Ozone Redesignation Request and Maintenance Plan

Clark County, Nevada

Clark County Department of Air Quality
and Environmental Management

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Zheng Li, Sr. Air Quality Modeler
Will Cates, Principal Planner
Jean Paul Huys, Air Quality Specialist II
Melissa Hamner, Technical Writer

EXECUTIVE SUMMARY

This *Ozone Redesignation Request and Maintenance Plan* is a formal request by the Clark County Department of Air Quality and Environmental Management (DAQEM) to the U.S. Environmental Protection Agency (EPA) to redesignate the Clark County ozone nonattainment area to attainment for the 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS). The plan summarizes the progress in attaining the ozone standard, demonstrates that all Clean Air Act (CAA) as amended requirements for attainment have been met, and presents a plan to assure continued attainment over the next ten years.

Clark County was designated nonattainment of the 8-hour ozone NAAQS in April 2004. The Phase 1 Implementation Rule issued by EPA on June 15, 2004 classified Clark County as a "basic" nonattainment area under Subpart 1 of the Clean Air Act. Following the April 2004 designation, the state of Nevada submitted to EPA a request to reconsider the boundaries of the nonattainment designation for Clark County. EPA accepted the Nevada recommendations and issued a final rule in September 2004 delineating those boundaries.

On December 22, 2006, the United States Court of Appeals for the District of Columbia Circuit vacated the Phase 1 Implementation Rule. EPA and other entities petitioned for a rehearing. On June 8, 2007, the court reviewed its decision and decided to vacate only certain portions of the rule, including the classification determinations for areas designated under Subpart 1 of the CAA. Following the court's decision, EPA issued a memorandum (dated 6/15/2007) stating that nonattainment areas classified under "Subpart 1 are not currently subject to the June 15, 2007 submission date for their attainment demonstrations" and established a transportation conformity rule allowing states in nonattainment to submit an Early Progress Plan (EPP). The EPP was to allow nonattainment areas to establish motor vehicle emission budgets (MVEB) that address the ozone NAAQS in advance of a complete attainment demonstration. These actions obligated Clark County to develop and submit the *Eight Hour Early Progress Plan for Clark County* to EPA in June 2008. In May 2009, EPA formally approved Clark County's EPP.

This plan provides an ozone attainment demonstration that makes use of the most recently adopted planning variables (e.g., vehicle miles traveled projections and population forecasts) approved by the designated Metropolitan Planning Organization for the Las Vegas urban area, the Regional Transportation Commission of Southern Nevada. The plan also provides, among other things, revised emission inventories and updated MVEBs.

After EPA approval, the plan will become a federally enforceable plan that identifies how Clark County will maintain the 1997 ozone NAAQS through 2022. Once approved, the MVEBs contained in the plan will become the projected budgets that the Regional Transportation Commission will use for transportation conformity determinations in future regional transportation plans.

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ACRONYMS AND ABBREVIATIONS

Acronyms

AQR	Clark County Air Quality Regulation
BCC	Clark County Board of County Commissioners
CAA	Clean Air Act
CFR	Code of Federal Regulations
DAQEM	Clark County Department of Air Quality & Environmental Management
DRI	Desert Research Institute
EI	Emission Inventory
EPA	U.S. Environmental Protection Agency
EQM	Environmental Quality Management, Inc
ERC	Emission Reduction Credit
HPMS	Highway Performance Monitoring System
I/M	Nevada Vehicle Inspection and Maintenance Program
MVEB	Motor Vehicle Emission Budget
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NRS	Nevada Revised Statues
RTC	Regional Transportation Commission of Southern Nevada
SIP	state implementation plan
SLAMS	State and Local Air Monitoring System
TDM	Transportation Demand Model
TSD	Technical Support Document
VMT	vehicle miles traveled

Abbreviations

CO	carbon monoxide
NO_x	nitrogen oxides
PM	particulate matter
ppm	parts per million
tpd	tons per day
tpy	tons per year
VOCs	volatile organic compounds

1.0 PLAN OVERVIEW

1.1 INTRODUCTION

The Clark County Department of Air Quality and Environmental Management (DAQEM), in conjunction with the Nevada Division of Environmental Protection (NDEP), requests that the U.S. Environmental Protection Agency (EPA) redesignate the Clark County ozone nonattainment area to attainment status for the 1997 8-hour National Ambient Air Quality Standards (NAAQS) for ozone.

To comply with EPA guidance, DAQEM inventoried emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO_x) for the 2008 attainment year and projected those emissions outward to 2015 and 2022. The inventories were then adjusted to reflect federal, state, and local rules on VOC and NO_x emissions already adopted or implemented; these controls were shown to reduce overall ozone emissions through 2022, the maintenance year.

1.2 CHARACTERISTICS AND HEALTH EFFECTS OF OZONE

Ozone is a gas composed of three oxygen atoms that occurs both in Earth's upper atmosphere (stratosphere) and at ground level (troposphere). Ozone in the stratosphere, which extends upward from 6 to 30 miles, occurs naturally and protects life from harmful ultraviolet rays. In the troposphere, ozone is a pollutant that poses a significant health risk, especially for children, the elderly, and people with chronic illnesses. It may also damage crops, trees, and other vegetation.

Ground-level ozone is not usually emitted directly into the air, but formed through chemical reactions between NO_x and VOCs in the presence of sunlight. Vehicle exhaust, emissions from commercial and industrial sources, gasoline vapors, chemical solvents, and natural sources emit NO_x and VOCs. Since sunlight is an important formative factor, ozone pollution is usually a summertime problem.

Ozone can irritate lung airways and cause an inflammation that resembles sunburn. Symptoms include wheezing, coughing, pain when taking a deep breath, and difficulty breathing during exercise or outdoor activities. Children and those with respiratory problems are particularly susceptible, but even healthy people who are active outdoors can be affected. Repeated exposure to ozone pollution over many months may cause permanent lung damage. Even when concentrations are low, ozone pollution may aggravate asthma, reduce lung capacity, and increase susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ground-level ozone may also affect plants and ecosystems. It interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, harsh weather, and other pollutants. This in turn can impact crop and forest yields. In addition, ozone can damage the leaves of trees and other plants.

Ozone and its precursor pollutants may be transported hundreds of miles downwind from their original sources. Transport of pollutants from California into southern Nevada contributes to ozone concentrations in Clark County during the summer months.

1.3 NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OZONE

There are two federal standards for ozone: a primary standard that establishes limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly, and a secondary standard that sets limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Both standards are identical for the 1997 ozone NAAQS: 0.08 parts per million (ppm).

1.4 HISTORY OF THE CLARK COUNTY NONATTAINMENT AREA

On March 3, 1978, EPA designated the Las Vegas Valley a nonattainment area for the ozone NAAQS in volume 43, page 8962 of the *Federal Register* (43 FR 8962). Air quality monitoring data for calendar years 1975 through 1977 show violations of the 1-hour ozone NAAQS in effect at the time. That same month, Nevada's governor designated the Clark County Board of County Commissioners (BCC) the responsible entity for preparing State Implementation Plans (SIPs) for Clark County; the BCC then delegated that responsibility to the agency that is now DAQEM.

On February 8, 1979, the 1-hour ozone NAAQS was revised from 0.08 ppm to 0.12 ppm (44 FR 8220). After EPA determined the Las Vegas Valley was a nonattainment area for ozone, the county began requiring targeted industries to implement improved control technologies that curbed precursor pollutants because research had shown that industrial processes within Clark County were contributing to elevated ozone levels. By the end of 1984, control technologies had been fully implemented and Clark County had completed a SIP demonstrating attainment of the ozone NAAQS.

In January 1985, the Nevada governor submitted the Clark County ozone SIP to EPA for review and approval. This SIP demonstrated attainment of the 1-hour ozone NAAQS, in accordance with EPA requirements and federal law. In April 1986, the state of Nevada requested that EPA redesignate the Las Vegas Valley as an attainment area, providing documentation that showed how control measures and technologies had resulted in improved air quality and compliance with the ozone NAAQS. EPA approved the SIP in August 1986, and on November 19, 1986, it redesignated the Las Vegas Valley as an attainment area for the 1-hour ozone NAAQS effective January 20, 1987 (51 FR 41788).

On July 18, 1997, EPA revised the ozone NAAQS (62 FR 38856), replacing the 1-hour 0.12-ppm primary standard with an 8-hour 0.08 ppm standard that was based on the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within a given area. This rule became effective September 16, 1997.

On June 27, 2003, DAQEM submitted a recommendation to NDEP on the designation of Clark County under the 1997 8-hour ozone NAAQS. At the time, the data for the past three years (2000, 2001, 2002) indicated that Clark County was in compliance with the 8-hour standard. On July 10, 2003, pursuant to Section 107(d) of the 1990 CAA, the state of Nevada submitted the recommended designations to EPA's Region 9 office.

In its response to the governor on December 3, 2003, EPA agreed with the state's recommendation but noted that it was tracking 2003 ozone monitoring data. That data indicated that the standard was exceeded, if barely, at one location. Basing its final designation on 2001, 2002, and 2003 monitoring data, EPA designated Clark County in nonattainment of the 8-hour ozone NAAQS on April 15, 2004 (69 FR 23858) under the Title 1, Part D, Subpart 1 of the Clean Air Act (CAA).

On May 21, 2004, the Nevada governor requested that EPA delay the effective date of its nonattainment designation for Clark County until October 15, 2004, and on June 18, EPA promulgated a final rule deferring the effective date to September 13, 2004 (69 FR 34076). The agency agreed that relevant factors for defining a nonattainment area might support a different recommendation than the one the state had submitted on April 12, 2004. On August 2, 2004, the state submitted a revised recommendation that encompassed the following areas in Clark County:

- Ivanpah Valley (Hydrographic Areas 164A, 164B, 165, and 166).
- Eldorado Valley (Hydrographic Area 167).
- Las Vegas Valley (Hydrographic Area 212).
- Colorado River Valley (Hydrographic Area 213).
- Paiute Valley (Hydrographic Area 214).
- Apex Valley (Hydrographic Areas 216 and 217).
- A portion of Moapa Valley (Hydrographic Area 218).

Figure 1-1 shows the areas within Clark County designated as basic nonattainment for the 8-hour ozone standard. EPA accepted the state's recommendations and issued a final rule in September 2004 delineating the revised boundaries.

On December 22, 2006, a three-judge panel from the U.S Court of Appeals for the District of Columbia Circuit vacated the Phase 1 Implementation Rule (472 F. 3d 882 (D.C. Cir. 2006)). EPA and other organizations filed petitions for a rehearing. On June 8, 2007, the entire court reviewed the decision to vacate the rule and decided to vacate only certain portions, including the classification determinations for areas designated under Title I, Part D, Subpart 1 of the CAA. Following the court's decision, EPA issued a memorandum (dated 6/15/2007) stating that nonattainment areas classified under "Subpart 1 are not currently subject to the June 15, 2007 submission date for their attainment demonstrations." These actions obligated Clark County to develop and submit to EPA in June 2008 the *8-Hour Ozone Early Progress Plan for Clark County, Nevada* (DAQEM 2008a) to establish motor vehicle emission budgets (MVEBs) for maintaining transportation conformity. EPA formally approved these MVEBs on May 14, 2009 (74 FR 22738).

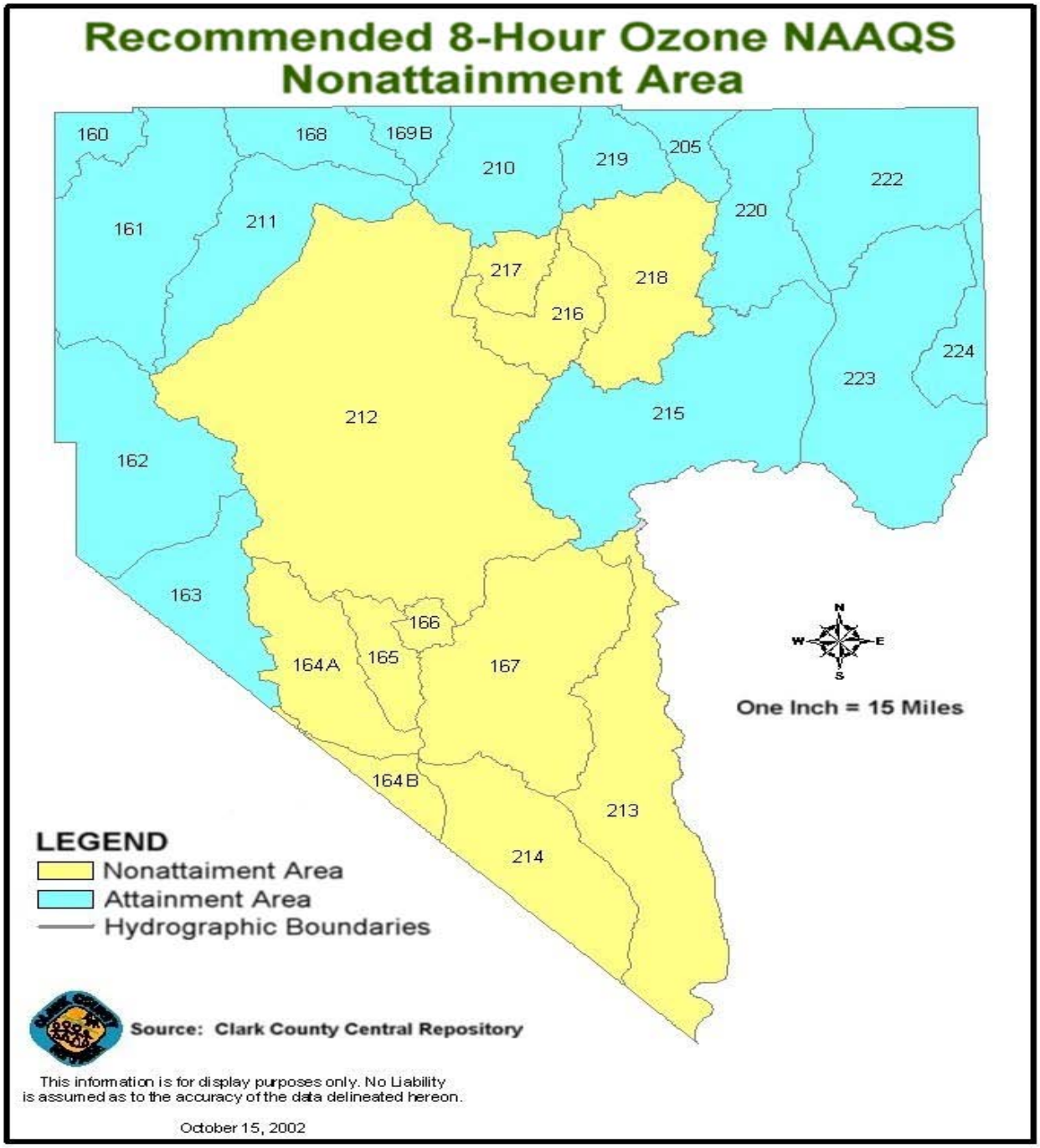


Figure 1-1. Areas in Clark County Designated Nonattainment for the 8-hour Ozone NAAQS.

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 Standard

Clark County must show that the area is attaining the applicable NAAQS. Redesignation of ozone nonattainment areas to attainment is based solely on ambient air quality data. Section 2 presents the data that demonstrate Clark County's attainment of the 1997 ozone NAAQS.

1.5.2 Approved Implementation Plan under Section 110(k)

Clark County must have a SIP fully approved under CAA Section 110(k) and must satisfy all requirements that apply to the nonattainment area. Section 3 discusses Clark County's approved ozone SIP. Section 110(k) addresses completeness findings, deadlines for EPA actions, types of EPA actions, and sanctions that may be applied to areas failing to meet Clean Air Act requirements.

1.5.3 Permanent and Enforceable Improvements in Air Quality

Clark County must be able to reasonably attribute the improvement 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 adverse economic or meteorological conditions.

1.5.4 Requirements under Section 110 and Part D

Clark County must meet all requirements of CAA Section 110 and Part D that applied before the submittal of the redesignation request. Section 5 describes how this SIP does not interfere with any requirements for attainment of the ozone NAAQS, reasonable further progress towards attainment of all other criteria pollutant NAAQS, or any other applicable CAA requirement.

1.5.5 Approvable Maintenance Plan under Section 175(a)

CAA Section 107(d)(3)(E) stipulates that EPA must fully approve a maintenance plan that meets the requirements of Section 175(a) before it can redesignate an area to attainment. Section 6 provides a plan to maintain compliance with the ozone NAAQS for at least ten years after redesignation.

2.0 ATTAINMENT OF THE OZONE STANDARD

2.1 INTRODUCTION

The first required component of an area's redesignation request is a demonstration that it has attained the NAAQS. Attainment of the 1997 ozone standard is demonstrated through the establishment of a design value, which is based on the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor. The fourth-highest daily maximum 8-hour average ozone concentration may not exceed 0.084 ppm.

This section demonstrates, as required by CAA Section 107(d)(3)(E), that Clark County has attained the 1997 ozone NAAQS. The attainment demonstration is based on quality-assured monitoring data representative of the Clark County ozone nonattainment area.

2.2 MONITORING NETWORK

Title 40, Part 58 of the Code of Federal Regulations (40 CFR 58) defines the requirements for the ambient air quality monitoring programs mandated by the CAA. The DAQEM ozone monitoring network consists of 8 State and Local Air Monitoring Stations (SLAMS). As Table 3-1 shows, the monitoring objective of most DAQEM sites is "population exposure." The exceptions are Jean, which monitor regional transportation, and Joe Neal, whose monitoring objective is "highest concentration." DAQEM's monitoring system is governed by quality assurance and quality control procedures approved by EPA and subject to periodic EPA performance audits.

Table 2-1. Clark County Ozone Monitoring Sites

Site Name	Site Code	Address	Monitoring Objective
Paul Meyer	32-002-0043	4525 New Forest Dr., Las Vegas 89147	Population exposure
Walter Johnson	32-002-0071	7701 Ducharme Ave., Las Vegas 89145	Population exposure
Palo Verde	32-003-0073	333 Pavilion Center Dr., Las Vegas 89144	Population exposure
Joe Neal	32-003-0075	6651 Azure Way, Las Vegas 89130	Highest concentration
Winterwood	32-0030-538	5483 Club House Dr., Las Vegas 89142	Population exposure
Boulder City	32-003-0601	1005 Industrial, Boulder City 89005	Population exposure
Jean	32-003-1019	1965 State Highway 161, Jean 89019	Regional transportation
J.D. Smith	32-003-2002	1301B Tonopah Ave., North Las Vegas 89030	Population exposure

Source: *8-Hour Ozone Early Progress Plan for Clark County, Nevada* (2008).

Figure 2-1 shows the locations of Clark County ozone monitoring stations. Tables 2-2 and 2-3 show the three-year averages of the fourth-highest ozone concentrations measured at these stations during 2006–2008 and 2007–2009, respectively.

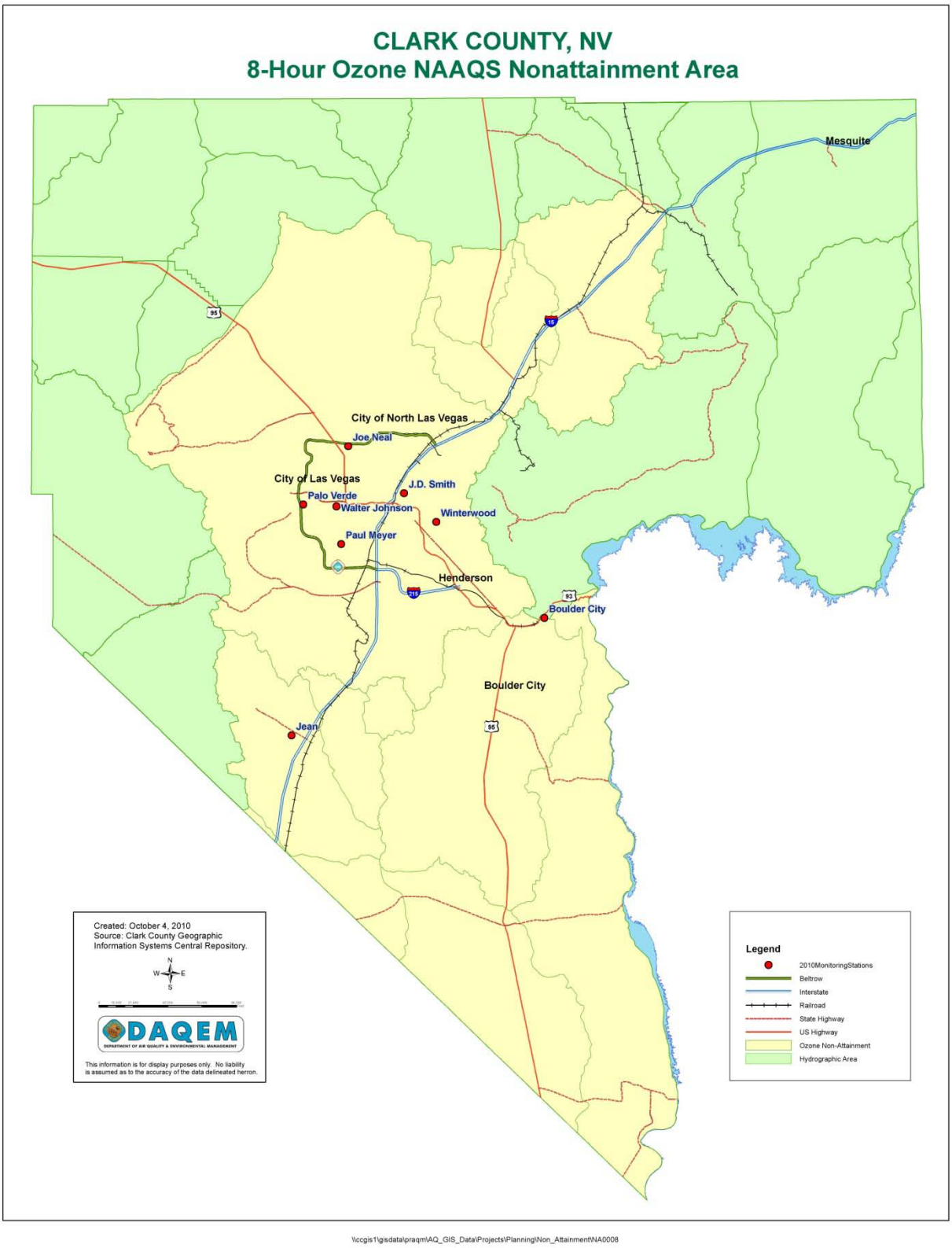


Figure 2-1. Clark County Ozone Monitoring Stations.

Thirteen ozone monitoring stations were in operation during the time period 2006-2009. Monitoring data from 2006-2008 and 2007-2009 is used to show that Clark County is in attainment of the 1997 ozone NAAQS.

Table 2-2. Three Year Average (ppm) of the 4th Highest Ozone Concentrations (2006-2008)

Site Name	Site Code	2006	2007	2008	Design Value 2006-2008
Craig Road	32-003-0020	0.079	0.075	0.071	0.075
Apex	32-003-0022	0.079	0.081	0.071	0.077
Mesquite	32-003-0023	0.069	0.065	0.069	0.067
Paul Meyer	32-002-0043	0.083	0.083	0.077	0.081
Walter Johnson	32-002-0071	0.085	0.085	0.076	0.082
Lone Mountain	32-003-0072	0.085	0.080	0.078	0.081
Palo Verde	32-003-0073	0.084	0.081	0.074	0.079
Joe Neal	32-003-0075	0.083	0.081	0.080	0.081
Winterwood	32-0030-538	0.078	0.076	0.071	0.075
Boulder City	32-003-0601	0.074	0.076	0.071	0.073
Jean	32-003-1019	0.079	0.083	0.074	0.078
Orr	32-003-1021	0.085	0.077	0.074	0.078
J.D. Smith	32-003-2002	0.081	0.080	0.068	0.076

Source: EPA Air Quality System, 2006-2008 (Appendix B).

Table 2-3. Three Year Average (ppm) of the 4th Highest Ozone Concentrations (2007-2009)

Site Name	Site Code	2007	2008	2009	Design Value 2007-2009
Craig Road	32-003-0020	0.075	0.071	0.072	0.072
Apex	32-003-0022	0.081	0.071	0.070	0.074
Mesquite	32-003-0023	0.065	0.069	0.062	0.065
Paul Meyer	32-002-0043	0.083	0.077	0.071	0.077
Walter Johnson	32-002-0071	0.085	0.076	0.074	0.078
Lone Mountain	32-003-0072	0.080	0.078	0.072	0.076
Palo Verde	32-003-0073	0.081	0.074	0.072	0.075
Joe Neal	32-003-0075	0.081	0.080	0.074	0.078
Winterwood	32-0030-538	0.076	0.071	0.070	0.072
Boulder City	32-003-0601	0.076	0.071	0.071	0.072
Jean	32-003-1019	0.083	0.074	0.072	0.076
Orr	32-003-1021	0.077	0.074	0.071	0.074
J.D. Smith	32-003-2002	0.080	0.068	0.072	0.073

Source: EPA Air Quality System, 2007–2009 (Appendix C).

2.3 MONITORING RESULTS AND ATTAINMENT DEMONSTRATION

The monitoring data presented in Tables 2-2 and 2-3 verify that the Clark County nonattainment area has been in attainment with the ozone NAAQS since 2008, including the most recent three-year period of 2007–2009, in accordance with the federal requirements of 40 CFR 58. The data also depict a downward trend in ozone concentrations in the Clark County nonattainment area.

2.4 QUALITY ASSURANCE PROGRAM

Ozone data have been collected and verified in accordance with 40 CFR 58, Appendix A, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Ambient Air Specific Methods," and the *DAQEM Quality Control and Assurance System for Criteria Gaseous Pollutants* (DAQEM 2008b).

Ozone data are submitted to EPA's Air Quality System database and are available for public review in the annual network plan DAQEM submits to EPA. The data are also posted on the Air Quality Index page of DAQEM's Web site and are reported in local media.

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 the 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. As required under CAA Section 110(k), the information in this section demonstrates that Clark County has an approved SIP for ozone nonattainment area.

3.2 PREVIOUS OZONE STATE IMPLEMENTATION PLAN APPROVALS

The Phase 1 Implementation Rule issued by EPA in April 30, 2004, classified Clark County as a "basic" nonattainment area under Subpart 1 of the CAA, effective June 15, 2004 (69 FR 23858). Following this designation, the state of Nevada submitted to EPA a request to reconsider the boundaries of the Clark County nonattainment area. EPA accepted the Nevada recommendations and issued a final rule in September 2004 delineating those boundaries (Section 1.3).

In December 2006, the U. S. Court of Appeals for the District of Columbia Circuit vacated the Phase 1 Implementation Rule. EPA issued a memorandum in June 2007 stating that nonattainment areas previously classified under Subpart 1 were no longer subject to the June 2007 submittal date for their attainment demonstrations. EPA then established a transportation conformity rule allowing nonattainment areas to submit early progress plans containing early MVEBs that addressed the ozone NAAQS before submitting a complete attainment demonstration. Clark County developed the *8-Hour Ozone Early Progress Plan for Clark County, Nevada* (DAQEM 2008a) and submitted it to EPA in June 2008 to establish MVEBs, and EPA formally approved the MVEBs on May 14, 2009 (74 FR 22738).

4.0 PERMANENT AND ENFORCEABLE IMPROVEMENT IN AIR QUALITY

4.1 INTRODUCTION

The third required component of an area's redesignation request is a demonstration that the improvement in air quality is reasonably attributed to emission reductions that are permanent and federally enforceable. This section demonstrates that improved air quality in the Clark County ozone 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, totals more than 8,000 square miles in area and is located at the southern tip of the state. Most residents live in the Las Vegas Valley, a 600-square-mile basin in the middle of the county. In addition to hosting up to 40 million visitors a year, Las Vegas has been one of the fastest growing cities in the nation for 25 years. This rapid population growth and accompanying development led to increased emissions of pollutants and, beginning in 2001, ozone concentrations in Clark County approached (and sometimes exceeded) the 8-hour ozone NAAQS.

4.2.1 Development Patterns

More than 90 percent of the land in Clark County is owned by federal agencies and restricted from public use. The U.S. Bureau of Land Management (BLM) has the largest holdings, 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 Toiyabe National Forest.

Urbanized land is concentrated in the Las Vegas Valley and includes the cities of Las Vegas, Henderson, and North Las Vegas, as well as unincorporated areas of Clark County. These communities contain the highest population densities and corresponding roadway networks. Traffic volumes are increasing every year because of population growth and development.

Although emissions from mobile and nonpoint sources in Clark County originate primarily in the Las Vegas Valley, nearby areas contain significant industrial sources of pollution. The Apex Industrial Park, 20 miles northeast of Las Vegas, is home to many sources of NO_x. Power plants such as the Reid Gardner facility near Moapa are a significant source of NO_x.

4.2.2 Population Trends

More than 95 percent of Clark County's population resides in the Las Vegas Valley. But communities outside the valley have also experienced significant growth in the past 20 years, including Mesquite, on the county's northeastern edge, and Laughlin, at the county's southern end. Table 4-1 provides population data in Clark County from 1990 to 2009, and Appendix A contains Clark County population projections for future years. Clark County experienced a

population decrease of less than one percent between 2008 and 2009, but this likely has not had an effect on overall ozone concentrations in the county.

Table 4-1. Clark County Population History (1990-2009)

Year	Population	Annual Population Change	Annual Percent Increase
1990	770,280	—	—
1991	835,080	64,800	8%
1992	873,730	38,650	5%
1993	916,837	43,107	5%
1994	990,564	73,727	8%
1995	1,055,435	64,871	7%
1996	1,119,052	63,617	6%
1997	1,193,388	74,336	7%
1998	1,261,150	67,762	6%
1999	1,327,145	65,995	5%
2000	1,394,440	67,295	5%
2001	1,485,855	91,415	7%
2002	1,549,657	63,802	4%
2003	1,620,748	71,091	5%
2004	1,715,337	94,589	6%
2005	1,796,380	81,043	5%
2006	1,874,837	78,457	4%
2007	1,954,319	79,482	4%
2008	1,967,716	13,397	<1%
2009	1,952,040	-15,676	- <1%

Source: Center for Business and Economic Research, UNLV (2010).

4.3 METEOROLOGICAL CONDITIONS

Located in the Mojave Desert, Clark County has four well-defined seasons. Summers display the classic characteristics of the desert Southwest: daily high temperatures in the lower elevations often exceed 100ºF, with lows in the 70s. There has been no change in weather patterns over the last decade.

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 flash flooding. Temperatures during the spring and fall are generally moderate. Strong winds are the most persistent weather hazard: although winds higher than 50 miles per hour are infrequent, they often happen during vigorous storms.

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 thirty years, temperatures fall below 32ºF an average of 24 days a year.

Average annual rainfall in the valley, measured at McCarran International Airport, 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 2009)

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: Western Regional Climate Center (2010).

Local meteorology and general weather patterns in the Southwest have a significant effect on the valley's air quality. Stagnant conditions and low wind speeds can build up concentrations of ozone and precursor pollutants in the valley; winds from the southwest or west can transport ozone and other pollutants into Clark County. Wind speed and direction affect ozone levels in different areas at different times, and complex terrain features influence local flows within, into, and out of neighboring basins. Ozone concentrations in the Las Vegas Valley can therefore differ significantly, depending on location and time of day.

4.4 ATTAINMENT AND MAINTENANCE CONTROL MEASURES

This plan demonstrates maintenance of the 1997 ozone NAAQS through 2022 using seven permanent and enforceable emissions reduction control measures:

1. Federal Tier 2 vehicle emissions standards (65 FR 6822).
2. Federal highway diesel rule (66 FR 5001).
3. Federal large nonroad diesel engines rule (69 FR 38958).
4. Nonroad spark-ignition engines and recreational engines standards (65 FR 76789).
5. Federal nonroad spark-ignition engines and equipment standards (73 FR 59034).
6. Nevada vehicle inspection and maintenance (I/M) program (Nevada Revised Statutes (NRS) 445B and Nevada Administrative Code (NAC) 445B).

7. Clark County stationary point and nonpoint source air quality regulations (AQRs).

Section 4.4.1 discusses each of these seven measures. Section 4.4.2 describes additional emission reduction control measures that provide further ozone reductions, but are not quantified in the emission inventories (EIs).

4.4.1 Permanent and Enforceable Emission Reduction Control Measures

The seven emission reduction control measures used for quantitative emission reductions in the ozone maintenance plan are described below. These measures, which are permanent and enforceable, will remain in place through the maintenance year of 2022 and will ensure continued ozone emission reductions throughout the nonattainment area, as demonstrated in Section 6.6.

4.4.1.1 Federal Tier 2 Vehicle Emission Standards

The Tier 2 standards require all passenger vehicles in a manufacturer's fleet, including light-duty trucks and sport utility vehicles, to meet an average standard of 0.07 grams of NO_x per mile. Implementation of Tier 2 standards began in 2004, and most vehicles had been phased in by 2007. Federal Tier 2 standards also cover passenger vehicles over 8,500 pounds gross vehicle weight rating (e.g., large pickup trucks, sport utility vehicles), which were not covered by the previous Tier 1 regulations. Phase-in for these vehicles began in 2008, with full compliance achieved in 2009.

The Tier 2 rule also reduced the sulfur content of gasoline from major refineries to 30 ppm starting in January 2006; before then, most summertime gasoline sold in Clark County had a sulfur content of about 300 ppm. Emission reductions from the federal Tier 2 standards have been primarily responsible for a large decrease in ozone concentrations in Clark County.

4.4.1.2 Federal Highway Diesel Rule

Beginning with the 2007 model year, this rule reduced emissions from heavy-duty diesel vehicles by more than 90 percent. Additionally, the rule led to a 97 percent reduction in the sulfur content of highway diesel fuel. Previous levels were between 500 ppm (low sulfur diesel) and 15 ppm (ultra-low sulfur diesel). Advanced pollution control technology for cars, trucks, and buses allowed engine manufacturers to meet 2007 emission standards. EPA estimated this rule would eliminate 2.6 million tons of NO_x emissions from heavy-duty vehicles each year once the program was fully implemented, equivalent to a 95 percent reduction in NO_x emissions when compared to older diesel engines using higher-content sulfur diesel.

4.4.1.3 Federal Large Nonroad Diesel Engines Rule

This rule, promulgated in 2004, applies to large nonroad diesel engines like those used in construction, agricultural, and industrial equipment. EPA began phasing in the program in 2008, and is scheduled to finish in 2014. The rule reduces the allowable sulfur in nonroad diesel fuel to 15 ppm by 2010. The combined engine and fuel rules should reduce NO_x emissions from large

nonroad diesel engines by over 90 percent when compared to older nonroad engines using higher-content sulfur diesel.

4.4.1.4 Federal Nonroad Spark-Ignition Engines and Recreational Engines Standards

In 2003, this standard began regulating NO_x and VOCs for groups of previously unregulated nonroad engines, including large spark-ignition engines (e.g., forklifts, airport ground service equipment), recreational vehicles (e.g., off-highway motorcycles), and recreational marine diesel engines. In Clark County, the standards on large spark-ignition engines and recreational vehicles have contributed the most to reducing local ozone concentrations. EPA estimates that by 2020, the standard will reduce NO_x emissions from these types of equipment by 80 percent and VOC emissions by 72 percent.

4.4.1.5 Federal Nonroad Spark-Ignition Engines and Equipment Standard

In 2011, this standard will start regulating NO_x, VOCs, and carbon monoxide (CO) from all new land-based spark-ignition engines running at or below 19 kilowatts (e.g., lawn and garden equipment, utility vehicles, generators) and from spark-ignition engines used in marine vessels (e.g., outboard engines, personal watercraft, stern drive/inboard engines). The standard also adopts new evaporative emissions standards to control permeation from these engines. In Clark County, the standards on small engines used in lawn and garden equipment, utility vehicles, and generators will contribute the most to reducing local ozone concentrations. EPA estimates that by 2020, the standard will reduce NO_x emissions from these types of equipment by 46 percent and VOC emissions by 33 percent.

4.4.1.6 State Vehicle Inspection and Maintenance Program

Chapter 445B in the NRS and the NAC set forth the regulations governing motor vehicles in Clark County. Adopted in 1978 and administered by the Nevada Department of Motor Vehicles, these regulations establish annual testing procedures for 1968 or newer gasoline-powered vehicles, regardless of size, and for diesel-powered vehicles with a manufacturer's gross vehicle weight rating of up to 10,000 pounds. The Nevada I/M program allows exemptions from emission testing for new vehicles on their first and second registration, new hybrid-electric vehicles during their first five model years, alternative fuel vehicles, vehicles registered as Classic Rods or Classic Vehicles and driven 2,500 miles or less per year, and vehicles registered as Replica Vehicles.

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

4.4.1.7 Clark County Stationary Point and Nonpoint Source Regulations

Stationary sources in the Clark County nonattainment area are generally industrial, commercial, or institutional sources that emit 10 tons per year (tpy) or more of VOCs, 25 tpy of NO_x, and 100 tpy of any other criteria pollutant. Any source that generates, or has the potential to generate, at least 10 tpy of any single hazardous air pollutant (HAP) or 25 tpy of aggregate HAPs must report emissions. 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.

DAQEM has numerous regulations in place for stationary and nonpoint sources, notably AQR Sections 12.0 through 12.13, and Sections 13, 14, 16, 19, 20 and 21. DAQEM also regulates nonpoint sources, including gasoline-dispensing facilities, through the Stage II vapor recovery requirements in AQR Section 52, "Gasoline Dispensing Facilities."

Additionally, DAQEM enforces several federal regulations, such as 40 CFR 61, "National Emission Standards for Hazardous Pollutants," and 40 CFR 63, "National Emission Standards for Hazardous Air Pollutants for Source Categories," to control VOC emissions.

4.4.2 Additional Emission Reduction Control Measures

The Las Vegas Valley also benefits from the regional, state, and local ozone control programs listed below. Although these programs are not quantified in the EIs of this plan, they play an important role in reducing ozone levels in Clark County.

4.4.2.1 Regional Haze Rule

This rule, promulgated in July 1999, mandates emission reductions to achieve natural visibility levels in mandatory Class I areas by 2064. Emission reduction control measures principally address light-scattering and -absorbing aerosols, such as NO_x and VOC emissions. Several control measures will be implemented throughout the western states: for example, Best Available Retrofit Technologies will be installed on older units to significantly reduce NO_x and VOCs. These controls will be operating 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 and are awaiting EPA approval.

4.4.2.2 Actions by California Local Air Agencies

Several local air agencies in California, such as the South Coast and San Joaquin Air Pollution Control Districts, are implementing control measures in conjunction with their SIPs. These control measures will likely reduce ozone transport into Clark County.

4.4.2.3 Alternative Fuels for Government Fleets Program

This program is designed to reduce motor vehicle emissions, including NO_x and VOCs, by regulating state and local government fleets of more than 24 vehicles based in Clark County.

Alternative fuels accepted by the program include methanol, ethanol or other alcohol 85 percent or greater by volume (E-85), compressed natural gas, liquefied petroleum gas, hydrogen, federal reformulated gasoline or its equivalent, ultra-low sulfur diesel, electricity, certain ethanol-diesel blends (e.g., O2Diesel™), and biodiesel from B5 to B100. Hybrid electric vehicles are considered alternative fuel vehicles if the electric motor is used as a propulsion device during parts of the vehicle's drive cycle. As of fiscal year 2000, government fleets had to ensure that 90 percent of new vehicle purchases were alternative-fuel vehicles.

4.4.2.4 Transportation Control Measures/Transportation Demand Management Program

In 1999, after adoption of the *Transportation Improvement Plan FY 1998-2000* (RTC 1999), the Regional Transportation Commission of Southern Nevada (RTC) created Club Ride, an employer-based commuter services program. Major components include employer/community outreach and marketing efforts, employer rideshare program incentives, preferential parking for carpoolers and vanpoolers, emergency rides home for Club Ride members, travel assistance information on the Internet and at public kiosks, transit passes to subsidize employees' transit expenses, and partnerships with vanpool leasing companies. Although voluntary, this and other RTC programs play an important role in Clark County's efforts to reduce ozone levels.

4.4.2.5 Ozone Action Days

This public outreach and education program is a voluntary initiative asking local residents to take additional preventive actions when high ozone levels are predicted. Under certain meteorological conditions, DAQEM meteorologists can forecast when ground-level ozone may exceed health standards. On those days, DAQEM faxes an air quality message to media outlets, government agencies, and other Ozone Action Day participants. The department also makes Ozone Action Day messages and daily forecasts available to the public on its Web site. Preventive actions to reduce air pollution on these days include refueling vehicles after dusk, avoiding excessive driving, using public transportation, and telecommuting.

4.4.2.6 Transportation Conformity

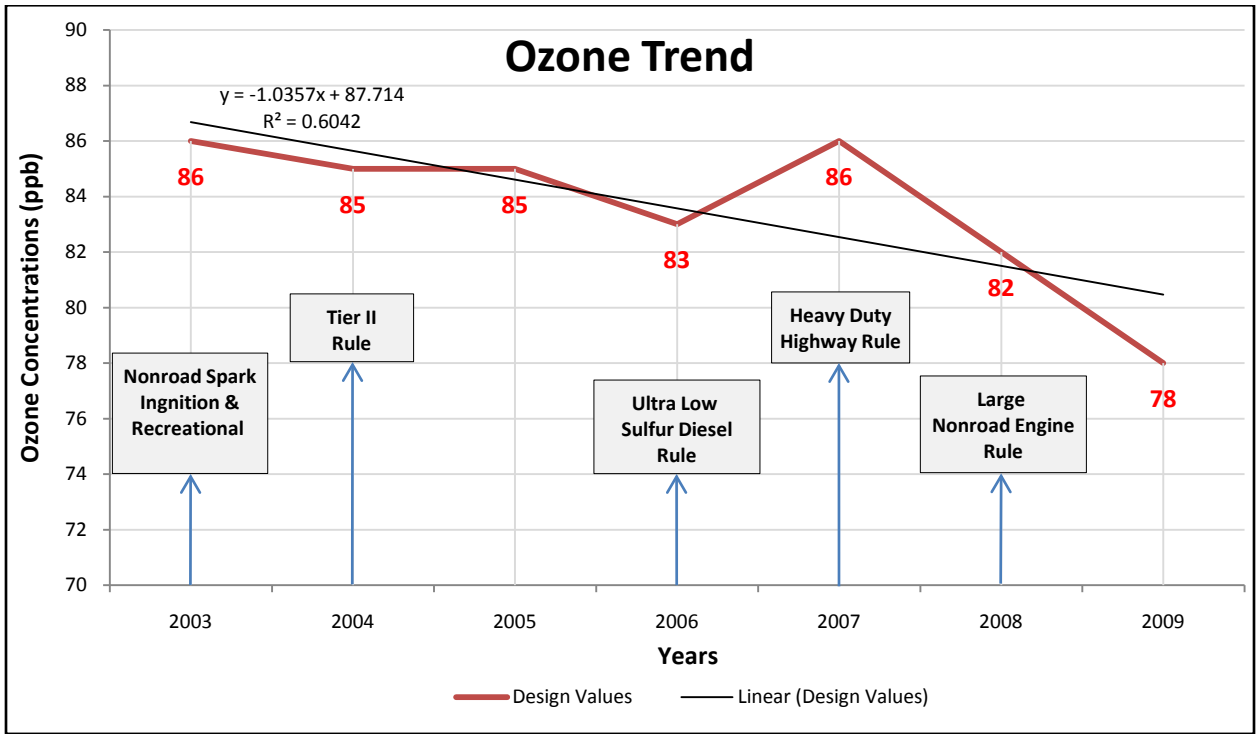
DAQEM will continue to work closely with the RTC to assure that Regional Transportation Plans and Transportation Improvement Programs in the Clark County ozone nonattainment area are consistent with and conform to DAQEM's air quality program, including the ozone SIP.

4.5 AIR QUALITY TREND ANALYSIS: WEIGHT OF EVIDENCE

Forecasting ozone concentrations in future years carries some level of uncertainty, so DAQEM performed an air quality trend analysis for the period between 2003 and 2009 using quality-assured data from the EPA Air Quality System database (Figure 4-1). The trend analysis would contribute to a weight-of-evidence approach to support the attainment demonstration of the ozone NAAQS with future-year VOC and NO_x MVEBs. This trend analysis also supports Section 4.4.1 – Permanent and Enforceable Emission Reduction Control Measures. Declining design values started with the implementation of the first Federal emission standard for engines in 2003. The 2007 design value went slightly up due to 3 consecutive intensive wildfire seasons

in 2005, 2006 and 2007. The significant drop of the DV in 2009 can be contributed, in part, to the implementation of the Large Nonroad Engine rule; the source apportionment of the nonroad emissions category in 2008 was 33% for NOx and 20% for VOC.

This linear analysis, based on the ordinary least squares, showed a continued downward trend of the design values. DAQEM is confident that future ozone concentrations will continue to trend downward with the maintenance control measures described in Section 4.4 in place.



Source: EPA Air Quality System, 2003-2010 (Appendix D).

Figure 4-1. Actual and Linear (OLS) Ozone Trends.

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 ozone nonattainment area, the provisions of CAA Section 110(a)(2) and CAA Section 110(l) must be satisfied. Section 110(a)(2) addresses the general requirements for SIPs; Section 110(l) prevents approval of SIP revisions if 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 that the state has adequate funds and authority to enforce the SIP and associated regulations.
6. Establishment of permit fees for stationary sources.

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 DAQEM. The department has more than 100 staff members and an annual budget of approximately $28 million to administer, implement and enforce the CAA, including air quality plans and regulations applicable to the Clark County ozone nonattainment area.

DAQEM's current air program meets all provisions required by CAA Section 110(a)(2). If DAQEM becomes unable to meet any of the 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 CO or particulate matter NAAQS. Nevada is currently designated as attainment/unclassifiable for particulate matter less than 2.5 microns in diameter under Section 107(d) of the CAA.

5.3 PART D REQUIREMENTS

Sections 172(c) and 176(c) in Part D of the CAA lay out requirements applicable to all areas designated as nonattainment because of a NAAQS violation. Clark County was not classified under CAA Part D, so it is only subject to the general provisions of CAA Subpart 1, "Nonattainment Areas in General."

5.3.1 Section 172(c)

This 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. 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.

DAQEM'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.

In approving the *Clark County Transportation Conformity Plan* (DAQEM 2008c) and the transportation conformity budgets in the *8-Hour Ozone Early Progress Plan for Clark County, Nevada* (DAQEM 2008a), EPA determined that DAQEM met the Section 176(c) requirements of the transportation conformity rule, 40 CFR 93, Subpart A (73 FR 66183). Additionally, DAQEM's commitment to submit a maintenance plan to EPA that incorporates all emissions from a conformity determination for the force beddown of the F-35 Force Development Evaluation and Weapons School at Nellis Air Force Base is consistent with the general conformity requirements of CAA Section 176(c) and 40 CFR 93.158(a)(5)(i)(B).

6.0 MAINTENANCE PLAN

6.1 INTRODUCTION

The fifth required component of an area's redesignation request is 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 ozone NAAQS for ten years after redesignation.

Two approaches are acceptable for demonstrating maintenance of the NAAQS (Calcagni 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. DAQEM used the emissions projection approach, comparing an EI for the attainment year (2008) to an EI for the maintenance year (2022). The maintenance year was chosen to allow EPA 18 months after receipt of a complete submittal to process Clark County's redesignation request.

The attainment EI represents an emission level that would not cause a NAAQS violation. If the projected maintenance year EI remains at or below the attainment year EI, continued maintenance is demonstrated. In addition, the maintenance demonstration includes a comparison between an interim year EI (2015) and the attainment year EI to show definitive maintenance throughout the 10-year period after redesignation, not just in the maintenance year.

6.2 TRANSPORATION INPUT DATA

Table 6-1 summarizes the transportation data used to develop the EIs in Section 6.4. The information was obtained from the *Regional Transportation Plan 2009-2030*, approved in November 2008 (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, has also been updated with the most current data available.

Table 6-1. Demographic Data Used to Develop Emission Inventories

Year	Vehicle Miles Traveled
2008 - attainment	41,992,968
2015 - interim	52,218,868
2022 - maintenance	67,795,656

6.3 EFFICIENCY AND EFFECTIVENESS FACTORS

Control efficiency, rule effectiveness and rule penetration factors were applied to the attainment emissions of point and nonpoint source categories affected by Clark County AQRs, when applicable. The term control efficiency includes capture efficiency for point sources which defines the percentage of emissions from a source that is 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, on the other hand, are the assumed

percentage of emissions of the targeted Source Classification Code (SCC) subject to the requirements of a rule.

6.4 EMISSION INVENTORY TYPE CATEGORIES

The inventories for NO_x and VOC emissions for the Clark County nonattainment area was derived from estimates developed for nine EI type categories: point sources, nonpoint sources, private and commercial aviation, Federal aviation, railway, on-road mobile, nonroad mobile, biogenic, and banked emission reduction credits. The following sections provide a brief discussion of each category and its estimated emissions; more detailed explanations of EI estimates can be found in Appendix A, the *Clark County Ozone Redesignation Request and Maintenance Plan Technical Support Document* (TSD).

6.4.1 Point Sources

Point source inventories include all Title V major stationary sources, minor stationary sources that emit at least 10 tpy of VOCs or 25 tpy of NO_x per year, and clustered minor stationary sources that could be considered emission hot spots. The source emissions are tabulated from data collected by direct on-site measurements or calculated using emission factors and activities data. When a single facility has multiple sources, emission data is collected for each source and entered into a database that organizes it and allocates the emissions to a geographic location. To calculate projected EIs, point sources are adjusted by growth factors based on Source Classification Codes using version 5.0 of EPA's Economic Growth Analysis System program.

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 sources are generally divided into two groups, according to the emission mechanism: (1) hydrocarbon evaporative emissions, considered primarily as VOCs, or (2) fuel combustion emissions, considered primarily as NO_x. Hydrocarbon evaporative emission sources include printing presses, industrial coatings, degreasing solvents, house paints, and the filling of underground gasoline tanks. Fuel combustion emission sources include stationary source fossil fuel combustion at residences and businesses, vehicle/equipment operations, materials burning outdoors, and structural fires.

Nonpoint source emission calculations are estimated as county-wide totals rather than as individual source emissions. With some exceptions, these emissions may be 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 unavailable, surrogates are used, including county population or employment data by industry type (and, when applicable, by growth factors from EPA's Economic Growth Analysis System model).

6.4.3 Private and Commercial Aviation

Private and commercial aviation in Clark County is overseen by the Clark County Department of Aviation and served by five airports: (1) McCarran International Airport; (2) North Las Vegas Airport; (3) Henderson Executive Airport; (4) Jean Airport; and (5) Perkins Field Airport. The Aviation Department provided DAQEM with the 2008 actual and 2022 estimated EIs for each of these five facilities, along with emission estimates for the proposed Ivanpah Airport and Sloan Heliport (Ricondo and Associates Inc. 2008) in the southern part of the county. Emission estimates for 2015 were interpolated using the 2008 and 2022 EIs, minus the estimates for Ivanpah and Sloan. The Ivanpah Airport will not be completed until 2020, and the Sloan Heliport will not be operational until 2017.

6.4.4 Federal Aviation

Federal aviation in Clark County centers around Nellis Air Force Base, a major aircraft training facility seven miles northeast of Las Vegas. Although most emissions at Nellis come from aircraft operations, the base holds a Title V permit to cover stationary source emissions that also permeate the area. Both emission types were included in the overall EIs Nellis provided to DAQEM for 2008 and 2022.

The 2022 EI included emissions from the beddown of F-35 aircraft, which will be used to train instructor pilots and support the Air Force Weapons School's mission of testing and evaluation. Emission estimates for 2015 were interpolated using the 2008 and 2022 EIs, minus the emissions from the F-35 beddown. Once the 2015 EI was calculated, F-35 beddown emissions were added back in because Nellis expects the wing to be fully operational between 2012 and 2013.

6.4.5 Railway

The sole proprietor of railroad track in Clark County is Union Pacific Railroad; in 2008, it operated roughly 148 miles of track in the county and consumed about 3.9 million gallons of diesel while hauling approximately 3.2 billion gross tons. Emissions from locomotives are assumed to be uniform throughout the year, and are based on activity throughput data in the form of gross tonnage hauled and emission factors.

To project activity throughput, DAQEM incorporated an average annual growth rate of one and a half percent into the 2008 EI, based on average domestic freight demand forecasts from the Federal Highway Administration. EIs for 2015 and 2022 included future emissions associated with proposed high-speed passenger train service between Las Vegas and southern California, for which DAQEM obtained estimates from the draft environmental impact statement (Federal Railroad Administration 2008).

6.4.6 On-Road Mobile

On-road mobile sources consist of cars, trucks, motorcycles, and other motor vehicles traveling on public roadways. Combustion-related emissions (NO_x and CO) were estimated for vehicle engine exhaust; evaporative hydrocarbon emissions (VOCs) were estimated for the fuel tank and

other evaporative leak sources on the vehicle. DAQEM then developed emission factors for 2008, 2015, and 2022 using the CONCEPT MV model; the MOBILE6 emissions factor model; Vehicle Miles Travelled (VMT) from the RTC's transportation demand model (TDM); and federal Highway Performance Monitoring System (HPMS) data from the Nevada Department of Transportation (NDOT). Every effort was made to use parameters reflective of local conditions, local parameters include vehicle speeds by roadway type, vehicle registration by vehicle type and age, percentage of vehicles in cold-start mode, percentage of miles traveled by vehicle type, type of I/M program in place, and gasoline vapor pressure.

6.4.7 Nonroad Mobile

Nonroad 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, with the exception of locomotive, aircraft, and airport ground support equipment. Nonroad EIs for 2008, 2015, and 2022, which were estimated using the EPA's NONROAD model, included more than 80 basic and 260 specific types of nonroad equipment. The model further stratified equipment types into ten categories by horsepower rating and fuel type, then incorporated the effects of recent federal regulatory actions (i.e., emission standards for nonroad compression ignition engines and ultra-low sulfur diesel). The model also accounted for fleet turnover, when older engines are replaced by newer engines that comply with stricter federal emission controls.

6.4.8 Biogenic

Biogenic sources include agricultural crops; lawn grass; forests that produce isoprene, monoterpene, alpha-pinene, and other VOC emissions; and soils that generate trace amounts of NO_x. Like emissions from man-made sources (anthropogenic emissions), biogenic emissions react with oxidants in the atmosphere to produce ozone; they can even dominate anthropogenic emissions in some areas. A comparison of biogenic emissions estimates to emissions estimates for other categories (e.g., mobile sources) showed that biogenic emissions represent a large portion of overall VOC emissions in Clark County. DAQEM assumed these emissions would remain constant over time because biogenic emissions are beyond the scope of reasonable emission reduction measures,The EIs for 2008, 2015, and 2022 were based on the Model of Emissions of Gasses and Aerosols from Nature (MEGAN) estimates, measured emission factors, and species information from completed surveys.

6.4.9 Banked Emission Reduction Credits

Under strict guidelines, Emission Reduction Credits (ERCs) may be granted, if requested, to a source that voluntarily reduces emissions beyond required levels of control. ERCs may be sold, leased, banked for future use, or traded in accordance with applicable regulations. Both NDEP and DAQEM have authority to bank ERCs in Clark County. NDEP has jurisdiction over permitting, compliance, and ERC banking for plants that burn fossil fuels in a boiler to produce steam for the production of electricity (**NRS** 445B.500) in Clark County; all other emission units in Clark County are under the jurisdiction of DAQEM. While developing this plan, DAQEM verified NDEP's bank of VOCs and NO_x and the two facilities from which the related ERCs originated. At this time, neither DAQEM nor NDEP has any pending ERC applications.

DAQEM chose to account for all ERCs in the maintenance year 2022 because ERCs can be used in nonattainment areas to offset emissions of new major sources and major modifications at existing major sources. Therefore, ERC emissions are already accounted for in the point source emissions growth estimated for 2022, i.e., point source emissions growth and ERCs largely overlap. To be conservative, however, DAQEM is not considering the potential overlap of these emissions in this plan.

6.5 SUMMARY OF EMISSION INVENTORIES

Table 6-2 summarizes the 2008, 2015, and 2022 VOC EIs for nine source type categories in tons per day (tpd). Figures 6-1 through 6-3 show the VOC EIs for 5 source categories[1] for each of those three years. Detailed information on the methodologies used to estimate EIs can be found in the TSD (Appendix A).

Table 6-2. Summary of Total Daily VOC Emissions (tpd)

Source Category	2008 VOC	2015 VOC	2022 VOC
Point source	1.32	1.61	1.74
Nonpoint source	57.07	66.21	76.15
Commercial Aviation	2.6	2.83	4.14
Federal Aviation	0.79	0.9	0.95
On-road mobile	65.08	45.32	36.71
Nonroad mobile	42.91	32.29	29.73
Biogenic	132	132	132
ERC	0	0.43	0.43
Total	**301.77**	**281.59**	**281.85**

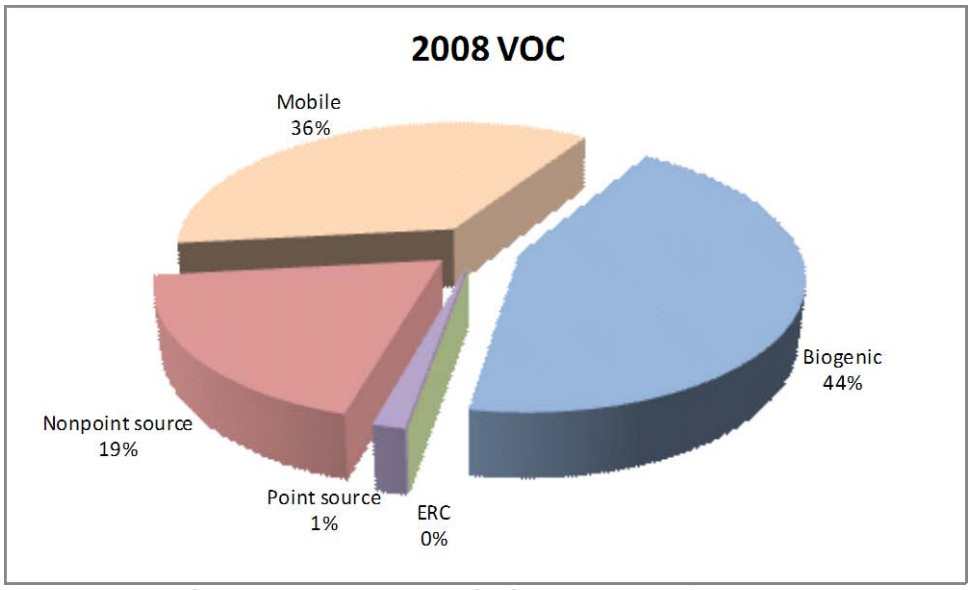


Figure 6-1. VOC Emission Inventory for 2008.

[1] Airports are considered point sources; therefore, the commercial and federal aviation emissions are accounted for in the Point Source category. Only five source categories are shown in the graphs.
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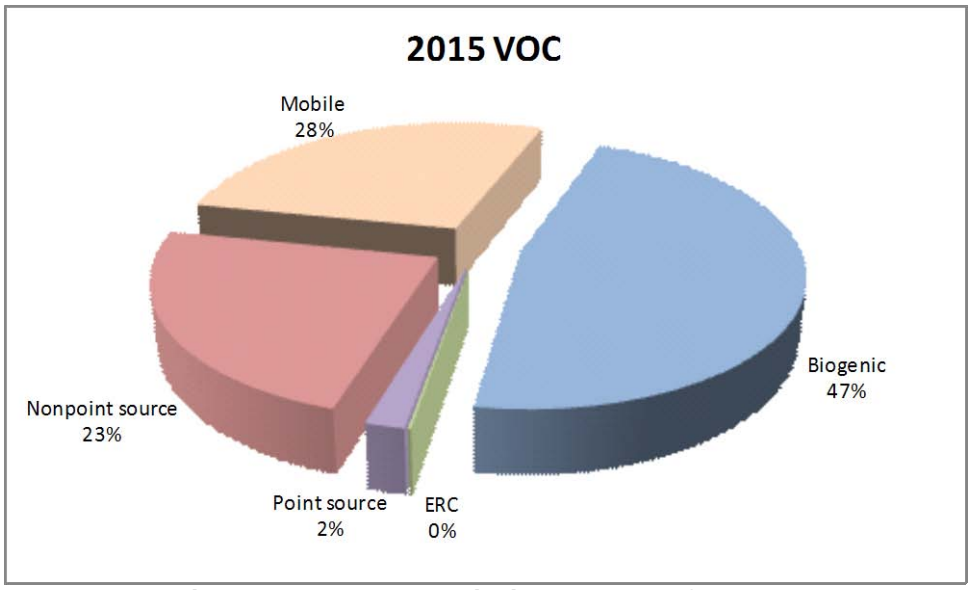

Figure 6-2. VOC Emission Inventory for 2015.

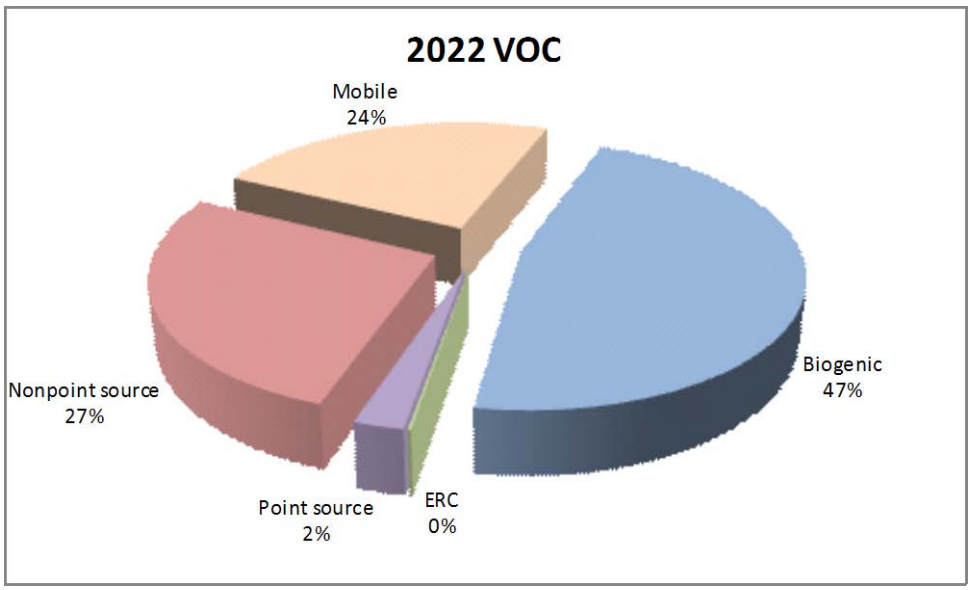

Figure 6-3. VOC Emission Inventory for 2022.

Table 6-3 summarizes the 2008, 2015, and 2022 NO_x EIs for all nine source type categories. Figures 6-4 through 6-6 show the NO_x EIs for 5 source categories[2] for each of those three years. Detailed information on the methodologies used to estimate EIs can be found in the TSD (Appendix A).

Table 6-3. Summary of Total Daily NO_x Emissions (tpd)

Source Category	2008 NOx	2015 Nox	2022 Nox
Point source	28.73	31.54	31.73
Nonpoint source	5.41	5.64	5.9
Commercial Aviation	11.41	14.78	28.82
Federal Aviation	1.27	1.87	2.26
On-road mobile	68.46	34.69	23.15
Nonroad mobile	43.28	30.1	19.51
Biogenic	5	5	5
ERC	0	22.23	22.23
Total	**163.56**	**145.85**	**138.6**

[2] Airports are considered point sources; therefore, commercial and federal aviation emissions are accounted for in the Point Source category. Only five source categories are shown in the graphs.

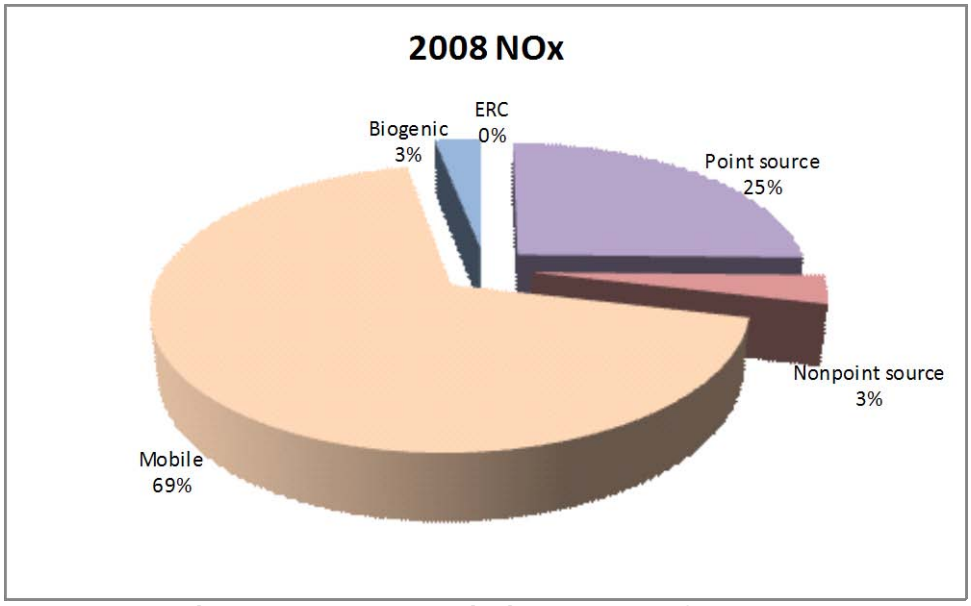

Figure 6-4. NO_x Emission Inventory for 2008.

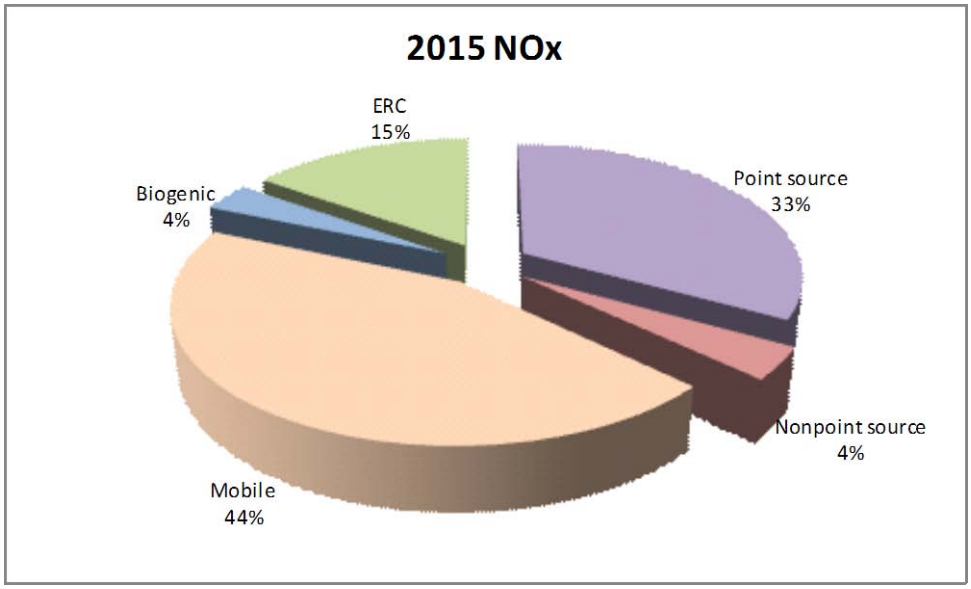

Figure 6-5. NO_x Emission Inventory for 2015.

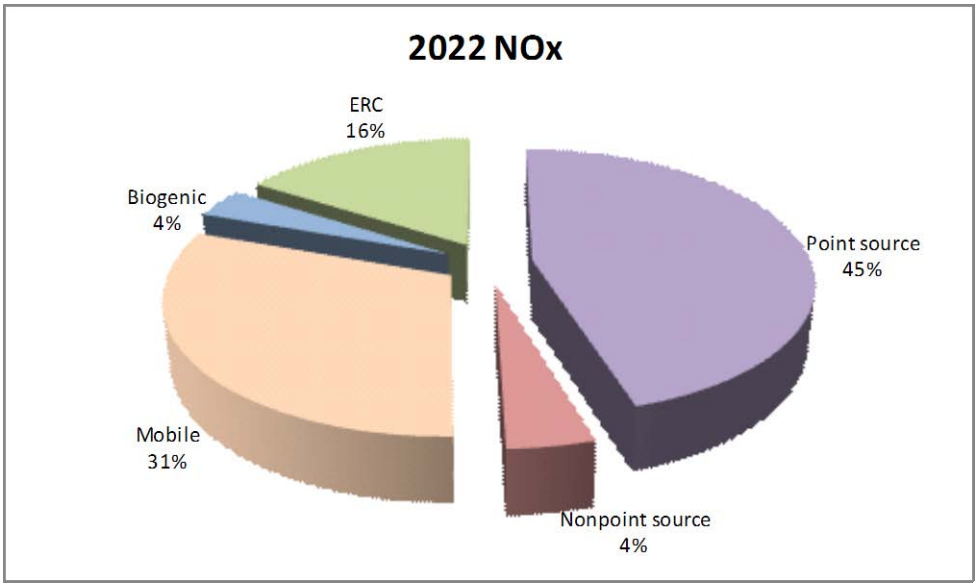

Figure 6-6. NO_x Emission Inventory for 2022.

In summary, total VOC emissions decrease by 19.9 percent between 2008 and 2022 with the maintenance control measures described in Section 4.4, or from 301.77 tpd to 281.85 tpd. Total NO_x emissions follow a similar downtrend, decreasing 24.9 percent between 2008 and 2022, or from 163.5 tpd to 138.6 tpd.

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 ten years after redesignation. Following EPA guidance (Calcagni 1992), DAQEM demonstrated maintenance of the ozone NAAQS by comparing projected 2015 and 2022 EIs with the attainment year EI (2008). If the 2015 and 2022 EIs are less than the 2008 EI, then maintenance of the NAAQS is demonstrated. As illustrated in Tables 6-2 and 6-3, projected future year VOC and NO_x emissions in the Clark County nonattainment area are less than 2008 emissions. Figure 6-7 illustrates the differences in the attainment, interim, and maintenance year EIs for VOC and NO_x.

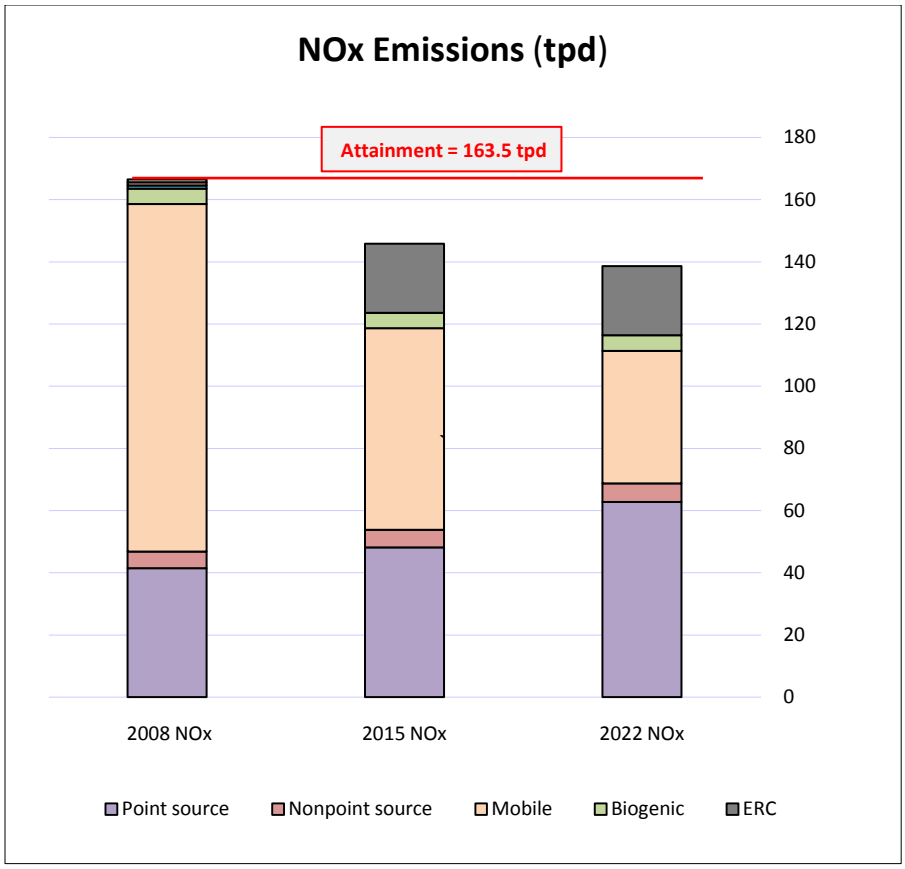

Figure 6-7. Comparison of 2008, 2015, and 2022 NO_x Emissions.

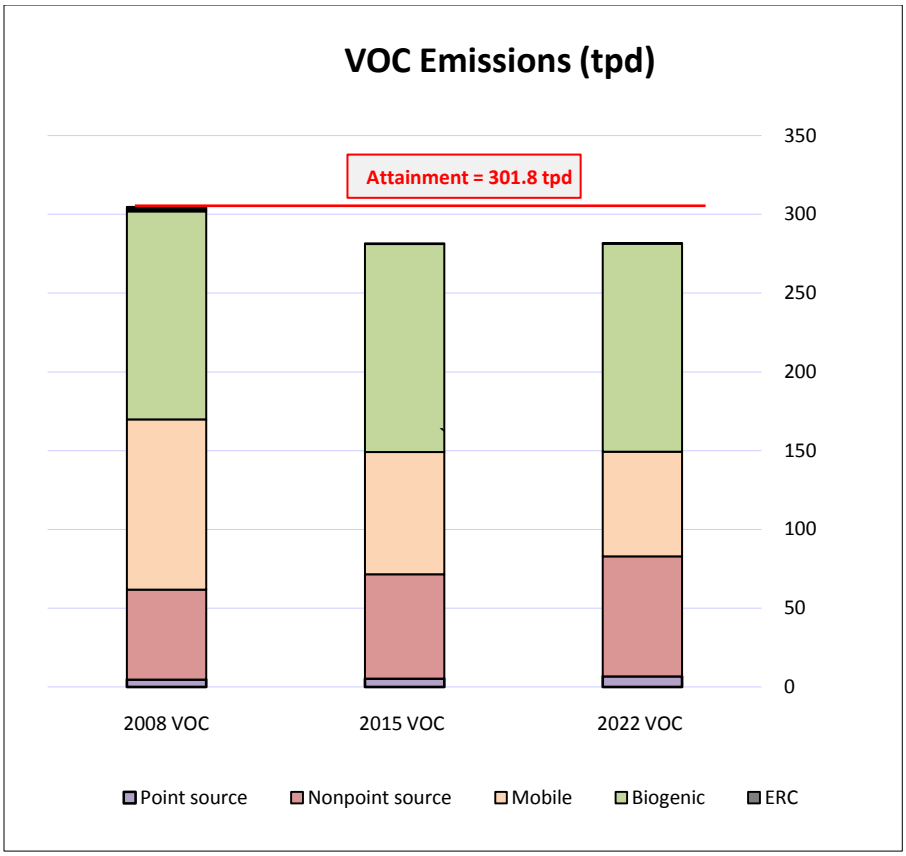

Figure 6-8. Comparison of 2008, 2015, and 2022 VOC Emissions.

The EIs show a downward trend in both VOC and NO_x emissions, due mainly to the control measures described in Section 4.4. No increases in emissions are expected in the intervening years that will threaten the demonstration of attainment because this downward trend, and the fact that future EIs in the maintenance year are considerably below the 2008 levels.

6.7 MONITORING NETWORK AND VERIFICATION OF CONTINUED ATTAINMENT

After EPA redesignates the Clark County nonattainment area to attainment status, DAQEM will continue to operate the air quality monitoring network to verify the continued attainment of the 1977 8-hour ozone NAAQS. Annual review of the SLAMS air quality surveillance system will be conducted in accordance with 40 CFR 58.20(d) to determine whether the system continues to meet monitoring objectives.

6.8 CONTINGENCY PLAN

CAA Section 175A(d) requires that a maintenance plan contain contingency provisions to assure prompt correction of any violation of the 8-hour ozone NAAQS. Contingency plans must also describe the methods that will be used to ensure the measures in the plan are adopted expeditiously once the need is triggered. While EPA guidance states that a contingency plan does not have to contain fully adopted contingency measures (Calcagni 1992), it 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.

6.8.1 Potential Contingency Measures

In addition to the six potential contingency measures outlined below, DAQEM may evaluate other strategies to address any future ozone NAAQS violations in the most appropriate and effective manner possible.

6.8.1.1 Reid Vapor Pressure Reduction

In conjunction with the Nevada Department of Agriculture, DAQEM may consider requiring the reduction of gasoline Reid vapor pressure to below 9.0 psi within the nonattainment area during the summer ozone season.

6.8.1.2 Inspection/Maintenance Program Changes and Additions

In conjunction with the Nevada Department of Transportation, DAQEM may consider changing the cutpoints for VOCs and NO_x applicable to pre-1996 vehicles and/or increase the I/M waiver repair rate in Clark County.

6.8.1.3 Consumer and Commercial Products

DAQEM may consider regulations to restrict the sale, offer for sale, or manufacture for sale of any consumer product, such as personal care products, automotive and industrial maintenance products, and pesticides that contain VOCs above specified limits.

6.8.1.4 Architectural Surface Coatings

DAQEM may consider regulations to restrict the sale, supply, offer for sale, or solicitation of the application of architectural coatings that contain VOCs above specified limits.

6.8.1.5 Lawn and Garden Equipment Use

DAQEM may consider regulations to restrict the use of gasoline-powered lawn mowers on announced ozone action days in the Clark County nonattainment area.

6.8.1.6 Establish/Enhance Trip Reduction Programs

In conjunction with the RTC, DAQEM may establish and/or enhance employer-based community outreach and marketing efforts, employer rideshare program incentives, preferential parking for carpoolers and vanpoolers, emergency rides home for Club Ride members, travel

assistance information on the Internet and at public kiosks, transit passes to subsidize employees' transit expenses, and partnerships with vanpool leasing companies.

6.8.2 Tracking and Triggering Mechanisms

The primary tracking mechanism will be DAQEM's continuous ozone monitoring, as described in Section 6.7. DAQEM will examine ambient air quality monitoring data within 30 days of collection to determine if the ozone NAAQS has been exceeded. The RTCs ongoing regional transportation planning process will serve as another means of tracking mobile source VOC and NO_x precursor emissions. 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 of this plan.

The primary trigger mechanism will be a confirmed violation of the 1997 8-hour ozone NAAQS, or a three-year average of the fourth highest values that is equal to or greater than 0.085 ppm. The trigger date will be 60 days from the date DAQEM observes a fourth highest value that, would result in a design value equal to or greater than 0.085 ppm.

The triggering of the contingency plan does not automatically require a revision of the Clark County ozone SIP, nor would Clark County necessarily be redesignated to nonattainment. Instead, DAQEM will have a period of time to correct the violation by implementing one or more contingency measures. If ozone violations continue after contingency measures have been implemented, additional measures will be implemented until the violations are corrected.

6.8.3 Action Resulting from Trigger Activation

Within 45 days of the trigger date, DAQEM will notify EPA that an internal review process will begin to evaluate potential contingency measures. Within 90 days of that notification, DAQEM will send EPA an information report outlining recommended actions. DAQEM will then solicit stakeholder involvement through public forums (i.e., ozone working groups) to refine the process of implementing the recommended actions. The BCC, Nevada State Board of Agriculture, and/or Nevada State Environmental Commission will hold a public hearing(s) to consider the recommended contingency measures, along with any other contingency measures that may address the confirmed violation. The necessary contingency measures will be adopted and implemented within 18 months after submittal of the information report to EPA.

6.9 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. DAQEM commits to the submittal of a revised maintenance plan eight years after Clark County 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 MVEBs specified in the applicable SIP. In this case, 40 CFR 93.118 provides the criteria and procedures for MVEBs.

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

Table 7-1 provides 2015 and 2022 VOC and NO_x MVEBs for the area of Clark County that comprises the 1997 8-hour ozone maintenance area. Upon an EPA affirmative adequacy finding and approval of the MVEBs, these budgets will be used for conformity determinations in future regional transportation plans.

Table 7-1. VOC and NO_x MVEBs for Clark County

Year	VOC MVEBs (tpd)	NO_x MVEBs (tpd)
2008 – attainment	65.08	68.46
2015 – interim	45.32	34.69
2022 – maintenance	36.71	23.15

8.0 REFERENCES

43 FR (Federal Register) 8962." National Ambient Air Quality Standards: State Attainment Status."

44 FR 8220. Revision of primary and secondary ozone standards.

51 FR 41788. "Designations of Areas for Air Quality Planning Purposes; Las Vegas Valley, NV, Redesignation for Ozone."

62 FR 38856. "National Ambient Air Quality Standards for Ozone; Final Rule."

65 FR 6822. "Control of Air Pollution From New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements; Final Rule. Part 80—Regulation of Fuels and Fuel Additives."

65 FR 76789. "Control of Emissions from New Nonroad Spark-Ignition Engines Rated Above 19 Kilowatts and New Land-Based Recreational Spark-Ignition Engines."

69 FR 23858. "8-Hour Ozone National Ambient Air Quality Standards; Final Rules. Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates."

69 FR 34076. "Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Deferral of Effective Date."

69 FR 38958. "Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel; Final Rule."

73 FR 59034. "Control of Emissions from Nonroad Spark-Ignition Engines and Equipment; Final Rule."

73 FR 66182. "Approval and Promulgation of Implementation Plans; Revisions to the Nevada State Implementation Plan; Clark County."

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