Sulfur Dioxide Maintenance Provisions for the Salt Lake-Tooele Sulfur Dioxide Nonattainment Area

Section IX.B.6

Adopted by the Air Quality Board
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a. Introduction and Background

In 1978 EPA designated two areas within the State of Utah as nonattainment for the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide: Cedar City and an area encompassing Salt Lake and Tooele Counties. Effective February 19, 1980, EPA approved the State's control strategy for SO_2 in Cedar City, but disapproved the strategy for the Salt Lake County-Tooele County nonattainment area. In 1981, the State submitted a SIP revision for the control of SO_2 in the Salt Lake County-Tooele County nonattainment area. This submittal included a map redefining the boundaries of the nonattainment area as Salt Lake County and eastern portions of Tooele County above 5,600 feet. In 1985, EPA approved the SIP revision (demonstrating attainment of the NAAQS for SO_2) on an interim basis contingent upon resolution of certain issues surrounding Good Engineering Practice (GEP) stack height demonstration. The State submitted its GEP SIP in 1986, with subsequent submittals in 1986, 1987, and 1988. EPA proposed approval of the GEP SIP in 1988, but subsequent comment regarding land ownership on elevated terrain delayed final approval.

In 1990 the Clean Air Act was amended resulting in an automatic SIP call for any nonattainment area that did not have a fully approved SIP. Since the Utah SIP had never received full approval, the State was again required to submit SIPs for both GEP stack height and the control of SO_2 in the Salt Lake County-Tooele County nonattainment area. All other areas of the State, including Cedar City, were shown to have ambient air that is "better than national standards." The appropriate SIP revisions were submitted in 1991 and 1992 respectively, and approved by EPA in 1994.

There has been no violation in the Utah nonattainment area of any primary or secondary National Ambient Air Quality Standard for SO_2 since 1981. As will be discussed, this lack of monitored violations is the result of permanent and enforceable emission reductions at the emission points that were responsible for the violations which led to the area's original nonattainment status. Thus, the State is requesting redesignation of the Salt Lake County/Tooele County nonattainment area to attainment in accordance with Clean Air Act Section 107(d)(3)(D).

b. Prerequisites to Redesignation

Clean Air Act Section 107(d)(3)(D) allows any state governor to request redesignation of any area within the state. Section 107(d)(3)(E), (i) through (v), sets forth pre-conditions which the Administrator must verify prior to approving any request to redesignate an area from nonattainment to attainment. These conditions are paraphrased in Table 1.

Table 1. Prerequisites to Redesignation			
Category	Requirement	Reference	Addressed in Section
Attainment of Standard	The State must provide two complete, consecutive calendar years of quality-assured monitoring data in accordance with 40 CFR Part 58	CAA: Sec 107(d)(3)(E)(i)	IX.B.6.b(1)
State Implementation Plan Approval	The State must verify that a fully approved SIP is in place for the area under Clean Air Act section 110(k)	CAA: Sec 107(d)(3)(E)(ii), Sec 110(k)	IX.B.6.b(2)
Permanent and Enforceable Emissions Reductions	The State must verify that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from enforcement of the SIP, federal regulations, and other permanent and enforceable regulations.	CAA: Sec 107(d)(3)(E)(iii)	IX.B.6.b(3)
Maintenance Plan	To be redesignated to attainment, the State must have a fully approved maintenance plan in place.	CAA: Sec 107(d)(3)(E)(iv)	IX.B.6.b(4)
Section 110 and Part D Requirements	The State must verify that the area has met all requirements applicable to the area under Section 110 and Part D.	CAA: Sec 107(d)(3)(E)(v), Sec 110(a)(2), Sec 171	IX.B.6.b(5)

(1) Attainment of Standard

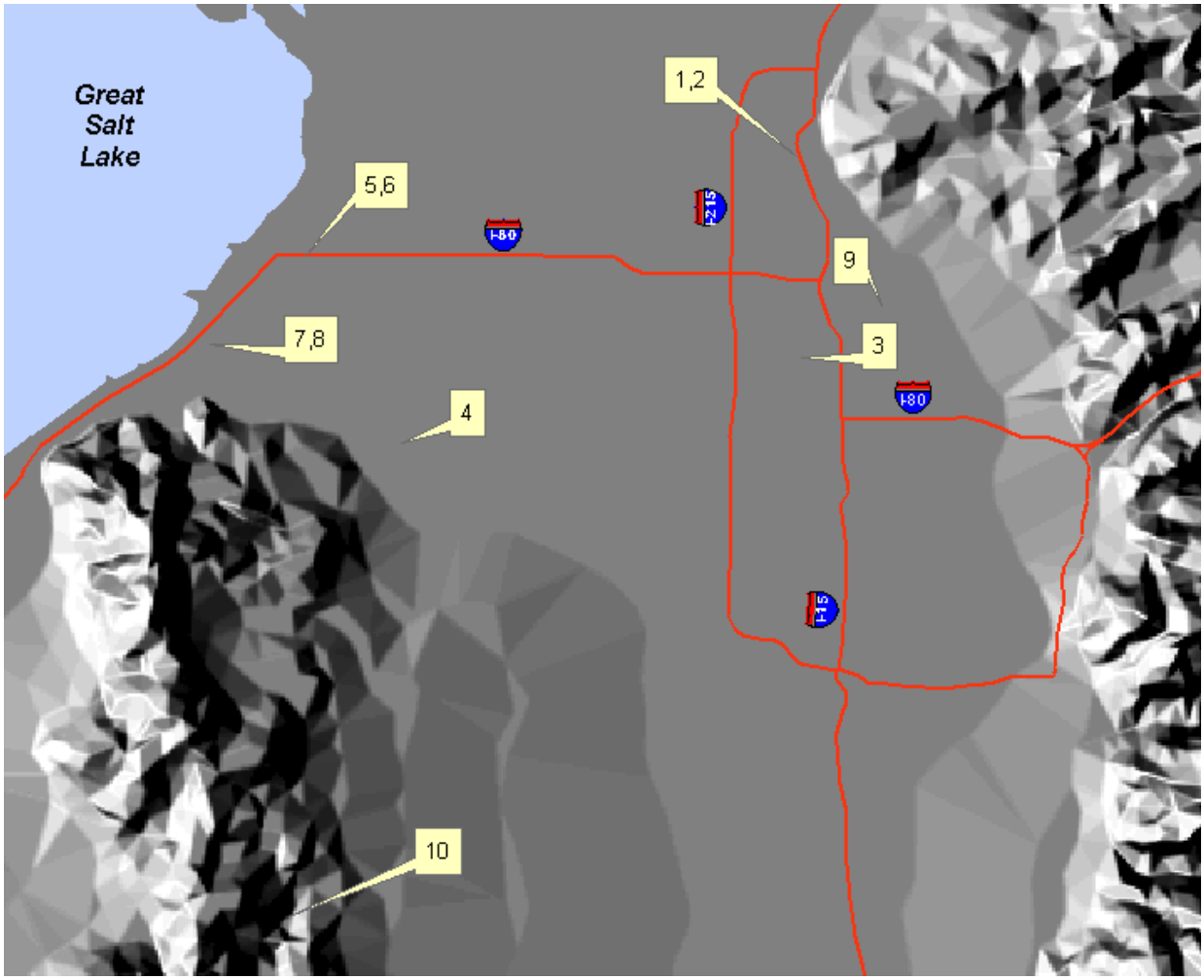
CAA 107(d)(3)(E)(i) - *The Administrator determines that the area has attained the national ambient air quality standard.* The national ambient air quality standards (NAAQS) for SO_2 are as follows: primary standards include an annual (calendar year) arithmetic mean of 0.03 ppm (80 µg/m^3) and a 24-hour midnight to midnight block average of 0.14 ppm (365 µg/m^3). An exceedance of the annual standard is a violation of the NAAQS, as are two exceedances of the 24-hour standard in any one calendar year at any one monitoring site. In addition there is a secondary standard of 0.5 ppm (1,300 µg/m^3) measured as a 3-hour block average, calculated from successive non-overlapping 3-hour blocks starting at midnight. Two exceedances of the 3-hour standard in a calendar year at any one monitoring site is a violation of the NAAQS. In order to demonstrate attainment of these standards, a State must collect eight consecutive calendar quarters (2 years) of ambient data that is below the levels outlined above.

Ambient SO_2 data is collected in the nonattainment area as part of the state's monitoring network (Figure 1) which has been approved in accordance with 40 CFR Part 58 and its appendices. As shown by Table 2, none of these monitors has recorded a violation of the NAAQS since 1981. The 3-hr secondary standard was exceeded once at the Lakepoint site near the Great Salt Lake in 1992, but there was no violation of the standard. Note: This site is not the high-elevation site that was also called Lakepoint; rather, it is one of four monitoring locations referred to as the "Beach" site (identified in Figure 1 as sites 5, 6, 7, and 8.) The purpose of the "Beach" site is to monitor impact from the copper smelter, a significant source of SO_2. It was relocated several times (with approval from EPA), but continues to serve this purpose.

The nonattainment area, as defined, also includes the eastern portion of Tooele County above 5,600 feet MSL. Although there are no monitors located in this portion of the nonattainment area, the modeling analysis discussed in Section IX.B.3.d of the SIP insures attainment of the standards in the elevated

terrain, given the emission limits described therein. These limits were in effect throughout the period of data collection at other low-level monitors, and continue to remain federally enforceable.

Figure 1. SO_2 Monitors in the Salt Lake-Tooele County Nonattainment Area, 1981 - 2003



Monitor Codes
1 - 1925 N. 900 W., Salt Lake City, Ut.; Airs No. 49-035-0007
2 - 1795 N. 1000 W., Salt Lake City, Ut.; Airs No. 49-035-0012
3 - 1420 S. 1100 W., Salt Lake City, Ut.; Airs No. 49-035-0009
4 - 2935 S. 8560 W., Magna, Ut.; Airs No. 49-035-1001
5 - 12600 W. I-80, Great Salt Lake St. Park; Airs No. 49-035-2002
6 - 11551 W. I-80, Salt Lake County, S.E. of Beach Exit; Airs No. 49-035-0005
7 - 1282 S. 12100 W., Lakepoint, Ut.; Airs No. 49-035-2003
8 - 1200 S. 12100 W., Lakepoint, Ut.; Airs No. 49-035-2004
9 - 610 S. 200 E., Salt Lake City, Ut. (Co. Health Dept. Bldg.); Airs No. 49-035-3001
10 - 8536 W. SR-48, Copperton, Ut; Airs No. 49-035-4001

Table 2. Salt Lake-Tooele County Nonattainment Area Monitoring Network, 1981 - 2003

Year	Monitors*	Annual	24-hr	3-hr
1981	4, 5, 9, 10	$\mathbf{V}_5$	$\mathbf{X}_{4\&5}$	$\mathbf{X}_5$
1982	1, 3, 4, 5, 9, 10	---	---	---
1983	3, 4, 5, 9, 10	---	---	---
1984	2, 4, 9, 10	---	---	---
1985	2, 4, 9, 10	---	---	---
1986	2, 4, 6, 9, 10	---	---	---
1987	2, 4, 6, 9	---	---	---
1988	2, 4, 6, 9	---	---	---
1989	2, 4, 6, 9	---	---	---
1990	2, 4, 6, 9	---	---	---
1991	2, 4, 6, 7, 9	---	---	---
1992	2, 4, 7, 8, 9	---	---	$\mathbf{X}_7$
1993	2, 4, 8, 9	---	---	---
1994	2, 4, 8, 9	---	---	---
1995	2, 4, 8	---	---	---
1996	2, 4, 8	---	---	---
1997	2, 4, 8	---	---	---
1998	2, 4, 8	---	---	---
1999	2, 4, 8	---	---	---
2000	2, 4, 8	---	---	---
2001	2, 4, 8	---	---	---
2002	2, 4, 8	---	---	---
2003	2, 4, 8	---	---	---

V = Violation of National Ambient Air Quality Standard (NAAQS); Subscript denotes monitoring site at which the violation occurred.

X = Measured Exceedance of the NAAQS, but not a violation; Subscript denotes monitoring site at which the exceedance was recorded.

* Monitor Codes:
1 - 1925 N. 900 W., Salt Lake City, Ut.; Airs No. 49-035-0007
2 - 1795 N. 1000 W., Salt Lake City, Ut.; Airs No. 49-035-0012
3 - 1420 S. 1100 W., Salt Lake City, Ut.; Airs No. 49-035-0009
4 - 2935 S. 8560 W., Magna, Ut.; Airs No. 49-035-1001
5 - 12600 W. I-80, Great Salt Lake St. Park; Airs No. 49-035-2002
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Figures 2 and 3 have been included to illustrate the magnitude of improvement in monitored SO_2 concentrations as well as the continuous nature of improvement since the late ‘70s. Such a wide margin of safety beneath the NAAQS suggests that it would be unlikely to again see concentrations that exceed the health standard for SO_2. As will be discussed later, there are definite reasons for the improvements seen in these charts.

Figure 2. Monitored Values, 1978 - 2003, Magna and Salt Lake Monitors

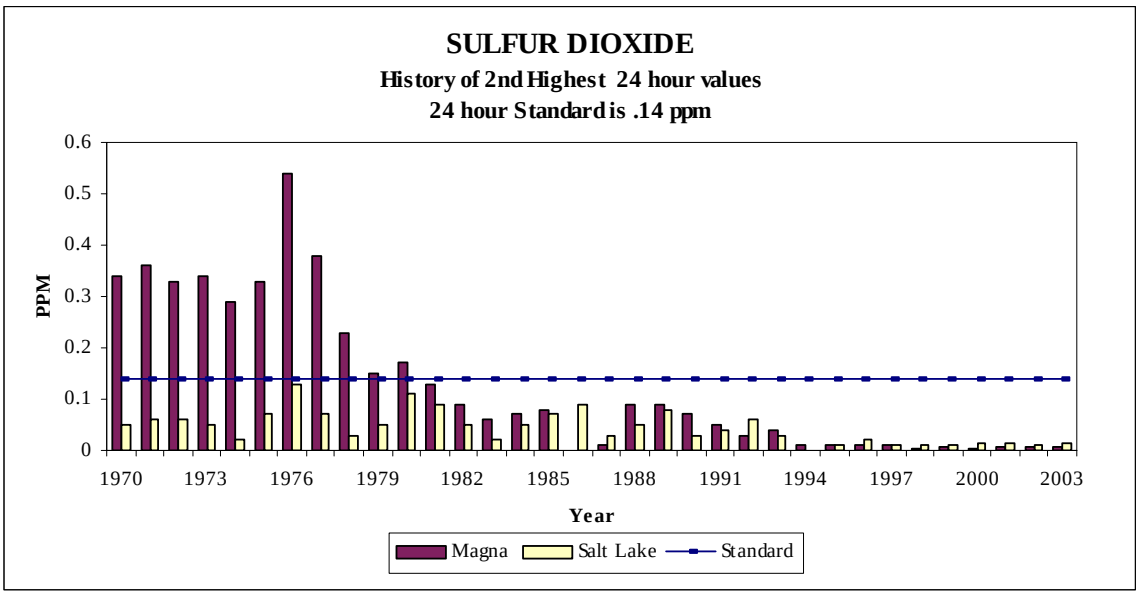
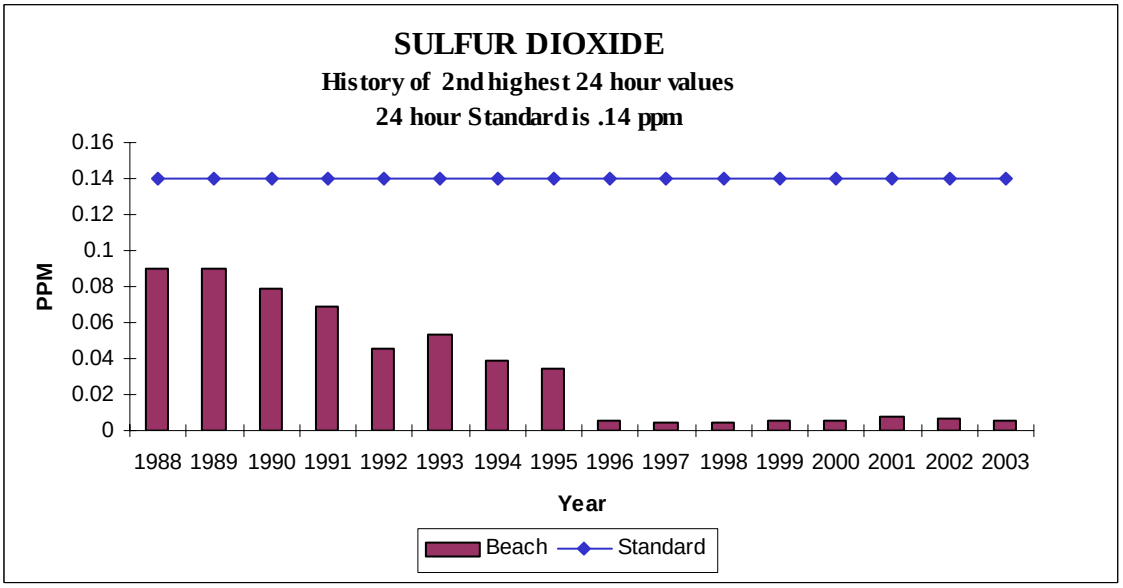


Figure 3. Monitored Values, 1988 - 2003, Beach Monitor



(2) State Implementation Plan Approval

CAA 107(d)(3)(E)(ii) - *The Administrator has fully approved the applicable implementation plan for the area under section 110(k).* As discussed in Section IX.B.1, the Clean Air Act Amendments of 1990 required the State to submit a SIP revision to address nonattainment of the SO_2 NAAQS in Salt Lake County and the eastern portion of Tooele County above 5,600 feet MSL. In addition, in response to the Clean Air Act Amendments of 1990, the State had to re-visit the issue of stack height as it pertained to

"Good Engineering Practice" (GEP). The GEP SIP was submitted on December 23, 1991, and the SO_2 SIP was submitted to EPA on May 15, 1992. EPA formally approved, in full, the GEP SIP and the SO_2 SIP in the Federal Register on December 14, 1994. The effective date was January 13, 1995.

(3) Permanent and Enforceable Emissions Reductions

CAA 107(d)(3)(E)(iii) - *The Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions.* As discussed in Section IX.B.3, the SO_2 impact that led to the area's nonattainment designation in 1978 was attributed entirely to Kennecott Utah Copper, and primarily to its smelting process. Hence, the history of emission reductions at Kennecott is directly related to the observable improvement in air quality. This history is discussed below and also depicted in Figure 4 and Table 4.

Historic Emission Levels - Until 1978, copper concentrate was smelted in reverberatory furnaces to produce copper matte, which was converted to copper in Pierce-Smith converters. Most of the SO_2 in the converter gas was captured by single-contact acid plants, but the SO_2 from the reverberatory furnaces was uncontrolled. In 1978-1979, the reverberatory furnaces were replaced by Noranda reactors, and a new single-contact acid plant was added so that SO_2 from both reactors and converters would be controlled. Also, the old 400-foot stacks were replaced by a 1200-foot stack to reduce the effect of terrain-induced downwash. From 1978 through 1982, a series of improvements was made to reduce fugitive emissions or to capture and route them up the 1200-foot stack.

In 1981, the Utah administrative rules for air quality (R307) were revised to include emission limitations and control requirements for Kennecott's smelter main stack and smelter fugitive emissions. Enforceable improvements in emissions control were also made at Kennecott's molybdenite heat treaters and refinery. These changes were also reflected in the rules, along with a standard for the sulfur content in coal burned at Kennecott’s power plant.

Also in 1981, Utah submitted to EPA a SIP demonstrating attainment of the SO_2 standards. That SIP was based on these technological improvements. The modeling analysis done by the State, as part of that SIP, demonstrated attainment of the SO_2 NAAQS in the low terrain at the Beach and Magna sites. It used the same emission rates for the 1200-foot stack, molybdenite heat treaters, refinery, and power plant that appeared in R307. It also relied on estimates of smelter fugitive emissions that were most directly responsible for the monitored exceedances of the NAAQS at those locations. Since these emissions were difficult to actually quantify, the SIP made no attempt to establish an enforceable limit on fugitive emissions. Rather, it required Reasonable Available Control Techniques (RACT) to address the prevention and capture of fugitive emissions.

The State’s modeling analysis did not address SO_2 concentrations in the elevated terrain. EPA, however, made some assessments in the high terrain on accessible property that was not owned by Kennecott, and found no violations of the SO_2 standards. The emission rates relied upon in that analysis were the limitations for the main stack which appeared in R307. No other source of SO_2 was considered to impact on the high terrain.

The improvements in technology that were made between 1978 and 1982 have been directly responsible for the end to violations of the SO_2 NAAQS. The trend of the 24-hour concentrations recorded at Magna for the same time period, and shown in Figure 2, underscores the effect that these technological improvements had.

Current Emission Levels - In 1991 the State promulgated its PM10 SIP for the Salt Lake County nonattainment area. Sulfur dioxide was identified as a precursor to secondary PM10 formation, and the control strategy for PM10 relied heavily on the control of SO_2 emissions in Salt Lake and southern Davis Counties. To comply with the PM10 SIP emission limits (as well as other reasons), Kennecott again upgraded its smelter technology, replacing the Noranda smelter with flash furnace technology, replacing the Pierce-Smith converters with a new flash converting furnace, and replacing the single contact acid plants with a double contact acid plant. These changes, collectively called the smelter modernization, actually took place during a period of time from 1992 through 1995.

Smelter modernization effectively reduced the SO_2 emission limit at the main stack from 18,200 lb/hr (annual average) to 3,204 lb/hr. Since the impact on elevated terrain within the SO_2 nonattainment area is due entirely to emissions from the 1200-foot stack, the smelter modernization is obviously pertinent to any discussion of SO_2 attainment.

Concerning the impact at low level, there were a number of other sources that were determined, by the 1981 SIP, to be significant. These included the molybdenite heat treaters, the refinery, the power plant, and smelter fugitive emissions. These sources were affected by the smelter modernization in the following ways:

Molybdenite heat treaters – This process had occurred at two distinct locations (Arthur and Magna.) The 1981 SIP had relied upon 70% control of SO_2 via wet scrubbers to achieve an enforceable emission rate of 139 lb/hr at each facility. In the current configuration, all molybdenite heat treating takes place at the Copperton Concentrator, and the allowable emission rate is only 26.2 lb/hr. Interestingly, a tracer study performed to better understand the SO_2 impact at the Beach location indicated that the impact from the moly heat treaters was greater than had been believed. So too, concluded the EPA, was the effect of the 70% removal efficiency at these sources.

Refinery – The 1981 SIP required that a new wet scrubber be constructed to achieve an allowable emission rate of 117 lb/hr. In the current configuration, it is no longer necessary to limit SO_2 emissions at the refinery. This source of low level SO_2 emissions has essentially been eliminated.

Power Plant – The 1981 SIP essentially codified the average sulfur content of the coal that was burned in 1979. The allowable rate was 0.48 lb sulfur per million btu. The power plant was held to a similar limit in the 1991 PM10 SIP, 0.52 lb sulfur per million btu (annual basis), which represents a relaxation of the 1981 limit. Nevertheless, the 1981 limit never represented any actual control of SO_2 emissions. Given the degree of improvement observed at the low-level monitors, in conjunction with the control strategies directed at the other low-level sources, the State's conclusion is that the 0.48 lb sulfur per million btu limitation on coal sulfur content is not necessary to ensure compliance with the SO_2 NAAQS.

Smelter Fugitive Emissions – While difficult to quantify, the 1981 SIP identified smelter fugitive emissions as the most significant contributor to the exceedances observed at low elevation. The SIP required RACT as it applied to the gas handling systems, acid plant effluent, and prevention of malfunctions. These changes in equipment and operating procedures applied to the smelter as it was configured prior to modernization. With construction of the new smelter building and associated facilities such as the acid plant, the specific details of the prescribed RACT from 1981 were superceded by RACT elements envisioned by the 1991 PM10 SIP. Again, the focus was on the operation and maintenance of a newly constructed gas handling system. It also required contained conveyance of acid plant effluent solutions. The modeled demonstration of PM10 attainment included in the 1991 SIP relied upon an estimate of 4,380 tons of SO_2 per year for smelter fugitive emissions (1.000 lb/hr.) Technical support documentation from that SIP indicates that un-captured fugitive emissions from the smelter were approximately 2,500 lb/hr.

New - SO_2 emission limits for the smelting process, as well as for the power plant, refinery and molybdenum heat treaters were incorporated into the Utah SIP at Section IX.H (formerly Appendix A to Section IX. Part A), which was approved as part of the PM10 SIP. These limits are, therefore, federally enforceable.

SIP Section IX.H, Emission Limitations, was also updated in 1992 and submitted to EPA on May 15, 1992 as part of the SO_2 SIP revision to protect the 3-hour secondary standard. The new smelter limits are nearly an order of magnitude lower than those relied on in the 1981 SIP.

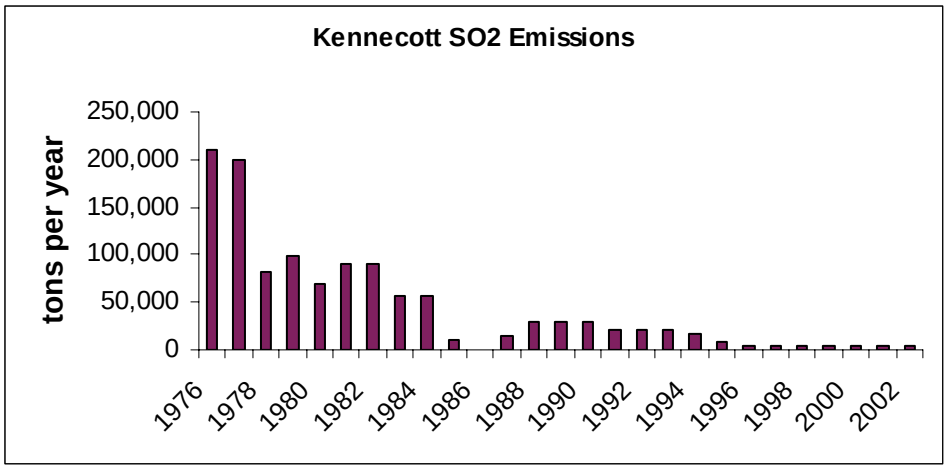
Again referring to Figures 2 and 3, the sequence of events described above is entirely relevant to the sequence of SO_2 concentrations monitored at Magna and at the Beach sites. It is worth pointing out that these two monitors are likely sensitive to different modes of SO_2 emissions and release points. The data collected at the Beach site(s) is largely influenced by low level fugitive emissions, and the reductions seen in these values are indicative of improvements made in capturing these emissions as part of the smelter modification[1] in the early 1990s as well as KUC's attention to operational practices during the years between promulgation of the PM10 SIP and actual construction of the new smelter. The data collected at the Magna site documents not only the effect of the 1,200 foot stack, but also the other improvements made as part of the 1981 SO_2 SIP and the smelter modernization in the early 1990s. Also of interest is the data spanning the end of 1985 through most of 1987, during which time the power plant and smelter were down for economic reasons. This serves to illustrate the singular nature of the sources affecting this monitor.

Figure 4 shows, in tons per year, the trend of SO_2 reductions at KUC from 1976 through 2003.[2]

[1] As noted in Section IX.B.3.c, the estimate of fugitive emissions routed out the 1200-foot stack as part of smelter modifications was 4500 lb/hour (24-hour basis).

[2] DAQ did not require emission inventories in 1989 or 1991. As per the KUC letter of March 2, 2000, the emissions in 1989 were about the same as those in 1988, and the emissions in 1991 were about the same as those in 1992.

Figure 4. Kennecott SO_2 Emissions, 1976-2002



Referring again to Figure 2, it could also be inferred from the way in which the data from the two monitors tracks that SO_2 concentrations throughout the Salt Lake valley are influenced to some degree by meteorology. In particular, low level temperature inversions may serve to concentrate SO_2 at ground level. However, the correlations observed between emission reductions at KUC and the monitored concentrations at the Beach and Magna sites would suggest that improvement in air quality cannot be ascribed solely to favorable meteorology. In fact, the low concentrations observed at the Salt Lake sites since 1993 track quite well with significant SO_2 emission reductions required in the vicinity of these measurements as part of the PM10 SIP. Although this SIP was promulgated in 1991, it was not until December 10, 1993, that application of the associated control elements was required. Also effective in 1993 was the federal requirement limiting the sulfur content in on-road diesel fuel to no more than 0.05%. The average sulfur content before 1993 was 0.43%. Note that the data in Figure 2 labeled "Salt Lake" was collected at the County Health Department building until 1994, and at the North Salt Lake site (1795 S. 1000 W.) thereafter.

(4) Maintenance Plan

CAA 107(d)(3)(E)(iv) - *The Administrator has fully approved a maintenance plan for the area as meeting the requirements of section 175A.* This is discussed separately in Section IX.B.6.c below.

(5) Section 110 and Part D Requirements

CAA 107(d)(3)(E)(v) - *The State containing such area has met all requirements applicable to the area under section 110 and part D.* Section 110 of the CAA deals with the broad scope of state implementation plans and the capacity of the respective state agency to effectively administer such a plan. Sections I through VIII of Utah's SIP contain information relevant to these criteria. Part D deals specifically with plan requirements for nonattainment areas, and includes the requirements for a maintenance plan in Section 175A. The fact that the attainment plan for SO_2 (SIP Section IX.B.1 - 5) has been fully approved by the EPA would suggest that Utah's air program meets the Part D requirements.

c. Maintenance Plan

The specific requirements for an approvable maintenance plan are outlined in CAA Section 175A. These criteria are paraphrased below in Table 3, and addressed in turn.

Table 3. Requirements of a Maintenance Plan

Category	Requirement	Reference	Addressed in Section
Maintenance Demonstration	Provide for maintenance of the relevant NAAQS in the area for at least 10 years after redesignation. Demonstration is made showing that the future mix of sources and emission rates will not cause a violation of the NAAQS.	CAA: Sec 175A(a)	IX.B.6.c(1)
Revise in 8 Years	The State must commit to revising the maintenance plan 8 years after redesignation	CAA: Sec 175A(b)	IX.B.6.c(2)
Continued Implementation of Nonattainment Area Control Strategy	The Clean Air Act requires continued implementation of the nonattainment area control strategy unless such measures are shown to be unnecessary for maintenance or are replaced with measures that achieve equivalent reductions.	CAA: Sec 175A(c), CAA Sec 110(l), Calcagni memo	IX.B.6.c(3)
Contingency Measures	Areas seeking redesignation from nonattainment to attainment are required to develop contingency measures that include State commitments to implement additional control measures in response to future violations of the NAAQS.	CAA: Sec 175A(d)	IX.B.6.c(4)
Verification of Continued Maintenance	The maintenance plan must indicate how the State will track the progress of the maintenance plan.		IX.B.6.c(5)

(1) Maintenance Demonstration

CAA 175A(a) - *Each State which submits a request under section 107(d) for redesignation of a nonattainment area as an area which has attained the NAAQS shall also submit a revision of the applicable implementation plan to provide for maintenance of the NAAQS for at least 10 years after the redesignation. The plan shall contain such additional measures, if any, as may be required to ensure such maintenance.* As discussed above in Section IX.B.6.b, there has not been a violation of any SO_2 NAAQS since 1981 at any of the monitoring locations in the nonattainment area. This is evidence that the improvements made at the smelter in the late 1970s and early 1980s resulted in emission levels and dispersion characteristics that were sufficient to achieve and maintain the SO_2 NAAQS at low elevation (4,200 - 5,600 feet). These improvements included replacement of the uncontrolled reverberatory furnaces with Noranda reactors and the associated acid plant, control of low level fugitive and stack emissions, and the addition of the 1,200-foot stack.

Dispersion modeling done in conjunction with the 1981 SO2 SIP had predicted this result, using emission rates that reflected these improvements in emission characteristics. These emission rates were incorporated into the Utah administrative rules for air quality (R307,) and pertained to the following sources: smelter fugitive emissions, the molybdenite heat treaters at Magna and Arthur, the Refinery

Fusion Kiln, and the power plant. These limits are shown as part of Table 4 below.

These emission levels have been further reduced by even more stringent SO_2 emission limitations that reflect yet another period of smelter modernization in the early 1990s. Since the new emission limits represent emission rates that are significantly less than what was modeled to show attainment of the SO_2 NAAQS in the 1981 SIP, it follows that the demonstration of attainment and maintenance of the SO_2 NAAQS at low levels is preserved via the permanence and continued enforceability of the new emission limits at these sources, to the extent that they still exist. The new limits, summarized below, have been incorporated into the Utah SIP at the following locations:

Source	Limit	Reference[3]
Smelter Fugitive Emissions	RACT	Section IX.H.2.b.V.A
Molybdenite Heat Treaters	26.2 lb/hr	Section IX.H.2.b.X
Utah Power Plant	0.52 lb/mmbtu	Section IX.H.2.b.Z

It should be pointed out that all moly heat treating now takes place at the Copperton Concentrator, and that the former facilities at Magna and Arthur no longer exist. Thus it is no longer necessary to rely on the emission limits that formerly applied. Likewise, the Refinery Fusion Kiln is no longer a source of SO_2 emissions.

Table 4 illustrates the succession of emission limits at the sources responsible for elevated concentrations of SO_2 at low elevations. It also shows actual emission inventories for the periods of time represented by the enforceability of these various limits. The progression of SO_2 control throughout the last 25 years is apparent in this table.

At high elevations (above 5,600 feet), the Kennecott Smelter is the only likely source of concern. The discussion in Section IX.B.3.d, Analysis of Control Strategy, shows that the emission levels allowed by the current SO_2 SIP are more than adequate to assure maintenance of the SO_2 NAAQS at high-elevation locations accessible to the public. In fact, the modeling and monitoring relationships outlined in Section IX.B.3.d suggest a safety factor of roughly 100%. Utah will continue to rely on this modeling demonstration to assure continued maintenance of the SO_2 NAAQS in the elevated terrain. The emission limits used therein are incorporated in the Utah SIP at Section IX. Part H.2.b.V.B (formerly 2.2.V.B. of Appendix A to Section IX. Part A), and as such remain federally enforceable. Table 4 also illustrates the effect that smelter modernization had on the emission rate for the 1200-foot stack.

[3] These references were formerly 2.2.V.A., 2.2.X, and 2.2.Z, respectively of Appendix A to Section IX. Part A.

Table 4. Kennecott: Historical SIP Limits and Inventories (SO2, tons/year)

Sources	impacted area	**1979**	Limits		**1990**	1981 SIP Limits		**1999**	1991 SIP Limits
main stack	elevated terrain	**67,900**	none		**22,382**	79,700 tpy		**629.8**	14,200 tpy
Smelter Fugitives	Beach / Magna	16,500	none		4,380	RACT		157.7	RACT
Utah Power Plant	Beach / Magna	4,759	none		2,905	0.48 lb/mmbtu		2,786.1	0.52 lb/mmbtu
Magna Moly Heat Treater	Beach / Magna	1,988	none		NA	608 tpy		NA	discontinued
Arthur Moly Heat Treater	Beach / Magna	1,988	none		NA	608 tpy		NA	discontinued
Copperton Moly Heat Treater		NA	NA		0.7	NA		0.1	115 tpy
Refinery	Beach / Magna	1,512	none		4.2	512 tpy		0.4	none
subtotal	Beach / Magna	**26,747**			**7,290**			**2,944**	
total		**94,647**			**29,672**			**3,574**	

Notes:

1. The 1979 inventory was compiled as part of the 1981 SIP revision.
2. The 1990 inventory represents the period between the first round of smelter modifications and the second round, which coincided with the PM10 SIP.
3. The 1999 inventory represents the period after the second smelter modification.
4. The 1981 SIP "ton/yr" limits were actually expressed in lbs/hr (18,200 annual avg. at the main stack, 139 lb/hr at each Moly Heat Treater, and 117 lb/hr at the refinery fusion kiln).
5. The 1991 SIP limits actually come from the PM10 SIP. The "ton/yr" limits were actually expressed in terms of lbs/hr (3,240 lb/hr annual avg at the main stack, 26.2 lb.hr for the Moly Heat Treater at the Copperton Concentrator).

As part of the 1992 SO_2 SIP, Utah also made revisions to the rule concerning sulfur content in fuels (R307-203.) These revisions involved the addition of a 24-hour averaging period for determining the sulfur content of coal, fuel oil, and fuel mixtures, and to specify the ASTM methods to be used to demonstrate compliance with the limitation and reporting requirement.

Since these emission limitations remain federally enforceable and have been sufficient to ensure continued attainment of the SO_2 NAAQS, there is no need to require any additional control measures to maintain the SO_2 NAAQS.

These conditions demonstrate maintenance through 2016.

Concerning the banking of any emission reduction credits for SO_2, the emission levels identified above and incorporated into the Utah SIP at Section IX. Part H (formerly Appendix A to Section IX. Part A,) should serve to establish a baseline for the emission rates relied upon by the 1992 SO_2 attainment SIP as well as this maintenance plan. These emission reduction credits shall be allowed to the extent that they are established by actual, verifiable, and enforceable reductions in SO_2 emissions below the levels relied upon by the 1992 SO_2 attainment SIP and this maintenance plan.

(2) Revise in Eight Years

CAA 175A(b) - *Eight years after redesignation, the State must submit an additional plan revision which shows maintenance of the applicable NAAQS for an additional 10 years.* The State of Utah agrees to fulfill this obligation at the appropriate point in time.

(3) SIP Requirements Remain in Force

CAA 175A(c) - *Until such plan revision is approved and an area is redesignated as attainment, the requirements of CAA Part D, Plan Requirements for Nonattainment Areas, shall remain in force and effect.* The Clean Air Act requires the continued implementation of the nonattainment area control strategy unless such measures are shown to be unnecessary for maintenance or are replaced with

measures that achieve equivalent reductions. Utah will continue to implement the emissions limitations and measures from the SO_2 SIP, with the following exception: upon redesignation to attainment, PSD requirements will apply in lieu of nonattainment New Source Review requirements.

(4) Contingency Measures

CAA 175A(d) - *Each maintenance plan shall contain contingency measures to assure that the State will promptly correct any violation of the standard which occurs after the redesignation of the area to attainment. Such provisions shall include a requirement that the State will implement all control measures which were contained in the SIP prior to redesignation.* Utah has implemented all measures contained in the plan, and will continue to do so even after redesignation. This revision need only address such contingency measures as may be necessary to mitigate any future violation of the standard.

The State will rely upon ambient SO_2 monitoring to determine whether a violation has occurred. Upon monitoring a violation of the SO_2 NAAQS, the State will take the following actions.

- The State will identify the source(s) of SO2 causing the violation, and report the situation to EPA Region VIII within four months.

- The State will identify a means of corrective action within six months. The maintenance plan contingency measures to be considered and selected will be chosen from the following list or any other emission control measures deemed appropriate based on a consideration of cost-effectiveness, emission reduction potential, economic and social considerations, or other factors that the State deems appropriate:

    - Re-evaluate the permissible sulfur content of fuels for commercial and industrial sources, as established in R307-203;

    - Further controls on stationary sources.

- The State will require implementation of such corrective action no later than one year after the violation was confirmed.

(5) Verification of Continued Maintenance

Implicit in the requirements outlined above is the need for the State to determine whether the area is in fact maintaining the standard it has achieved. There are two complementary ways to measure this: 1) by monitoring the ambient air for SO_2, and 2) by inventorying emissions of SO_2 from its sources.

The State will continue to maintain an ambient monitoring network for SO_2 in accordance with 40 CFR Part 58 and the Utah SIP. The State anticipates that the EPA will continue to review the ambient monitoring network for SO_2 each year, and any necessary modifications to the network will be implemented.

The State will also continue to collect actual emissions inventory data from all sources of SO_2 in Salt Lake County in excess of 25 tons per year (as per R307-150). More pertinent to the continued maintenance of the SO_2 NAAQS in the former nonattainment area is the actual emissions of SO_2 from Kennecott. Emissions from the 1200-foot stack at Kennecott are recorded by a continuous emissions monitor (CEM), and are reported to the DAQ on a monthly basis for purposes of compliance. All other sources at Kennecott are inspected by DAQ to ensure compliance with relevant SIP conditions.