



Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Stephen A. Owens
Director

JUN 07 2007

Mr. Wayne Nastri, Regional Administrator
U. S. Environmental Protection Agency, Region IX
Mail Code: ORA-1
75 Hawthorne Street
San Francisco, CA 94105

Re: Submittal of *Final Arizona State Implementation Plan Revision, San Manuel Sulfur Dioxide Nonattainment Area, March 2007*

Dear Mr. Nastri:

Consistent with the provisions of Arizona Revised Statutes §§ 49-104 and 49-404 (Enclosure 1) and the Code of Federal Regulations, Title 40, §§ 51.102 through 51.104, the Arizona Department of Environmental Quality (ADEQ) hereby adopts and submits to the U.S. Environmental Protection Agency (EPA), *Final Arizona State Implementation Plan Revision, San Manuel Sulfur Dioxide Nonattainment Area, March 2007*, as a revision to the Arizona State Implementation Plan (SIP).

The San Manuel area was designated nonattainment for the primary sulfur dioxide National Ambient Air Quality Standards (NAAQS) in 1979. ADEQ originally submitted the *Final San Manuel Sulfur Dioxide Nonattainment Area State Implementation and Maintenance Plan* and redesignation to attainment request to EPA in June 2002. The 2002 plan summarized the progress of the area in attaining the sulfur dioxide air quality standards and demonstrated the area would continue to maintain the standards. Since that time, however, the San Manuel copper smelter, which was the primary source of sulfur dioxide emissions in the area, permanently closed. The March 2007 revision updates the SIP to account for the change in emissions due to the closure of the smelting facility. Because the more current information and analyses contained in the March 2007 document supersedes the materials contained in the June 2002 submittal, ADEQ is requesting that the June 2002 submittal be withdrawn from consideration for any further action by EPA.

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Wayne Nastri
Page 2

With this submittal, ADEQ requests that EPA approve the March 2007 SIP revision and redesignate the San Manuel Sulfur Dioxide Nonattainment Area to attainment for the 24-hour and annual sulfur dioxide NAAQS. Enclosure 2 is the SIP Completeness Checklist. Enclosure 3 contains five copies of the SIP revision for your review and action. If you have any questions, please contact Nancy Wrona, Director, Air Quality Division, at (602) 771-2308.

Sincerely,



Stephen A. Owens
Director

SAO:BJF:MBL

Enclosures (3)

cc: Colleen McKaughan, EPA
Wienke Tax, EPA
Don Gabrielson, w/o enclosures, Pinal County Air Quality Control District
Ursula Kramer, w/o enclosures, Pima County Department of Environmental Quality

ENCLOSURE 1

Arizona Revised Statutes §§ 49-104 and 49-404

Arizona State Legislature

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Arizona Revised Statutes

The Arizona Revised Statutes have been updated with the 47th Legislature, 2nd Regular Session information, and contain the version of the statutes effective January 1, 2007.

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- Title 43 Taxation of Income
- Title 44 Trade and Commerce
- Title 45 Waters
- Title 46 Welfare
- Title 47 Uniform Commercial Code
- Title 48 Special Taxing Districts
- Title 49 The Environment

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49-104. Powers and duties of the department and director

A. The department shall:

1. Formulate policies, plans and programs to implement this title to protect the environment.
2. Stimulate and encourage all local, state, regional and federal governmental agencies and all private persons and enterprises that have similar and related objectives and purposes, cooperate with those agencies, persons and enterprises and correlate department plans, programs and operations with those of the agencies, persons and enterprises.
3. Conduct research on its own initiative or at the request of the governor, the legislature or state or local agencies pertaining to any department objectives.
4. Provide information and advice on request of any local, state or federal agencies and private persons and business enterprises on matters within the scope of the department.
5. Consult with and make recommendations to the governor and the legislature on all matters concerning department objectives.
6. Promote and coordinate the management of air resources to assure their protection, enhancement and balanced utilization consistent with the environmental policy of this state.
7. Promote and coordinate the protection and enhancement of the quality of water resources consistent with the environmental policy of this state.
8. Encourage industrial, commercial, residential and community development that maximizes environmental benefits and minimizes the effects of less desirable environmental conditions.
9. Assure the preservation and enhancement of natural beauty and man-made scenic qualities.
10. Provide for the prevention and abatement of all water and air pollution including that related to particulates, gases, dust, vapors, noise, radiation, odor, nutrients and heated liquids in accordance with article 3 of this chapter and chapters 2 and 3 of this title.
11. Promote and recommend methods for the recovery, recycling and reuse or, if recycling is not possible, the disposal of solid wastes consistent with sound health, scenic and environmental quality policies.
12. Prevent pollution through the regulation of the storage, handling and transportation of solids, liquids and gases that may cause or contribute to pollution.
13. Promote the restoration and reclamation of degraded or despoiled areas and natural resources.
14. Assist the department of health services in recruiting and training state, local and district health department personnel.
15. Participate in the state civil defense program and develop the necessary organization and facilities to meet wartime or other disasters.
16. Cooperate with the Arizona-Mexico commission in the governor's office and with researchers at universities in this state to collect data and conduct projects in the United States and Mexico on issues that are within the scope of the department's duties and that relate to quality of life, trade and economic development in this state in a manner that will help the Arizona-Mexico commission to assess and enhance the economic competitiveness of this state and of the Arizona-Mexico region.

B. The department, through the director, shall:

1. Contract for the services of outside advisers, consultants and aides reasonably necessary or desirable to enable the department to adequately perform its duties.
2. Contract and incur obligations reasonably necessary or desirable within the general scope of department activities and operations to enable the department to adequately perform its duties.
3. Utilize any medium of communication, publication and exhibition when disseminating information,

advertising and publicity in any field of its purposes, objectives or duties.

4. Adopt procedural rules that are necessary to implement the authority granted under this title, but that are not inconsistent with other provisions of this title.

5. Contract with other agencies including laboratories in furthering any department program.

6. Use monies, facilities or services to provide matching contributions under federal or other programs that further the objectives and programs of the department.

7. Accept gifts, grants, matching monies or direct payments from public or private agencies or private persons and enterprises for department services and publications and to conduct programs that are consistent with the general purposes and objectives of this chapter. Monies received pursuant to this paragraph shall be deposited in the department fund corresponding to the service, publication or program provided.

8. Provide for the examination of any premises if the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed on the premises. The director shall give the owner or operator the opportunity for its representative to accompany the director on an examination of those premises. Within forty-five days after the date of the examination, the department shall provide to the owner or operator a copy of any report produced as a result of any examination of the premises.

9. Supervise sanitary engineering facilities and projects in this state, authority for which is vested in the department, and own or lease land on which sanitary engineering facilities are located, and operate the facilities, if the director determines that owning, leasing or operating is necessary for the public health, safety or welfare.

10. Adopt and enforce rules relating to approving design documents for constructing, improving and operating sanitary engineering and other facilities for disposing of solid, liquid or gaseous deleterious matter.

11. Define and prescribe reasonably necessary rules regarding the water supply, sewage disposal and garbage collection and disposal for subdivisions. The rules shall:

(a) Provide for minimum sanitary facilities to be installed in the subdivision and may require that water systems plan for future needs and be of adequate size and capacity to deliver specified minimum quantities of drinking water and to treat all sewage.

(b) Provide that the design documents showing or describing the water supply, sewage disposal and garbage collection facilities be submitted with a fee to the department for review and that no lots in any subdivision be offered for sale before compliance with the standards and rules has been demonstrated by approval of the design documents by the department.

12. Prescribe reasonably necessary measures to prevent pollution of water used in public or semipublic swimming pools and bathing places and to prevent deleterious conditions at such places. The rules shall prescribe minimum standards for the design of and for sanitary conditions at any public or semipublic swimming pool or bathing place and provide for abatement as public nuisances of premises and facilities that do not comply with the minimum standards. The rules shall be developed in cooperation with the director of the department of health services and shall be consistent with the rules adopted by the director of the department of health services pursuant to section 36-136, subsection H, paragraph 10.

13. Prescribe reasonable rules regarding sewage collection, treatment, disposal and reclamation systems to prevent the transmission of sewage borne or insect borne diseases. The rules shall:

(a) Prescribe minimum standards for the design of sewage collection systems and treatment, disposal and reclamation systems and for operating the systems.

(b) Provide for inspecting the premises, systems and installations and for abating as a public nuisance any collection system, process, treatment plant, disposal system or reclamation system that does not comply

with the minimum standards.

(c) Require that design documents for all sewage collection systems, sewage collection system extensions, treatment plants, processes, devices, equipment, disposal systems, on-site wastewater treatment facilities and reclamation systems be submitted with a fee for review to the department and may require that the design documents anticipate and provide for future sewage treatment needs.

(d) Require that construction, reconstruction, installation or initiation of any sewage collection system, sewage collection system extension, treatment plant, process, device, equipment, disposal system, on-site wastewater treatment facility or reclamation system conform with applicable requirements.

14. Prescribe reasonably necessary rules regarding excreta storage, handling, treatment, transportation and disposal. The rules shall:

(a) Prescribe minimum standards for human excreta storage, handling, treatment, transportation and disposal and shall provide for inspection of premises, processes and vehicles and for abating as public nuisances any premises, processes or vehicles that do not comply with the minimum standards.

(b) Provide that vehicles transporting human excreta from privies, septic tanks, cesspools and other treatment processes shall be licensed by the department subject to compliance with the rules.

15. Perform the responsibilities of implementing and maintaining a data automation management system to support the reporting requirements of title III of the superfund amendments and reauthorization act of 1986 (P.L. 99-499) and title 26, chapter 2, article 3.

16. Approve remediation levels pursuant to article 4 of this chapter.

C. The department may charge fees to cover the costs of all permits and inspections it performs to insure compliance with rules adopted under section 49-203, subsection A, paragraph 6, except that state agencies are exempt from paying the fees. Monies collected pursuant to this subsection shall be deposited in the water quality fee fund established by section 49-210.

D. The director may:

1. If he has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed, inspect any person or property in transit through this state and any vehicle in which the person or property is being transported and detain or disinfect the person, property or vehicle as reasonably necessary to protect the environment if a violation exists.

2. Authorize in writing any qualified officer or employee in the department to perform any act that the director is authorized or required to do by law.

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49-404. State implementation plan

A. The director shall maintain a state implementation plan that provides for implementation, maintenance and enforcement of national ambient air quality standards and protection of visibility as required by the clean air act.

B. The director may adopt rules that describe procedures for adoption of revisions to the state implementation plan.

C. The state implementation plan and all revisions adopted before September 30, 1992 remain in effect according to their terms, except to the extent otherwise provided by the clean air act, inconsistent with any provision of the clean air act, or revised by the administrator. No control requirement in effect, or required to be adopted by an order, settlement agreement or plan in effect, before the enactment of the clean air act in any area which is a nonattainment or maintenance area for any air pollutant may be modified after enactment in any manner unless the modification insures equivalent or greater emission reductions of the air pollutant. The director shall evaluate and adopt revisions to the plan in conformity with federal regulations and guidelines promulgated by the administrator for those purposes until the rules required by subsection B are effective.

ENCLOSURE 2

State Implementation Plan Completeness Checklist

STATE IMPLEMENTATION PLAN COMPLETENESS CHECKLIST

Submittal of
Final Arizona State Implementation Plan Revision, San Manuel Sulfur Dioxide Nonattainment Area,
March 2007

1. SUBMITTAL LETTER FROM GOVERNOR/DESIGNEE
See cover letter.
2. EVIDENCE OF ADOPTION
See cover letter.
3. STATE LEGAL AUTHORITY FOR ADOPTION/IMPLEMENTATION
See Enclosure 1.
4. COMPLETE COPY OF STATUTE/REGULATION/DOCUMENT
See Enclosure 3.
5. WRITTEN SUMMARY OF RULE/RULE CHANGE
Not applicable.
6. RULE CHANGES INDICATED BY UNDERLINING AND CROSS-OUTS
Not applicable.
7. EVIDENCE THAT ARIZONA ADMINISTRATIVE PROCEDURE ACT REQUIREMENTS WERE MET FOR RULE/PLAN
See Enclosure 3.
8. EVIDENCE OF PUBLIC HEARING PER 40 CFR 51.102
See Enclosure 3, Appendix E.
9. PUBLIC COMMENTS AND AGENCY RESPONSE
See Enclosure 3, Appendix E.
10. IDENTIFICATION OF POLLUTANTS REGULATED BY RULE/PLAN
Sulfur dioxide.

11. IDENTIFICATION OF SOURCES/ATTAINMENT STATUS

See Enclosure 3.

12. RULE'S/PLAN'S EFFECT ON EMISSIONS

See Enclosure 3.

13. DEMONSTRATION THAT NAAQS, PSD INCREMENTS AND RFP ARE PROTECTED

See Enclosure 3.

14. MODELING SUPPORT

See Enclosure 3, Appendix A.

15. EVIDENCE THAT EMISSIONS LIMITATIONS ARE BASED ON CONTINUOUS EMISSIONS REDUCTION TECHNOLOGY

See Enclosure 3.

16. IDENTIFICATION OF RULE SECTIONS CONTAINING EMISSION LIMITS, WORK PRACTICE STANDARDS, AND/OR RECORD KEEPING/REPORTING REQUIREMENTS

Not applicable.

17. COMPLIANCE/ENFORCEMENT STRATEGIES

See Enclosure 3.

18. ECONOMIC TECHNICAL JUSTIFICATION FOR DEVIATION FROM U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) POLICIES

No known deviation from EPA policy.

ENCLOSURE 3

*Final Arizona State Implementation Plan Revision, San Manuel Sulfur Dioxide
Nonattainment Area, March 2007*



Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

Final

Arizona State Implementation Plan Revision

***San Manuel
Sulfur Dioxide Nonattainment Area***

Air Quality Division

March 2007

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1.0 EXECUTIVE SUMMARY

This State Implementation Plan (SIP) revision contains an attainment demonstration and formal request to the United States Environmental Protection Agency (EPA) to redesignate the San Manuel Sulfur Dioxide (SO₂) Nonattainment Area to attainment for the health-based 24-hour average and annual average SO₂ National Ambient Air Quality Standards (NAAQS). This document summarizes the progress of the area in attaining the SO₂ standards, demonstrates that all Clean Air Act (CAA) requirements for attainment have been satisfied, and includes a maintenance plan to assure continued attainment after redesignation. The San Manuel SO₂ Nonattainment Area is located and defined by Township and Range as follows: T8S, R16-18E; T9S, R15-18E; T10S, R15-17E; and T11S, R16E.

The air quality record included in Chapter 3 shows that air quality monitors located in the San Manuel Nonattainment Area have recorded no violations of the primary or secondary SO₂ NAAQS since 1985. This meets the EPA requirement for demonstrating a minimum of eight consecutive quarters of ambient air quality measurements that are below the SO₂ air quality standards.

This document also demonstrates that the emission reduction control measures responsible for the air quality improvement are both permanent and enforceable. The emissions inventory, presented in Chapter 4, lists the sources in the nonattainment area and their SO₂ emissions. Based on state and county point source and EPA National Emissions Inventory mobile and area source emissions inventories, the primary source of SO₂ emissions in the nonattainment area was the former copper smelter located near San Manuel, Arizona. Chapter 5 describes the primary control measures implemented to achieve attainment. The measures include implementation of reasonably available control measures (RACM) to reduce emissions sufficient to attain the SO₂ NAAQS. Details of the modeling demonstration are contained in Chapter 6. Chapter 7 describes measures designed to ensure continued maintenance of the NAAQS for at least ten years after redesignation of the area to attainment.

The clean air quality record, enforceable control measures, and projections of future emissions presented in this document all demonstrate that the area has attained and will continue to maintain the SO₂ air quality standards. With this submittal, the Arizona Department of Environmental Quality (ADEQ) requests that EPA approve this attainment demonstration and maintenance plan and redesignate the eleven townships that comprise the San Manuel SO₂ Nonattainment Area to attainment for the 24-hour and annual NAAQS.

2.0 INTRODUCTION

Chapter 2 presents general regulatory requirements for sulfur dioxide nonattainment areas as well as a description and regulatory history of the San Manuel Nonattainment Area.

2.1 Sulfur Dioxide Air Quality Standards

The federal air quality standards for SO₂ were established to identify maximum ambient concentrations above which adverse effects on human health and welfare may occur. Accordingly, the SO₂ standards are divided into two types: primary and secondary. The primary standards are based on the protection of public health, and the secondary standard is based on protection of the environment, including protection against damage to animals, vegetation, buildings, and decreased visibility. The original national primary and secondary NAAQS for SO₂ were codified in Volume 42 of the Code of Federal Regulations, Part 410 (42 CFR Part 410) on April 30, 1971 (36 FR 81875), and recodified to 40 CFR 50.4 and 50.5 on November 25, 1971 (36 FR 22384). On May 22, 1996, EPA promulgated the current primary and secondary NAAQS for SO₂ (61 FR 25566) as described in Table 2.1.¹ Arizona has adopted these standards in Arizona Administrative Code R18-2-202.

Standard ²	Annual	24-Hour	3-Hour
Primary	0.030 ppm (80 µg/m ³)	0.14 ppm (365 µg/m ³)	
Secondary			0.5 ppm (1300 µg/m ³)

2.2 San Manuel Nonattainment Area Description

Areas that do not meet the NAAQS may be designated nonattainment for the respective standard. The San Manuel SO₂ Nonattainment Area initially comprised all of Pima and Pinal Counties (43 FR 8968; March 3, 1978) but at the request of the state of Arizona, the boundaries were subsequently reduced to eleven townships around the primary copper smelter located near San Manuel (44 FR 21261; April 10, 1979). In addition, four adjacent townships were designated as unclassified.³

All but one of the townships that define the nonattainment area are located in southeastern Pinal County, with the remaining southernmost township located in neighboring Pima County. The current boundaries of the nonattainment and unclassified areas are codified at 40 CFR 81.303 and are defined by the complete townships listed in Table 2.2. The San Manuel Nonattainment Area is illustrated in Figure 2.1.

¹ Several technical changes were made at this time including stating the standards in parts per million (ppm) to make the SO₂ NAAQS consistent with those for other pollutants. The former standards, stated in micrograms per cubic meter (µg/m³) are in parentheses. For consistency with historic data and analyses this document uses µg/m³.

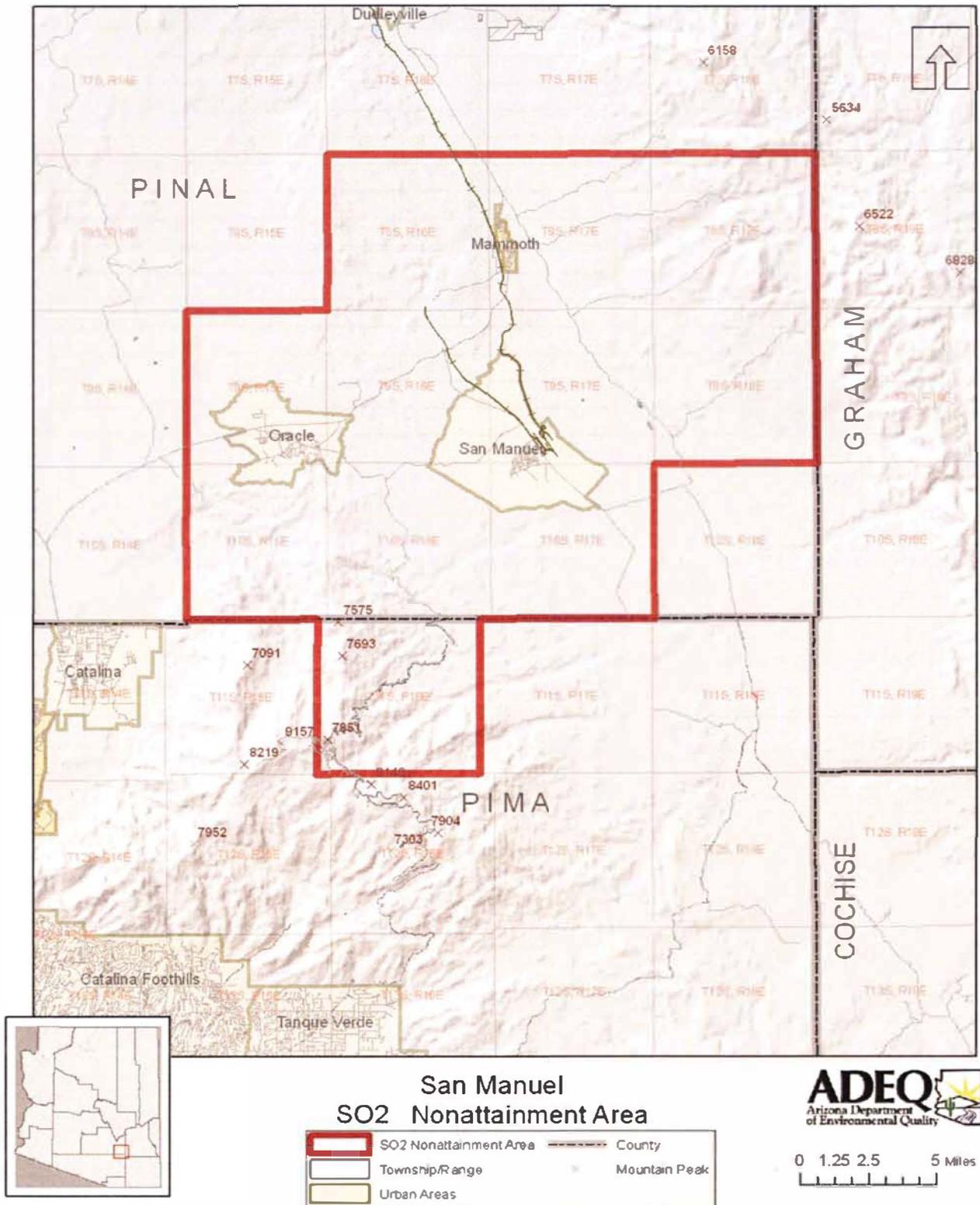
² Violations of the primary and secondary standards are determined as follows: The annual arithmetic mean of measured hourly ambient SO₂ concentrations must not exceed the level of the annual standard in a calendar year. The 24-hour and 3-hour averages of measured concentrations must not exceed the level of the respective standard more than once per calendar year (two exceedances of the standard per year is a violation of that standard).

³ The San Manuel area was subsequently classified by operation of law as nonattainment for the primary SO₂ standards, effective on November 15, 1990, following the enactment of the 1990 Clean Air Act Amendments.

Table 2.2: San Manuel Sulfur Dioxide Area Description

Designated Area	Does Not Meet Primary Standards	Cannot Be Classified
T8S, R16E	X	
T8S, R17E	X	
T8S, R18E	X	
T9S, R15E	X	
T9S, R16E	X	
T9S, R17E	X	
T9S, R18E	X	
T10S, R15E	X	
T10S, R16E	X	
T10S, R17E	X	
T11S, R16E	X	
T10S, R18E		X
T11S, R17E		X
T12S, R16E		X
T12S, R17E		X

Figure 2.1: San Manuel Sulfur Dioxide Nonattainment Area



March 2007 - Author N. Carroll

2.3 Physical, Demographic, and Economic Description of the San Manuel Area

Sections 2.3.1 through 2.3.3 describe the climate and physiography, demographics, and economy of the San Manuel area.

2.3.1 Climate and Physiography

The San Manuel area is located in south central Arizona in Pinal County, approximately 140 miles southeast of Phoenix and 45 miles northeast of Tucson.

Both desert terrain and mountain ranges are found within Pinal County's landscape. The western portion of the County is dominated by low desert areas. The eastern portion, where the San Manuel area is located, contains mountain ranges and broad river valleys. Elevations range from near 2,000 to more than 6,000 feet above sea level in the San Manuel SO₂ Nonattainment Area with the town of San Manuel situated at an elevation near 3,500 feet. Other towns in the nonattainment area are Oracle and Mammoth. The town of Oracle is located at an elevation of 4,514 ft., while Mammoth has an elevation of 2,350 ft. The nonattainment area is bordered on the southwest by the Santa Catalina Mountains. This mountain range with elevations over 9,000 feet separates the nonattainment area from the city of Tucson and other areas of Pima County.

The varied environment experiences both warm desert and cool montaine climates. In the town of San Manuel, the hottest month of the year is July, when the average daily maximum temperature is 97° Fahrenheit (F). January is the coolest month with an average daily minimum temperature of 35° F.

Precipitation generally occurs in two seasons. The wettest month in San Manuel is July when monsoonal thunderstorms produce an average monthly total of 2.67 inches of rain. Pacific winter storms moving across the area in December bring an average of 1.51 inches monthly precipitation in the form of rain or snow. The driest month is June, with an average of 0.25 inches of rain. Average yearly precipitation totals 14.59 inches.

2.3.2 Population

The San Manuel Census Designated Place (CDP) has a current population of less than 5,000.⁴ Mammoth, Oracle, and San Manuel have been copper mining and milling, smelting, and refining locations in the past. With the decline in mining activities and the shutdown of the BHP Copper Smelting and Refining Co. San Manuel operations in 1999, these areas have experienced declining populations or very slow growth compared to other cities in the county. By contrast, the population of all unincorporated areas in Pinal County doubled between 2000 and 2005.

Although the growth rate of the San Manuel CDP exceeded 25 percent during the 1970s, by 1990 it lost 30 percent more inhabitants than it gained during the 1970s. The 2000 Census showed that San Manuel CDP grew at a rate of 9 percent during the 1990s. In comparison, Mammoth continued to lose population during each of the three consecutive decades. Oracle CDP gained more than 22 percent and 17 percent during the 1980s and 1990s, respectively, but its starting population was less than 3,000.

During the 1970s when rural counties outpaced the growth of urban counties in the U.S., Pinal County grew by more than 32 percent. The County's growth was 28 percent during the 1980s, but it

⁴ Census Designated Places (CDPs) are delineated for decennial censuses. CDPs are places that are not legally incorporated and represent the statistical counterparts of incorporated places.

sharply increased to 54 percent during the 1990s. Between the 2000 Census and mid-year 2005, Pinal County's growth rate was about 37 percent, which was more than double the state's growth rate. The state grew at 40 percent during the 1990s. The majority of County population growth occurred outside the nonattainment area, including its largest population centers, Apache Junction, Casa Grande, and Florence (the County Seat).

Decennial census data for San Manuel CDP, Mammoth, Oracle CDP, and Pinal County are shown in Table 2.3.

Year	April 1, 1970	April 1, 1980	April 1, 1990	April 1, 2000
San Manuel CDP	4,332	5,443	4,009	4,375 ⁵
San Manuel Decennial Change		25.6%	-26.3%	9.1%
Mammoth	1,953	1,906	1,845	1,762
Mammoth Decennial Change		-2.4%	-3.2%	-4.5%
Oracle CDP ⁶		2,484	3,043	3,563
Oracle Decennial Change			22.5%	17.1%
Pinal County	68,579	90,918	116,397	179,727
Pinal County Decennial Change		32.6%	28.0%	54.4%

Source: U.S. Bureau of the Census, decennial census counts.

In 2000, 20.4 percent of the San Manuel CDP housing units were vacant.⁷ Although significant growth has occurred in certain areas of the county and recent population projections show that Pinal County is anticipated to double in population by 2010, some believe that the population estimates and projections under-predict future growth. More than 600,000 dwelling units are planned for the county, including 80 new subdivisions near Casa Grande in unincorporated areas.⁸ However, population growth in the tri-city area of Oracle, San Manuel, and Mammoth is not expected to be very robust. The Oracle CDP may experience moderate population growth.

Table 2.4 portrays the projected growth of San Manuel CDP, Mammoth, Oracle CDP, and Pinal County from 2000 to 2017, based on past projected growth rates. According to the 1997 population projections by Arizona Department of Economic Security, Oracle CDP, Mammoth, and San Manuel CDP are projected to grow about 44 percent, 6 percent, and 7 percent, respectively, between 2000 and 2015. Past projected growth rates for these areas were used because no current projections are available for these sub-county areas. Based on the growth rates from the 1997 projections, the sub-county areas are projected to have growth rates between 2000 and 2017 as follows: San Manuel CDP 7.9 percent; Mammoth 6.7 percent, and Oracle CDP 49.9 percent. Population numbers will remain small even after this growth.

⁵ The 2000 census shows a population of 4,375 with 1,832 housing units of which 1,458 are occupied (20.4 percent vacant). The number of occupied housing units equals the number of households residing in San Manuel with 3.0 persons per household. San Manuel has no group quarters population.

⁶ No data are available for 1970.

⁷ 1,458 occupied units out of 1,832 total housing units with 3.0 persons per household.

⁸ Population Technical Advisory Committee, Methodology Subcommittee meeting March 22, 2006.

Year	2000 (Census)	2005 (Estimates)	2010	2015	2017
San Manuel CDP	4,375	n/a	4,580	4,680	4,720
Mammoth	1,762	1,740	1,830	1,870	1,880
Oracle CDP	3,563	n/a	4,610	5,130	5,340
Pinal County	179,727	246,660	364,587	486,363	535,687

Source: U.S. Bureau of the Census, 2000 Census enumeration, Arizona Department of Economic Security (DES) population estimates for 2005, and DES population projections, March 31, 2006. The 2010, 2015, and 2017 sub-county population projections were calculated by first applying the projected growth rates between the 2000 Census counts and the 2015 population projection using the DES 1997 population projections; second, by uniformly interpolating the growth for 2010 and 2017 from the 2015 calculated values. Official DES population projections for sub-county areas are not available at this time.

* n/a = population estimates not available.

2.3.3 Economy

Pinal County was created in 1875 from portions of Maricopa and Pima Counties by the Eighth Territorial Legislature. The county covers 5,371 square miles. The State of Arizona is the county's largest landholder with 35.3 percent of the total area. Individual and corporate ownership accounts for 25.7 percent of the land area. Indian reservations cover 20.3 percent; the U.S. Forest Service and Bureau of Land Management hold 17.5 percent; and other public lands comprise the remaining 1.2 percent. Pinal County is a great source of mineral wealth. Silver originally attracted settlers to the area, but as the silver resources were depleted, copper was mined. In 1944, Magma Copper Company purchased existing mining claims in the eastern portion of the county and launched a development and exploration program. Smelting operations at San Manuel began in 1956. In 1996, Magma was purchased by BHP Copper, which in 2001 became BHP Billiton (BHP). A major local employer in San Manuel has been Magma/BHP which operated underground and open pit copper mines and associated activities. BHP smelting operations were suspended in June 1999. BHP smelting, mining, and milling activities permanently ended by 2006. According to the Arizona Department of Commerce, smaller mines and quarries, as well as cattle ranches, have also provided employment opportunities in the San Manuel area.

Table 2.5 shows the civilian labor force and unemployment rates for San Manuel CDP, Mammoth, and Oracle CDP. Civilian labor force data show moderate increases averaging about 13 percent between 2000 and 2004 for these three areas.

Year	1990	2000	2004
San Manuel CDP	1,704	2,572	2,921
Percent Unemployment	4.5	2.8	3.8
Mammoth	701	1,044	1,196
Percent Unemployment	7.7	4.8	6.6
Oracle CDP	1,164	1,877	2,117
Percent Unemployment	3.6	1.2	1.6

Source: Arizona Department of Commerce, Community Profiles, 2005.

Table 2.6 contains employment data for Pinal County. Data include total civilian labor force, seasonally adjusted unemployment rate, total employment, total nonfarm employment, and employment by various economic sectors.

The civilian labor force grew by almost 17 percent between 2001 and 2005, and the County's population grew more than 32 percent during this same time period. During this time period, all of the economic sectors showed growth except for Mining/Construction and Information. Employment in the construction industries will increase the Mining/Construction category the near future. The largest employment gains occurred in Educational and Health Services (40.0%); Leisure and Hospitality (32.0%); Trade, Transportation and Utilities (22.4%); Financial Activities (18.2%); and Manufacturing (15.8%).

Year	2001	2002	2003	2004	2005
Civilian Labor Force	71,700	74,725	77,550	80,525	83,550
Unemployment Rate	5.3%	7.2%	6.8%	5.7%	5.4%
Total Employment	67,850	69,325	72,200	75,900	79,025
Total Non-Farm	38,175	39,225	40,425	42,250	44,425
Mining/Construction	2,900	2,650	2,400	2,675	2,900
Manufacturing	2,850	2,525	2,600	2,925	3,300
TTU*	6,150	6,500	7,150	7,425	7,525
Information	300	300	300	300	300
Financial Activities	825	850	850	900	975
Professional/Business	3,200	3,200	2,975	2,975	3,475
Education/Health	2,875	3,450	3,825	4,000	4,025
Leisure/Hospitality	2,975	2,950	3,175	3,550	3,925
Other Services	1,275	1,225	1,250	1,275	1,400
Government	14,850	15,575	15,925	16,200	16,625

Source: Arizona Department of Economic Security, Research Administration, prepared in cooperation with the U.S. Department of Labor, Bureau of Labor statistics. Data are adjusted to the Current Population Survey to reflect place of residence. Employment categories are based on the North American Industry Classification system, adopted in 1997. Unemployment rates are seasonally adjusted.

* TTU = trade, transportation, and utilities.

2.4 San Manuel Regulatory Background

The relationship between major SO₂ point sources and ambient air quality is relatively well-defined. Emissions inventories demonstrate that, while it was operating, the San Manuel smelter comprised more than 99.5 percent of total SO₂ emissions in the nonattainment area (see Chapter 4). As required by the Clean Air Act (CAA), Arizona submitted a State Implementation Plan (SIP) for all major sources in the state in 1972. The portion of the SIP pertaining to attainment and maintenance of the NAAQS for SO₂ did not sufficiently define emissions limitations or require permanent control of emissions for existing copper smelters and was, therefore, disapproved on July 27, 1972 (37 FR 15081). On the same date, EPA proposed revised regulations for control of sulfur oxides emitted by all existing smelters in Arizona (37 FR 15096). These regulations were never finalized due to issues regarding the adequacy of the ambient air quality data used to develop the limits. EPA subsequently established an SO₂ monitoring network around each smelter to gather air quality data from June 1973 through October 1974 upon which to base emissions limitations.

EPA and State efforts to develop comprehensive emissions limits continued through the 1970s. In 1977, the State developed rules for the use of Supplementary Control Systems (SCS), whereby, based on ambient monitoring data, Arizona smelters could intermittently curtail emissions to prevent a violation of the SO₂ NAAQS. EPA disapproved this approach and required installation and continuous operation of SO₂ emissions controls adequate to ensure attainment of the NAAQS. Consequently, on January 4, 1978, EPA published final emissions limits for Arizona smelters based on the 1973-1974 air quality data and the use of a proportional rollback model (43 FR 755). These regulations specified emissions rates and compliance test methods for each smelter. The 1977 Clean Air Act Amendments, however, modified smelter control requirements to allow the temporary use of SCS while ultimate SO₂ emission limits were developed and also allowed certain smelters additional time for emissions control technology to be installed. In response to this action, Arizona began development of new regulations and on September 20, 1979, submitted *Ultimate Sulfur Dioxide Emission Limits for Arizona Copper Smelters* as a proposed revision to the Arizona SIP.⁹

The new regulations were developed using a "Multi-Point Rollback (MPR)" technique. The use of MPR to establish emissions limits in rule addressed the problem of inherently variable SO₂ emissions from smelting operations by correlating the frequency of short-term emissions at various levels with the probability of violating the ambient air quality standards. This technique "rolled back" a yearly emissions profile to a level protective of the standards. The new regulations, which established stack emission limits for smelters, also set requirements for analyzing the impact of fugitive SO₂ emissions on ambient air quality. The rule required all existing primary copper smelters in Arizona to implement control technology sufficient to comply with the new stack limits as well as any fugitive emissions controls necessary to assure attainment and maintenance of the NAAQS.

The MPR rules were approved by EPA on January 14, 1983 (48 FR 1717). Following approval, a consent decree (CIV 87-106-TUC-WBD, dated September 28, 1987) between EPA, ADEQ, and Magma Copper Company (later BHP Copper Inc. or BHP), the operators of the San Manuel smelter, was agreed to and required installation and implementation of improved control technology. The facility submitted a proposed compliance schedule in response to the consent decree for achievement of the 1979 MPR stack emission limits as expeditiously as practicable. The facility operators subsequently submitted a permit application in 1987 for installation of \$157 million worth of emissions collection and control equipment. All on-site construction and installation of emission control equipment and process modification was completed in 1988, meeting the incremental compliance schedule requirements of the consent decree. Installation of new controls in 1988 included: replacement of existing reverberatory furnaces with a flash furnace, installation of ducting and hoods for capture and venting of fugitive gases to the stack, and a retrofit to a double absorption acid plant (replacing an outdated sulfuric acid plant installed in 1974) for treatment of all primary process gas.

For purposes of determining compliance with the emissions limits as codified in 1979, BHP was required to install and operate a measurement system for continuously monitoring SO₂ concentrations in each stack that could emit 5 percent or more of the allowable annual average SO₂ emissions from the smelter. In addition to primary process gas, captured fugitive emissions were continuously monitored and were included when determining compliance with the stack emissions limits. To quantify converter area uncaptured fugitive emissions, BHP installed and operated a continuous emissions monitoring system at the outlets of the converter building ventilators (the primary source of fugitive emissions).

⁹ Site specific emissions limits were promulgated at Arizona Administrative Rules and Regulations (AARR) R9-3-515, later revised and recodified as Arizona Administrative Code (AAC) R18-2-715, Standards of Performance for Existing Primary Copper Smelters; Site-specific Requirements, R18-2-715.01, Standards of Performance for Existing Primary Copper Smelters; Compliance and Monitoring, and R18-2-715.02, Standards of Performance for Existing Primary Copper Smelters; Fugitive Emissions.

The installed controls significantly reduced emissions and enabled the smelter to come into full compliance with the MPR regulations by 1989. The collection and control technology implemented at the smelter reduced emissions sufficiently to demonstrate attainment of the SO₂ NAAQS in the San Manuel area and allowed the facility to request additional emissions reductions in 2001.

BHP was issued a Significant Permit Revision on March 24, 1998, that allowed the company to perform equipment upgrades for certain smelter equipment. The upgrades were completed during a 45-day shutdown beginning in May 1999. Although the smelter was functionally ready to operate at the end of June 1999, BHP made a decision to temporarily cease operations due to low copper prices. In 2001, BHP anticipated restarting smelting operations. However, since the smelter was shut down for more than two years, BHP was required to perform an air quality impact analysis pursuant to Arizona Administrative Code (AAC) Title 18, Chapter 2, Article 4 (AAC R18-2-411) prior to resumption of operations and demonstrate that the startup would not cause or contribute to a violation of the National Ambient Air Quality Standards for SO₂. BHP conducted the analysis at much lower emissions limits than those contained in the MPR rules. The demonstration analyzed the impacts of stack and fugitive emissions on ambient concentrations. Based on the analysis, BHP applied for and received a permit revision in 2001 to incorporate these more stringent emission limits in permit. A 2002 rulemaking revised AAC R18-2-715 and R18-2-715.01 to include the new emissions limits. The revisions, approved by EPA on November 1, 2004 (69 FR 63321), further reduced the smelter's stack emissions limits and added new limits for converter roof fugitive emissions (see Appendix A). The limits provided a considerable margin of safety to ensure continued protection of the SO₂ NAAQS, thus allowing the state to request that the area be redesignated to attainment for SO₂. In June 2002, ADEQ submitted *Final San Manuel Sulfur Dioxide Nonattainment Area State Implementation and Maintenance Plan*. The June 2002 plan demonstrated maintenance of the NAAQS through the year 2015.

In January 2005, BHP Copper Inc. (BHP Billiton) notified ADEQ of their intent to permanently cease operations and remove all equipment and buildings at their San Manuel area smelting facility. In March 2005, ADEQ terminated the permit for this facility (see Appendix B). BHP does not currently hold an active permit, and no subsequent Title V permit application has been submitted to ADEQ for this closed facility. The smelting facility cannot reopen without submittal of a New Source Review and Title V (Part 70) permit application according to Arizona Revised Statutes (ARS) 49-426 and Arizona Administrative Code, Title 18, Chapter 2, Article 4, Permit Requirements for New Major Sources and Major Modifications to Existing Major Sources.

This SIP revision updates the attainment demonstration for the San Manuel SO₂ Nonattainment Area to reflect the permanent closure of the primary source of SO₂ emissions and demonstrates maintenance of the SO₂ NAAQS through 2017.

2.5 General SIP Approach - Regulatory Requirements and Guidance

In November 1990, the United States Congress enacted a series of amendments to the Clean Air Act (CAA). One of the primary effects of the revision was to expand and clarify the planning provisions for those areas not currently meeting the NAAQS. The CAA, as amended, identifies specific emission reduction goals, requires both a demonstration of reasonable further progress and attainment of the NAAQS, and incorporates more stringent sanctions for failure to attain or to meet interim milestones. Section 2.5.1 outlines the Clean Air Act requirements for SO₂ nonattainment areas. Section 2.5.2 lists applicable EPA guidance.

2.5.1 Clean Air Act Requirements

Clean Air Act, Title I, Part A, and Title I Part D, Subparts 1 and 5 are applicable to this SIP and maintenance plan. Sections 172(c), 175(A), 176(c)(1)(A), 191, and 192 set forth the requirements, as described in Table 2.7, for SO₂ nonattainment areas.

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
CAA Section 172(c), Nonattainment Plan Provisions		
172(c)(1) – General	<p>“...Such plan provisions shall provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology (RACT)) and shall provide for attainment of the national primary ambient air quality standards.” RACT is defined for SO₂ as that technology which is necessary to achieve the NAAQS (40 CFR 51.100(o)).</p> <p>Chapter 5 contains an explanation of applicable RACM/RACT for SO₂ point sources in the nonattainment area.</p>	Chapter 5
172(c)(2) – Reasonable Further Progress (RFP)	<p>Plan provisions shall demonstrate reasonable further progress or “annual incremental reductions in emissions ... for the purpose of ensuring attainment of the applicable national ambient air quality standards by the applicable date.”</p> <p>This submittal demonstrates that the San Manuel Nonattainment Area has attained and will maintain the SO₂ NAAQS with current control measures (see Chapters 6 and 7).</p>	Chapter 6, Chapter 7
172(c)(3) – Emissions Inventory	<p>The plan provisions “... shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant(s)...”</p> <p>ADEQ maintains a historical and current database of actual emissions from State permitted point and area sources. The Pinal County Air Quality Control District and Pima County Department of Environmental Quality maintain a similar database of actual emissions from County permitted sources. All non permitted source emissions data (ie: mobile sources) are obtained from EPA's national emissions inventory. Base-year and projected emissions are contained in Chapter 4.</p>	Chapter 4

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
172(c)(4) – Identification and Quantification	<p>Plan provisions “... shall expressly identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in accordance with Section 173(a)(1)(B), from the construction and operation of major new or modified stationary sources in each such area. The plan shall demonstrate to the satisfaction of the Administrator that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard ...”</p> <p>The permit requirements of CAA Section 173(a)(1)(B) are applicable to sources located in a targeted economic development zone as determined by the Administrator under consultation with the Secretary of Housing and Urban Development. No such zones are currently known to exist within the San Manuel Nonattainment Area.</p>	
172(c)(5) – Permits for New and Modified Major Stationary Sources	<p>The plan provisions “...shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area...”</p> <p>All new sources and modifications to existing sources in Arizona are subject to state requirements for preconstruction review and permitting pursuant to AAC, Title 18, Chapter 2, Articles 3 and 4. All new major sources and major modifications to existing major sources in Arizona are subject to the New Source Review (NSR) provisions of these rules or Prevention of Significant Deterioration (PSD) for maintenance areas. ADEQ currently has full approval of its Title V permit program. Sources under Pinal County jurisdiction are subject to the Pinal County Air Quality Control District, NSR program in Code of Regulations, Chapter 3.</p>	
172(c)(6) – Other Measures	<p>The plan “... shall include enforceable emissions limitations, and such other control measures, means or techniques ..., as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date...”</p> <p>Emissions limitations and control measures for SO₂ sources in the nonattainment area may be found in Chapter 5.</p>	Chapter 5

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
172(c)(7) – Compliance with Section 110(a)(2), Implementation Plans	<p>The plan provisions “... shall also meet the applicable provisions of Section 110(a)(2).”</p> <p>The requirements of Section 110(a)(2) are detailed elsewhere in this Table.</p>	
172(c)(8) – Equivalent Techniques	<p>The plan may include upon application by the state “... the use of equivalent modeling, emission inventory, and planning procedures ...” as allowed by the administrator.</p> <p>Multi-Point Rollback modeling was used with EPA’s concurrence to establish emissions limits for the BHP Copper smelter and updated as part of the current SIP process. Modeling for the fugitive emissions study at this facility was conducted with models from EPA’s “Guideline on Air Quality Models.”</p>	Chapter 6
172(c)(9) – Contingency Measures	<p>The plan “... shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard ... Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator.”</p> <p>As noted in 172(c)(2) above, this submittal includes monitoring data and source permit information that demonstrate that the applicable area has attained, and will maintain, the SO₂ NAAQS with control measures currently fully implemented. As such, the RFP requirement is met.</p>	
CAA Section 175(A), Maintenance Plans		
175(A)(a) – Plan Revisions	<p>“Each State which submits a request under Section 107(d) for redesignation of a nonattainment area ... shall also submit a revision of the applicable State implementation plan to provide for the maintenance of the national primary ambient air quality standard ... for at least 10 years after the redesignation...”</p> <p>As documented in Chapter 7, this submittal demonstrates attainment through 2017.</p>	Chapter 7

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
175(A)(b) – Subsequent Plan Revisions	<p>“8 years after redesignation of any area as an attainment area under Section 107(d), the State shall submit to the Administrator an additional revision of the applicable State implementation plan for maintaining the national primary ambient air quality standard for 10 years after the expiration of the 10-year period referred to in subsection (a).”</p> <p>ADEQ commits to submit an additional SIP revision eight years after redesignation.</p>	
175(A)(c) – Nonattainment Requirements Applicable Pending Plan Approval	<p>“Until such plan revision is approved and an area is redesignated as attainment for any area designated as a nonattainment area, the requirements of this part shall continue in force and effect with respect to such area.”</p> <p>ADEQ commits to keeping all applicable measures in place.</p>	
175(A)(d) – Contingency Provisions	<p>“Each plan revision submitted under this Section shall contain such contingency provisions as the Administrator deems necessary to assure that the State will promptly correct any violation of the standard which occurs after the redesignation of the area as an attainment area. Such provisions shall include a requirement that the State will implement all measures with respect to the control of the air pollutant concerned which were contained in the state implementation plan for the area before redesignation...”</p> <p>ADEQ commits to implementing all identified measures as necessary.</p>	Chapter 7
CAA Sections 191 and 192 – Plan Submissions Deadlines and Attainment Dates		
191 and 192 – Submission and Attainment Dates	<p>Sections 191 and 192 outline requirements for submittal of applicable implementation plans for sulfur dioxide nonattainment areas.</p> <p>Submittal of the MPR rules and the 2002 plan revision fulfilled all outstanding implementation plan requirements for the San Manuel SO₂ Nonattainment Area. This document updates the San Manuel plan to account for the permanent closure of the primary source of SO₂ in the area. With the submittal of this revision, ADEQ requests redesignation of the San Manuel Nonattainment Area to attainment.</p>	

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
CAA Section 110(a)(2) – Implementation Plans		
110(a)(2)(A) – Control Measures and Emission Limits	<p>Section 110(a)(2)(A) requires that states provide for enforceable emission limitations and other control measures, means, or techniques, as well as schedules for compliance necessary to meet applicable requirements of the CAA.</p> <p>Chapter 5 includes the measures utilized to bring this area into attainment and ensure future maintenance of the SO₂ NAAQS.</p>	Chapter 5
110(a)(2)(B) – Ambient Monitoring	<p>Section 110(a)(2)(B) requires that states provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, compile, and analyze data on ambient air quality.</p> <p>Chapter 3 includes ambient monitoring network information and data for the San Manuel area.</p>	Chapter 3
110(a)(2)(C) – Permitting and Compliance	<p>Section 110(a)(2)(C) requires states to have permitting, compliance, and source reporting authority.</p> <p>Arizona Revised Statutes (ARS) § 49-402 establishes ADEQ’s permitting and enforcement authority. Under ADEQ’s air permits program, stationary sources that emit regulated pollutants are required to obtain a permit before constructing, changing, replacing, or operating any equipment or process which may cause air pollution. This includes equipment designed to reduce air pollution. Permits are also required if an existing facility that causes air pollution transfers ownership, relocates, or otherwise changes operations.</p> <p>Under ADEQ’s air quality compliance program, scheduled and unscheduled inspections are conducted at the major sources annually. The ADEQ Air Compliance Section also implements compliance assistance initiatives to address non-compliance issues (i.e., seminars and workshops for the regulated community explaining the general permit requirements, individual inspections of all portable sources within a geographical area, mailings, etc.). In addition, compliance initiatives are developed to address upcoming or future requirements and include such actions as training for inspectors; development of checklists and other inspection tools for inspectors; public education workshops; targeted inspections; mailings, etc. ADEQ’s Air Compliance Section also has an internal performance measure to respond to all complaints as soon as possible, but within five working days.</p>	

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
	Both the Pima County Department of Environmental Quality and the Pinal County Air Quality Control District have approved or delegated permitting programs and enforcement authority for sources under their jurisdiction.	
110(a)(2)(D) – Other States	<p>Section 110 (a)(2)(D) requires adequate provisions to ensure that emissions activity within the state does not contribute significantly to nonattainment in or interfere with maintenance by any other state or interfere with any other state’s required applicable implementation plan to prevent significant deterioration of air quality or to protect visibility. Also required are provisions to ensure compliance with Sections 126 and 115 relating to interstate and international pollution abatement.</p> <p>Analysis of the San Manuel area demonstrates attainment and maintenance of the SO₂ air quality standards. Based on enforceable emission reductions, no significant contribution or interference with air quality in any other state is expected.</p>	
110(a)(2)(E) – Adequate Resources	<p>Section 110 (a)(2)(E) requires that states have adequate personnel, funding, and authority under state law to carry out the implementation plan.</p> <p>As authorized under ARS 49-104, 49-402, and 49-404 ADEQ retains adequate funding and employs adequate personnel to administer the air quality program. Appendix C includes the organization chart for ADEQ’s Air Quality Division.</p>	
110(a)(2)(F) – Emissions Monitoring and Reporting	<p>Section 110 (a)(2)(F) requires, as prescribed by the Administrator, provision for emissions monitoring and reporting, by owners or operators of stationary sources and periodic reports on the nature and amounts of emissions as well as correlation of such reports by the state agency with any emission limitations or standards.</p> <p>AAC R18-2-327 requires that any source subject to a permit must complete and submit to the Director their responses to an annual emissions inventory questionnaire. A current air pollutant emissions inventory of both permitted and non-permitted sources within the state is necessary to properly evaluate the air quality program effectiveness, as well as determine appropriate emission fees for major sources. This inventory encompasses those sources subject to state permitting requirements emitting 1 ton per year or more of any individual regulated air pollutant, or 2.5 tons per year or</p>	

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
	<p>more of any combination of regulated air pollutants.¹⁰ ADEQ is responsible for the preparation and submittal of an emissions inventory report to EPA for major sources and emission points prescribed in 40 CFR 51.322, and for sources that require a permit under ARS 49-426 for criteria pollutants. Pinal County Air Quality Control District, Code of Regulations, Chapter 3, contains emissions monitoring and reporting requirements for sources under its jurisdiction.</p>	
<p>110(a)(2)(G) – Emergency Powers</p>	<p>Section 110(a)(2)(G) requires that states provide for authority to establish emergency powers and authority and contingency measures to prevent imminent endangerment.</p> <p>ARS 49-465 authorizes state actions to alleviate or prevent an emergency health risk to the public. AAC R18-2-220 prescribes the procedures the ADEQ Director shall implement in order to prevent the occurrence of ambient air pollution concentrations which would cause significant harm to the public health. In addition, as authorized by ARS 49-426.07, ADEQ may seek injunctive relief upon receipt of evidence that a source or combination of sources is presenting an imminent and substantial endangerment to public health or the environment.</p>	
<p>110(a)(2)(H) – Plan Revisions</p>	<p>Section 110(a)(2)(H) requires revisions to plans to take account of revised primary or secondary ambient air quality standards or the availability of improved or more expeditious methods of attaining such standards. This Section also requires states to provide for plan revisions to ensure the adequacy of the plan to attain the air quality standards or to otherwise comply with any additional requirements established under the Clean Air Act.</p> <p>ADEQ will revise this plan as necessary to comply with the requirements of the Clean Air Act.</p>	
<p>110(a)(2)(I) – Part D Requirements</p>	<p>Section 110(a)(2)(I) requires nonattainment area plans to meet the applicable requirements of Part D (relating to nonattainment areas).</p> <p>Provisions for Part D requirements, specifically Section 172(C), Nonattainment Plan Provisions, are described elsewhere in this Table.</p>	

¹⁰ “Regulated air pollutant” is defined in AAC R18-2-101 as any of the following: (a) Any conventional air pollutant as defined in ARS § 49-401.01; Nitrogen oxides and volatile organic compounds; any air contaminant that is subject to a standard contained in Article 9 of this Chapter; Any hazardous air pollutant as defined in ARS § 49-401.01; Any Class I or II substance listed in Section 602 of the Act.

Table 2.7: Clean Air Act (CAA) Regulatory Requirements

CAA Citation	Action to Meet Requirement	Location in Document
110(a)(2)(J) – Consultation, Public Notification, PSD, Visibility Protection	<p>Section 110(a)(2)(J) requires that plans meet the requirements of Section 121 (relating to consultation), Section 127 (relating to public notification), and Part C (relating to prevention of significant deterioration of air quality and visibility protection).</p> <p>ADEQ maintains appropriate consultation procedures with local governments, CAA Section 174 planning agencies and metropolitan planning agencies, and federal land managers pursuant to AAC R18-2-410, AAC R18-2-Article 14, and AAC R18-2-Article 16.</p>	
110(a)(2)(K) – Air Quality Modeling	<p>Section 110(a)(2)(K) requires air quality modeling as may be prescribed for the purpose of predicting the effect of emissions on ambient air quality.</p> <p>Information on modeling and ambient air quality are contained in Chapters 3 and 6.</p>	Chapter 3, Chapter 6
110(a)(2)(L) – Permit Fees	<p>Section 110(a)(2)(L) requires the owner or operator of major stationary sources to pay fees to the permitting authority to cover reasonable permitting costs.</p> <p>ADEQ is responsible for assessing annual fees to recoup the costs of administering a permit pursuant to AAC R18-2-326. Pinal County is responsible for assessing annual fees under its permitting program.</p>	
110(a)(2)(M) – Local Consultation	<p>Section 110(a)(2)(M) requires the plan to provide for consultation and participation by local political subdivisions affected by the plan.</p> <p>ADEQ consulted the Pinal County Air Pollution Control District and Pima County Department of Environmental Quality during the development of this plan. Both county agencies provided data and information contained in the plan.</p>	

2.5.2 EPA Guidance

Applicable EPA Guidance includes *Procedures for Processing Requests to Redesignate Areas to Attainment*, John Calcagni, Director, Air Quality Management Division, U.S. Environmental Protection Agency, Memorandum, September 4, 1992, and *SO₂ Guideline Document*, U.S. Environmental Protection Agency, February 1994.

3.0 AIR QUALITY MONITORING

Ambient SO₂ monitoring began in the San Manuel area as early as 1969 by the State of Arizona.¹¹ Smelting facility operators began continuous ambient SO₂ air quality monitoring in 1973. Over a period of years, an extensive monitoring network was developed with sufficient spatial and temporal coverage to comprehensively evaluate the ambient impact of smelter emissions. More than eighteen stationary and mobile monitoring sites were established throughout the area with as many as ten monitors operating concurrently (See Table 3.1 and Figure 3.1).¹² This ambient SO₂ network, comprised of EPA, state, and facility monitors, was developed as the result of extensive efforts to identify maximum ambient impact areas using diffusion modeling, monitored atmospheric dispersion parameters, citizen observations, and ambient SO₂ concentrations.

Stanford Research Institute (SRI), a facility contractor, was engaged to study the effects of SO₂ emissions from the San Manuel smelter on the surrounding environment. Criteria for determining ambient SO₂ and meteorological monitoring locations under SRI's recommendation, *Environmental Studies at San Manuel*, 1972, included consideration of public health, areas of frequent high SO₂ concentrations and relatively high long-term average concentrations. A gaussian diffusion model and meteorological records from the Tucson National Weather Service office were employed in the study to predict SO₂ dispersion patterns in the San Manuel area. In addition, forty-seven sulfation plate monitoring sites were utilized to characterize ambient SO₂ over 500 square miles surrounding the area.

The studies contributed to the subsequent expansion of the San Manuel monitoring network including installation of seven of the initial stationary sites (Mammoth Courthouse, Minesite, Oracle Courthouse, Golf Course, Peppersauce, Trailer, and Redington) and implementation of a mobile analyzer. Installation of additional meteorological instrumentation at the network sites, measuring wind speed and direction, temperature, and humidity parameters helped to further define airflow and pollutant transport in the region. Utilization of mobile monitors allowed evaluation and verification of ambient SO₂ concentrations over a greater area. Numerous sites were monitored and subsequently relocated under the direction of state meteorologists when no significant impacts were observed. All monitoring for SO₂ was performed with guidance and dispersion analysis from the Arizona Department of Health Services, Bureau of Air Quality Control.

The monitoring network was also developed in accordance with Supplementary Control Systems (SCS). Prior to implementation of continuous control technology, SCS utilized analysis of atmospheric conditions and monitored ambient concentrations to vary the rate of smelter emissions to avoid any exceedance of the NAAQS. In 1977, the state adopted rules that codified requirements for concurrent operation of at least eight ambient monitors, including a mobile monitor placed at points representative of observed maximum concentrations. Relocation of a stationary monitor was allowed only when:

1. There were no ambient SO₂ violations recorded at the existing location;
2. No SCS curtailment actions were implemented due to data recorded at that monitor;
3. The foregoing conditions were due to implementation of improved emissions control techniques or other permanent modifications; and
4. A new site was shown to be more representative of the ambient air quality of the area.

¹¹ *Sulfur Dioxide Monitoring Network Study*, Arizona State Department of Health, Environmental Health Services, Division of Air Pollution Control, 1969.

¹² Protocols for SO₂ monitoring established by EPA are found in 40 CFR Part 50, Appendix A, *Reference Method for the Determination of Sulfur Dioxide in the Atmosphere*; Part 58, Subpart B, §58.14, *Special Purpose Monitors*, Subpart C, §58.20, *State and Local Air Monitoring Stations, Air Quality Surveillance: Plan Content*, and Subpart D, §58.30, *National Air Monitoring Stations (NAMS)*.

Further refinement of the monitoring network was required by the adoption of the MPR rules that established stack emissions limits for the smelter in 1979 based on permanent controls. Placement of additional monitors was accomplished with EPA consultation to further evaluate ambient impacts. Following implementation of continuous emissions control technology and compliance with emissions limits as defined in AAC R18-2-715(F) at the San Manuel smelter, the number of permanent monitors was gradually reduced to a network of four: LDS church, Townsite, Dorm Site, and Hospital. These were all high impact ambient monitor sites found to be representative of air quality for the area. The Dorm Site and Hospital monitors were primarily fugitive impact sites. The Townsite and the LDS Church site were primarily stack impact sites. The Townsite monitor was the “limiting site” for the original MPR analysis (see *Ultimate Sulfur Dioxide Limits for Arizona Copper Smelters*, Moyers and Peterson, September 14, 1979). These monitoring site decisions were made by ADEQ in accordance with EPA guidance.

Following the shut down of smelting operations in 1999 the facility operated Townsite, Dorm Site, and Hospital monitors were closed. ADEQ continues to operate a monitor at the LDS Church site. Historic ambient SO₂ monitoring site periods of operation are provided in Table 3.1. Figure 3.1 illustrates monitor locations and their proximity to the BHP smelter.

Table 3.1: Ambient Monitoring Network	
Monitor Site	Period of Operation
LDS Church¹³	1975-1999 and 2002-present
Townsite¹⁴	1969-1974 and 1979-2002
Hospital¹⁵	1987-2002
Dorm Site¹⁶	1978-2002
Golf Course	1974-1997
3-C Ranch	1981-1982 and 1987-1994
Elks	1987-1994
Oracle Courthouse	1975-1994
Minesite	1974-1994
Mammoth Courthouse	1974-1987
Redington	1976-1985
Mammoth Aravaipa Canyon	1980-1981
Industrial Hygiene	1981
Mercer Ranch	1979-1980
Oracle Holy Cross Canyon	1978-1979
Mobile¹⁷	1977-1978
Upper Shopping Center	1975-1978
East Peppersauce Wash	1974-1978
Trailer Park	1974-1975
EPA¹⁸	1973-1974

Source: Compiled from BHP Copper Inc. San Manuel and ADEQ archives.

¹³ The LDS Church monitor was removed in October 1999 due to the closure of the BHP smelter. This monitoring site was reestablished in March 2002.

¹⁴ Monitoring site closed at the end of 2002.

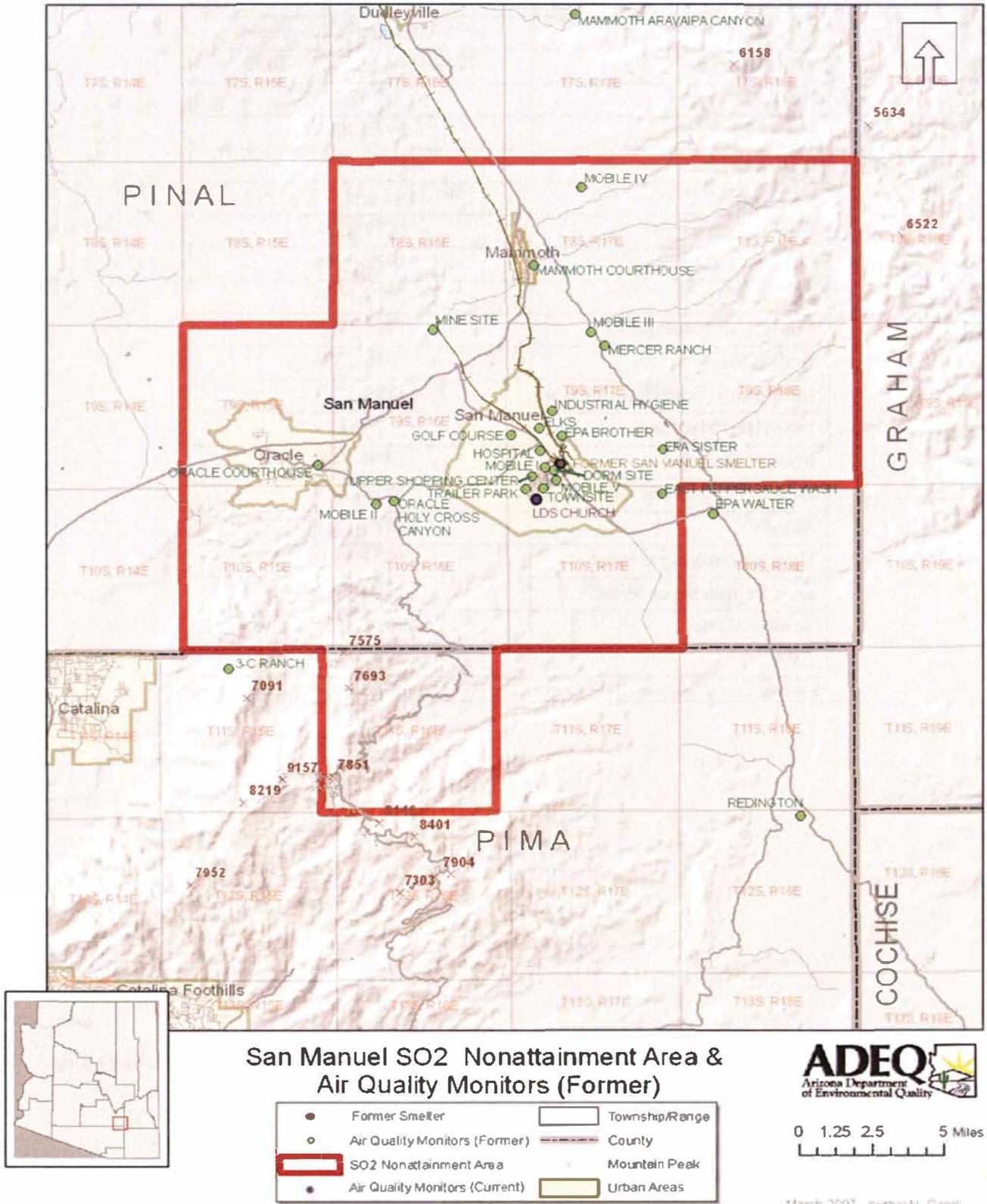
¹⁵ See footnote 14.

¹⁶ See footnote 14.

¹⁷ The 1977/1978 San Manuel Smelter Operations and Maintenance Manual notes eleven experimental mobile monitoring locations to date.

¹⁸ Monitors at three EPA established sites were operated during this period.

Figure: 3.1: San Manuel Area SO₂ Monitoring Locations



3.1 Monitoring Network and Quality Assurance Procedures

Under ADEQ's air quality assessment program, ambient monitoring networks for air quality are established to sample pollution in a variety of representative settings, to assess health and welfare impacts and to assist in determining air pollution sources. Monitoring sites are combined into networks operated by a number of government agencies and regulated companies. Each network is comprised of one or more monitoring sites, whose data are compared to the NAAQS, as well as statistically analyzed in a variety of ways.

The protocol for SO₂ monitoring was established by EPA in the following sections of the Code of Federal Regulations (CFR):

1. 40 CFR Part 50, Appendix A, Reference Method for the Determination of Sulfur Dioxide in the Atmosphere;
2. 40 CFR Part 53, Subpart B, Procedures for Testing Performance Characteristics of Automated Methods for SO₂, CO, O₃, and NO₂; and
3. 40 CFR Part 58, Subpart A, B, and C, Ambient Air Quality Surveillance.

The BHP and ADEQ monitors have been operated and maintained in accordance with federal regulations as described in 40 CFR Parts 58.13 and 58.22 as well as Appendices A and E of Part 58. Collected data have been summarized into the appropriate quarterly or annual averages. Current and past samplers were certified by Federal Reference or Equivalent Methods. Regular checks of the stability, reproducibility, precision, and accuracy of samplers and laboratory procedures were conducted by either the agency or company network operators.

3.2 Sampler Type and Siting

Three monitoring units were operated by BHP during the attainment demonstration period 1997 through 1999: Townsite, Dorm Site, and Hospital. These monitors were Thermo Electron pulsed fluorescent (TECO) Model 40 SO₂ analyzers. All of these SO₂ analyzers were interfaced to BHP's data acquisition system by telemetry. The TECO analyzers measured in the 0-2 ppm range. Redundant recording systems were operated for all of the BHP analyzers. The samplers were connected to strip chart recorders for backup and analyzed by planimeter as necessary for validation of recorded concentrations. ADEQ operates an SO₂ analyzer at the LDS Church site. This monitor is a TECO analyzer, measuring in the 0-2 ppm range.

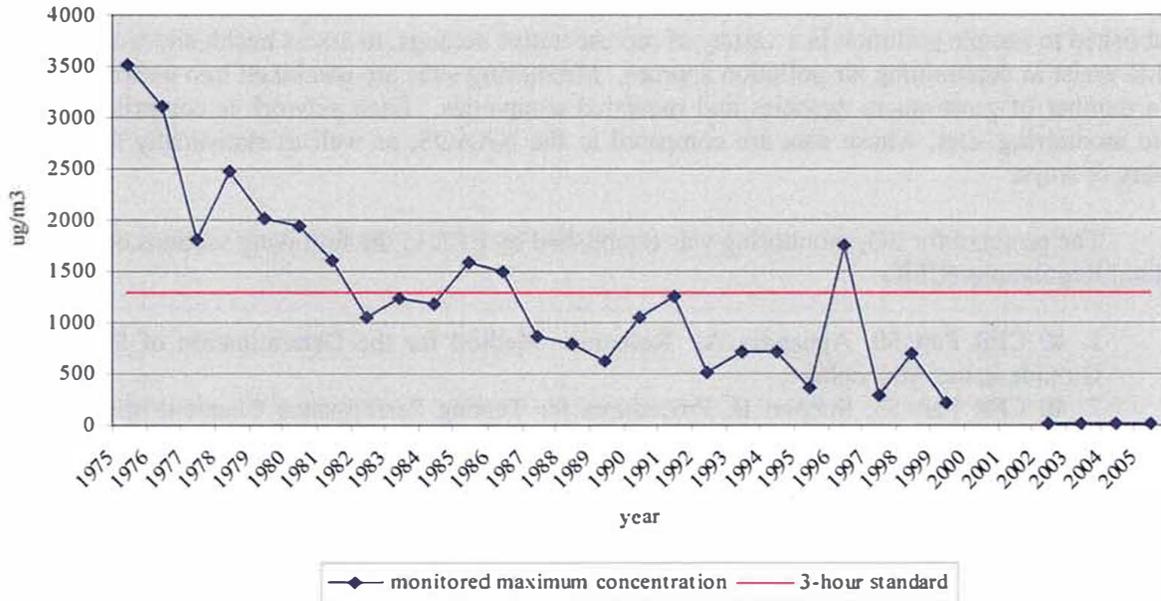
3.3 Air Quality Data

A review of historic ambient SO₂ monitoring data in the San Manuel Nonattainment Area verifies that no violations of the primary SO₂ NAAQS have been recorded since 1979 and no violations of the secondary SO₂ NAAQS have been recorded since 1985.¹⁹

Implementation of control measures and subsequent emissions reductions at the San Manuel copper smelter enabled the area to attain the SO₂ NAAQS (see Chapters 5 and 6). Measured maximum concentrations from the LDS Church monitoring site, as presented in Figures 3.2, 3.3, and 3.4, illustrate the improvement in air quality from 1975 through 2005.

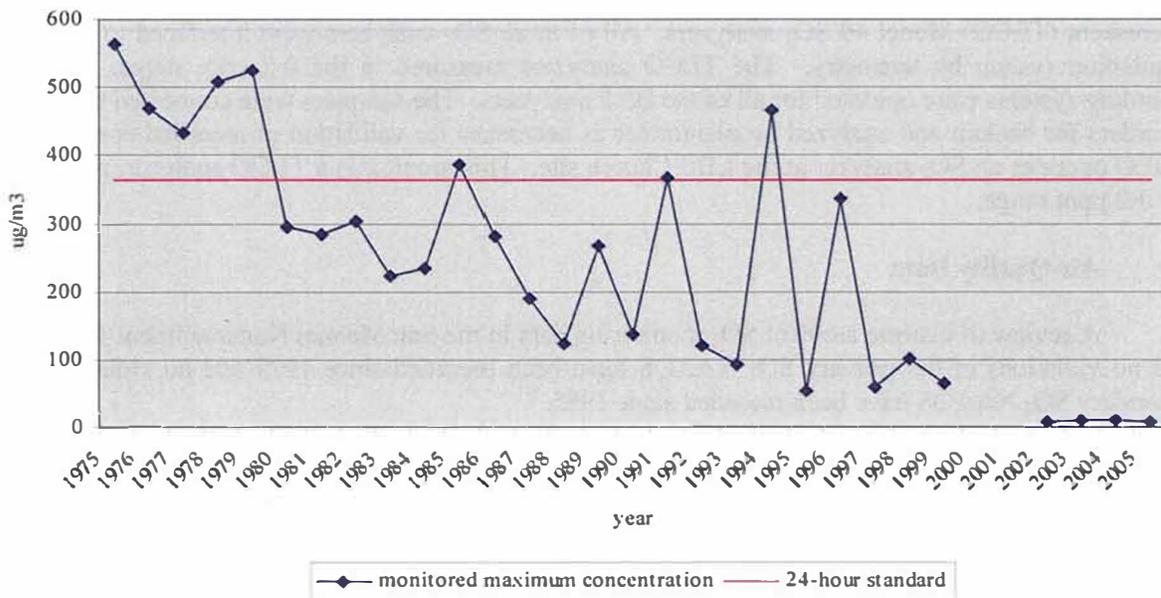
¹⁹ See Arizona Department of Health Services, Bureau of Air Quality Control and Arizona Department of Environmental Quality annual reports 1970 through 2005 and EPA Air Quality System annual summary reports.

Figure 3.2: San Manuel (LDS Church) Maximum 3-hour SO₂ Concentrations*



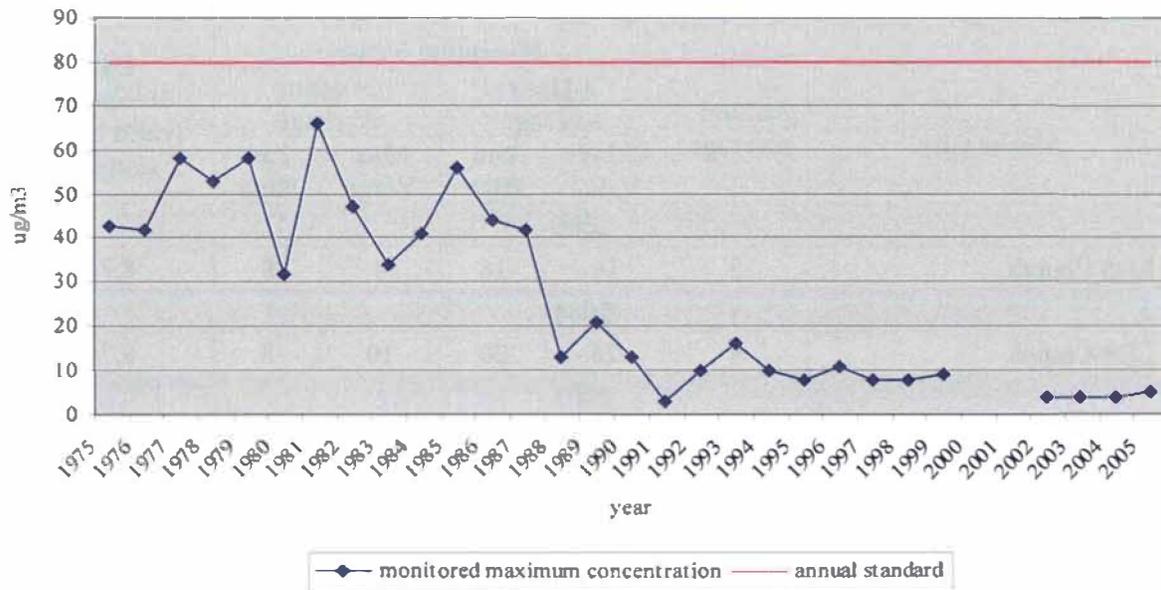
* The 1996 exceedance was determined due to a process/equipment malfunction at the San Manuel smelting facility. The LDS Church monitor was removed in October 1999 due to the closure of the BHP smelter. This monitoring site was reestablished in March 2002.

Figure 3.3: San Manuel (LDS Church) Maximum 24-hour SO₂ Concentrations*



* The 1994 exceedance was determined due to a process/equipment malfunction at the San Manuel smelting facility.

Figure 3.4: San Manuel (LDS Church) Annual Average SO₂ Concentrations



As required for redesignation, the nonattainment area has recorded more than eight current, consecutive quarters of quality assured, violation-free data. Monitoring data for 1997 through 1999, while the San Manuel smelter was still operating, indicate that maximum ambient concentrations were less than 55 percent of the NAAQS for the 3-hour standard; less than 59 percent of the NAAQS for the 24-hour standard; and less than 33 percent of the NAAQS for the annual standard.

Closure of the smelter in 1999 further reduced emissions and resultant ambient SO₂ concentrations. Monitoring data for 2002 through 2005 indicate that maximum ambient concentrations were two percent of the NAAQS for the 3-hour standard; less than three percent of the NAAQS for the 24-hour standard; and less than seven percent of the NAAQS for the annual standard. Monitoring network data for the period 1995 through 2005 are presented in Table 3.2.

Table 3.2: San Manuel Sulfur Dioxide Ambient Air Quality Monitoring Data (in $\mu\text{g}/\text{m}^3$)²⁰

(Primary NAAQS: Annual Average $80 \mu\text{g}/\text{m}^3$ [0.030 ppm], 24-hour Average $365 \mu\text{g}/\text{m}^3$ [0.14 ppm]
 Secondary NAAQS: 3-hour $1300 \mu\text{g}/\text{m}^3$ [0.5 ppm])

Site or City	Annual Average	Maximum Value				Data Recovery* (valid hourly samples)
		3-Hour Average		24-Hour Average		
		Max Value	2nd High	Max Value	2nd High	
2005						
LDS Church	5	16	16	8	8	8,716
2004						
LDS Church	4	26	26	10	8	8,742
2003						
LDS Church	4	15	15	10	7	8,711
2002						
LDS Church (opened 3/02)	4	24	24	8	8	6,827
1999						
LDS Church (closed 10/99)	9	220	189	66	47	6,121
Townsite	4	290	255	69	57	n/a
Dorm Site	4	311	195	54	52	n/a
Hospital	8	433	399	120	103	n/a
1998						
LDS Church	21	710	265	105	71	8,469
Townsite	8	570	243	105	81	8,656
Dorm Site	8	262	255	135	62	8,714
Hospital	11	485	443	214	154	8,642
1997						
LDS Church	12	252	252	63	63	8,589
Townsite	33	374	253	95	91	8,725
Dorm Site	11	391	381	75	58	8,751
Hospital	32	705	604	208	152	8,742

* n/a = not available. Valid data recovery is the percentage of valid samples collected of the total number of scheduled sampling hours.

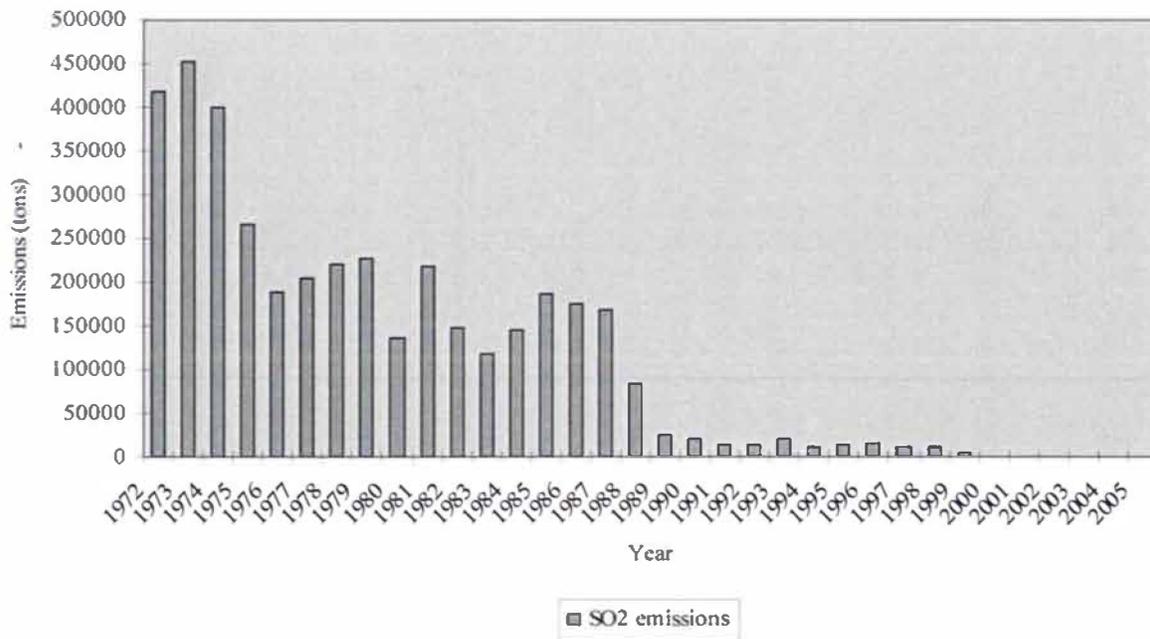
²⁰ Does not include Golf Course site for 1997 (site closed August 1997). Townsite, Dorm Site, and Hospital data are as contained in BHP's monthly reports. The facility reported zero concentrations for the period 2000-2001 at the Townsite, Dorm Site, and Hospital locations. LDS Church site data for 2002-2005 were obtained from ADEQ Annual Reports. LDS Church site data for 1997-1999 were calculated from data in EPA's Air Quality System Report (October 3, 2006) by multiplying sulfur dioxide values in parts per million by 2620 to convert to micrograms per cubic meter.

4.0 EMISSIONS INVENTORY AND PROJECTIONS

Emissions inventories for the San Manuel Nonattainment Area demonstrate that, although there were other sources of SO₂ emissions, the San Manuel copper smelter was the primary emissions source and comprised more than 99.5 percent of total emissions while it was operating. Data show that no other point, area, or mobile sources have contributed in the past or currently contribute to the same levels of SO₂ emissions in the San Manuel Nonattainment Area as those attributed to the smelter. Figure 4.1 illustrates sulfur dioxide emissions levels for the San Manuel smelter from 1972 through 2005. Implementation of new emissions control technologies at the smelter in the mid 1970s and again in the late 1980s are clearly reflected in the resulting emissions reductions for these periods. The smelter temporarily ceased operations in 1999 and permanently closed in 2005.

Sections 4.1 and 4.2 below describe emissions units and rates and projected emissions for all sources in the nonattainment area for 1997 through 2017.

Figure 4.1: San Manuel Smelter SO₂ Emissions



4.1 Emissions Inventory

Emissions inventories for point, area, and mobile sources are presented in Sections 4.1.1 through 4.1.3.

4.1.1 Point Sources

As described below three permitted point sources are currently located within the San Manuel Nonattainment Area. Three additional sources, the BHP Copper mining and milling operations and the BHP smelter were permanently closed during the period 2002 through 2005. Both the current source locations as well as the closed BHP Copper facility locations are illustrated in Figure 4.2. Historic and current inventories for these sources are presented in Table 4.1.

Figure 4.2: San Manuel Area Point Sources

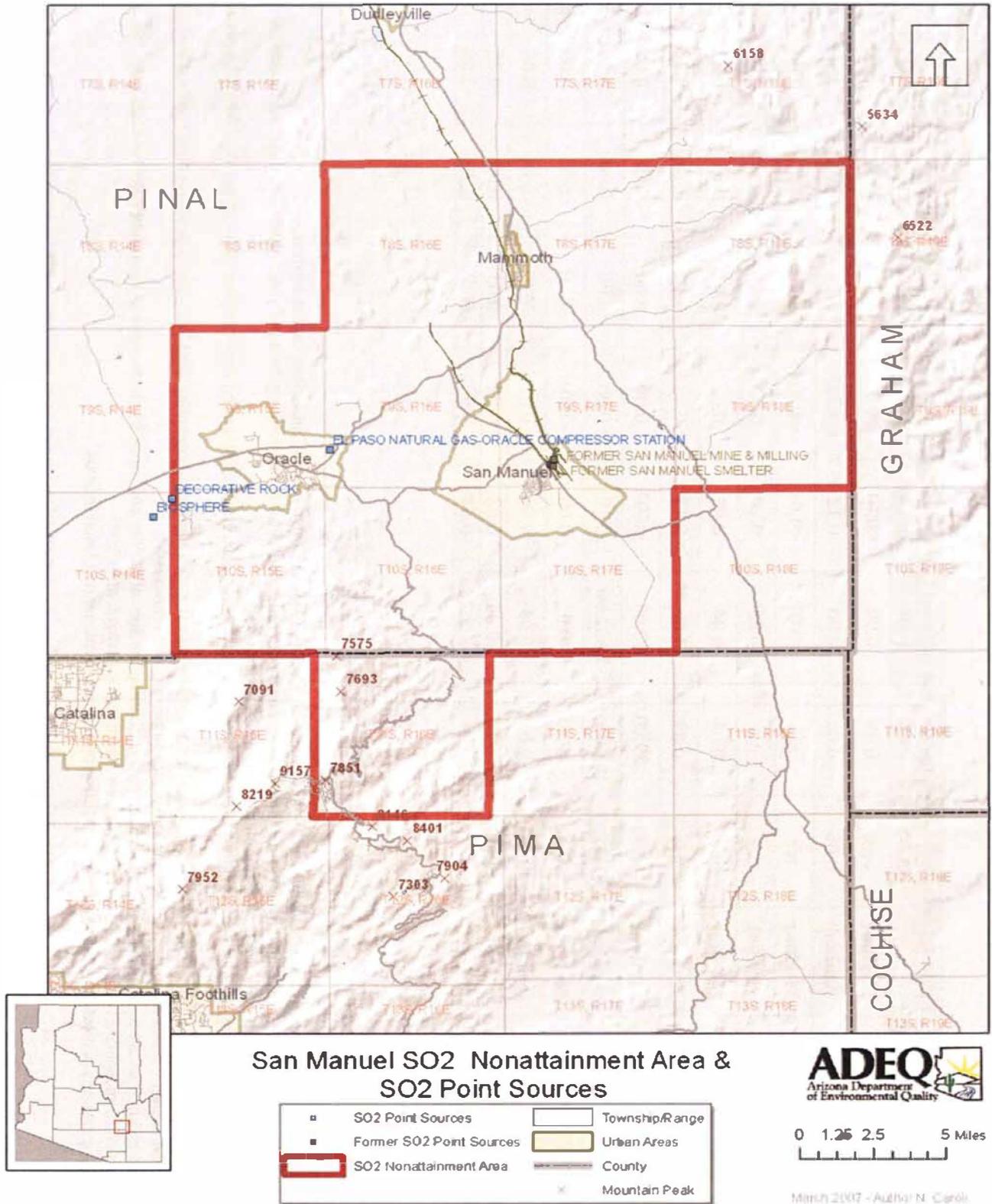


Table 4.1: SO₂ Emissions for the San Manuel Nonattainment Area (tons) – Point Sources^{21*}										
Source Name		1997	1998	1999	2000	2001	2002	2003	2004	2005
Oracle Compressor Station²²	24-Hour	0.00	0.00	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Annual	0.00	0.00	0.00	0.12	0.22	0.04	0.03	0.40	0.60
Decorative Rock²³	24-Hour	n/a	n/a	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.00
	Annual	n/a	n/a	0.25	0.29	0.23	0.11	0.01	0.00	0.00
Biosphere²⁴	24-Hour	n/a	0.03	0.04	0.02	0.02	0.03	0.03	0.25	0.01
	Annual	n/a	0.89	3.00	0.17	0.43	0.14	0.16	0.25	0.01
BHP Copper Smelting Operations²⁵	24-Hour	32.00	29.00	30.00	<0.01	0.00	0.00	0.00	0.00	0.00
	Annual	11,482.00	10,409.00	3,622.00	0.10	0.00	0.00	0.00	0.00	0.00
BHP Copper Mining and Milling Operations²⁶	24-Hour	<0.01	<0.01	<0.01	0.00	<0.01	<0.01	<0.01	0.00	0.00
	Annual	0.03	0.03	0.03	0.00	0.02	<0.01	<0.01	0.00	0.00
24-Hour Total		32.00	29.03	30.04	0.02	0.02	0.03	0.03	0.25	0.01
Annual Total		11,482.03	10,409.92	3,625.28	0.68	0.90	0.29	0.20	0.65	0.61

* n/a = Data not available.

²¹ Point source estimates are based on ADEQ and Pinal County Air Quality Control District annual emissions inventory data.

²² 24-hour inventories were calculated by dividing annual emissions by the estimated number of operating days per year. Operating days were calculated by dividing the reported equipment hours of operation per year by 24 (hours).

²³ 24-hour inventories were calculated by dividing annual emissions by the estimated number of operating days per year (8 hours per day, five days per week, 52 weeks per year).

²⁴ 24-hour inventories were calculated by dividing annual emissions by the estimated number of operating days per year. Operating days were estimated by dividing the reported hours of operation per year for select equipment by 24 (hours).

²⁵ 24-hour inventories are a ton per day average calculated by dividing the annual facility emissions by the number of operating days for each year. Smelting operations were suspended beginning May 1999. The closure became permanent in 2005.

²⁶ Mining operations permanently closed in 2002. Milling operations permanently closed in 2004.

4.1.1.1 Oracle Compressor Station

This source is a natural gas transport facility that utilizes a natural gas powered turbine to compress the natural gas for transmission through a pipeline. An emergency generator is also listed in the permitted fuel burning equipment. The facility did not operate from 1997 through 1999. When operating, the Oracle Compressor Station is a very low contributor to ambient SO₂ levels with potential to emit from all existing permitted equipment limited to less than one ton per year.

4.1.1.2 Decorative Rock

This sand and gravel operation provides products for construction and residential use. Sulfur dioxide emitting equipment at this facility includes a water pump, generator, and backup generator. Past operation of the listed fuel burning equipment was necessary because the facility did not have direct access to an electric power supply. Since being connected to the commercial electric grid, the fuel burning equipment has not been used but the permits have not been surrendered. This is reflected in zero reported emissions beginning in 2004. Potential to emit from all permitted equipment totals 3.1 tons per year.

4.1.1.3 Biosphere

Biosphere 2 is a structure originally built to serve as an artificial closed ecological system. The facility is currently utilized as a tourist attraction in the Oracle area. Most of the biosphere property and emitting equipment is located outside the San Manuel SO₂ Nonattainment Area, with a small portion of facility owned land extending into the western portion of the San Manuel planning area. Sulfur dioxide emitting equipment includes water heaters, generators, and an air compressor. This facility is currently being offered for sale and expected future use and operation of emitting equipment has not been determined. The permit currently limits SO₂ emissions from all equipment to less than 7 tons per year.

4.1.1.4 BHP Copper San Manuel Smelter

Smelting and refining of copper ore at BHP's primary copper smelter operations produced copper cathode and copper rod as well as byproducts of the smelting process (molybdenum concentrate, sulphuric acid, gold, and silver) for sale to customers. Based on 1998 emissions data, the majority of this facility's emissions were from stack and converter building fugitive emissions. Appendix A contains a detailed description of emissions units and rates.

Smelting operations were temporarily suspended beginning May 1999. In January 2005 BHP Copper Inc. (BHP Billiton) notified ADEQ of their intent to permanently cease operations and remove all equipment and buildings at their San Manuel smelting facility. In March 2005 ADEQ terminated the permit for this facility (see Appendix B). The smelter cannot reopen or commence operations without submitting a permit application according to ARS §49-426. Closure of the smelter reduced emissions by more than 10,000 tons per year.

4.1.1.5 BHP Copper Mining and Milling Operations²⁷

These former sources were a mining operation and a copper ore processing facility where copper sulfide ore was prepared for smelting and refining at the BHP smelter. The primary source of emissions from these minimal SO₂ sources were natural gas and diesel burning equipment that included concentrate

²⁷ BHP mining and milling originally operated under a single permit. The mining and milling operations began operating under separate permits in 2000.

dryers, generators, and boilers. Permits for the mine and mill required the use of low sulfur natural gas and propane in the generators and limited the potential to emit from all existing equipment to 0.38 tons per year of SO₂. Actual emissions were minimal, at 0.03 tons per year. In April 2002 BHP Copper notified ADEQ of their intent to permanently cease operations at the San Manuel mining facility and to remove all equipment or render it non-operational. ADEQ terminated the mining permit the same month (see Appendix B). In July 2004 BHP expressed intent to permanently cease operations at the San Manuel milling operations. ADEQ terminated the milling permit in September 2004 (see Appendix B). Neither facility can reopen or commence operations without submitting a permit application according to ARS §49-426.

4.1.2 Area and Mobile Sources

Emissions for the San Manuel Nonattainment Area were derived from EPA's National Emissions Inventory and National Emissions Trends area and mobile source inventories for Pinal County based on the assumption that area and mobile source emissions are proportionate to population levels (see Chapter 2 and Appendix D). According to U.S. Census data, the 2000 San Manuel SO₂ Nonattainment Area population was approximately 5.4 percent of the Pinal County population based on the aggregate population centers of San Manuel Census Designated Place (CDP), Mammoth, and Oracle CDP. The remainder of the nonattainment area has a very low population density with low traffic levels and minimal commercial or industrial development. Data show that there are no urban areas that might contain significant area or mobile sources located within the San Manuel Nonattainment Area (see Figure 2.1 and Table 2.3).

Because mid-decade population data for CDPs is not available, 5.4 percent (San Manuel Nonattainment Area population as a percent of Pinal County population) was used to estimate the nonattainment area portion of Pinal County area and mobile source emissions for 1997 through 2001. The projected nonattainment area population was estimated to be approximately 5.2 percent of the Pinal County population for 2002 (see Appendix D). This figure was used to estimate the nonattainment area portion of area and mobile source emissions from Pinal County totals for 2002. No actual area and mobile source emissions data is available for Pinal County for 2003 through 2005. Area and mobile sources combined were less than one percent of total nonattainment area emissions during the period 1997 through 1999 when the BHP smelter was operating. Area and mobile emissions for 1997 through 2002 are presented in Table 4.2.

Source Type		1997	1998	1999	2000	2001	2002
Area and Mobile	24-Hour ²⁸	0.08	0.08	0.10	0.10	0.09	0.07
	Annual	30	30	38	36	33	26

²⁸ 24-hour inventories are averages based on a 365 day distribution of emissions from these sources.

4.1.3 Emissions Totals for All Sources

Table 4.3 presents available point, area, and mobile source emissions for the San Manuel Nonattainment Area from 1997 through 2005.

Table 4.3: SO₂ Emissions for the San Manuel Nonattainment Area (tons) – All Sources*										
Source Type		1997	1998	1999	2000	2001	2002	2003	2004	2005
Area and Mobile	24-Hour	0.08	0.08	0.10	0.10	0.09	0.07	n/a	n/a	n/a
	Annual	30	30	38	36	33	26	n/a	n/a	n/a
Point	24-Hour	32.00	29.03	30.04	0.02	0.02	0.03	0.03	0.25	0.01
	Annual	11,482.03	10,409.92	3,625.28	0.68	0.90	0.29	0.20	0.65	0.61
24-Hour Total		32.08	29.11	30.14	0.12	0.11	0.10	>0.03	>0.25	>0.01
Annual Total		11,512.03	10,439.92	3,663.28	36.68	33.90	26.29	>0.20	>0.65	>0.61

* n/a = not available.

4.2 Emissions Projections

Sections 4.2.1 through 4.2.3 contain point, area, and mobile emissions projected through the year 2017.

4.2.1 Point Source Projections

Arizona does not anticipate any substantial increase in existing point source emissions between 2005 and 2017 for the nonattainment area. Should any growth occur due to construction of additional SO₂ point sources, the ADEQ, Pinal County Air Quality Control District, and Pima County Department of Environmental Quality permit programs limit all emissions as part of the construction of new point sources or the upgrading of existing sources. With the permanent closure of the San Manuel smelter, no major point sources exist in the nonattainment area.

Emissions projections for the existing minor sources are based on potential to emit and historic peak operating rates. Projections for the Oracle Compressor Station are based on a facility potential to emit of less than one ton per year. Emissions projections for Decorative Rock are conservatively based on peak operating levels for the period 1999 through 2005. Although the need for regular operation of emitting equipment at this facility no longer exists, the equipment continues in permit. Projections for Biosphere are based on peak operating levels for the period 1998 through 2005. As the facility is currently on the market to be sold, future use and operation of fuel burning equipment is not assured and recent emissions have demonstrated a downward trend.

Table 4.4 presents projected emissions for point sources within the San Manuel Nonattainment Area through 2017.

Source Name		2005*	2010	2015	2017
Oracle Compressor Station	24-Hour	<0.01	<0.01	<0.01	<0.01
	Annual	0.60	1.00	1.00	1.00
Decorative Rock	24-Hour	0.00	<0.01	<0.01	<0.01
	Annual	0.00	0.29	0.29	0.29
Biosphere	24-Hour	0.01	0.04	0.04	0.04
	Annual	0.01	3.00	3.00	3.00
24 Hour Total		0.01	0.04	0.04	0.04
Annual Total		0.61	4.29	4.29	4.29

* Actual emissions.

4.2.2 Area and Mobile Source Projections

ADEQ projects SO₂ emissions from area and mobile sources to grow proportionately with the population of the nonattainment area. Appendix D describes the source category emissions and derivation of mobile and area source emissions projections for the San Manuel area in greater detail. Table 4.5 presents projected area and mobile source emissions through 2017.

Source Type		2005	2010	2015	2017
Area and Mobile	24-Hour	0.07	0.08	0.08	0.08
	Annual	27	29	30	31

4.2.3 Emissions Projections for All Sources

Table 4.6 contains point, area, and mobile source emissions projections for the San Manuel Nonattainment Area through 2017. Sulfur dioxide emissions in 2017 are projected to be less than 0.5 percent of 1997 and 1998 total nonattainment area emissions, a period in which the San Manuel smelter was operating full time.

Source Type		2005	2010	2015	2017
Area and Mobile	24-Hour	0.07	0.08	0.08	0.08
	Annual	27	29	30	31
Point	24-Hour	0.01	0.04	0.04	0.04
	Annual	0.61	4.29	4.29	4.29
24-Hour Total		0.08	0.12	0.12	0.12
Annual Total		27.61	33.29	34.29	35.29

5.0 CONTROL MEASURES

Sections 5.1 and 5.2 describe sulfur dioxide emission control measures for sources within the San Manuel Nonattainment Area.

5.1 Point Sources

Nonattainment area plans are required to provide for the implementation of all reasonably available control measures (RACM) including reductions in emissions from existing sources in the area that may be obtained through reasonably available control technology (RACT). RACT is the emissions control level for sources located in SO₂ nonattainment areas. RACT is determined, in part, by the technological and economic feasibility of the control for the specific source and is generally defined for SO₂ as control technology which will achieve the NAAQS within statutory timeframes.²⁹

The BHP copper smelter was the primary source of SO₂ emissions in the San Manuel Nonattainment Area. Emissions inventories demonstrate that, while it was operating, the San Manuel smelter comprised more than 99.5 percent of total SO₂ emission in the nonattainment area (see Chapter 4). No other SO₂ emitting sources of this magnitude have historically operated or currently operate in the San Manuel area. Implementation of new emissions control technologies at the smelter in 1988 reduced emissions by more than 150,000 tons per year. These emissions reductions enabled the area to attain the NAAQS. The permanent closure of this facility in March 2005 provided additional emissions reductions of more than 10,000 tons per year (see Chapter 2 for a regulatory history of the San Manuel area). Closure of the smelter is considered to meet RACM requirements.

Three existing point sources are located in the San Manuel Nonattainment Area (see Chapter 4). The permits for these sources limit emissions to less than 7 tons per year for Biosphere, 3.1 tons per year for Decorative Rock, and less than 1 ton per year for the Oracle Compressor Station. Combined emissions from these sources are limited to less than 11 tons per year which is less than one percent of 1998 base year emissions.

5.2 Area and Mobile Sources

Several EPA programs are related to the sulfur content of fuels. These programs integrate engine and fuel controls for emissions reductions in highway vehicles and non-road equipment. Due to these national programs, future sulfur emissions are likely to be lower than those projected in Chapter 4 of this document. The programs are as follows:

- 1) Tier 2 Vehicle and Gasoline Sulfur Program for passenger vehicles,
- 2) Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements for highway trucks and buses, and
- 3) Clean Air Nonroad Diesel Rule for nonroad diesel equipment.

EPA's Tier 2 program implements more stringent emissions standards for the reduction of oxides of nitrogen emissions from all passenger cars and light trucks. To meet the new emission standards the program incorporates gasoline requirements that substantially reduce sulfur levels in gasoline. Sulfur in fuel impairs the effectiveness of vehicle emission control systems and by removing most of the sulfur from gasoline, new emission controls work longer and more efficiently. As a result, average national

²⁹ U.S. EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards, *SO₂ Guideline Document*, February 1994.

gasoline sulfur levels are expected to be 90 percent lower by 2006.

The Heavy-Duty Engine and Vehicle standards and Highway Diesel Fuel Sulfur Control program established new oxides of nitrogen and particulate matter emissions standards for heavy-duty highway engines and vehicles. The standards are based on high-efficiency catalytic exhaust emission control technologies. Because emissions control devices are damaged by sulfur, associated regulations reduce the sulfur in highway diesel fuel 97 percent by mid-2006.

The Clean Air Nonroad Diesel Rule established new oxides of nitrogen and particulate matter emission standards that are applicable to diesel engines used in construction, agricultural, industrial, and other equipment. To prevent damage to emissions control systems, the regulations also require a reduction in sulfur levels in nonroad diesel fuel from the current approximately 3,000 parts per million to 15 parts per million when fully implemented. Fuel sulfur reductions will be phased in over a number of years beginning in 2007.

6.0 MODELING DEMONSTRATION

Attainment is demonstrated through the clean ambient air quality record and the use of Multi-Point Rollback (MPR) modeling. The modeling analysis demonstrates that the improvement in air quality due to permanent and enforceable measures is sufficient to maintain the air quality standards in the San Manuel area through at least 2017. Details of the analysis are contained in Appendix A.

7.0 MAINTENANCE PLAN

Section 107 (d)(3) of the CAA requires that nonattainment areas have a fully-approved maintenance plan meeting the requirements of Section 175(A) before they can be redesignated to attainment. Section 175(A) requires submittal of a SIP revision that provides for maintenance of the NAAQS for at least 10 years after the redesignation to attainment. The required components of the maintenance plan include:

1. A demonstration that future emissions of SO₂ will not cause a violation of the NAAQS,
2. A commitment to continue to operate an appropriate air quality monitoring network to verify the attainment status of the area,
3. Assurance that the state has the legal authority necessary to implement and enforce all necessary measures used to attain and maintain the NAAQS,
4. An indication of how the state will track the progress of the maintenance plan, and
5. A contingency plan that contains measures to promptly correct any violation of the NAAQS that occurs after redesignation.

This submittal demonstrates that all of the above required elements have been met. ADEQ also commits to submit an additional SIP revision eight years after redesignation providing for maintenance of the NAAQS for an additional ten years.

7.1 Maintenance Demonstration

Copper smelting operations at the San Manuel facility were the single greatest source of SO₂ emissions in the nonattainment area, comprising more than 99.5 percent of total emissions. Conservative emissions limits were established for the smelter based on actual emissions for the most recent eight quarters of smelter operations, a period which concurrently recorded ambient concentrations meeting the SO₂ NAAQS (see Chapter 3). Subsequent closure of the smelter in 1999 reduced emissions to less than 0.5 percent of pre-closure levels. The greater than 99 percent reduction in emissions from 1998 to 2002 corresponds to a more than 92 percent reduction in 3-hour average and 24-hour average ambient SO₂ concentrations.³⁰

Following redesignation, any new sources or modifications to existing point sources of SO₂ are subject to the new source permitting procedures contained in AAC Title 18, Chapter 2, Article 4, specifically, ADEQ's Prevention of Significant Deterioration (PSD) Permitting Program contained in AAC R18-2-406 (or those of Pinal County's permitting program). These regulations were established to preserve the air quality in areas where ambient concentrations are below the NAAQS and require stationary sources to undergo preconstruction review, utilizing BACT, before the facility is constructed, modified, or reconstructed.

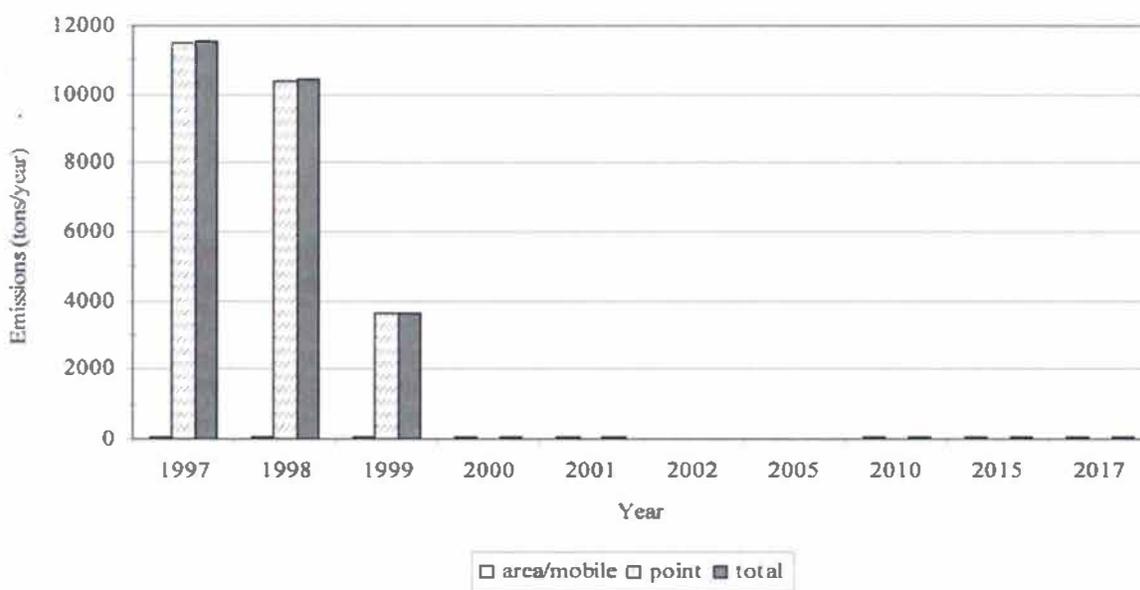
Chapter 4 contains detailed projection information for all sources. Projections of base year attainment inventories for all point, area, and mobile sources in the nonattainment area are included in Tables 4.4 and 4.5. These projections indicate that point source emissions in the area are estimated to remain well below attainment period levels through 2017. The estimate of mobile and area source emissions through the maintenance period is based on moderate population growth. These emissions are projected to remain near attainment period levels. Total area, mobile, and point source projections are illustrated in Figure 7.1. Although there is slight growth in total emissions from 2005 through 2017,

³⁰ As measured at the LDS Church monitor (see Chapter 3).

projected 2017 emissions are 0.3 percent of 1998 emissions levels.

Because the 1997 through 1999 attainment emissions inventories demonstrate a stringent level of protection of ambient air quality (see Appendix A), the permanent and enforceable emissions reductions due to the closure of the San Manuel smelter are greater than needed to attain and maintain the NAAQS. Therefore, once redesignated, the area is expected to continue to exhibit a substantial margin of safety that is protective of the SO₂ NAAQS.

Figure 7.1: San Manuel Nonattainment Area Sulfur Dioxide Emissions Projections



7.2 Ambient Monitoring

Continued operation of an appropriate air quality monitoring network is generally required to verify the attainment status of the area. To ensure adequate representation of ambient air quality, ADEQ calibrates, maintains, and operates SO₂ monitoring equipment at the LDS site. All ambient monitoring data is quality assured to meet the requirements of 40 CFR Part 58, Ambient Air Quality Surveillance. Data is also entered into EPA's Air Quality System database in accordance with federal guidelines. ADEQ commits to continue monitoring ambient SO₂ concentrations as required.

Because the primary source of SO₂ emissions in the nonattainment area permanently closed and recorded air quality data for 2002 through 2005 indicate that maximum ambient concentrations are less than seven percent of the primary and secondary SO₂ NAAQS, ADEQ intends to discontinue monitoring at this location. EPA regulations at 40 CFR 58.14(c)(3) allow a state to discontinue a monitor within a nonattainment or maintenance area "... provided the monitor has not measured violations of the applicable NAAQS in the previous five years, and the approved SIP provides for a specific, reproducible approach to representing the air quality of the affected county in the absence of actual monitoring data." This change in Arizona's SO₂ monitoring network will be addressed in the State's Annual Monitoring Plan, scheduled to be submitted to EPA by July 1, 2007. ADEQ will continue to demonstrate maintenance of the SO₂

NAAQS through updates to the emissions inventory. ADEQ commits to reestablish an appropriate network before any major source of SO₂ begins operations in the San Manuel planning area.

7.3 Verification of Continued Attainment

ADEQ anticipates no relaxation of any implemented control measures used to attain and maintain the ambient air quality standards. ADEQ commits to submit to EPA Region IX any changes to rules or emission limits applicable to SO₂ sources as a SIP revision. ADEQ also commits to maintain the necessary resources to actively enforce any violations of the provisions contained in this submittal.

Maintenance of the SO₂ NAAQS in the San Manuel area will be tracked through updates to the emissions inventory and permit applications received for SO₂ emitting sources. Any permitted sources are subject to the monitoring, reporting, and certification procedures contained in AAC R18-2-306 and AAC R18-2-309 respectively. ADEQ has authority pursuant to ARS §49-101 et seq. to monitor and ensure source compliance with all applicable rules and permit conditions for sources in its jurisdiction. The Pinal County Air Quality Control District and Pima County Department of Environmental Quality have authority for sources under their jurisdiction.

7.4 Contingency Plan

According to EPA guidance *Procedures for Processing Requests to Redesignate Areas to Attainment*, the contingency plan must require, at a minimum, implementation of all measures contained in the Part D nonattainment plan for the area prior to redesignation.

The only threat to the SO₂ NAAQS in this planning area would be from new sources. Because the primary source of SO₂ emissions in the San Manuel area permanently closed, measures to ensure continued attainment of the SO₂ NAAQS are PSD and permitting requirements. Any new source proposing to operate in the San Manuel area is subject to the provisions of AAC R18-2-403, "Permits for Sources Located in Nonattainment Areas," and those of AAC R18-2-406, "Permit Requirements for Sources Located in Attainment and Unclassified Areas." These programs address New Source Review (NSR) and PSD requirements applicable to SO₂ sources.³¹ Under the PSD program stationary sources are required to undergo preconstruction review before the facility is constructed, modified, or reconstructed and to apply Best Available Control Technology (BACT). If a new source is not a major source it is required to obtain a permit under minor source permitting rules at AAC R18-2-Article 3. The Pinal County Air Quality Control District and Pima County Department of Environmental Quality have authority for sources under their jurisdiction.

7.5 Conclusion

The San Manuel Nonattainment Area qualifies for redesignation to attainment for the SO₂ NAAQS. Attainment and maintenance of the NAAQS is demonstrated by the clean ambient air quality record, the closure of the only significant source of SO₂ emissions in the area, existing controls on the remaining stationary sources, and the requirement to impose PSD requirements on any new sources. Maintenance of the NAAQS is demonstrated through 2017. With this submittal, ADEQ requests that EPA approve this attainment demonstration and maintenance plan and redesignate the eleven townships that comprise the San Manuel SO₂ Nonattainment Area to attainment for the 24-hour and annual NAAQS.

³¹ AAC Sections R-18-2-403 and R-18-2-406 were adopted effective November 15, 1993. New Source Review standards are defined in 40 CFR § 51.307, Prevention of Significant Deterioration standards, in 40 CFR § 51.166.

Appendix A
Modeling Demonstration

San Manuel Sulfur Dioxide Nonattainment Area Modeling Demonstration

A.1 Introduction

In June 2002 ADEQ submitted to the U.S. Environmental Protection Agency (EPA) *Final San Manuel Sulfur Dioxide Nonattainment Area State Implementation and Maintenance Plan*. The Arizona State Implementation Plan (SIP) revision contained a Multi-Point Rollback (MPR) modeling analysis that established new emissions limits for the San Manuel smelter and demonstrated attainment and maintenance of the sulfur dioxide (SO₂) National Ambient Air Quality Standards (NAAQS) through 2015. The current analysis is adapted from the 2002 submittal and similarly demonstrates attainment and maintenance of the NAAQS, through 2017, based on emissions levels projected to occur if the San Manuel primary copper smelter was still operating even though the smelter has since been shut down. Because the analysis demonstrates attainment and maintenance for the worst case, emissions reductions resulting from the permanent closure of the smelting facility ensure continued maintenance of the NAAQS.

A.2 Background

Attainment is demonstrated in the San Manuel SO₂ Nonattainment Area through the clean ambient air quality record of more than ten years and use of Multi-Point Rollback modeling analysis. The improvement in air quality and attainment of the NAAQS has been due to continuous SO₂ emissions control technologies implemented by the San Manuel smelter to comply with the SO₂ emission limits regulations adopted for Arizona smelters in September 1979. MPR, which was approved by EPA in January 1983 as a modeling technique for Arizona smelters, was selected as the most precise and reliable method for then determining contemporary and future stack SO₂ emission limits.

MPR is a proportional rollback technique founded on the assumption that smelter emissions and ambient concentrations are proportional for a given set of dispersion conditions. Thus, a reduction in emissions results in a comparable reduction in ambient concentrations. Based on this assumption, the appropriate level of emission reductions to protect the NAAQS can be achieved if emissions are reduced by the ratio of the corresponding ambient concentrations to the air quality standard.

The use of MPR addresses the high variability of both smelter emissions patterns and meteorological conditions, in part, by rolling back an entire emissions curve rather than a single emissions measurement. A rollback factor is determined by fitting a concentration frequency distribution (from observed data) to an appropriate functional curve and calculating an expected once per year maximum (limiting) value. The rollback or reduction factor is defined as the ratio of the ambient standard to the limiting value. Rollback factors are calculated for all applicable NAAQS averaging periods. The largest calculated rollback factor is used to reduce each emission which occurred over the period of data accumulation (the emissions profile). The maximum rollback value is chosen to ensure that all primary and secondary standards are protected. In the case of the San Manuel smelter, the 3-hour standard was selected as the most conservative limiting standard which is also protective of the 24-hour and annual standards.¹

Because hourly emissions data were not available, the original MPR analysis used an estimate of hourly SO₂ emissions over the course of a year, based on knowledge of smelter operations and emissions variability, to construct an emissions curve. The entire curve was then "rolled-back" and the resultant

¹ See *Ultimate Sulfur Dioxide Emission Limits for Arizona Copper Smelters*, September 1979, for a detailed discussion of multi-point rollback methodology.

distribution used directly to construct the original MPR cumulative occurrence and 3-hour average emissions limits tables for stacks. Hourly ambient SO₂ concentration data from the Townsite monitor (a stack impact site) for the period October 1973, through September 1974, were used and average emissions were calculated by sulfur balance.

A.3 Derivation of New Emissions Limits - 2002

Based on EPA's approval as a model, ADEQ utilized MPR as a component of the 2002 attainment demonstration. The analysis of stack and fugitive emissions and resultant ambient impacts was based on emissions data and operating levels from the two most recent years of smelter operations (May 1997 through April 1999), and included continuous measurement data for stack and converter fugitive SO₂ emissions and measured ambient concentrations. These data were used to establish new stack and converter fugitive emission limits in rule below attainment period levels. The limits were codified in AAC R18-2-715 and AAC R18-2-715.01 and approved by EPA on November 1, 2004 (69 FR 63321).

The 2002 SO₂ limits for stack and fugitive emissions for the San Manuel smelter maintained the basic MPR principles, that smelter emissions and meteorological conditions, which influence the impact of those emissions on air quality, are two highly variable but independent processes, and that emissions limits can be set that assure a high probability of attaining the applicable ambient air quality standards. The 2002 limits were in the same format as the original MPR tables. However, the derivation of new values differed from the original 1979 analysis in two important aspects. First, the 2002 limits were based on actual hourly SO₂ measurements. Secondly, these emissions required no reduction for compliance with the SO₂ air quality standards because those standards were met by a large margin during the two year period from which the emissions data were obtained (see Section A.4 below). Accordingly, the 2002 MPR limits did not require the same degree of complex calculations and assumptions as the original effort.

A.3.1 Emissions Monitoring

For purposes of determining compliance with the MPR emissions limits as codified in 1979, BHP was required to install, calibrate, maintain, and operate a measurement system for continuously monitoring SO₂ concentrations and stack gas volumetric flow rates in each stack that could emit 5 percent or more of the allowable annual average SO₂ emissions from the smelter. In addition to primary process gas, captured fugitive emissions were continuously monitored for SO₂ concentrations and stack gas volumetric flow rates, and were included when determining compliance with the stack emissions limits. To quantify converter area uncaptured fugitive emissions, BHP installed and operated a continuous emissions monitoring system at the outlets of the converter building forced draft roof ventilators. Total emissions were calculated by material balance for sulfur.²

Based on the emissions monitoring system, the majority of this facility's emissions were from the following stack and fugitive units: flash furnace fugitive stack, acid plant II tail stack, acid plant III tail stack, converter secondary and flash emergency vent stack, concentrate dryer stack, and fugitive emissions from the converter building roof vents. Stack emissions and converter building uncaptured fugitive emissions which are the subject of this analysis comprised more than 99 percent of total facility emissions. Additional de minimis sources included emissions from the anode and utility vessel roof vent. Emissions from these units at 1998 operating levels were estimated to be 59 tons per year (tpy), less than 0.6 percent of total emissions. In addition, the smelting facility permit limited sulfur content and usage rates for fuel used in all fuel burning equipment. Actual emissions from fuel burning equipment were minimal, at less than 2.5 tons per year. San Manuel smelter emissions units and rates for 1998 are contained in Attachment

² Sulfur balance procedures are contained in AAC R18-2-715.01 and AAC R18-2-Appendix 8.

1.

A.3.2 Stack Emissions Limits³

Two years of data, based on actual emissions measurements from May 1997 through April 1999, were used to determine new 3-hour average emissions limits for stacks. The data for this period (17,520 hourly values) were ranked in descending numerical order. Each successive pair of ranked values were averaged to obtain a single representative profile consisting of 8,760 hourly values for the attainment period. Three-hour running averages were calculated creating a new database of 8,760 three-hour averages. As with the original MPR, the highest 26 percent or 2,240 hours of the resulting averages were then sorted into 24 categories of cumulative frequency of occurrence values identical to the occurrence limits in the original MPR tables (0 to 2,240). The emission limits were selected using the same conceptual method used in the original MPR where in each category of allowed emission occurrences, the lowest actual emissions value in that range was used to establish the new limits. For example, the “n” cumulative frequency of occurrence where $n = 7$ in the new MPR table for stack emission corresponds to the emissions value E where $E = 5660$. The measured emissions values that occur in the frequency, where $n = 7$, are 5860, 5747, and 5660. The selection of the lowest measured emissions value in each frequency of occurrence mimics the selection of the lowest calculated values of the original MPR analysis, which were all below the emissions profile or curve.

The annual average emissions limit for stacks was determined from the calculated numerical average of the combined hourly stack emission values (17,520 hourly values). Details of the stack analysis are presented in Attachment 2.

A.3.3 Fugitive Emissions Limits⁴

The 1979 MPR limit was based on ambient impacts from stack sources. A similar MPR analysis was also performed for uncaptured converter fugitive emissions based on the proportional impacts of these emissions on ambient concentrations at fugitive impact sites (See Section 3.1 and 3.2). Two years of measured converter roof emissions from May 1997 through April 1999, were used to establish 3-hour average and annual emissions limits for this source. Details of the fugitive emissions analysis are presented in Attachment 2.

A.3.4 Emissions Reductions

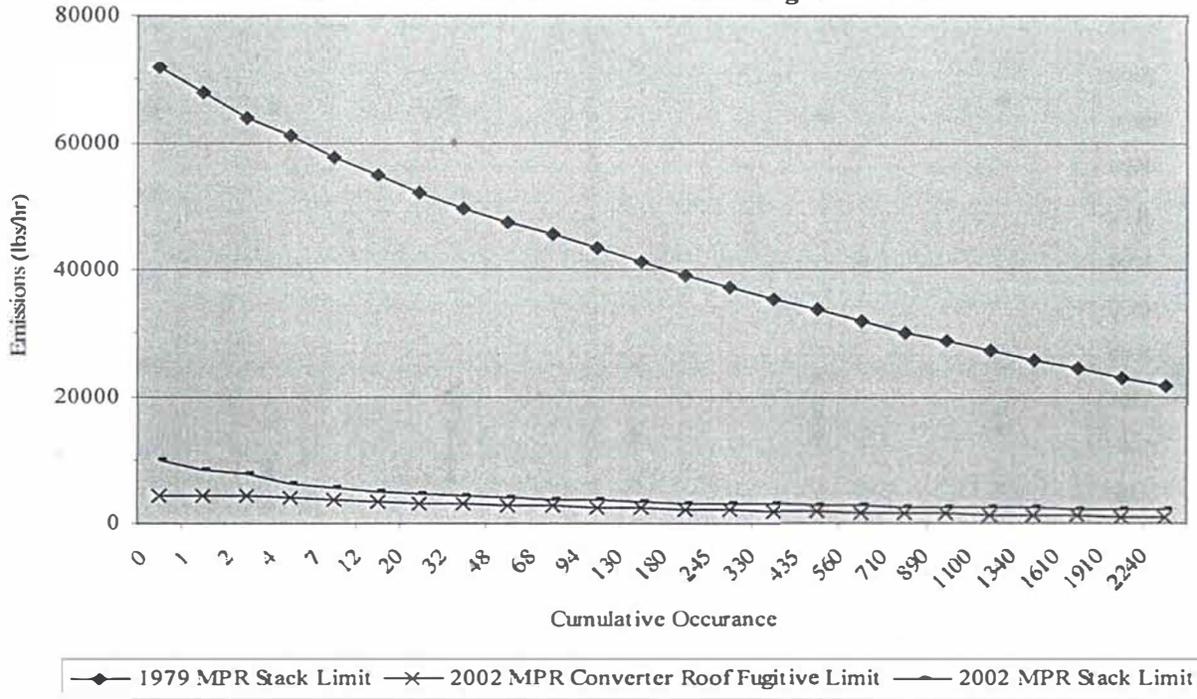
The 2002 rollback reduced allowable annual average stack emissions from 18,275 to 1,742 pounds per hour (lbs/hr). Fugitive SO₂ emissions as measured from the converter roof were reduced from a previous permit limit of 1,115 lbs/hr to 715 lbs/hr. Overall, allowable emissions from stack and fugitive sources were reduced from 84,928 tpy to 10,762 tpy providing a reduction of 74,166 tpy (approximately 87 percent). The 1979 and 2002 3-hour limits for stack and converter fugitive emissions are compared in Table A.1. The reductions are illustrated in Figure A.1.

³ The format and compliance methods for stack limits are detailed in *Ultimate Sulfur Dioxide Emission Limits for Arizona Copper Smelters*, September 1979, and in AAC R18-2-715 and AAC R18-2-715.01 as approved by EPA on November 1, 2004 (69 FR 63321).

⁴ The format and compliance methods for converter roof fugitive limits are detailed in AAC R18-2-715 and AAC R18-2-715.01 as approved by EPA on November 1, 2004 (69 FR 63321).

Table A.1: Comparison of San Manuel Smelter 3-hour MPR Emissions Limits			
Number of Allowed Cumulative Occurrences (n)	1979 3-hour Average Stack Emissions Limits lbs/hr (E)	2002 3-hour Average Stack Emissions Limits lbs/hr (E)	2002 3-hour Average Converter Roof Emissions Limits lbs/hr (E)
0	72,000	9,803	4,462
1	68,000	8,253	4,299
2	64,000	7,619	4,222
4	61,000	6,072	4,017
7	57,800	5,660	3,867
12	54,800	4,922	3,460
20	52,000	4,515	3,179
32	49,500	4,272	3,000
48	47,500	3,945	2,827
68	45,500	3,727	2,649
94	43,500	3,568	2,523
130	41,200	3,419	2,361
180	39,200	3,253	2,218
245	37,200	3,101	2,072
330	35,200	2,958	1,923
435	33,770	2,831	1,785
560	32,000	2,712	1,644
710	30,200	2,615	1,517
890	28,700	2,525	1,402
1100	27,200	2,440	1,300
1340	25,700	2,366	1,208
1610	24,500	2,290	1,121
1910	23,000	2,216	1,039
2240	21,700	2,142	957
Annual Average Emissions Limits (lbs/hr)			
	18,275	1,742	715

Figure A.1: Comparison of 1979 and 2002 3-hour MPR Limits - San Manuel Smelter Allowable 3-hour Average Emissions*



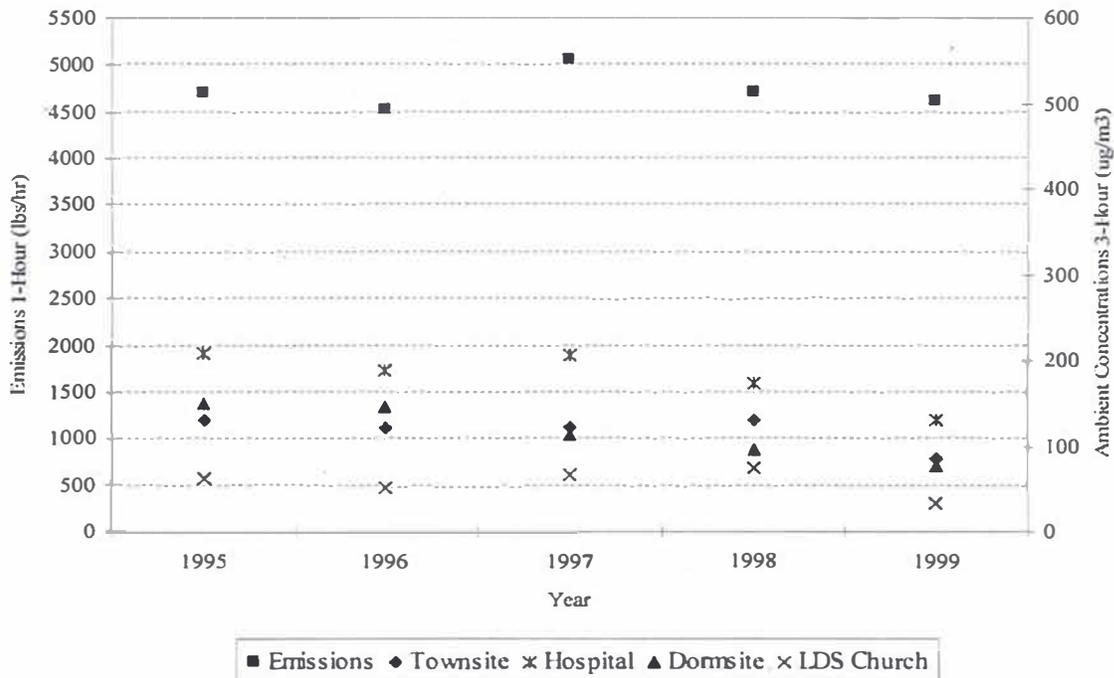
*Emissions limits codified in AAC R18-2-715(F)(1) and (G).

A.3.5 Long-Term Comparison of Emissions and Ambient Concentrations

To ensure that the variety of possible meteorological conditions were represented over the analysis period and that favorable atmospheric dispersion did not influence the impact of emissions on ambient concentrations, the variation of emissions and ambient concentrations were compared from 1995 through 1999.

The upper distribution of short-term (1-hour) total smelter emissions and three-hour ambient SO₂ concentrations from all ambient monitors were determined for each of the five years. Review of the data demonstrates that emissions levels are relatively consistent throughout the MPR study period. The 99th percentile emissions values for the five-year period differ by only 534 lbs/hr. The resulting annual values are presented in Figure A.2. Emissions for the period preceding the 2002 MPR analysis were marginally higher than emissions recorded during the MPR study period. When adjusted for the difference in emissions between the two time periods (increased by the ratio of the earlier to later emissions); however, ambient concentrations from the current MPR period do not vary significantly, and are less than five percent higher than the actual measured concentrations. The adjusted ambient values continue to demonstrate protection of the NAAQS. A five year period is considered to be long enough to experience potentially restrictive meteorological conditions. Nonetheless, Figure A.2 shows that high concentrations varied little from year to year.

Figure A.2: 99th Percentile Total Emissions and Ambient Concentrations



A.3.6 Smelter Configuration

Smelter configuration and in particular the location and height, of SO₂ releases was a critical consideration in finding the San Manuel smelter in compliance with the original MPR limits and for the 2002 demonstration of attainment of the SO₂ NAAQS. The original MPR limits for the San Manuel smelter were based on 1973-1974 records of SO₂ emissions and ambient concentrations. The smelter achieved compliance with MPR emission limits in 1987 and remained in compliance through shutdown in 1999. Although the smelter underwent major modifications and emission reductions over the years, the location and heights of SO₂ releases changed only slightly. Basically, emissions can be grouped into two categories based on the height of release. Low level emissions at heights less than 200 feet include fugitive and dryer stack emissions. High level emissions are predominantly from the reverberatory and converter stacks which are over 500 feet and include minor emissions from the 250 foot acid tail gas stacks. Table A.2 and Table A.3 show the release heights and SO₂ emissions for 1974 compared to the most recent years of operation 1997-1999. Table A.4 shows the distances of the individual emission points to the facility property boundary.

Thus the ambient SO₂ network established in the 1970's and refined in the 1980's, including extensive sampling and testing for fugitive SO₂ impact sites, occurred at a time with quite consistent release geometry. This consistency of SO₂ release locations continued through the 1990's thereby providing assurance that the ambient SO₂ monitoring network continues to represent the maximum impact of SO₂ emissions from the San Manuel smelter. As demonstrated, SO₂ concentrations in the San Manuel Nonattainment Area have been shown to attain the NAAQS.

Table A.2: San Manuel Smelter Configuration 1974 through 1999				
Emissions Source	1974 Height (ft)	1999 Height (ft)	1974 Process Emission Source	1999 Process Emission Source
High Level				
Reverb Stack	509	509	reverberatory furnace process gases	flash furnace captured and vented fugitive gases
Converter Stack	530	530	converter process gases	converter secondary hood and flash emergency vent gases
Tail I Stack	n/a	n/a	n/a	constructed 1975; decommissioned May, 1996
Tail II Stack	n/a	250	n/a	Constructed 1975; converted to double contact acid plant 1987; upgraded 1994
Tail III Stack	n/a	250	n/a	Acid plant constructed and upgraded 1994
Low Level				
Dryer Stack	n/a	144	n/a	concentrate dryer gases (constructed 1987)
Converter Fugitives	106	106	direct converter fugitive gases	converter gases not captured by primary or secondary hood systems

Emissions Source	1974⁵	1997	1998	1999	Attainment Period Average⁶
High Level					
Reverb Stack	28,300	1,690	1,612	519	1,620
Converter Stack	39,600	2,436	2,249	969	2,531
Tail II Stack	n/a	186	220	69	204
Tail III Stack	n/a	538	400	101	414
Tall Stack Total	67,900	4,850	4,481	1,658	4,768
Low Level					
Dryer Stack ⁷	n/a	3,494	3,018	593	2,764
Converter Fugitives	26,400	3,003	2,846	1,370	3,319
Low Level Total	26,400	6,497	5,864	1,963	6,083
High and Low Level					
Total	94,300	11,347	10,345	3,620	10,851

Emissions Source	Distance to Property Line 1974	Distance to Property Line 1999
Reverberatory Stack	1,399	1,399
Converter Stack	1,955	1,955
Tail I Stack	n/a	n/a
Tail II Stack	n/a	2,160
Tail III Stack	n/a	1,744
Dryer Stack	n/a	144
Converter Fugitives	1,735	1,735

A.4 Attainment and Maintenance of the Sulfur Dioxide Air Quality Standards

The emissions analysis and subsequent rulemaking limited allowable emissions to the level of the actual emissions that occurred during the most recent period of smelter operations. Ambient SO₂ concentrations for the analysis period, as presented in Table A.5, demonstrate that the area had achieved attainment of the SO₂ air quality standards. Based on 1997 through 1999 monitoring data, annual average concentrations were less than 42 percent of the NAAQS; maximum 24-hour concentrations were less than 59 percent of the NAAQS; and maximum 3-hour concentrations were less than 55 percent of the NAAQS.

⁵ The original MPR analysis projected an hourly emission rate of 94,242 pounds of sulfur dioxide per hour as the basis for the "rollback" for the San Manuel smelter. This projection was based on sulfur balance data submitted by the facility and supports empirical evidence that approximately thirty percent of the sulfur content in sulfide copper concentrate will be oxidized by an initial melting step such as occurs in reverberatory furnaces. Of the remaining 70 percent, it is estimated that the 1980 vintage primary hood system at the San Manuel smelter was, at best, sixty percent efficient in capturing converter gases. Consequently, 42 percent of these emissions actually reported to the converter stack. The remaining 28 percent were emitted as low-level fugitive emissions.

⁶ Values represent average emissions from 1997 through 1999. Because smelter operations were suspended in May 1999, emissions for this year were estimated based on January through April operating levels to reflect a full year of emissions.

⁷ A 1998 permit revision limited dryer SO₂ emissions to 2,073 tons per year based on a twelve month rolling average.

Area, mobile, and point source projections are shown in Table A.6. Total emissions projections, based on the assumption of an operating San Manuel smelter, are near attainment period levels. Projected 2017 emissions are nearly 6 percent lower than 1997 emissions. Because the attainment emissions inventories demonstrate a stringent level of protection of ambient air quality and no substantial growth from 1998 base year inventories was estimated for total source emissions, the area was projected to maintain the SO₂ NAAQS with a substantial margin of safety.

Table A.5: San Manuel Sulfur Dioxide Ambient Air quality Monitoring Data (in $\mu\text{g}/\text{m}^3$)*					
<i>(Primary NAAQS: Annual Average $80 \mu\text{g}/\text{m}^3$ [0.030 ppm]), 24-hour Average $365 \mu\text{g}/\text{m}^3$ [0.14 ppm] Secondary NAAQS: 3-hour $1300 \mu\text{g}/\text{m}^3$ [0.5 ppm])</i>					
Site or City	Annual Average	Maximum Value			
		3-Hour Average		24-Hour Average	
		Max Value	2nd High	Max Value	2nd High
1999					
LDS Church (closed 10/99)	9	220	189	66	47
Townsite	4	290	255	69	57
Dorm Site	4	311	195	54	52
Hospital	8	433	399	120	103
1998					
LDS Church	21	710	265	105	71
Townsite	8	570	243	105	81
Dorm Site	8	262	255	135	62
Hospital	11	485	443	214	154
1997					
LDS Church	12	252	252	63	63
Townsite	33	374	253	95	91
Dorm Site	11	391	381	75	58
Hospital	32	705	604	208	152

Table A.6: San Manuel Nonattainment Area SO₂ Emissions and Projections for an Operating Smelter (tons)							
Source Name		1997*	1998*	1999*	2010**	2015**	2017**
Oracle Compressor Station	24-Hour	0.00	0.00	0.00	<0.01	<0.01	<0.01
	Annual	0.00	0.00	0.00	1.00	1.00	1.00
Decorative Rock	24-Hour	n/a	n/a	<0.01	<0.01	<0.01	<0.01
	Annual	n/a	n/a	0.25	0.29	0.29	0.29
Biosphere	24-Hour	n/a	0.03	0.04	0.04	0.04	0.04
	Annual	n/a	0.89	3.00	3.00	3.00	3.00
BHP Copper Smelting Operations¹	24-Hour	32.00	29.00	30.00	30.00	30.00	30.00
	Annual	11,482.00	10,409.00	3,622.00	10,827.00	10,827.00	10,827.00
BHP Copper Mining and Milling Operations²	24-Hour	<0.01	<0.01	<0.01	0.00	0.00	0.00
	Annual	0.03	0.03	0.03	0.00	0.00	0.00
Area and Mobile	24-Hour	0.08	0.08	0.10	0.08	0.08	0.08
	Annual	30	30	38	29	30	31
24-Hour Total		32.08	29.11	30.14	30.12	30.12	30.12
Annual Total		11,512.03	10,439.92	3,663.28	10,860.29	10,861.29	10,862.29

* Actual emissions.

** Projected emissions.

¹ Emissions projections for the San Manuel smelter are for demonstration purposes. Smelting operations were temporarily suspended beginning May 1999 and closure of the facility became permanent in 2005. Projections for the San Manuel smelter are based on a 10,762 ton per year limit for stack and converter fugitive emissions and on the assumption that at these operating levels emissions from anode and utility vessel activities and other fuel burning equipment are approximately 0.6 percent of total emissions. Chapter 4 contains detailed projection information for all other sources. 24-hour inventories are a ton per day average calculated by dividing the annual facility emissions by the number of operating days for each year. The annual number of operating days used to calculate the projected 24-hour inventories for 2010 through 2017 (annual emissions divided by the number of operating days) were based on average operating conditions. The average number of operating days for the period 1997 through 1999 were assumed to represent typical operating rates.

² Mining operations permanently closed in 2002. Milling operations permanently closed in 2004.

A.5 Conclusion

The current analysis demonstrates attainment and maintenance of the NAAQS through 2017 based on emissions levels projected to occur when the San Manuel primary copper smelter was still operating. Because the analysis demonstrates attainment and maintenance for conditions of an operating smelter, the emissions reductions and resulting reduction in ambient concentrations due to the permanent closure of the smelting facility are greater than needed, and therefore, ensure continued maintenance of the NAAQS.

Appendix A

Attachment 1

San Manuel Copper Smelter Emissions Inventory

Attachment 1: BHP San Manuel Copper Smelter 1998 Emissions Inventory	
Segment Name	Sulfur Dioxide Emissions (tons)
Concentrate Dryer	3,018.03
Flash Fugitives	1,612.49
Acid Plant Tail II	219.52
Acid Plant Tail III	400.40
Acid Train Preheater 2	0.01
Acid Train Preheater 3	0.11
Secondary Hoods	2,130.97
Converter Aisle Roof Vents	2,845.51
Anode and Utility Vessel	59.94
Thermal Emulsion Breaker and Rod plant Shaft Furnace	0.09
Powerhouse Boiler No. 6	0.70
Powerhouse Boiler No. 7	1.10
Powerhouse Boiler No. 8	0.04
Powerhouse Boiler No. 9	0.02
Superheater	0.07
Flash Emergency Vent Stack	120.29
Total	10,409.29

Appendix A

Attachment 2

Emission Limit Analysis

Procedure for Derivation of MPR Emission Limits Based on Actual Sulfur Dioxide Emissions at the San Manuel Smelter

Data Source Description

Hourly sulfur dioxide emission data were obtained for the latest two years of operation (May 1997 through April 1999). The database contains 17,520 hourly emission values for the flash fugitive stack, converter secondary hood stack, dryer stack, acid plant tail II stack, acid plant tail III stack, and the converter roof. The stack sources were then combined to create a discrete database consisting of 17,520 hourly values of the combined sulfur dioxide emissions from these units. A second fugitive based database was derived from the 17,520 hourly values of measured converter roof sulfur dioxide emissions. Values for any invalid or missing data were estimated by averaging the valid hour immediately preceding and the valid hour immediately following the invalid or missing hour.

Methodology

The annual average emissions rate limits described below were determined for both the stack and converter roof fugitive emissions from the calculated arithmetic mean of the 17,520 hourly values for each of the data sets.

Stack Emissions

Population - 17,520 samples
Arithmetic mean - 1,742 lb/hr

Converter Roof Fugitive Emissions

Population - 17,520 samples
Arithmetic mean - 715 lb/hr

The following procedure was utilized for determining 3-hour emission rate limits for both the stack and converter roof fugitive emissions:

1. The data were sorted in descending numerical order.
2. Each two hour couplet was averaged (1 and 2, 3 and 4, ... 17,519 and 17,520) to create a new database consisting of 8,760 hourly values.
3. Three-hour rolling averages were calculated from the 8,760 hour data set.

The resulting 8,760 3-hour averages were arranged according to the distribution outlined in Table 1 and Table 2 on the following pages and became the basis for the revised rule at AAC R18-2-715 and R18-2-715.01.

Table 1: Selection Method for Cumulative Occurrence and 3-hour Average Emission Limits for Stack and Fugitive Sources

N, Cumulative Occurrences	E, Emission Rate (lb/hr)
0	Highest 3-hr value, never to be exceeded
1	Second highest value
2	Third highest value
4	Fifth highest value
7	Eighth highest value
12	Thirteenth highest value
20	Twenty first highest value
32	Thirty third highest value
48	Forty ninth highest value
68	Sixty ninth highest value
94	Ninety fifth highest value
130	One hundred and thirty first highest value
180	One hundred and eighty first highest value
245	Two hundred and forty sixth highest value
330	Three hundred and thirty first highest value
435	Four hundred and thirty sixth highest value
560	Five hundred and sixty first highest value
710	Seven hundred and eleventh highest value
890	Eight hundred and ninety first highest value
1100	Eleven hundred and first highest value
1340	Thirteen hundred and forty first highest value
1610	Sixteen hundred and eleventh highest value
1910	Nineteen hundred and eleventh highest value
2240	Two thousand, two hundred and forty first highest value

Table 2: 3-hour Average Emission Limits for Stack and Fugitive Sources
(0 through 48 cumulative occurrences)

n, Cumulative Occurrences	Stack E, 3-hour Average Emission Rate (lb/hr)	Fugitive E, 3-hour Average Emission Rate (lb/hr)
0	9803	4462
1	8253	4299
2	7619	4222
	6360	4071
4	6072	4017
	5860	3968
	5747	3932
7	5660	3867
	5539	3812
	5383	3737
	5222	3655
	5067	3553
12	4922	3460
	4803	3402
	4739	3362
	4700	3324
	4659	3290
	4620	3250
	4584	3222
	4546	3195
20	4515	3179
	4482	3160
	4462	3141
	4441	3126
	4417	3110
	4396	3095
	4374	3078
	4359	3063
	4344	3049
	4327	3036
	4312	3022
	4291	3011
32	4272	3000
	4236	2989
	4201	2977
	4171	2965
	4160	2956
	4153	2948
	4146	2942
	4134	2935
	4112	2925
	4084	2910
	4057	2895
	4040	2882
	4026	2875
	4007	2863
	3985	2851
	3963	2838
48	3945	2827
	3934	2814
	3923	2801

Appendix B

Correspondence Regarding Closure of the BHP San Manuel Smelter, Mining, and Milling Facilities



BHP Copper Inc.

BHP Copper Inc.
200 S. Redington Road
San Manuel, Arizona 85631
Tel: 520-385-3401
Fax: 520-385-3810

April 2, 2002

Certified Mail Receipt
No. 7001 1140 0003 1849 1806

Re: Air Quality Permit No. 1001030

Ms. Nancy Wrona, Director,
Air Quality Division
Arizona Department of Environmental Quality
3033 N Central Avenue
Phoenix, AZ 85012

02 APR 15 PM 12:04
APR 15 2002

Dear Ms. Wrona,

BHP has made the decision to permanently cease all operations at the San Manuel Mining Facility. All of the equipment as listed in "Attachment C: Equipment List" of the above referenced permit will be either removed, or rendered non-operational.

Consequentially we are today requesting that the air quality permit for the mining facility be terminated. BHP will however continue to maintain the San Manuel Milling Facility (Permit No. 1000650) and the San Manuel Smelter Complex (Permit No. 1000047) in a cold standby mode. BHP will continue to comply with all of the conditions associated with those permits.

BHP appreciates the cooperation of the Department in our earlier effort to segregate the San Manuel property into three separate Title V Permits. Obviously terminating the entire permit is preferable to the intensive effort of a significant permit revision. If you have any questions please call Jeff Parker at (520) 385-3851 or myself at (520) 385-3444.

Sincerely,

Ronald R. Allum
Ronald R. Allum
Vice President
San Manuel Mine Operations

A member of the BHP Billiton group
which is headquartered in Australia
Registered Office: 600 Bourke Street
Melbourne Victoria 3000 Australia
ABN 49 004 028 077
Registered in Australia



Jane Dee Hull
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

3033 North Central Avenue • Phoenix, Arizona 85012-2809
(602) 207-2300 • www.adeq.state.az.us



Jacqueline E. Schafer
Director

April 26, 2002

Certified Mail
Return Receipt Requested

COPY AOD:PS:CTS:51989

Ronald R. Allum
BHP Copper Inc.
200 S. Redington Road
San Manuel, AZ 85631

Subject: Termination of Permit No. 1001030 (LTF ID #24508)
Place ID # 2058

Dear Mr. Allum:

The Arizona Department of Environmental Quality (ADEQ) is in receipt of your letter, dated April 2, 2002, requesting the termination of Permit No.1001030. Per your request, the referenced permit has been terminated.

Please be aware that should you require to commence operation again, you may need to submit a permit application to the ADEQ or the concerned county agency in accordance with Arizona Revised Statutes §49-426.

If you have any questions regarding this letter, please do not hesitate to call Hoda Kazemi, the permit engineer, at (602) 207-4483 or me at (602) 207-2308.

Sincerely,

Nancy C. Wrona, Director
Air Quality Division

NCW:hk4

cc: Compliance Section
Accounts Receivable
Permit File 1001030

BHP Copper Inc.



BHP Copper Inc.
200 S. Redington Rd
PO Box M
San Manuel, AZ 85631
Tel: 520-385-3100
Fax: 520-385-3299

19 July 2004

Ms. Nancy Wrona, Director
Air Quality Division
Arizona Department of Environmental Quality
1110 W. Washington
Phoenix, AZ 85007

AIR QUALITY DIVISION
04 JUL 30 AM 11:14

Via Certified Mail Number 7001 1140 0003 1849 3213

Re: Air Quality Permit No. 1000650

Dear Ms. Wrona,

BHP Copper, Inc. has made the decision to permanently cease all operations at the San Manuel Milling Facility. All of the equipment as listed in "Attachment C: Equipment List" of the above referenced permit will be either removed, or rendered non-operational.

Consequently, BHP is requesting that the air quality permit for the milling facility be terminated at this time.

BHP will continue to maintain the San Manuel Smelter Complex (Permit No. 1000047) in a cold standby mode. BHP will continue to comply with all of the conditions associated with this permit.

If you have any questions please call me at (520) 385-3581.

Regards,



Jeff Parker
Director of Environmental and External Affairs



Janet Napolitano
Governor

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street Phoenix, Arizona 85007
(602) 771-2300 · www.adeq.state.az.us



Stephen A. Owens
Director

AQD:PS:96001

Certified Mail
Return Receipt Requested
September 7, 2004

COPY

Jeff Parker
BHP Copper Inc.
200 S. Reddington Road, P.O. Box M
San Manuel, AZ 85631

Dear Mr. Parker:

Subject: Termination of Permit No.: 1000650; San Manuel Mill
Place ID No.: 15585

The Arizona Department of Environmental Quality (ADEQ) is in receipt of your letter, dated July 19, 2004, requesting for termination of the above mentioned air quality permit. Per the request, the referenced permit has been terminated.

Please be aware that should you require to commence operation again, you may need to submit a permit application to the ADEQ or the concerned county agency in accordance with Arizona Revised Statutes §49-426.

If you have any questions regarding this letter, please do not hesitate to call P. K. Tandon at (602) 771-2358 or me at (602) 771-2308.

Sincerely,

Nancy C. Wrona, Director
Air Quality Division

NCW:pkt

cc: Compliance Section
Mike Clark
Permit File No. 1000650

ATS # 103019



bhpbilliton

ADEQ
AIR QUALITY DIVISION

05 JAN 14 PM 12:18

BHP Copper Inc.

BHP Copper Inc.
200 S. Reddington Rd
PO Box M
San Manuel, AZ 85631
Tel: 520-385-3100
Fax: 520-385-3299

11 January 2005

Ms. Nancy Wrona
Director, Air Quality Division
Arizona Department of Environmental Quality
1110 W. Washington
Phoenix, AZ 85007

Via certified mail: 7001 1140 0003 1849 3329

Re: Air Quality Permit No. 1000047

Dear Ms. Wrona,

BHP has made the decision to permanently cease all operations at the San Manuel Smelting Facility. All of the equipment and buildings in the above referenced permit will be removed, as a part of the closure of the site.

BHP Copper, Inc. is requesting that the air quality permit for the smelting facility be terminated (Air Quality Permit No. 100047). BHP continues to work with ADEQ and other entities to close its' properties in San Manuel.

BHP will not be responsible for emissions during calendar year 2005 and is therefore not remitting fees for the attached invoice.

I want to extend to you and your staff a sincere "thank-you" on behalf of BHP Copper for all the hard work performed by your staff in issuing the permits. The Air Quality Division has always conducted itself in a proactive and professional manner in working with BHP at San Manuel and I for one, am very grateful.

If you have any questions please call me at (520) 385-3851.

Warm regards,

Jeff Parker
Director of Environmental and Community Affairs
BHP Copper, Inc.

Attachment: 2005 Annual Emissions Fee Invoice



Janet Napolitano
Governor

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007-2935

(602) 771-2300 • <http://azdeq.gov>

COPY



Stephen A. Owens
Director

AQD:PS:CTS: 103019

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 8, 2005

Jeff Parker, Director, Environmental Quality and Community Affairs
BHP Copper, Inc.
200 S Reddington Rd.
PO Box M
San Manuel, AZ 85631

Dear Mr. Parker:

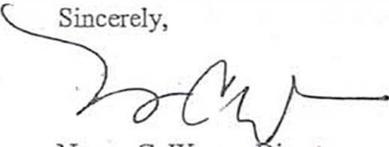
Subject: Termination of Permit No.:1000047
Place ID No.:15582

The Arizona Department of Environmental Quality (ADEQ) is in receipt of your letter, dated January 11, 2005, requesting for termination of the above mentioned air quality permit. Per the request, the referenced permit has been terminated. Invoice # 73240 for \$44520.00 for billing year 2005 will be voided.

Please be aware that should you require to commence operation again, you may need to submit a permit application to the ADEQ or the concerned county agency in accordance with Arizona Revised Statutes §49-426.

If you have any questions regarding this letter, please do not hesitate to call Vivek Kapur at (602) 771-2323 or me at (602) 771-2308.

Sincerely,


Nancy C. Wrona, Director
Air Quality Division

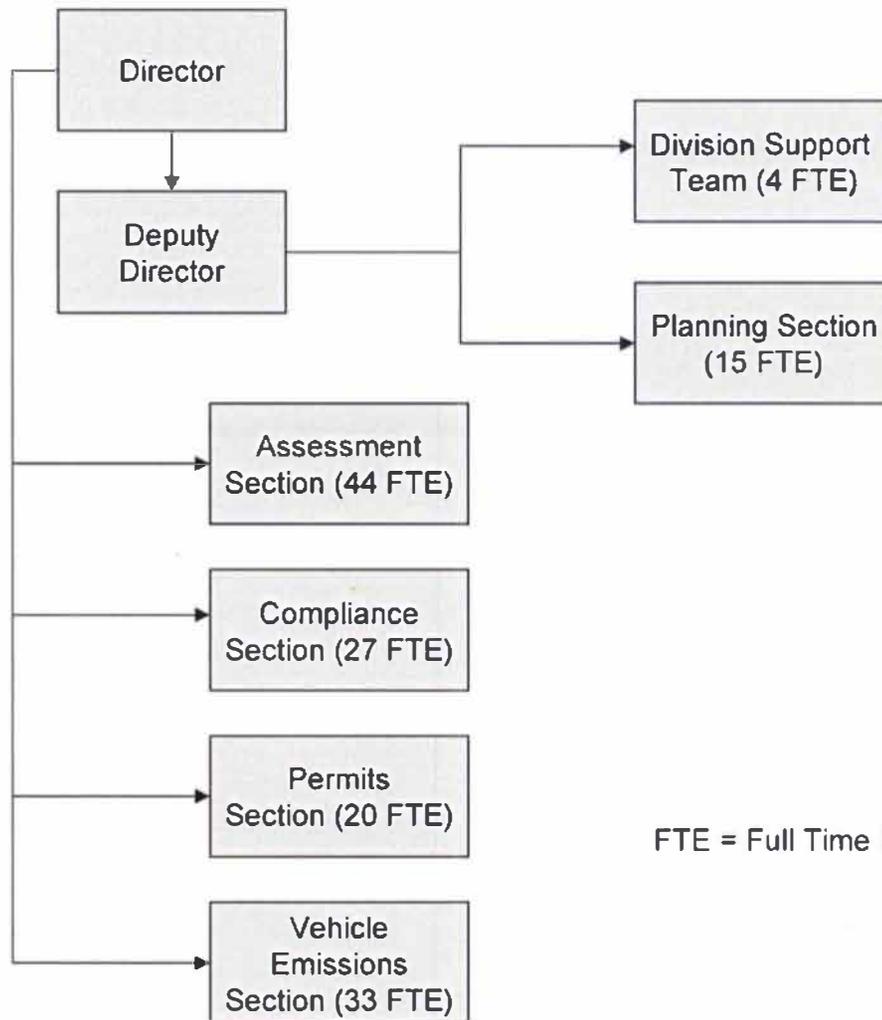
NCW:vk2

cc: Compliance Section
Mike Clark
Permit File No. 1000047
Anna Yen, EPA Region IX

Appendix C

ADEQ Air Quality Division Organizational Chart

Arizona Dept. of Environmental Quality Air Quality Division



FTE = Full Time Employees

Appendix D

Area and Mobile Source Emissions Inventory and Projections

Area and Mobile Source Sulfur Dioxide Emissions Inventory and Projections for the San Manuel Sulfur Dioxide Nonattainment Area

Area and mobile source emissions estimates from the 2002 U.S. Environmental Protection Agency (EPA) National Emissions Inventory (NEI) report were used to project emissions for the San Manuel area. Table D.1 presents the 1997 through 2002 emissions for Pinal County, Arizona.¹

Table D.1: Pinal County Area and Mobile Source Sulfur Dioxide Emissions (tons)*						
	1997	1998	1999	2000	2001	2002
Area Emissions						
Fuel Comb. Industrial – Coal	55.7	54.7	56.7	55.6	60.4	59.0
Fuel Comb. Industrial – Oil	8.12	7.92	8.15	8.49	9.61	70.60
Fuel Comb. Industrial – Gas	0.59	0.59	0.61	0.63	0.64	0.08
Fuel Comb. Other – Commercial/Institutional Coal	n/a	n/a	n/a	n/a	n/a	0.11
Fuel Comb. Other – Commercial/Institutional Oil	0.38	0.29	0.30	0.31	0.32	9.38
Fuel Comb. Other – Commercial/Institutional Gas	0.09	0.09	0.10	0.10	0.11	0.10
Fuel Comb. Other – Misc. Fuel Comb. (non-residential)	n/a	n/a	n/a	n/a	n/a	0.04
Fuel Comb. Other – Residential Wood	0.49	0.49	0.49	0.53	0.53	0.49
Fuel Comb. Other – Residential Other	0.33	0.31	0.75	0.77	0.78	0.65
Waste Disposal and Recycling – Incineration	1.84	1.90	1.94	2.01	2.10	1.34
Waste Disposal and Recycling – Open Burning	4.89	5.07	5.25	6.20	6.20	5.97
Mobile Emissions						
Highway Vehicles – Light-Duty Gas Vehicles and Motorcycles	91.6	95.0	97.3	110.0	103.0	38.9
Highway Vehicles – Light-Duty Gas Trucks	61.8	63.9	67.3	76.8	76.7	29.3
Highway Vehicles – Heavy-Duty Gas Vehicles	14.7	14.3	14.5	15.6	14.3	5.3
Highway Vehicles – Diesels	112	112	115	84.8	79.3	88.5
Off-highway – Non-Road Gasoline	2.93	2.92	3.08	3.14	3.20	0.81
Off-highway – Non-Road Diesel	76.2	78.6	81.2	83.6	86.0	75.3
Off-highway – Aircraft	0.03	0.05	0.02	0.02	0.02	0.30
Off-highway – Railroads	122	119	116	117	119	98
Off-highway – Other	0.05	0.05	0.06	0.06	0.07	0.08
Miscellaneous – Other Combustion	3.61	5.90	130	108	45.6	11.3
Area and Mobile Emissions						
Total	557	563	699	673	608	496

Source: U.S. Environmental Protection Agency 2002 National Emission Inventory (NEI) and 1997-2001 AirData, National Emission Trends (NET), Tier Reports for sulfur dioxide.

* Because of changes in EPA's emission inventory estimation procedures, emissions for years 1999 and later may not be directly comparable with prior years.

Area and mobile source projections for the nonattainment area are based on the assumptions that the sulfur content of fuels will not be exceeded, that no additional controls for SO₂ emissions will be

¹ Year 2002 is the most recent area and mobile emissions estimate available for Pinal County.

implemented, and that fuel usage rates per person will remain constant through the projected time period. The projections are also based on the assumption that SO₂ emissions are proportionate to population and thus will increase proportionately with the population of the San Manuel nonattainment area. Table D.2 shows the Pinal County population and the relative percent of nonattainment area population.

Area	2002
Pinal County*	192,395
San Manuel CDP**	4,416
Mammoth*	1,790
Oracle CDP**	3,772
Nonattainment Area Population	9,978
Nonattainment Area as Percent of Pinal County Population	5.2%

* Arizona Department of Economic Security intercensal population estimate.

** For San Manuel Census Designated Place (CDP), 2002 population is based on a projected average annual growth rate of approximately 0.5 percent per year from the U.S. Bureau of the Census, 2000 Census enumeration. For Oracle CDP, 2002 population is based on a projected average annual growth rate of approximately 2.9 percent per year from the U.S. Bureau of the Census, 2000 Census enumeration.

The nonattainment area population, calculated from the aggregate population centers of San Manuel CDP, Mammoth, and Oracle CDP is approximately 5.2 percent of the Pinal county population. A corresponding proportion of the 2002 Pinal County area and mobile source emissions equates to 26 tons (496 tons × 0.052 = 26 tons). To estimate future emissions from these sources, this value was increased by the rate of population growth for the nonattainment area. Table D.3 illustrates San Manuel area population growth through 2017.

Area	2002	2005	2010	2015	2017
San Manuel CDP	4,416	4,478	4,580	4,680	4,720
Mammoth	1,790	1,740	1,830	1,870	1,880
Oracle CDP	3,772	4,087	4,610	5,130	5,340
Nonattainment Area Population	9,978	10,305	11,020	11,680	11,940
Nonattainment Area Population Growth (percent)	n/a	3.3%	6.9%	6.0%	2.2%

Table D.4 presents the corresponding area and mobile emissions projections. The projections show that an estimated 20 percent increase in the nonattainment area population between 2002 and 2017 corresponds to an increase of area and mobile source emissions from 26 tons per year to 31 tons per year for the San Manuel area.

	2002	2005	2010	2015	2017
Area and Mobile Emissions	26	27	29	30	31

Appendix E

State Implementation Plan Revision Public Comment and Hearing Documentation

Appendix E.1

Notice of Public Hearing

Public Notice

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY (ADEQ)
PUBLIC HEARING ON THE SAN MANUEL SULFUR DIOXIDE NONATTAINMENT AREA STATE IMPLEMENTATION PLAN (SIP) REVISION

ADEQ will hold a public hearing to receive comments on a proposed revision to the Arizona SIP for the San Manuel sulfur dioxide nonattainment area. The purpose of the revision is to demonstrate how the area has met the sulfur dioxide air quality standards and how compliance with the standards will be maintained. The revision also contains a request to the U.S. Environmental Protection Agency to redesignate the area to attainment.

A public hearing on the proposed revision will be held on Wednesday, January 31, 2007, 2:00 p.m., Mammoth Town Hall, 125 N. Clark Street, Mammoth, Arizona. All interested parties will be given an opportunity at the public hearing to submit relevant comments, data, and views on the proposal, orally and in writing. All written comments must be postmarked or received at ADEQ by 5 p.m. on Wednesday, January 31, 2007.

All written comments should be addressed, faxed, or e-mailed to:
Bruce Friedl, Air Quality Planning Section, Arizona Department of Environmental Quality, 1110 W. Washington St., Mail Code 3415A-3, Phoenix, AZ 85012-2905, FAX: (602) 771-2388, E-Mail: friedl.bruce@azdeq.gov

Copies of the proposal will be available for review beginning December 27, 2006, at the following locations:

Arizona Department of Environmental Quality
First Floor Library, 1110 W. Washington St., Phoenix, Arizona 85012. Lorraine Cona (602) 771-2217

and
Town of Mammoth, Office of the Clerk, 125 N. Clark Street, Mammoth, Arizona 85618, Shannon Ortiz (520) 487-2928

MINER 12/20, 12/27

AFFIDAVIT OF PUBLICATION

11/10: 23

MARIANNE GUTIERREZ, first being duly sworn deposes and says that she is **RECEPTIONIST** of the San Manuel Miner, a legal weekly newspaper published at San Manuel, Pinal County, Arizona, on Wednesday of each week; that the legal entitled **PUBLIC NOTICE** a true and complete copy hereto annexed was published for 2 weeks.

First publication 12/20, 2006

Second publication 12/27, 2006

Third publication _____, 2006

Fourth publication, _____, 2006

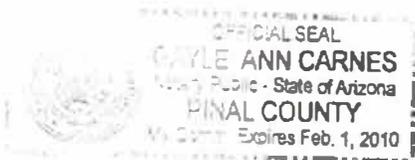
Fifth publication, _____, 2006

Sixth publication, _____, 2006

[Handwritten Signature]

Subscribed and sworn to before me on this 27th

day of December, 2006



[Handwritten Signature: Gayle Ann Carnes]

Notary Public

Appendix E.2

Public Hearing Agenda



Public Hearing Agenda

AIR QUALITY DIVISION

PUBLIC HEARING ON A PROPOSED REVISION TO THE ARIZONA AIR QUALITY STATE IMPLEMENTATION PLAN (SIP) FOR THE SAN MANUEL SULFUR DIOXIDE NONATTAINMENT AREA

PLEASE NOTE THE MEETING LOCATION AND TIME:

**Mammoth Town Hall
125 N. Clark Street, Mammoth, Arizona
Wednesday, January 31, 2007, 2:00 p.m.**

Pursuant to 40 CFR § 51.102 notice is hereby given that the above referenced meeting is open to the public.

1. Welcome and Introductions
2. Purposes of the Oral Proceeding
3. Procedure for Making Public Comment
4. Brief Overview of the proposed SIP revision
5. Question and Answer Period
6. Oral Comment Period
7. Adjournment of Oral Proceeding

Copies of the proposal are available for review at the Arizona Department of Environmental Quality (ADEQ) Library, 1110 W. Washington St., Phoenix, Arizona, and Town of Mammoth Office of the Clerk, 125 N. Clark Street Mammoth, Arizona. For additional information regarding the hearing please call Bruce Friedl, ADEQ Air Quality Division, at (602) 771-2259 or 1-800-234-5677, Ext. 771-2259.

Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Dan Flukas at (602) 771-4795 or 1-800-234-5677, Ext. 771-4795. Requests should be made as early as possible to allow sufficient time to make the arrangements for the accommodation. This document is available in alternative formats by contacting ADEQ TDD phone number at (602) 771-4829.

Appendix E.3

Public Hearing Sign In Sheet



Air Quality Division Sign-In Sheet

Please Sign In

SUBJECT San Manuel Sulfur Dioxide Nonattainment Area SIP Revision DATE January 31, 2007

	<u>NAME</u>	<u>ORGANIZATION</u>	<u>PHONE</u>	<u>FAX</u>	<u>E-MAIL</u>
1.	TINO ANGLIMANU	ADEQ	520-628-6236		
2.					
3.					
4.					
5.					
6.					
7.					
8.					

Appendix E.4

Public Hearing Officer Certification and Transcript



Air Quality Division

Public Hearing Presiding Officer Certification

I, Scott Baggio, the designated Presiding Officer, do hereby certify that the public hearing held by the Arizona Department of Environmental Quality was conducted on January 31, 2007, at the Mammoth Town Hall, 125 North Clark Street, Mammoth, Arizona, in accordance with public notice requirements by publication in the San Manuel Miner and other locations beginning December 20, 2006. Furthermore, I do hereby certify that the public hearing was recorded from the opening of the public record through concluding remarks and adjournment, and the transcript provided contains a full, true, and correct record of the above-referenced public hearing.

Dated this 20 day of February 2007.

[Signature]
Scott Baggio

State of Arizona)
) ss.
County of Maricopa)

Subscribed and sworn to before me on this 20 day of February 2007.



[Signature]
Laura McFarland
Notary Public

My commission expires: 4/2/08

1 Public notice appeared in the *San Manuel Miner* and on ADEQ's website. Copies of
2 the proposal titled, ***Proposed Arizona State Implementation Plan Revision, San***
3 ***Manuel Sulfur Dioxide Nonattainment Area, December 2006***, were made available
4 at the ADEQ Phoenix office and at the Town of Mammoth, Office of the Clerk.

5
6 The procedure for making a public comment on the record is straightforward. If you
7 wish to comment, you need to fill out a speaker slip, which is available at the sign-in
8 table, and give it to me. Using speaker slips allows everyone an opportunity to be
9 heard and allows us to match the name on the official record with the comments. You
10 may also submit written comments to me today. Please note, the comment period for
11 the proposed SIP revision ends on January 31, 2007. All written comments must be
12 postmarked if sent via U.S. mail or received if sent via e-mail at ADEQ by January 31,
13 2007. Written comments can be mailed to Bruce Friedl, Air Quality Planning Section,
14 Arizona Department of Environmental Quality, 1110 W. Washington Street, Phoenix,
15 Arizona 85007 or e-mailed directly to friedl.bruce@azdeq.gov. Comments may also
16 be faxed to (602) 771-2366.

17
18 Comments made during the formal comment period are required by law to be
19 considered by the Department when preparing the final state implementation plan.
20 This is done through the preparation of a responsiveness summary in which the
21 Department responds in writing to written and oral comments made during the formal
22 comment period.

23
24 The agenda for this hearing is simple. First, we will present a brief overview of the
25 proposed revision to the state implementation plan.

1 Second, I will conduct a question and answer period. The purpose of the question and
2 answer period is to provide information that may help you in making comments on the
3 proposed revision.

4
5 Thirdly, I will conduct the oral comment period. At that time, I will begin to call
6 speakers in the order that I have received speaker slips.

7
8 Please be aware that any comments at today's hearing that you want the Department to
9 formally consider must be given either in writing or on the record at today's hearing
10 during the oral comment period of this proceeding.

11
12 At this time, Bruce Friedl will give a brief overview of the proposal.

13
14 MR. FRIEDL: The proposed SIP revision consists of an attainment demonstration,
15 maintenance plan, and redesignation to attainment request for the San Manuel Sulfur
16 Dioxide Nonattainment Area. The purpose of the plan is to demonstrate how the Area
17 has met the National Ambient Air Quality Standards for sulfur dioxide and how
18 compliance with the standards in the San Manuel Area will be maintained.

19
20 The San Manuel Area was designated nonattainment for sulfur dioxide in 1979.
21 Ambient air quality monitors located in the San Manuel Nonattainment Area have
22 recorded no violations of the primary 24-hour and annual standards for sulfur dioxide
23 since 1979. There have been no recorded violations of the 3-hour secondary standard
24 since 1985. The record also shows that ambient air quality measurements have
25 remained below the standards for more than eight consecutive quarters.

1 The plan also demonstrates that the emissions reductions responsible for the air
2 quality improvement have resulted from permanent and enforceable control measures.

3 Based on point, area, and mobile source emissions inventories, the primary source of
4 sulfur dioxide emissions in the Nonattainment Area was the copper smelter located
5 near San Manuel, Arizona. A 2002 State Implementation Plan revision described the
6 control measures implemented at the San Manuel smelter to reduce emissions from the
7 smelter and to achieve attainment of the air quality standards. The smelter
8 subsequently closed in 2005. The facility cannot reopen without submitting a New
9 Source Review and Title V permit application according to Arizona Revised Statutes
10 Section 49-426 and Arizona Administrative Code, Title 18, Chapter 2, Article 4,
11 Permit Requirements for New Major Sources and Major Modifications to Existing
12 Major Sources. The current revision updates the Arizona SIP to account for the
13 permanent closure of this facility.

14
15 The clean air quality record, enforceable control measures, and projections of future
16 emissions presented in the proposed plan, demonstrate that the area has attained and
17 will continue to maintain the sulfur dioxide air quality standards through 2017.

18
19 The proposed plan also includes a request to the U.S. Environmental Protection
20 Agency to redesignate the San Manuel Area to attainment for sulfur dioxide.

21
22 This concludes the explanation period of this proceeding on the proposed revision to
23 the state implementation plan.

24
25 MR. BAGGIORE: Thanks.

1 Are there any questions before we move to the oral comment period?

2

3 Hearing none, this concludes the question and answer period of this proceeding on the
4 proposed state implementation plan revision.

5

6 I now open this proceeding for oral comments.

7

8 Seeing no speaker slips, this concludes the oral comment period of this proceeding.

9

10 If you have not already submitted written comments, you may submit them to me at
11 this time. Again, the comment period for this proposed revision to the state
12 implementation plan ends today, January 31, 2007.

13

14 Thank you for attending.

15

16 The time is now 2:14 p.m. I now close this oral proceeding.

Appendix E.5
Responsiveness Summary

RESPONSIVENESS SUMMARY

to

Testimony Taken at Oral Proceedings and Written Comments Received on the *Proposed Arizona State Implementation Plan Revision, San Manuel Sulfur Dioxide Nonattainment Area, December 2006*

The oral proceeding on the *Proposed Arizona State Implementation Plan (SIP) Revision, San Manuel Sulfur Dioxide Nonattainment Area* was held on Wednesday, January 31, 2007, 2:00 p.m., at the Mammoth Town Hall, 125 N. Clark Street, Mammoth, Arizona. The public comment period closed on Wednesday, January 31, 2007. No oral or written comments were received during the comment period. During its final review of the proposed SIP, the Arizona Department of Environmental Quality determined further clarifications were appropriate. These clarifications are described below.

- 1) References to charts and tables in Appendix A were corrected.
- 2) The legends in Figures 2.1, 3.1, and 4.2, were revised to more accurately denote urban areas.
- 3) The sources and calculation method of ambient monitoring data in Table 3.2 were clarified.
- 4) Procedures for changes to the San Manuel ambient monitoring network were clarified in Section 7.2.
- 5) Typographical and formatting corrections were made throughout the document.

