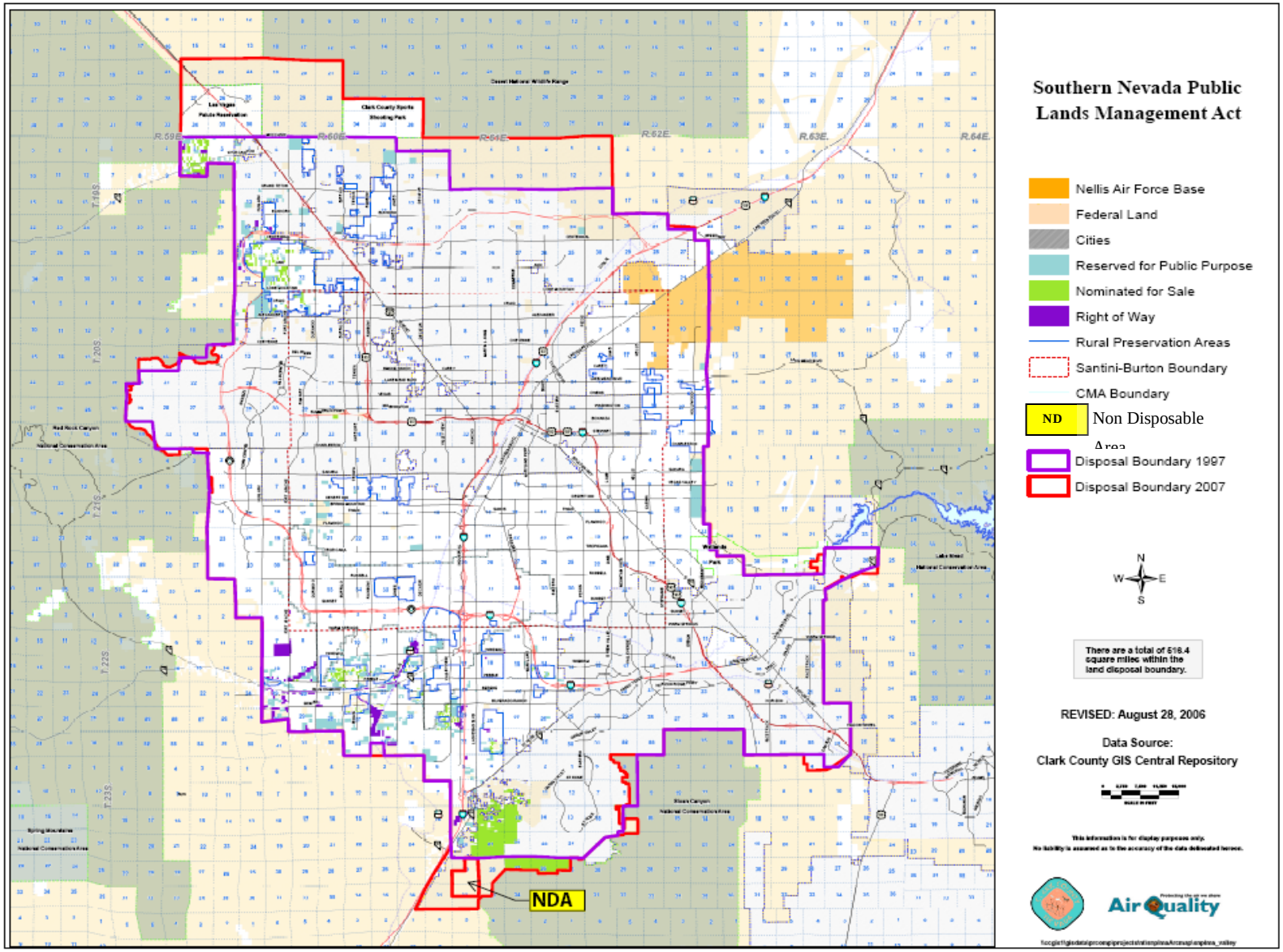

Figure 1-2. BLM Disposal Area within HA 212.

1.5 REQUIRED COMPONENTS OF A REDESIGNATION REQUEST

CAA Section 107(d)(3)(E) defines the five conditions that must be met before EPA can redesignate a nonattainment area to attainment. With the submittal of this plan, Clark County meets these five conditions.

1.5.1 Attainment of the PM_{10} Standards

Clark County must show that the area is attaining the applicable NAAQS. Redesignation of PM_{10} nonattainment areas to attainment are based solely on ambient air quality data. Section 2 presents the data used to demonstrate attainment.

1.5.2 Approved Implementation Plan

The SIP for the nonattainment area must be fully approved under CAA Section 110(k) and must satisfy all requirements that apply to the nonattainment area. Section 3 provides the information required by CAA Section 110(k) to show that Clark County has an approved PM_{10} SIP.

1.5.3 Permanent and Enforceable Improvements in Air Quality

Clark County must be able to reasonably attribute improvements in air quality to emission reductions that are permanent and federally enforceable. Section 4 shows that improved air quality in the Clark County area is the result of permanent and enforceable emission reduction control measures, as opposed to air quality improvements resulting from adverse economic or meteorological conditions.

1.5.4 Requirements under Section 110 and Part D of the Clean Air Act

Clark County must meet all requirements of Section 110 and Part D that applied before submittal of the redesignation request. Section 5 discusses the noninterference of this SIP with any applicable requirements concerning attainment, and with reasonable further progress towards attainment of all other criteria pollutant NAAQS or any other applicable CAA requirement.

1.5.5 Approvable Maintenance Plan: Section 175(a) of the Clean Air Act

Section 107(d)(3)(E) of the Clean Air Act Amendments stipulates that EPA must fully approve a maintenance plan that meets the requirements of CAA Section 175(a) before it can redesignate an area to attainment. Section 6 provides a plan to maintain the PM_{10} NAAQS for at least 10 years after redesignation.

2.0 ATTAINMENT OF THE PM_{10} STANDARD

2.1 INTRODUCTION

The first required component of an area's redesignation request is a demonstration that it has attained the NAAQS. This attainment demonstration is based on quality-assured monitoring data representative of the Clark County PM_{10} nonattainment area. A total of three consecutive years of non-violating air quality data is needed to show attainment of the standard. A complete year of air quality data comprises all four calendar quarters, with each quarter containing data from at least 75 percent of the scheduled sampling days.

Attainment of the PM_{10} standard is demonstrated through establishment of a design value. As specified in Appendix K of Title 40, Part 50 of the Code of Federal Regulations (40 CFR 50), attainment of the 24-hour standard is determined by calculating the expected number of exceedances of the 150 $\mu g/m^3$ limit per year: the standard is attained when the expected number of exceedances is one or less.

On August 3, 2010, EPA issued a final rule determining that the PM_{10} NAAQS had been attained for the HA 212 nonattainment area by the applicable attainment date of December 31, 2006, and that the area was currently attaining the standard (75 FR 45485). Therefore, the requirements of CAA Section 107(d)(3)(E)(i) have been satisfied.

2.2 MONITORING NETWORK

40 CFR 58 defines the requirements for the ambient air quality monitoring programs mandated by the CAA. Clark County's PM_{10} monitoring network consists of eight State and Local Air Monitoring System monitors; the system is governed by quality assurance and quality control procedures and subject to periodic EPA performance audits. As shown in Table 2-1, the monitoring objective of all but one station is "population exposure." The exception is the Jean monitoring station, which monitors background concentrations.

Table 2-1. Clark County PM_{10} Monitoring Sites

Site Name	Scale	Monitoring Objective
Paul Meyer	Middle	Population exposure
Palo Verde	Neighborhood	Population exposure
Joe Neal	Neighborhood	Population exposure
Green Valley	Middle	Population exposure
Sunrise Acres	Neighborhood	Population exposure
Jean	Regional	Background
J.D. Smith	Neighborhood	Population exposure
Boulder City	Neighborhood	Population exposure

Figure 2-1 shows the locations of the Clark County PM_{10} monitoring stations. Table 2-2 shows the design value concentrations measured at these stations from 2008–2010.

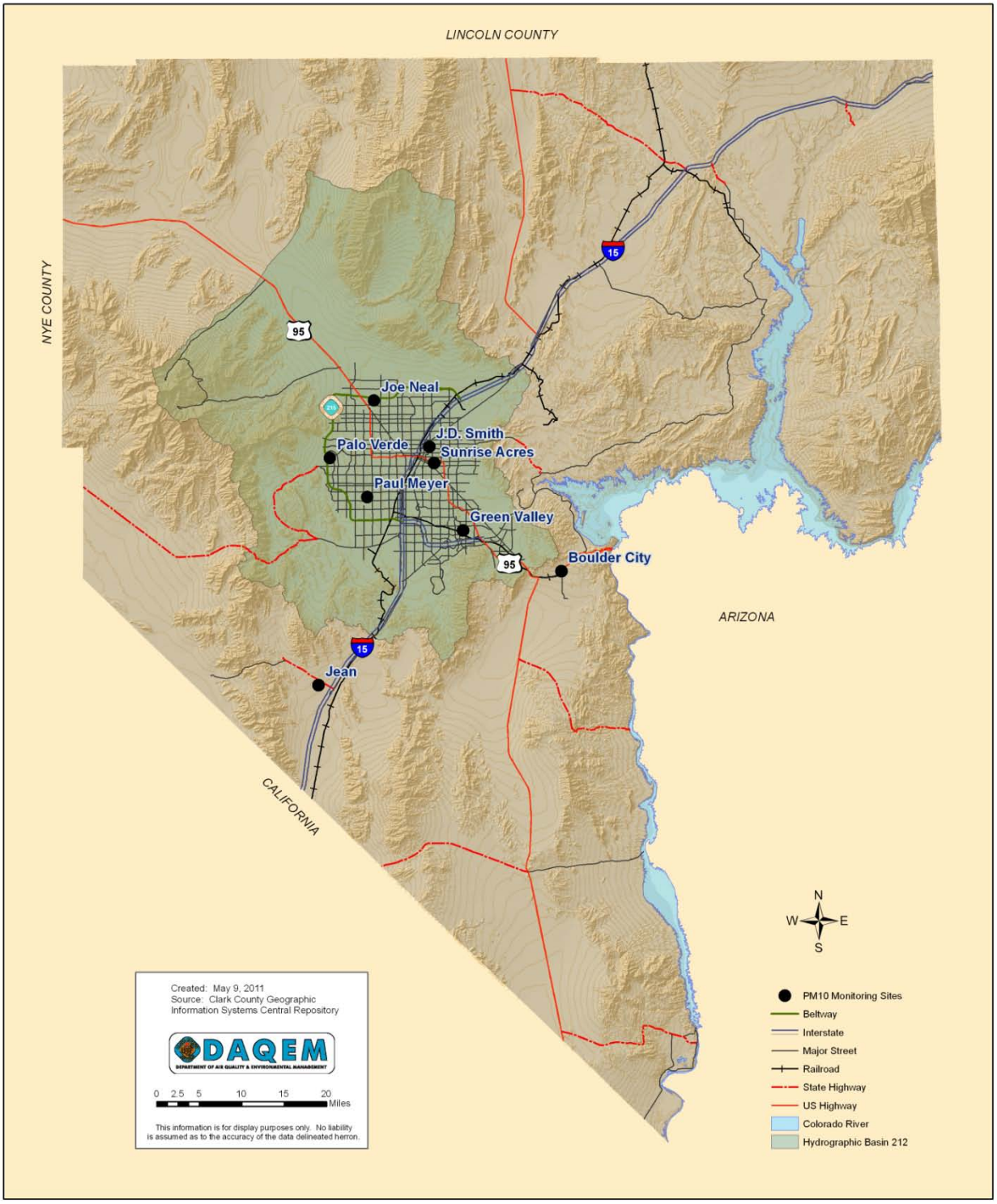

Figure 2-1. Clark County PM_{10} Monitoring Stations.

Table 2-2. Design Values for 2008–2010 (µg/m^3)

Site ID	Site Name	Number of Daily Values	1st High	2nd High	3rd High	4th High	Site Value	Design Value (highest site value)
0020	E. Craig Road	876	123	102	98	96	98	98
0043	Paul Meyer	1,050	83	76	70	66	66	
0072	Lone Mountain	806	70	69	59	58	59	
0073	Palo Verde	1,060	57	54	52	51	51	
0075	Joe Neal	1,047	120	96	95	84	84	
0298	Green Valley	1,041	144	81	80	78	80	
0561	Sunrise Acres	1,047	106	103	86	81	81	
1021	Orr	804	85	75	71	70	71	
2002	J.D. Smith	1,045	109	91	82	78	78	

2.3 DESIGN VALUE

The design value (in µg/m^3) is the concentration derived from a statistical approach to monitoring data that describes the air quality status of a given area, during a specific period, relative to the NAAQS. When a design value is related to a comprehensive emissions inventory (EI) for the same period, future concentrations can be predicted through emissions forecasts.

The 24-hour PM_{10} baseline year (2008) design value for the BLM disposal area was derived using the *PM_{10} SIP Development Guideline* (EPA 1987). Data from the nine PM_{10} monitoring sites that operated from 2008–2010 were ranked by the four highest values for each site during that period. As Table 2-3 shows, the first, second, third, or fourth highest values are selected for each site, depending on the number of recorded values at that site during the three-year period.

Table 2-3. Estimation of PM_{10} Design Concentrations

Number of Daily Values	Data Point Used for Design Concentration
≤ 347	Highest Value
348 – 695	Second Highest Value
696 – 1,042	Third Highest Value
1,043 – 1,096	Fourth Highest Value

The data analysis identified two exceptional events, one on February 13, 2008, and another on May 21, 2008. On these days, HA 212 experienced high-wind events during which the 24-hour PM_{10} standard was violated.

Sustained winds of 25 miles per hour (mph) and gusts of 40 mph are the established thresholds for exceptional high-wind events in HA 212; winds greater than these values overwhelm BACM. Wind speeds during both identified events were greater than these thresholds. Since PM_{10} emissions were not reasonably controllable during these events, they were not reasonably

preventable; the events were therefore flagged in EPA's Air Quality System (AQS). In accordance with EPA's Exceptional Event Rule, Clark County is requesting that these exceedance days be excluded from regulatory consideration.

The two event days were not considered in the design value calculations. Clark County ranked the remaining high values from each site for the three-year period (Table 2-2). The highest value from the list, 98 µg/m^3, was determined to be the design value. The design day (i.e., the day on which the design value concentration occurred) was determined to be April 15, 2008.

Figure 2-2 shows the 12-year trend of the design values in HA 212. The data demonstrate a significant improvement in air quality since implementation of the PM_{10} SIP.

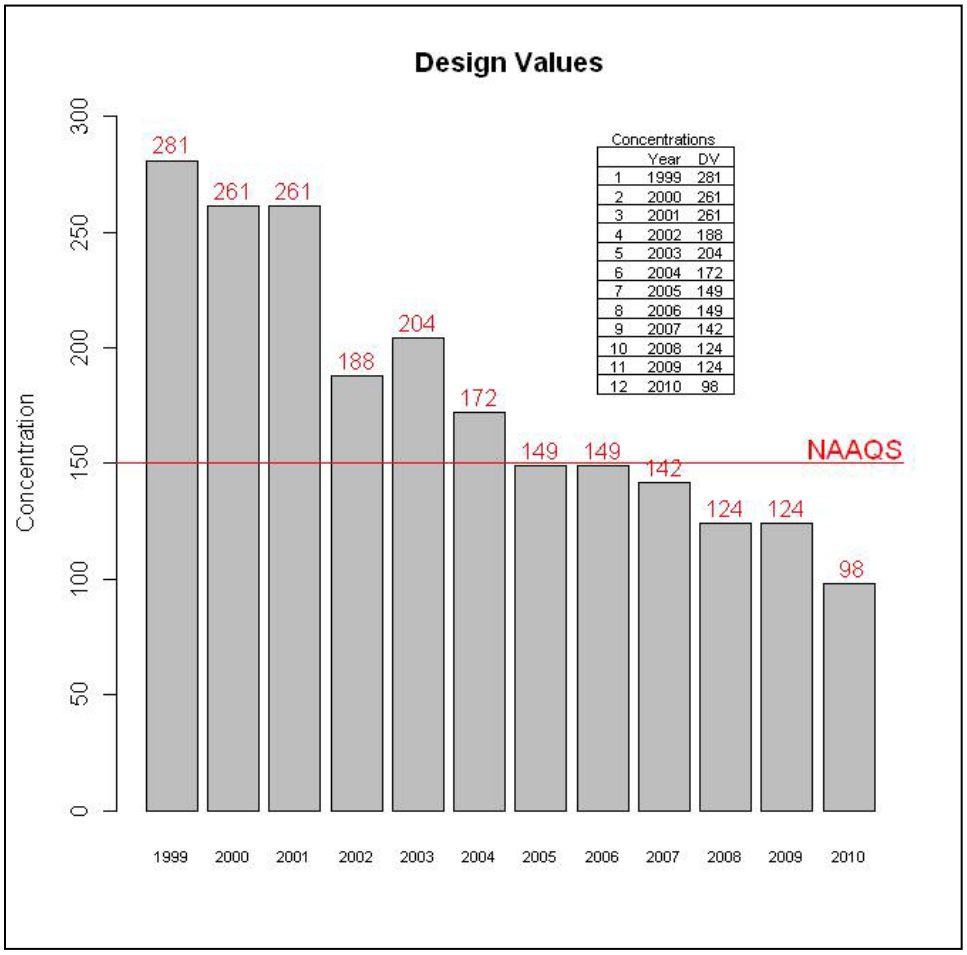

Figure 2-2. Design Values for 1999–2010 (µg/m^3).

2.4 MONITORING RESULTS AND ATTAINMENT DEMONSTRATION

The monitoring data illustrated by Figure 2-2 verify that the Clark County nonattainment area has been in attainment with the PM_{10} NAAQS since 2006, in accordance with the requirements of 40 CFR 58. Table 2-4 outlines the highest 24-hour concentrations during 2008–10, excluding the two high-wind events of February 13, 2008, and May 21, 2008.

Table 2-2. Summary of Las Vegas Valley PM_{10} Monitoring Data, 2008–2010

Site ID	Monitoring Site	Highest 24-hour PM_{10} Concentration ($\mu g/m^3$)			Expected Exceedances Per Year
		2008	2009	2010	2008-2010
0020	E. Craig Road	123	67	N/A[1]	0
0043	Paul Meyer	76	83	48	0
0072	Lone Mountain	70	69	N/A[1]	0
0073	Palo Verde	54	57	49	0
0075	Joe Neal	120	95	64	0
0298	Green Valley	144	81	52	0
0561	Sunrise Acres	106	85	57	0
1021	Orr	71	85	N/A[1]	0
2002	J. D. Smith	109	77	62	0

[1] Site is no longer in operation or no longer monitoring PM_{10}.

Since none of the values are greater than the PM_{10} NAAQS, the expected number of exceedances in the Las Vegas Valley for 2008–2010 is zero. This is lower than the annual expected exceedance rate for the 24-hour PM_{10} NAAQS, demonstrating continued attainment of the standard.

2.5 QUALITY ASSURANCE PROGRAM

PM_{10} data have been collected and verified in accordance with 40 CFR 58 and the *Quality Control & Assurance System for Continuous Particulate Matter (2.5 & 10) Pollutants (Quality Assurance Project Plan)* (DAQEM 2008). PM_{10} audit data are submitted to AQS, and the audit schedule is available in the annual network plan Clark County submits to EPA.

3.0 STATE IMPLEMENTATION PLAN APPROVAL

3.1 INTRODUCTION

The second required component of an area's redesignation request is a fully approved SIP satisfying all requirements that apply to the nonattainment area under CAA Section 110(k), which addresses completeness findings, deadlines for EPA actions, types of EPA actions, and sanctions that may be applied to areas failing to meet CAA requirements. The information in this section demonstrates, as required under CAA Section 110(k), that there is an approved SIP for the Clark County PM_{10} nonattainment area.

3.2 PREVIOUS PLAN APPROVALS

In June 2001, Clark County submitted a PM_{10} SIP that met federal requirements for remediating serious PM_{10} nonattainment areas. This SIP demonstrated that the adoption and implementation of best available control measures and technologies would result in attainment of the 24-hour NAAQS by December 31, 2006. Final EPA approval of the Clark County PM_{10} SIP was effective in July 2004 (69 FR 32273).

4.0 PERMANENT AND ENFORCEABLE IMPROVEMENT IN AIR QUALITY

4.1 INTRODUCTION

The third required component of a redesignation request is a demonstration that improvements in air quality are reasonably attributed to emission reductions that are permanent and federally enforceable. The information in this section shows that improved air quality in the Clark County PM_{10} nonattainment area is the result of permanent and enforceable emission reduction control measures, as opposed to adverse economic or meteorological conditions.

4.2 ECONOMIC CONDITIONS

Clark County, formed in 1909 and located at the southern tip of Nevada, is an area of more than 8,000 square miles. Most county residents live within the BLM disposal area, a 511-square-mile basin inside HA 212. The BLM disposal area was one of the fastest-growing areas in the nation for several decades, and hosts up to 40 million visitors each year. Rapid population growth, high construction activity, disturbance of vacant lands, and high-wind events led to increased PM_{10} 24-hour NAAQS exceedances in the 1990s and early 2000s.

4.2.1 Population Trends

More than 96 percent of Clark County's population resides in HA 212, and more than 99 percent of the population in HA 212 resides within the BLM disposal area. Table 4-1 provides population data for Clark County over the last 20 years; during that time, the average annual population growth was 4.8 percent.

Table 4-1. Clark County Population History (1990-2010)

Year	Clark County	HA 212	BLM Disposal Area	Annual Population Change in HA 212	Annual Percent Increase
1990	805,519	776,180	773,029	—	—
1991	829,839	797,973	794,779	21,793	2.8%
1992	870,692	837,862	834,604	39,889	5.0%
1993	919,388	884,184	880,874	46,322	5.5%
1994	986,152	949,139	945,784	64,955	7.3%
1995	1,048,668	1,009,812	1,006,467	60,673	6.4%
1996	1,119,708	1,077,971	1,074,597	68,159	6.7%
1997	1,170,113	1,127,419	1,124,161	49,448	4.6%
1998	1,246,193	1,199,347	1,196,164	71,928	6.4%
1999	1,321,176	1,272,638	1,269,290	73,291	6.1%
2000	1,428,689	1,372,022	1,367,181	99,384	7.8%
2001	1,498,278	1,448,827	1,445,970	76,805	5.6%
2002	1,578,332	1,525,226	1,522,291	76,399	5.3%
2003	1,641,529	1,586,032	1,583,363	60,806	4.0%
2004	1,747,025	1,691,647	1,685,391	105,615	6.7%
2005	1,815,700	1,759,636	1,752,457	67,989	4.0%

Year	Clark County	HA 212	BLM Disposal Area	Annual Population Change in HA 212	Annual Percent Increase
2006	1,912,654	1,855,019	1,847,643	95,383	5.4%
2007	1,996,542	1,933,602	1,925,411	78,583	4.2%
2008	1,986,145	1,924,817	1,916,585	-8,785	-0.5%
2009	2,006,347	1,943,812	1,936,450	18,995	1.0%
2010	2,036,358	1,974,611	1,966,074	30,798	1.6%

Source: Clark County Department of Comprehensive Planning.

4.2.2 Development Patterns

More than 90 percent of the land of HA 212 is owned by federal agencies. The land is managed with varying types and intensities of use, according to individual agencies' land and resource management plans. BLM has the largest holding, including the Red Rock National Conservation Area west of Las Vegas. Most of the Spring Mountain Range, including Mt. Charleston, is administered by the U.S. Forest Service as part of the Humboldt-Toiyabe National Forest. The rapid disturbance and development of vacant land has been concentrated in the BLM disposal area, which includes the cities of Las Vegas, Henderson, and North Las Vegas, as well as the unincorporated areas of Clark County.

Monitored levels of PM_{10} have shown a continued decline since the early 2000s despite the rapid growth. It is reasonable, therefore, to conclude that improvements in HA 212 PM_{10} air quality have not been caused by a downturn in economic conditions, i.e., any reduction of PM_{10} concentrations in HA 212 can be reasonably attributed to the emission reduction control measures in the PM_{10} SIP, which are permanent and federally enforceable.

4.3 METEOROLOGICAL CONDITIONS

Summers in Clark County display the classic characteristics of the desert Southwest: daily high temperatures in the lower elevations often exceed 100ºF, with lows above 70ºF. The summer heat is usually tempered by low relative humidity, which may increase for several weeks during July and August in association with moist monsoonal wind flows from the south. This is the most common period for thunderstorms in the valley, which can result in high-wind events. Temperatures during the spring and fall are generally moderate, with strong winds being the most persistent weather hazard.

Winters are generally mild and pleasant. Afternoon temperatures average 60ºF, and the sky is normally clear and sunny. Snow accumulation on valley floors is rare; however, higher elevations, such as the Spring Mountains, typically receive 5–10 feet of snowfall annually. Based on measurements from McCarran International Airport over the past 30 years, temperatures fall below 32ºF an average of 24 days a year.

Average annual rainfall in the valley, also measured at McCarran, is approximately 4.16 inches. Table 4-2 lists temperature and rainfall averages in Clark County over the last seven decades.

Table 4-2. Monthly Averages for Temperature and Rainfall (1937 to 2010)

Month	Maximum (°F)	Minimum (°F)	Average (°F)	Rainfall (inches)
January	57.1	34.5	47.0	0.52
February	62.5	38.9	52.2	0.58
March	69.5	44.3	58.3	0.45
April	78.2	51.7	66.0	0.20
May	88.5	61.1	75.4	0.15
June	98.6	69.9	85.6	0.07
July	104.6	76.5	91.2	0.43
August	102.2	74.8	89.3	0.44
September	94.7	66.6	81.3	0.32
October	81.3	54.3	68.7	0.25
November	66.5	42.0	55.0	0.36
December	57.2	34.7	47.0	0.40
Annual Average	**80.1**	**54.1**	**68.1**	**4.16**

Source: DRI (2010).

Elevated levels of PM_{10} emissions in HA 212 are largely associated with wind-blown dust, re-entrained road dust, or construction emissions, and are often amplified by dry, arid conditions. High-wind events in HA 212 generally occur between February–May and September–December, although high winds have been recorded in other months as storms pass through. The monitoring stations that record the highest concentrations of PM_{10} during high-wind events are typically those located near large expanses of disturbed soil.

Figures 4-1 and 4-2 illustrate data on wind speed and precipitation, respectively, in HA 212 for the last 10 years. Rainfall dropped significantly during this time (2006–2009), although winds remained relatively constant. SIP-implemented PM_{10} control measures were effective in spite of drought-like conditions, so it is reasonable to assume that lower PM_{10} concentrations over the last 10 years were not caused by atypical meteorological conditions.

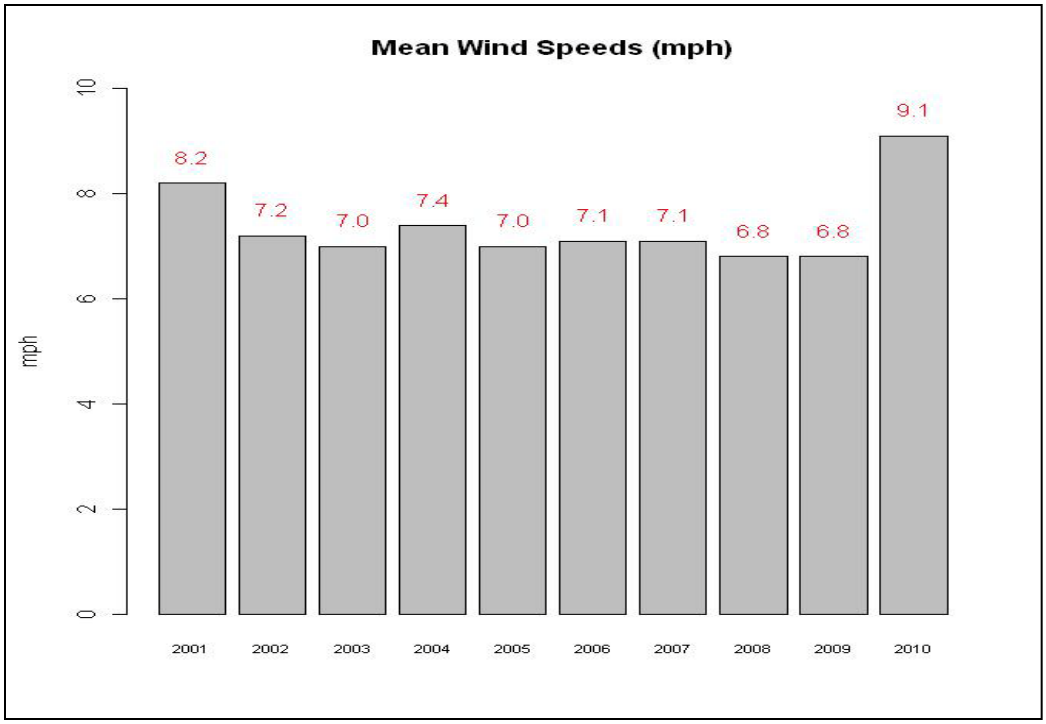

Figure 4-1. Wind Speeds (2001–2010).

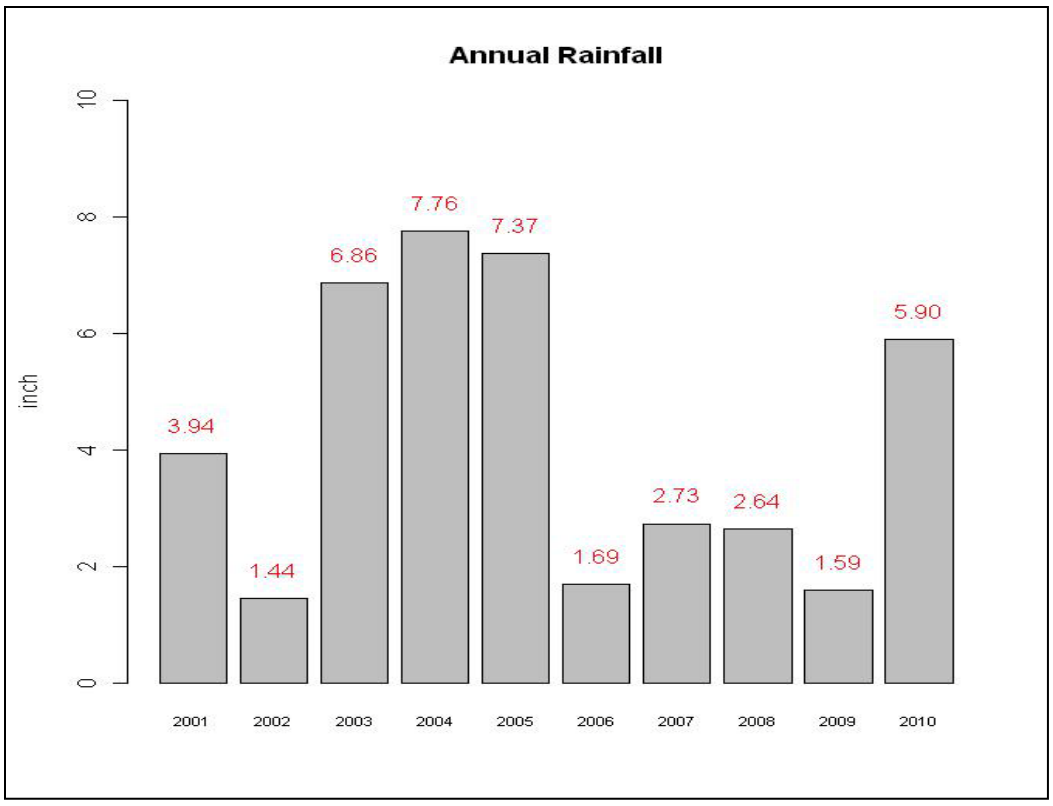

Figure 4-2. Precipitation (2001–2010).

4.4 ATTAINMENT AND MAINTENANCE CONTROL MEASURES

CAA Section 110(a)(2)(A) requires that each SIP include enforceable emission limitations and other control measures to achieve and maintain the NAAQS. As part of its attainment effort, Clark County included the Section 90 series of the Clark County Air Quality Regulations (AQRs) in the PM_{10} SIP. These rules include control requirements for open areas, construction activities, and vacant lands, and their implementation and enforcement have significantly contributed to the improvement of air quality in the Las Vegas Valley.

Clark County is now obligated to maintain the valley's improved air quality status. Clark County is not proposing amendments to the Section 90-series AQRs with this maintenance plan; in fact, the Section 90 series is vital to maintaining compliance with the PM_{10} NAAQS. Construction activities and vacant lands are the two source categories with the highest PM_{10} emissions; while their controls are not without cost, Clark County cannot relax PM_{10} measures applicable to HA 212 at this time. Section 110(l) of the CAA states: "[EPA] shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress...."

4.4.1 Stationary Point and Nonpoint Source Regulations

PM_{10} stationary point sources in Clark County are generally industrial and utility combustion sources that emit 70 tons per year or more. Nonpoint sources are commercial, small-scale industrial, and residential sources whose emissions fall below point source reporting levels and which are too numerous or too small to identify individually.

Clark County has numerous SIP and non-SIP regulations in place for stationary and nonpoint sources, notably AQR Sections 12.0–12.13 and Section 21. Clark County also enforces several federal regulations as part of its emissions control program, including 40 CFR 61 and 63, "National Emissions Standards for Hazardous Air Pollutants" (under AQR Section 13) and 40 CFR 60, "Standards of Performance for New Stationary Sources" (under AQR Section 14).

As part of its 2001 PM_{10} SIP submittal, Clark County adopted comprehensive fugitive dust controls (the Section 90 series). The following list outlines these AQRs:

- Section 90 requires stabilization of open areas and vacant lands to prevent entrainment of particulate matter.

- Section 91 requires stabilization of unpaved roads, and paving of unpaved roads when traffic volume is equal to or greater than 150 vehicles per day. It also prohibits construction of new unpaved roads in public thoroughfares.

- Section 92 requires stabilization of unpaved parking areas, including material handling and storage yards, and generally prohibits construction of new unpaved parking lots in the nonattainment area.

- Section 93 sets forth requirements for paved roads, street sweeping equipment, and certain other dust-mitigating devices.

- Section 94 establishes permitting and dust control requirements for construction activities. This regulation incorporates by reference a comprehensive dust control handbook (DAQEM 2003) that outlines Best Management Practices (BMP) for construction activities.

The Clark County dust program met EPA's most stringent measures requirements at the time of adoption, and it remains state-of-the-art because of Clark County's SIP commitment to evaluate the feasibility of revising the Section 90 rules. This resulted in numerous amendment adoptions in 2002 and 2003.

4.5 ADDITIONAL EMISSION REDUCTION CONTROL MEASURES

4.5.1 Regional Haze Rule

This rule, promulgated in July 1999, mandates emission reductions to achieve natural visibility levels in mandatory Class I areas by 2064. Control measures principally address light-scattering and -absorbing aerosols. Several of these measures will be implemented throughout the western states, i.e., Best Available Retrofit Technology will be installed on older emissions units. The measures will be operational by January 1, 2015, or no later than five years after approval of state regional haze SIPs, whichever comes first. Most western states, including Nevada, have submitted regional haze SIPs; EPA proposed full approval of Nevada's plan on June 22, 2011 (76 FR 36450).

4.5.2 Transportation Conformity

Clark County will continue to work closely with the Regional Transportation Commission of Southern Nevada (RTC) to assure that regional transportation plans and transportation improvement programs in HA 212 are consistent with and conform to Clark County's air quality program requirements, including the PM_{10} SIP.

4.5.3 Clark County Natural Events Action Plan

In April 2005, the BCC adopted the *Natural Events Action Plan for High-Wind Events: Clark County, Nevada* (NEAP). The NEAP protects public health by warning of impending wind events: dust control permittees are reminded to employ all BMP for dust control, the public is notified of wind events in progress, and Clark County citizens are educated on the health hazards of PM. Public notifications include information on how residents can reduce airborne particulates by avoiding certain individual or collective particulate-emitting activities, especially during high-wind events.

Protection of public health is the principal goal of the NEAP, which contains detailed information about actions implemented in Clark County to minimize public exposure to potentially high levels of PM_{10} caused by winds. Its primary components are:

- A high-wind event notification system that includes an early warning procedure.

- Education and outreach programs.

- Enhanced enforcement and compliance programs to reduce emissions.

- Submittal of required documentation to EPA in the event of an exceedance.

The only guidance in effect when Clark County developed its NEAP was an EPA policy memo, "Areas Affected by PM_{10} Natural Events" (EPA 1996), which allowed air quality data to be flagged so it would not count toward an area's attainment status if it could be shown there was a clear causal relationship between the data and one of three categories of natural events: volcanic and seismic activity, unwanted wild land fires, or high-wind events. On March 22, 2007, EPA promulgated a final rule (72 FR 13560) addressing the review and handling of air quality monitoring data influenced by "exceptional events," i.e., those for which the normal planning and regulatory process established by the CAA is not appropriate.

Clark County's NEAP procedures have been very effective since their adoption, and changes reflecting the exceptional event final rule have created an even stronger program. Clark County now provides more information to EPA in submittal packages, and has improved early warning processes to better inform the public.

Clark County continually updates its natural events program. One example is the high-wind exceptional event exercise drill, which is conducted each year before the windy season to refamiliarize staff with procedures and identify potential problem areas. Additionally, construction notices are issued that proactively warn sources of winds that are below NEAP event levels but could still impact public health. These and other enhancements provide essential tools for regularly evaluating operational processes to help reduce the health and environmental effects of PM on county residents.

4.6 AIR QUALITY TREND ANALYSIS: WEIGHT OF EVIDENCE

Clark County performed an air quality trend analysis for the period between 2001 and 2010 using quality-assured data from EPA's AQS database (Figure 4-2). The purpose was to use a weight-of-evidence approach to support the attainment demonstration of the PM_{10} NAAQS.

For the demonstration, a regressed logarithmic trend line was fit to the data points in lieu of a linear trend line because of its smoothing effect on the rate of change of the dependent variable (PM_{10} design values, or y), and because the trend line is more representative of real world conditions (i.e., the line is prevented from dropping below zero (the lower asymptote) due to all values of $y > 0$).

The R-squared (R^2) of the regression—commonly called the "goodness-of-fit"—is the percentage of variance in y that can be accounted for by the independent variable (years, or x). An R^2 greater than 0.80 suggests that the regression line equation ($y = 62.32\ln(x) + 255.24$) strongly approximates the data points, and provides a significant level of credibility for the weight-of-evidence attainment demonstration. The R^2 of this regression is 0.9366.

Clark County is confident that future PM_{10} concentrations will continue to trend downward with the maintenance control measures described in Section 4.4 and continued enforcement of the PM_{10} control program.

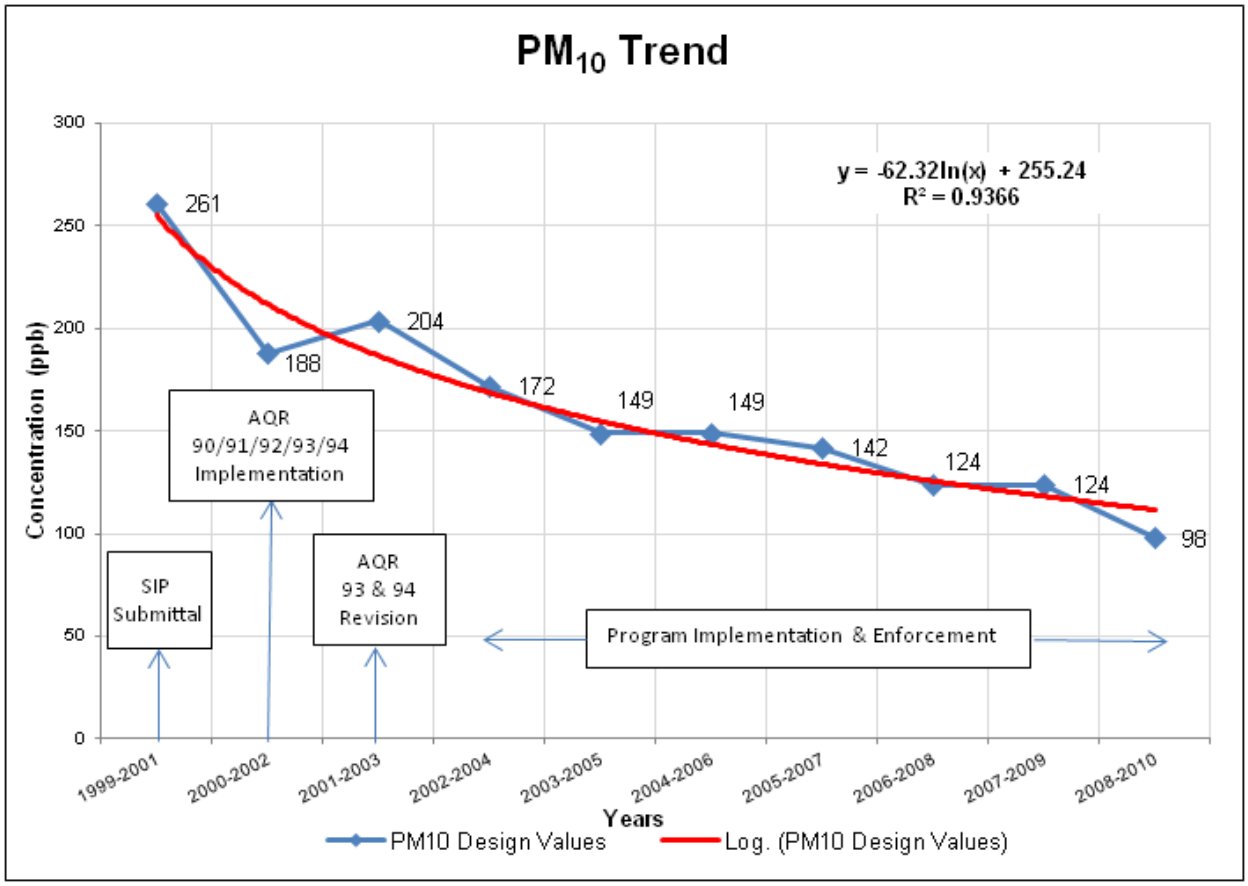

Figure 4-3. Actual and Log PM_{10} Trend.

5.0 REQUIREMENTS FROM SECTION 110 AND PART D OF THE CLEAN AIR ACT AMENDMENTS

5.1 INTRODUCTION

The fourth required component of a redesignation request is verification that Clark County meets CAA Section 110 and Part D requirements. This section provides that verification.

5.2 SECTION 110 REQUIREMENTS

Before EPA can redesignate the Clark County PM_{10} nonattainment area, the provisions of CAA Sections 110(a)(2) and 110(l) must be satisfied. Section 110(a)(2) addresses the general requirements for SIPs; Section 110(l) prevents approval of SIP revisions if components of the plan would interfere with any applicable requirement concerning attainment, with reasonable further progress towards attainment of a NAAQS, or with any other applicable CAA requirement.

5.2.1 Section 110(a)(2)

This CAA section contains the following SIP requirements:

1. Establishment and implementation of enforceable emission limitations.
2. Monitoring, compilation, and analysis of ambient air quality data.
3. Preconstruction review and permitting of new and modified major stationary sources.
4. Consultation with, and provisions for, the participation of affected local governments.
5. Assurance the state has adequate funds and authority to enforce the SIP and associated regulations.
6. Establishment of permit fees for stationary sources.

Nevada Revised Statutes (NRS) 445B.500 addresses the establishment, administration, and enforcement of programs for controlling air pollution in Nevada. In Clark County, these programs are administered and enforced by the Clark County Department of Air Quality. The department has more than 100 staff members and an annual budget of approximately $28 million to administer, implement, and enforce the CAA, including the development of air quality plans and regulations applicable to the PM_{10} maintenance area.

Clark County's current air quality program meets all the provisions required by Section 110(a)(2). If Clark County becomes unable to meet any of these provisions, NRS 445B.520 and 445B.530 allow the State Environmental Commission to assume jurisdiction over the local air quality management program to ensure that CAA requirements are met. EPA also has authority to impose sanctions on a state if it "finds that any requirement of an approved plan (or approved part of a plan) is not being implemented" (CAA, Section 179).

5.2.2 Section 110(l)

CAA Section 110(l) requires that SIP revisions not interfere with requirements for attainment or reasonable further progress regarding other criteria pollutants, or with any other CAA requirements. Since this plan proposes no changes to current emission reductions control measures, it poses no interference with Clark County's progress towards continued attainment of the carbon monoxide or ozone NAAQS. The only other criteria pollutant in Clark County is $PM_{2.5}$, for which Nevada is currently designated as attainment/unclassifiable under CAA Section 107(d).

5.3 PART D REQUIREMENTS

Sections 172(c) and 176(c) in Part D of the CAA lay out requirements that apply to all areas designated as nonattainment because of a NAAQS violation.

5.3.1 Section 172(c)

This CAA section contains general requirements for maintenance plans, including:

1. Implementation of reasonably available control measures, including reasonably available control technologies, for existing sources.

2. Reasonable further progress for existing sources.

3. A current EI, and periodic EIs every three years until attainment.

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

5. A stationary source permitting program.

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

7. Compliance with Section 110 provisions.

8. Contingency measures.

Clark County's current air program, in conjunction with the components of this plan, meets all Section 172(c) provisions.

5.3.2 Section 176(c)

This section contains transportation and general conformity provisions applicable in maintenance areas. The transportation conformity process ensures transportation plans, programs, and projects in maintenance areas do not create new violations of the NAAQS, do not increase the frequency or severity of NAAQS violations, and do not delay timely attainment of the NAAQS. It does not

allow federal agencies to engage in, support, or provide financial assistance for licensing, permitting, or approving any project unless the project conforms to the SIP.

6.0 MAINTENANCE PLAN

6.1 INTRODUCTION

The fifth required component of an area's redesignation request is the fulfillment of CAA Section 107(d)(3)(E) requirements. These specify that for an area to be redesignated to attainment, EPA must approve a maintenance plan that meets all the conditions of CAA Section 175(a), including a comprehensive and accurate demonstration of continued maintenance of the PM_{10} NAAQS for 10 years after redesignation.

Two approaches are acceptable for demonstrating maintenance of the NAAQS (EPA 1992). The first, the emissions projections approach, compares a projected EI with an attainment EI. The second is a complex analysis using gridded dispersion modeling. Clark County chose the emissions projection approach, comparing an EI for the baseline year (2008) to an EI for the maintenance year (2023). The maintenance year was chosen to allow EPA 18 months after receipt of a complete submittal to process Clark County's redesignation request.

The baseline EI represents an emission level that would not cause a NAAQS violation—the design value concentration of 98 $\mu g/m^3$ on the design day of April 15, 2008. If the projected maintenance year concentration remains at or below the baseline year concentration, continued maintenance is demonstrated. In addition, the maintenance demonstration includes a comparison between an interim year (2015) concentration and the baseline year concentration to show maintenance throughout the 10-year period after redesignation, not just in the maintenance year. A roll-forward model was also used to support the attainment demonstration

6.1.1 Inventory Domain

Although EPA requires an EI for the entire nonattainment area, attainment can be demonstrated for a larger or smaller area if there are compelling reasons to do so. Use of smaller areas can focus the attainment analysis on relevant areas and key anthropogenic sources that affect high-concentration monitors and population areas.

In choosing a domain boundary, such factors as wind patterns and source, monitor, and receptor locations (e.g., population centers) should be considered (EPA 1991). The boundary should be established such that phenomena at the boundary have little effect on the center. Background concentrations should account for sources not explicitly modeled (40 CFR 51, App. W; EPA 1987, Appendix D; and EPA 1981, p.27.)

Based on these criteria, and consistent with the boundary used in the PM_{10} SIP attainment demonstration, Clark County selected the BLM disposal area as the domain for the maintenance demonstration. Its edges are areas of low emission density that have little effect on the places of concern (i.e., locations with high monitored values). Sources in the outlying areas are effectively accounted for by including background concentrations in the inventory. This approach is

supported by modeling work conducted in Clark County for previous studies (e.g., DRI 1997) that discovered sources of PM_{10} have a small radius of influence.

HA 212 covers roughly 960,000 acres, over half of which are 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
- Humboldt-Toiyabe National Forest: 60,073 acres.

Nonattainment area EIs were not projected for future years because Clark County based the attainment demonstration on the BLM disposal area. The demonstration was limited to this area for several reasons, including:

- All violations of the 24-hour NAAQS happened within the BLM disposal area.
- More than 99 percent of the population in the nonattainment area lives within the BLM disposal area.
- More than 98 percent of the vehicle miles traveled (VMT) in the nonattainment area are within the BLM disposal area.
- The topography within the BLM disposal area is relatively uniform, a factor that minimizes modeling uncertainty, whereas the outlying areas of the nonattainment area vary by over 8,000 feet – a factor that increases modeling uncertainty.
- All man-made emissions of PM_{10}, except one major stationary source and small percentages of minor sources, unpaved road dust, and paved road dust, lie within the BLM disposal area.
- Focusing on the BLM disposal area places a greater emphasis on sources closest to human receptors.

Before Clark County attained the PM_{10} NAAQS, all measured violations occurred within the BLM disposal area, which is also where nearly all anthropogenic emissions within the nonattainment area occur. As part of a network saturation study (DAQEM 2007b), three samplers were deployed outside the BLM disposal area but within the nonattainment area. No violations were recorded.

6.2 TRANSPORTATION INPUT DATA

Table 6-1 summarizes the transportation data (i.e., daily VMT) used to develop the EIs in Section 6.4 (RTC 2008). All other input data used in developing the EIs, such as vehicle fleet mix, seasonal/day-of-the-week adjustment factors, and hourly activity profiles, have been updated with the most current data available.

Table 6-1. Daily VMT Data Used to Develop Emission Inventories

Year	VMT (HA 212)	VMT (BLM Disposal Area)
Baseline (2008)	39,377,980	38,795,925
Interim (2015)	48,886,838	48,073,477
Maintenance (2023)	63,994,191	62,735,685

6.3 EFFICIENCY AND EFFECTIVENESS FACTORS

Control efficiency, rule effectiveness, and rule penetration factors were applied to the baseline emissions of point and nonpoint source categories affected by the AQRs, when applicable. The term "control efficiency" includes capture efficiency for point sources, which defines the percentage of emissions from a source captured by a control device. Rule effectiveness reflects the actual capability of a regulatory program to achieve the emission reductions required by regulation. Rule penetration is the assumed percentage of emissions of the targeted Source Classification Code subject to the requirements of a rule.

6.4 EMISSION INVENTORY TYPE CATEGORIES

The PM_{10} EIs were derived from estimates developed for categories including point sources, nonpoint sources, mobile, and banked emission reduction credits (ERCs). The following sections briefly discuss each category and its estimated emissions; more detailed explanations of the estimates are provided in the technical support document (Appendix A).

6.4.1 Point Sources

Clark County's point source inventory includes all airport/aircraft and Title V stationary sources inside HA 212, as well as minor stationary sources clustered together closely enough to be considered potential hot spots of emissions within the BLM disposal area.

Clark County has authority over most emission units in the county; however, Nevada state law places certain electric steam-generating units in the county under NDEP jurisdiction. The facilities within the nonattainment area over which NDEP has or had authority, partial or whole, are:

- NV Energy Clark Station. The emission units at this facility that once operated under NDEP's jurisdiction have been decommissioned. However, emission units under Clark County's jurisdiction still operate at this facility.

- NV Energy Sunrise Station. Certain emission units at this facility operate under NDEP's jurisdiction, while others operate under Clark County's jurisdiction.

The status of all units at these facilities, whether decommissioned or in current operation, was properly considered in the point source EIs.

All point source EIs for the baseline year (2008) were obtained from reports submitted by the individual sources, and reflect actual emissions for that calendar year. This information was quality assured/quality controlled by Clark County staff.

Projections were performed for 2015 and 2023 for each facility (except Nellis Air Force Base) using the 2008 EI and Economic Growth Analysis System, version 5.0, Source Classification Code growth factors, which are based on the Regional Economic Models, Inc. 6.0 model. Projections for Nellis were estimated using actual 2008 emissions and projections supplied by the source.

Linear regression was used to establish emissions projections for 2015 and 2023. To account for the possibility of a new power plant or expansions of existing plants, emissions from a theoretical power facility were included for the 2015 and 2023 EIs.

6.4.2 Nonpoint Sources

Nonpoint sources of emissions are those that fall below point-source reporting levels and are too numerous or small to identify individually. Generally, they are small-scale industrial or residential operations that use emission-generating materials or processes.

Nonpoint source emission calculations are estimated as countywide totals rather than as individual source emissions. With some exceptions, these emissions are calculated by multiplying an EPA-approved factor (emissions per unit of activity) by the appropriate activity or activity surrogate responsible for generating emissions. When available, actual activity data is used; when data is unavailable, surrogates are used, including county population or employment data by industry type (and, when applicable, by growth factors from the Economic Growth Analysis System).

6.4.3 Mobile Sources

The mobile sources category consists of on-road and non-road sources and locomotives. On-road mobile sources consist of cars, trucks, motorcycles, and other motor vehicles traveling on public roadways. Emissions from this category are vehicle exhaust, brake wear, and tire wear, all calculated using the MOVES2010a model. Re-entrained road dust from on-road sources, while included in the mobile source budgets for transportation conformity, is addressed in the nonpoint sector of this plan. Re-entrained road dust emissions for on-road emissions were calculated using the January 2011 version of AP-42.

Non-road mobile sources consist of a wide variety of equipment types that either move under their own power or can be moved from site to site. Exhaust emissions were calculated using

EPA's NONROAD model. Re-entrained unpaved road dust, while included in the mobile source budgets, is addressed in the nonpoint portion of this plan.

The third and last subcategory is locomotives, whose emissions were categorized separately from the nonpoint source inventory.

6.4.4 Banked Emission Reduction Credits

If a source voluntarily reduces emissions beyond the permit limits, and/or implements controls beyond what is required, it may apply for ERCs pursuant to Section 12.7. If the ERCs are approved, they will be banked for future use or transacted in accordance with the AQRs. Clark County may grant reciprocity for use of ERCs banked by NDEP within the county if the ERCs comply with all AQR requirements at the time of redemption, and NDEP has the authority to grant reciprocity for use of Clark County-banked ERCs at sources in Clark County that it permits. NDEP has jurisdiction over permitting, compliance, and ERC banking for sources in the county that burn fossil fuels in a boiler to produce steam for the production of electricity (NRS 445B.500); all other emission units in the county are under the jurisdiction of Clark County.

Clark County chose to account for all ERCs in the maintenance year (2023) because ERCs can be used in nonattainment areas to offset emissions of new major sources and major modifications at existing major sources. ERC emissions are accounted for in the point source emissions growth estimated for 2023 because point source emissions growth and ERCs largely overlap. To be conservative, however, Clark County is not considering the potential overlap in this demonstration.

6.5 SUMMARY OF EMISSION INVENTORIES

Table 6-2 summarizes the 2008, 2015, and 2023 PM_{10} EIs for the BLM disposal area in tons per day (tpd) for five source categories. In particular, emissions from wind erosion of vacant lands show a significant decrease over time as construction within the BLM disposal area consumes vacant lands.

Table 6-2. Summary of Total Daily PM_{10} Emissions (tpd)

Source	2008 (tpd)	2015 (tpd)	2023 (tpd)
Point Emissions:			
Subtotal:	**2.19**	**2.60**	**2.88**
Nonpoint Emissions:			
Fuel Combustion	1.23	1.29	1.38
Residential Wood Combustion	1.89	1.90	1.92
Locomotive	0.06	0.06	0.06
Paved Road	30.85	38.04	48.78
Unpaved Road	5.84	6.51	7.49
Commercial Cooking	2.19	2.52	2.83
Mineral Processing (concrete, gypsum)	0.28	0.34	0.40
Mineral Processing (stone)	0.15	0.18	0.21
Asphalt	0.33	0.37	0.40
Wind Erosion (Construction)	183.97	217.70	249.21
Construction	30.93	37.69	41.22
Sand & Gravel	0.42	0.51	0.60
Open Burning	0.02	0.02	0.02
Wind Erosion (Vacant Lands)	439.05	288.16	122.77
Structural Fires	0.02	0.02	0.03
Vehicle Fires	0.03	0.03	0.04
Subtotal:	**697.23**	**595.34**	**477.36**
On-road Emissions:			
Subtotal:	**3.08**	**2.52**	**2.75**
Nonroad Emissions:			
Subtotal:	**3.74**	**2.95**	**1.94**
Emission Reduction Credits:			
Subtotal:	**0.31**	**0.31**	**0.31**
Total:	**706.55**	**603.72**	**485.24**

Figures 6-1 and 6-2 show emission distributions in 2008 and 2023, respectively, and Figure 6-3 shows the nonpoint source category EIs for each of the three demonstration years. Appendix A provides detailed information on the methodologies used to estimate EIs.

In summary, total PM_{10} emissions decrease 31 percent (221 tpd) between 2008 and 2023.

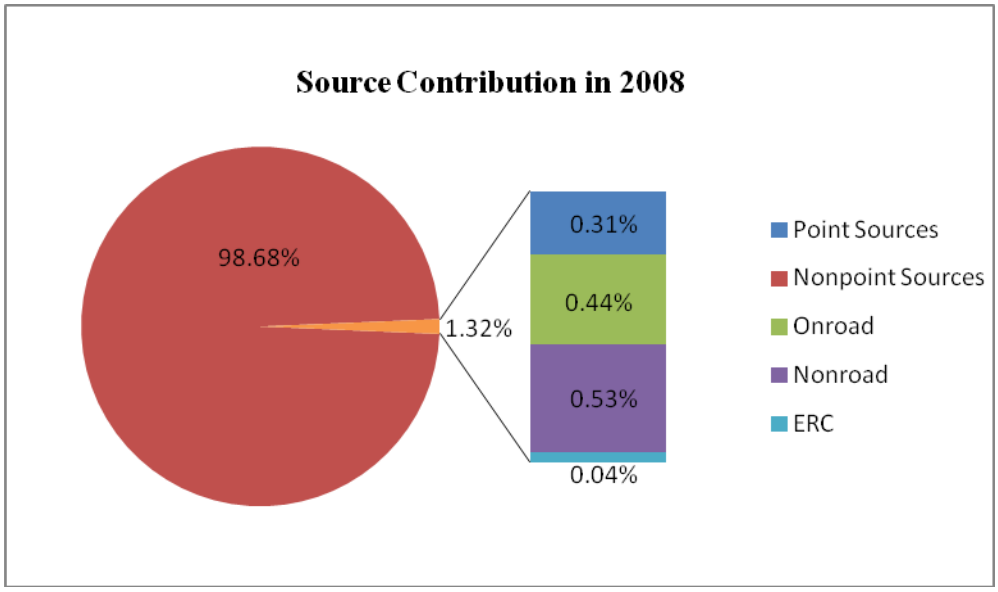

Figure 6-1. Emission Distribution in 2008.

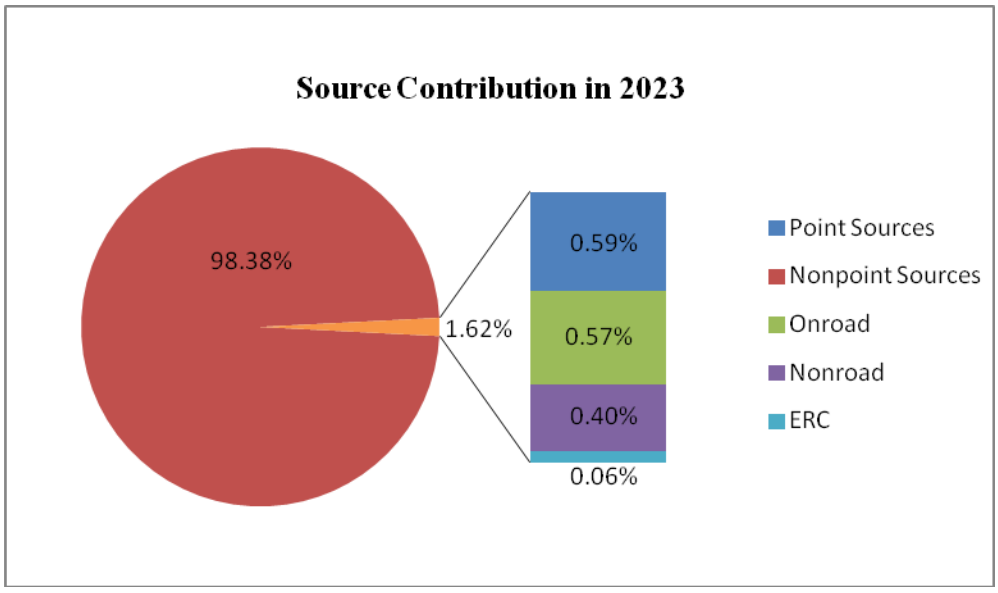

Figure 6-2. Emission Distribution in 2023.

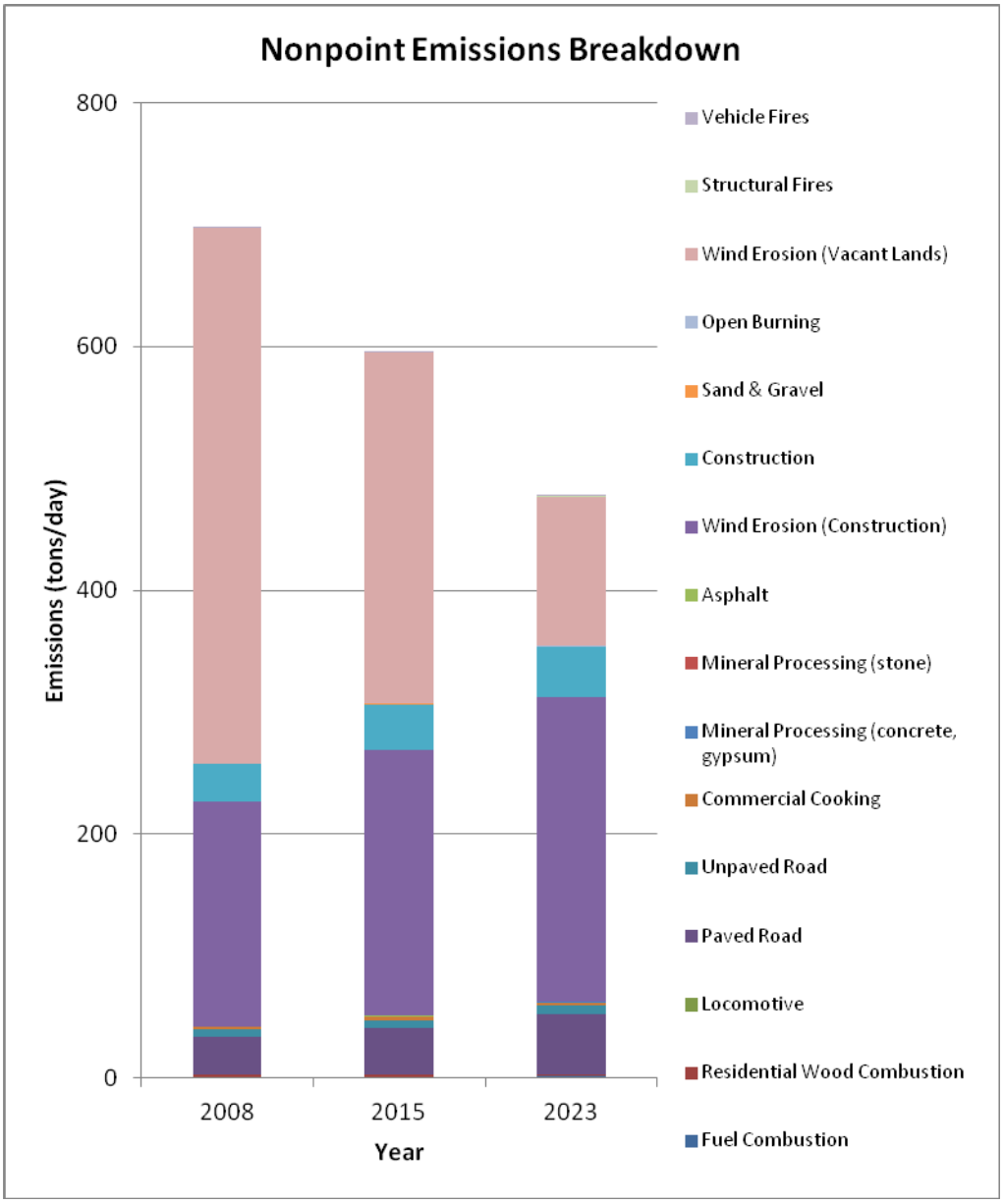

Figure 6-3. Nonpoint Emissions in the BLM Disposal Area.

6.6 MAINTENANCE DEMONSTRATION

CAA Section 175(a) requires each request for redesignation to be accompanied by a SIP revision that provides for maintenance of the NAAQS for at least 10 years after redesignation. EPA (1992) recommends using the ratio of baseline emissions to the design value, adjusted for background concentration, to determine whether projected emissions for a future year will predict concentrations in compliance with the NAAQS.

Table 6-2 and Figure 6-4 show that projected future-year PM_{10} emissions are less than 2008 emissions. Since projected emissions for 2015 and 2023 are less than 2008 emissions, maintenance of the NAAQS is demonstrated.

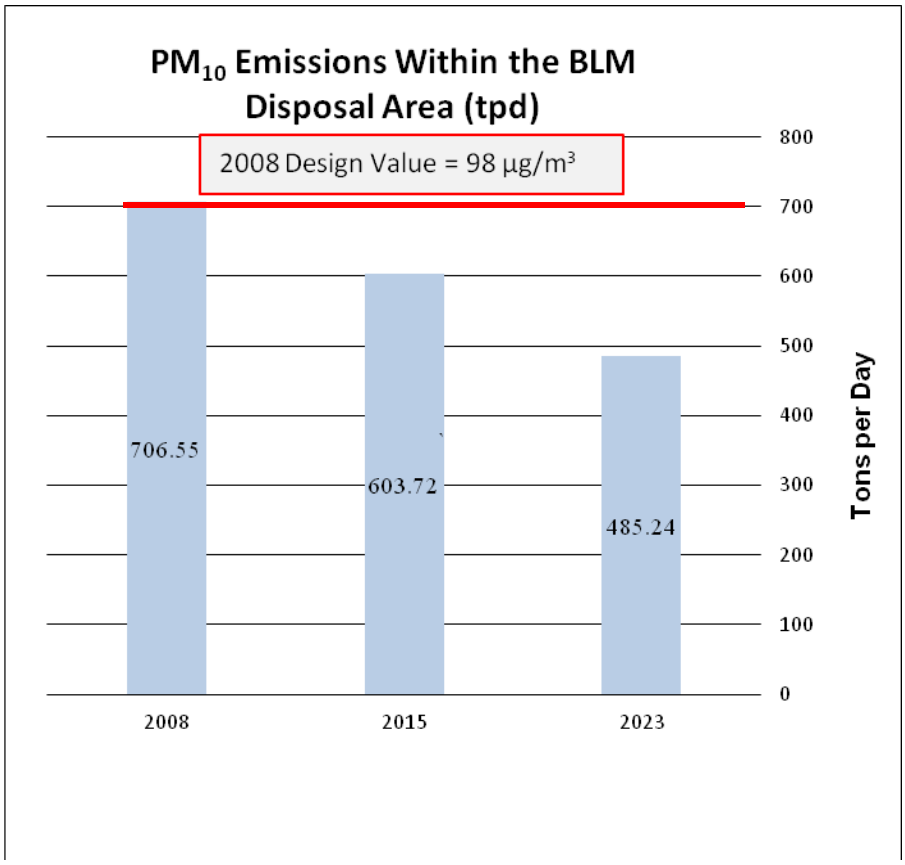

Figure 6-4. Comparison of 2008, 2015, and 2023 PM_{10} Emissions.

The EIs show a downward trend in PM_{10} emissions, mainly due to the control measures described in Section 4.4. No emission increases are expected that will threaten the demonstration of attainment; even if new sources emerge, the 2023 EI is well below the 2008 EI.

6.7 ROLLBACK MODEL

EPA recommends a combination of receptor and dispersion models, paired with reliable emission projections, to model attainment in a future year. However, receptor models cannot quantify absolute PM_{10} emission estimates in some circumstances, such as urban locations where a large fraction of particulate emissions come from nontraditional sources (e.g., construction operations or wind-blown fugitive dust). Dispersion models also have limitations that make modeling fugitive dust difficult, since uncertainties regarding emission rates, deposition rates, and plume characteristics of course fraction crustal particulates pose problems in obtaining valid results.

For these reasons, Clark County adopted the proportional rollback model approach to demonstrate attainment in the PM_{10} SIP. Since it was an accurate predictor, the same approach was used to demonstrate continuous (maintenance) attainment for 2015 and 2023.

The rollback model assumes a linear relationship between PM_{10} emissions from sources and their contribution to measured PM_{10} levels in ambient air: for example, if 25 percent of emissions in an area come from wind erosion of vacant lands, the model assumes that 25 percent of the ambient concentration measured by a monitor in that area (minus the background concentration, which remains constant) came from this wind-entrained soil. The proportional rollback model assumes that any reduction or increase in emissions will cause a corresponding reduction or increase in the ambient concentration measured at the monitoring station. The basic steps are:

1. Determine the representative monitoring station(s) and design value.
2. Define the background concentration as the lowest PM_{10} value recorded at an upwind monitoring station on the same day or during the same time period.
3. Estimate the anticipated increase or decrease in emissions from each source.
4. Apply the same percentage of increase or decrease from emissions to the design concentration.
5. Calculate the anticipated ambient concentration after the emissions change.

The PM_{10} SIP analyzed five microscale sites, in addition to completing a valley-wide analysis. Since the areas surrounding those five sites are now built out, they are no longer considered representative. Moreover, as the PM_{10} SIP stated, the percent reduction for attainment was equal or higher valley-wide than at the microscale sites. The rollback analysis for this maintenance plan therefore uses a valley-wide scale.

The analysis used a design value of 98 $\mu g/m^3$, minus the background concentration of 37 $\mu g/m^3$ measured at Jean on the design day (April 15, 2008). The Jean monitoring station is upwind of the nonattainment area, so it is often used to represent background levels in Clark County.

The referenced design-day and future-year emission calculations do not include contributions from the secondary formation of particulates, and the rollback method does not account for nonlinear secondary particulate formation. The PM_{10} SIP accounted for this by adding 3.5 $\mu g/m^3$ to the background concentration, based on past chemical mass balance studies. Including 3.5 $\mu g/m^3$ to represent secondary PM, the background level was 40.5 $\mu g/m^3$. Subtracting this background level from the design value yielded a concentration due to anthropogenic emissions of 57.5 $\mu g/m^3$ (98 $\mu g/m^3$ – 40.5 $\mu g/m^3$).

The following PM_{10} concentrations are anticipated in 2015 and 2023.

- Future year 2015:
  - Total 2008 emissions = 706.55 tpd (Table 6-2)
  - Total 2015 emissions = 603.72 tpd (Table 6-2)
  - Total 2008 anthropogenic concentration = 57.5 $\mu g/m^3$

  - Anthropogenic concentrations for 2015, determined by multiplying the 2008 anthropogenic concentration by the ratio of 2015 emissions to 2008 emissions:
    57.5 $\mu g/m^3$ • (603.72 tpd / 706.55 tpd) = 49.13 $\mu g/m^3$

  - Adding back the background concentration, which is presumed constant:
    49.13 $\mu g/m^3$ + 40.5 $\mu g/m^3$ = **89.63 $\mu g/m^3$**

- Future year 2023:

  - Emissions = 485.24 tpd (Table 6-2)

  - Concentration = (57.5 $\mu g/m^3$ • (485.24 tpd / 706.55 tpd)) + 40.5 $\mu g/m^3$ = **79.99 $\mu g/m^3$**

The concentrations predicted by the rollback analysis show that the 24-hour PM_{10} NAAQS will be maintained through 2023.

6.8 MONITORING NETWORK AND VERIFICATION OF CONTINUED ATTAINMENT

After being redesignated to attainment status, Clark County will continue to operate its air quality monitoring network to verify attainment of the PM_{10} NAAQS. Annual review of the eight State and Local Air Monitoring System monitors will be conducted in accordance with 40 CFR 58.20(d) to ensure the system continues to meet monitoring objectives.

6.9 CONTINGENCY MEASURES

CAA Section 175A(d) requires that a maintenance plan contain contingency provisions to assure prompt correction of any violation of the NAAQS. Contingency plans must also describe the methods that will be used to ensure the measures in the plan are adopted quickly if triggered. EPA (1992) states that a contingency plan does not have to contain fully adopted contingency measures, but should at least have three primary elements:

1. A list of potential contingency measures.

2. An explanation of the tracking and triggering mechanisms that will determine when contingency measures are needed.

3. A description of the process for recommending and implementing contingency measures, with specific timelines for action.

6.9.1 Potential Contingency Measures

Clark County proposes the following potential control measures as part of this maintenance plan:

- Implementing a new dust control permit requirement for certain short-term activities that disturb, or have the potential to disturb, soils that emit PM into the atmosphere, such as

mechanized weed abatement, fairs, carnivals, Christmas tree and Halloween pumpkin lots, art sales, and similar activities.

- Conducting a comprehensive review and update of the *Construction Activities Dust Control Handbook* (DAQEM 2003) to increase the effectiveness of existing BMP and to identify and develop new BMP. Updated BMP may include management practices for soil-disturbing activities not covered in current practices. Potential new BMP include practices for roadway and detention basin maintenance activities.

- Reviewing the dust mitigation plan requirements in AQR Section 90, giving consideration to reducing the acreage-trigger thresholds and incorporating additional mitigation plan criteria. Also reviewing Section 92, giving consideration to lowering applicability thresholds for unpaved parking lots.

- Reassigning staff to provide additional field enforcement of the AQRs that control sources of fugitive dust emissions.

- Mapping construction activities during inspections to collect PM_{10} data to provide greater accuracy for calculating actual emissions from construction projects.

- Developing a new dust control database that will strengthen oversight of dust control permits and improve source compliance.

- Amending current fugitive dust regulations to incorporate new technologies and measures for controlling emissions and preventing them from crossing property lines or causing a nuisance.

Clark County may use additional strategies to address any future violations in the most appropriate and effective manner.

6.9.2 Tracking and Triggering Mechanisms

The primary tracking mechanism will be Clark County's continuous PM_{10} monitoring network (Section 6.9). Clark County will examine ambient air quality monitoring data within 30 days of collection to determine if the PM_{10} NAAQS has been exceeded.

The primary trigger mechanism will be a confirmed violation of the PM_{10} NAAQS, defined as more than one exceedance day per year averaged over a three-year period. The trigger date will be 60 days from the date a monitoring station records a reading that results in a design value equal to or greater than the PM_{10} NAAQS.

The triggering of the contingency plan would not automatically require a revision of the PM_{10} SIP, nor would Clark County necessarily be redesignated to nonattainment. Instead, it would have a period of time to correct the violation by implementing one or more contingency measures. If violations continued after contingency measures were implemented, additional measures would be implemented until the violations were corrected.

The RTC's ongoing regional transportation planning process will serve as another means of tracking mobile source emissions, since the RTC revises its transportation improvement plan every three years and these revisions are subject to a transportation conformity finding. That process will serve as a periodic check on maintaining the VMT and mobile source emissions projections in this plan.

6.9.3 Action Resulting from Trigger Activation

Within 45 days of the trigger date, Clark County must notify EPA that an internal review process will begin to evaluate potential contingency measures. Within 90 days of that notification, Clark County must send EPA an information report outlining recommended actions. Clark County will then solicit stakeholder involvement through public forums (e.g., PM_{10} working groups) to refine the process of implementing the recommended actions. The BCC and/or Nevada State Environmental Commission will hold one or more public hearings to consider the recommended contingency measures, along with any others that may address the confirmed violation. The necessary measures must be adopted and implemented within 18 months of submittal of the information report to EPA.

6.10 SUBSEQUENT MAINTENANCE PLAN REVISIONS

Section 175A(b) requires that, eight years after redesignation of any area to attainment under Section 107(d), the state shall submit an additional revision of the applicable SIP that shows how the NAAQS will be maintained for 10 years after the expiration of the first 10-year period. Clark County commits to the submittal of a revised maintenance plan eight years after HA 212 is redesignated to attainment.

7.0 MOTOR VEHICLE EMISSIONS BUDGETS

Under CAA Section 176(c), transportation plans, programs, and projects in maintenance areas that are funded or approved under Title 23 of the U.S. Code or the Federal Transit Act must conform to the on-road motor vehicle emissions budgets (MVEBs) specified in the applicable SIP. In this case, 40 CFR 93.118 provides the criteria and procedures for MVEBs.

The MVEB establishes a cap on motor vehicle-related emissions that cannot be exceeded by predicted transportation system emissions. The emissions budget applies a ceiling on emissions in the year for which it is defined, and for all subsequent years until a different budget is defined for another year or a SIP revision modifies the budget. Table 7-1 lists 2008, 2015, and 2023 PM_{10} mobile source emissions for the BLM disposal area.

Table 7-1. BLM Disposal Area PM_{10} Mobile Source Emissions (tpd)

Source	2008	2015	2023
Paved road	30.85	38.04	48.78
Unpaved road (public)	0.28	0.32	0.36
Vehicle (exhaust, brake wear, and tire wear)	3.08	2.52	2.75
Road construction	1.54	1.87	2.05
Construction track-out	0.25	0.30	0.33
Wind erosion (road construction)	6.53	7.73	8.85
TOTAL	**42.53**	**50.78**	**63.12**

EPA's conformity regulation (40 CFR 93.124) allows a SIP to quantify explicitly the amount by which motor vehicle emissions could be higher while still demonstrating compliance with the maintenance requirement. The plan can then allocate some or all of this additional "safety margin" to the emissions budgets for transportation conformity purposes. The safety margin for this maintenance plan is 52 $\mu g/m^3$, the difference between the NAAQS value (150 $\mu g/m^3$) and the design value (98 $\mu g/m^3$). Using the methodology of Section 6.7, the MVEBs were recalculated to include a safety margin.

The mobile source budgets for 2008, 2015, and 2023 (Table 7-1) were adjusted to 141.41 tpd, which match the emission budgets in the PM_{10} SIP and were thus approved by EPA in 2004 (69 FR 32273). Clark County's request for the same PM_{10} budget figure is both for consistency and for RTC's familiarity with it in transportation planning. The mobile source budgets in Table 7-1 were increased by 98.88 tpd, 90.63 tpd, and 78.29 tpd for 2008, 2015 and 2023, respectively. Table 7-2 lists the adjusted emission inventories for 2008, 2015, and 2023 based on the mobile budget increases.

The design values were recalculated using the rollback model. These parameters were used to recalculate the estimated concentrations for 2008, 2015, and 2023. The revised maintenance demonstration for 2008, 2015, and 2023 still shows maintenance of the PM_{10} standard: it estimates maximum PM_{10} concentrations of 106 $\mu g/m^3$ in 2008, 97 $\mu g/m^3$ in 2015, and 86 $\mu g/m^3$ in 2023.

- Adjusted 2008 data:
  - Pre-adjusted total 2008 emissions = 706.55 tpd (Table 6-2)
  - Desired mobile source emissions budget = 141.41 tpd
  - Pre-adjusted 2008 mobile source emissions budget = 42.53 (Table 7-1)
  - Since total 2008 emissions include the pre-adjusted 2008 mobile budgets, the latter are subtracted from the total and then the desired budgets are added: 706.55 tpd - 42.53 tpd + 141.41 tpd = 805.43 tpd (adjusted 2008 EI)
  - To determine the adjusted 2008 design value:
    - Pre-adjusted anthropogenic 2008 concentration = 57.5 µg/m^3 (Section 6.7)
    - Pre-adjusted total 2008 EI = 706.55 tpd (Table 6-2)
    - Adjusted 2008 EI = 805.43 tpd
    - Background concentration = 40.5 µg/m^3 (Section 6.7)
    - To determine the adjusted 2008 anthropogenic concentration, the pre-adjusted 2008 anthropogenic concentration is multiplied by the ratio of the adjusted 2008 emissions to the pre-adjusted 2008 emissions:
      57.5 µg/m^3 • (805.43 tpd / 706.55 tpd) = 65.5 µg/m^3
    - Because the background concentration, which is constant, is not accounted for in this anthropogenic concentration, it is now added to determine the adjusted 2008 design concentration: 65.5 µg/m^3 + 40.5 µg/m^3 = **106 µg/m^3**
- Adjusted 2015 data:
  - Pre-adjusted total 2015 emissions = 603.72 tpd (Table 6-2)
  - Desired mobile source emissions budget = 141.41 tpd
  - Pre-adjusted 2015 mobile source emissions budget = 50.78 (Table 7-1)
  - In that the total 2015 emissions include the pre-adjusted 2015 mobile budgets, the latter are subtracted from the total and then the desired budgets are added: 603.72 tpd – 50.78 tpd + 141.41 tpd = 694.35 tpd (adjusted 2015 EI)
  - To determine the adjusted 2015 concentration:
    - Pre-adjusted anthropogenic 2008 concentration = 57.5 µg/m^3 (Section 6-7)
    - Adjusted 2015 EI = 694.35 tpd

- Pre-adjusted total 2008 emissions = 706.55 tpd (Table 6-2)
- Background concentration = 40.5 µg/m^3 (Section 6-7)
- The pre-adjusted 2008 anthropogenic concentration is multiplied by the ratio of the adjusted 2015 emissions to the pre-adjusted 2008 emissions = 57.5 µg/m^3 • (694.35 tpd / 706.55 tpd) = 56.5 µg/m^3
- Because the background concentration, which is constant, is not accounted for in this anthropogenic concentration, it is now added to determine the adjusted 2015 design concentration = 56.5 µg/m^3 + 40.5 µg/m^3 = **97 µg/m^3**

- Likewise, the adjusted 2023 data is calculated as:
  - Adjusted 2023 EI = 485.24 tpd – 63.12 tpd +141.41 tpd = 563.53 tpd
  - Adjusted 2015 anthropogenic concentration: (98 µg/m^3 – 40.5 µg/m^3) • (563.53 tpd / 706.55 tpd) = 45.9 µg/m^3
  - Adjusted 2023 design concentration = 45.9 µg/m^3 + 40.5 µg/m^3 = **86 µg/m^3**

Table 7-2. Revised Maintenance Demonstration

Parameter	2008	2015	2023
Concentration before adjustment (µg/m^3)	98	89.63	79.99
Background (µg/m^3)	40.5	40.5	40.5
EI (tpd)	706.55	603.72	485.24
Mobile emissions (tpd)	42.53	50.78	63.12
Adjusted EI (tpd)	805.43	694.35	563.53
Estimated concentrations after adjustment (µg/m^3)	**106**	**97**	**86**

Upon an EPA affirmative adequacy finding and approval of the MVEBs, the budgets in Table 7-3 will be used for conformity determinations in future regional transportation plans.

Table 7-3. PM_{10} MVEBs for the BLM Disposal Area (tpd)

Year	2008	2015	2023
Original	42.53	50.78	63.12
Adjustment	+ 98.88	+ 90.63	+ 78.29
MVEB	**141.41**	**141.41**	**141.41**

8.0 REFERENCES

AQR Section 91. Fugitive Dust from Unpaved Roads, Unpaved Alleys, and Unpaved Easement Roads (amended 7/1/2004).

40 CFR 50. National Primary and Secondary Ambient Air Quality Standards.

40 CFR 51. Requirements for Preparation, Adoption, and Submittal of Implementation Plans.

40 CFR 58. Ambient Air Quality Surveillance.

40 CFR 60. Standards of Performance for New Stationary Sources.

40 CFR 93. Determining Conformity of Federal Actions to State or Federal Implementation Plans.

70 FR 20665. Clean Air Fine Particle Implementation Rule.

70 FR 71612. Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard-Phase 2; Final Rule to Implement Certain Aspects of the 1990 Amendments Relating to New Source Review and Prevention of Significant Deterioration as They Apply in Carbon Monoxide, Particulate Matter and Ozone NAAQS; Final Rule for Reformulated Gasoline.

75 FR 45485. Determination of Attainment for PM_{10} for the Las Vegas Valley Nonattainment Area, NV.

43 U.S.C. § 932. Mining Act of 1866 (repealed 1976).

43 U.S.C. § 1701. Federal Land Policy and Management Act of 1976.

49 U.S.C. § 63. Federal Transit Act.

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