PART I
REVISED AIR DISPERSION MODELING ANALYSIS
PM_{10} AND SO_2 SIGNIFICANT IMPACT AREA AND REFINED MODELING

I.0 REVISED AIR DISPERSION MODELING ANALYSIS

In April 2003, City Utilities of Springfield (CU) submitted a Prevention of Significant Deterioration (PSD) permit application for a new nominal 275 megawatt (MW) coal-fired boiler at their existing Southwest Power Station near Springfield, Missouri. The modeling that was submitted with the permit application included modeled impacts of nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter less than ten (10) microns in aerodynamic diameter (PM_{10}). For NO_2 and CO, it was determined that the new boiler and ancillary equipment, referred to as Southwest Power Station Unit 2 (SWPS Unit 2), would not have impacts greater than the modeling significance levels and no further modeling was performed. Additionally, for the annual impacts SO_2, the modeling indicated that the proposed facility would not have impacts greater than the modeling significance levels and no further modeling was needed.

However, for the 3-hour and 24-hour SO_2 impacts and the 24-hour and annual PM_{10} impacts, the model predicted off-site ambient impacts greater than the modeling significance levels. Pursuant to 40 CFR 52.21 and Missouri Regulation 10 CSR 10-6.060(8), a refined modeling analysis was required to determine if this facility would be in compliance with the PSD Class II increments and National Ambient Air Quality Standards (NAAQS). This supplement to the PSD permit application contains the results of the PM_{10} and SO_2 modeling including the annual averaging periods per Missouri Air Pollution Control Program (APCP) request. As can be seen in the modeling results, impacts of PM_{10} and SO_2 from the operation of this facility, while greater than the modeling significance levels, will not violate the NAAQS or exceed the increment consumption allowable for this area. Therefore, no further modeling is required for either pollutant.

I.1 AIR DISPERSION MODEL

Air dispersion modeling was performed using the latest version of the ISCST3 model (Version 02035). The ISCST3 model is an EPA-approved, steady state, Gaussian air dispersion model that is designed to estimate downwind concentrations from single or multiple sources using supplied meteorological data. The ISCST3 model is used for most industrial sources and PSD permits and is an appropriate model for this type of industrial facility.

Major features of the ISC model are as follows:

- Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions;
- The influence of building wakes on plume transport and dispersion as evaluated by the Huber and Snyder Method for physical stack heights that are greater than hb + 0.5(lb), where hb is the building height and lb is the lesser of the building height or width, and by the Schulman and Scire Method for stack heights that are less than or equal to hb + 0.5(lb);
- Regulatory default option;
- Buoyancy-induced dispersion algorithm;
- Calm wind treatment of meteorological data;
- Procedures suggested by Briggs for evaluating stack-tip downwash;
- Default wind profile exponents;
- Default vertical potential temperature gradient;
- Consideration of the effect of gravitational settling and dry deposition on ambient particulate concentrations;
- Capability of simulating line, volume, and area sources;
- Concentration estimates for 1-hour to annual average; and,
- Adjustment procedures for complex terrain.

Details of the modeling algorithms contained in the ISC model may be found in the User's Guide for ISC. The regulatory default option was selected for this analysis since it met the EPA guideline requirements.

I.2 MODEL STACK PARAMETERS

I.2.1 Modeling Scenarios

Modeling runs were conducted differently for full load and partial loads confirm that operation of SWPS Unit 2 will not result in impacts greater than the NAAQS or PSD increments. The stack parameters used in the analysis were provided in Part 7 of the original PSD permit application and are provided in this supplement in Table I-1. Emission rates for each of the pollutants at each operating load are given in Table I-2, along with the corresponding BACT emission limits.

Table I-1: SWPS Unit 2 – Boiler Stack Parameters

Stack Height	Stack Diameter	Stack Temp. (°F)	Exit Velocity (ft/s)			
			100% Capacity	75% Capacity	50% Capacity	25% Capacity
513 ft	14 ft	165	81.6	61.2	40.8	20.4

Table I-2: Modeled Emission Rates for SWPS Unit 2

Pollutant	Emission Rate (lb/mmBtu)	Capacity Emissions (lb/hr)			
		100%	75%	50%	25%
NO_X	0.08	217.9	163.4	109.0	54.5
SO_2	0.12	326.9	245.2	163.5	81.7
CO	0.15	435.8	326.9	217.9	109.0
PM_{10}	0.018	49.0	36.8	24.5	12.3

I.2.2 SO_2 Modeling Setup

In addition to the steady-state emission rates listed in Table I-2, the APCP requested that CU provide short-term emission rates for SO_2. After discussion with flue gas desulfurization (FGD) system manufacturers, it was determined that the 3-hour and 24-hour emission rates could potentially be higher than the steady-state 30-day rolling average of 0.12 lb/mmBtu due to normal plant operations.

The 30-day rolling average emission rate for SO_2 was determined to be 0.12 lb/mmBtu based on the BACT analysis. Short-term (3-hour and 24-hour) averages may be affected due to normal plant operations. Normal scrubber operations necessitate the cleaning and flushing of the lime slurry feed loop to the atomizers in the Dry FGD and the replacement of the atomizers themselves. During cleaning and atomizer replacement, which usually occurs once per month, the overall Dry FGD efficiency will be reduced. As a worst-case scenario, if a single atomizer module is used, then the entire gas stream has the potential of being unscrubbed during the change-out. It is estimated that a scrubber change-out could be done in two hours, and when the module comes back on-line, the gas stream will be over-scrubbed in order to put the unit back into compliance with the 30-day rolling BACT limit. The short-term emission rates for SO_2 (3-hour and 24-hour) would be affected by these operations.

In order to estimate a 3-hour emission rate to use in the NAAQS and PSD Increment compliance modeling, the unit is assumed to have an uncontrolled SO_2 emission rate for two hours and an over controlled emission rate for one hour. The estimated maximum three hour emissions are then calculated as follows:

$$(1.195 \text{ lb/mmBtu}) \cdot (2{,}724 \text{ mmBtu/hr}) * (2 \text{ hours}) + (0.08 \text{ lb/mmBtu}) \cdot (2{,}724 \text{ mmBtu/hr}) * (1 \text{ hour}) = 6{,}728.6 \text{ lb } SO_2\text{/3-hours}$$

It is assumed that one of these operations might occur in any 24-hour period and would therefore be considered a worst-case scenario. There would be only three hours during which the emission rate would be 6,728.6 pounds while the remaining 21 hours would have an overcontrolled emission rate of 0.08 lb/mmBtu. The emission rate that would occur on a 24-hour basis was therefore calculated as follows:

(6728.6 pounds per 3-hours) +

[(0.08 lb/mmBtu) * (2,724 mmBtu/hr) * (21 hours)] = 11,305 pounds/24-hours

The maximum emission rates were calculated for the boiler for use in the model on a 3-hour and a 24-hour averaging period. Emissions are as follows:

Steady-State E_{SO2} = (0.12 lb/mmBtu) * (2,724 mmBtu/hr)

= 326.9 lb/hr

24-hour E_{SO2} = 11,305 lb SO_2/24-hours

= 471.04 lb SO_2/hr (averaged)

3-hour E_{SO2} = 6,728.6 lb SO_2/3-hours

= 2,242.9 lb SO_2/hr (averaged)

This equates to the following emission rates at the modeled load levels:

Table I-3: Short-Term Emission Rates for SWPS Unit 2

Boiler Load	Emission rate	
	24-hr Average	3-hr Average
100%	471.04	2,242.9
75%	353.28	1,682.2
50%	235.52	1,121.4
25%	117.76	560.7

While it is hoped that SWPS Unit 2 will only process a feed loop cleaning/flushing or an atomizer change-out while the unit is operating at full capacity, CU may reduce the load on the boiler in order to remain under the total 3-hour and 24-hour emission rates. Therefore, modeling runs of the boiler operating at 75 percent, 50 percent and 25 percent capacity were also performed.

I.2.3 PM_{10} Modeling Setup

As new PM_{10} emission points have been added to this modeling analysis, the PM_{10} setup is briefly addressed. However, the categorization of sources and modeling assumptions for all points that have already been submitted have not changed. As in the original PSD modeling setup, the PM_{10} sources can be broken into two distinct groups – point sources and fugitive sources. The point sources included the following:

Cooling Tower	Fly Ash:	Lime:	Coal:
	• Storage • Loading	• Unloading • Storage	• Unloading • Transfer

The emission calculations associated with each of these points and their corresponding designations for modeling purposes are described in Part 3 of the original PSD application.

Additionally, fugitive sources will generate PM_{10} emissions in conjunction with the new boiler. Fugitive emissions will arise from the following operations:

Haul Roads:	Storage Piles:	Conveyors:	Landfill:
• Lime transport on-site • Ash transfer to landfill • PAC transport on-site • Coal hauling to James River	• Active pile wind erosion • Active pile vehicular traffic • Dead pile wind erosion • Dead pile vehicular traffic	• Non-baghouse controlled drop points	• Wind erosion • Vehicular traffic

The equations used to estimate the emissions from the haul roads are described in Part 3.9 of the original PSD application while the emissions from the storage piles are explained in Part 3.10. Details of the calculations are in Appendix D of the original PSD. A detailed description of the emission calculations for all operations that are new with this submittal (PAC points, new coal loop) are included in Appendix B of this application.

In accordance with APCP guidance, the parameters for volume and area sources are defined in the APCP modeling guidance document. Haul roads are modeled as area sources and are assumed to be 9.14 m (30 feet) wide. With a 10:1 aspect ratio, the maximum length of any haul road segment is 91.4 meters. This allows the haul roads to be broken up into segments that are no longer than 91.4 meters. The additional parameters for each haul road are as follows: a release height of zero meters, and an initial vertical dimension of 1.42 meters.

The coal loadout onto the storage pile (essentially an open conveyor drop point) was modeled as a volume source with a lateral dimension of 0.4651 meters, a vertical dimension of 1.395 meters and a release height of 1.5 meters.[1]

As in the original application, both the point and volume sources were modeled to correspond to the boiler operating at 100 percent capacity. During the runs where the boiler will be operating at 75, 50, or

25 percent capacity, the ancillary emission sources remained at emission levels corresponding to 100 percent unit load. While this method does not accurately reflect the operations at SWPS Unit 2, the results of the model yielded a worst-case impact scenario.

I.2.4 Good Engineering Practice Stack Height and Building Downwash

Good Engineering Practice (GEP) stack height was evaluated for SWPS Unit 2 in Part 7 of the original PSD permit application. The proposed boiler stack will comply with GEP, and as none of the original parameters have been modified, a further analysis was not performed for these modeling runs.

I.3 MODELING METHODOLOGY AND PARAMETERS

I.3.1 Significant Impact Area

The overall purpose of the revised PM_{10} and SO_2 modeling analysis is to ensure that operation of the proposed facility will not result in, or contribute to, concentrations above the NAAQS or PSD Class II increments. The significance levels, NAAQS, and Class II increments for the PM_{10} and SO_2 averaging periods are listed in Table I-4.

Table I-4: NAAQS, Significance Levels and Class II Increments (μg/m³)

Pollutant	Averaging Period	NAAQS	Modeling Significance Level	Monitoring Significance Level	PSD Class II Increments
PM_{10}	Annual	50	1	NA	17
	24-hour	150	5	10	30
SO_2	Annual	80	1	NA	20
	24-hour	365	5	13	91
	3-hour	1,300*	25	NA	512

* Secondary Standard

I.3.2 Receptor grid

The first step in the re-analysis is to determine the project's significant impact area (SIA) for PM_{10} and for the short-term SO_2 emission rates. The receptor grids for the two pollutants are based on the same principal, but are described in detail below.

[1] Based on "Source Guidance and Default Parameters" on the Missouri website at http://www.dnr.state.mo.us/alpd/apcp/protocolatt.pdf.

I.3.2.1 PM_{10} RECEPTOR GRID

The PM_{10} receptor grid was set up following the same methodology that was employed in the original PSD modeling analyses. The modeling runs were conducted using the ISCST3 model in simple terrain within a 10 by 10 kilometer Cartesian grid to determine the significant impact area for each pollutant. The grid incorporated the following spacing between receptors: 100-meter out to 2 kilometers, 250-meter out to 5 kilometers, and 1,000-meter out to 10 kilometers. Receptors were also placed along the fence line of the property at a spacing of 50 meters.

I.3.2.2 SO_2 RECEPTOR GRID

The SO_2 receptor grid was set up exactly the same as the PM_{10} grid with one distinction. As the 3-hour and 24-hour emission rates caused the SIA to extend beyond the original 10 kilometer grid, the "coarse" 1,000-meter grid was expanded out to a distance of 50 kilometers in each direction beyond the plant boundaries. This is accordance with APCP guidance. Receptors were again placed at the fence line at a spacing of 50 meters.

I.3.3 On-Site Receptors

As in the original modeling analysis, the two public roads traversing the site required modeling consideration. Farm Road 164 (also known as Walnut Lawn) runs east to west across the northern property. Farm Road 115 (also known as Haseltine Road) runs from the north and terminates as it intersects Farm Road 164. Additionally, Haseltine road runs in a north-south direction along the western fenceline of the property before turning into the property. The road cuts east-west across the southwestern portion of the property before leaving the fenced property boundaries. As these are publicly available roads, discrete receptors were placed along the roadway at a 50 meter spacing between each receptor. These receptors were evaluated to determine compliance with the NAAQS and PSD Class II increments.

I.3.4 Rural/Urban Land Use Classification

The original PSD application indicated that the rural/urban land use classification for SWPS Unit 2 and surrounding area is rural. Therefore, rural dispersion coefficients were again used in the air quality dispersion model.

I.3.5 Meteorological Data

Surface air meteorological data and upper air data from the Springfield-Branson Regional Airport in Springfield, Missouri were used in the analysis. The analysis was performed using the most recent 5-year meteorological data set (1997-2001).

I.3.6 Terrain Elevations

The base elevation at the proposed site is approximately 1,268 feet above mean sea level. After reviewing the topography of the area, it was determined that terrain elevations should be incorporated into the model. Therefore, the appropriate United States Geological Survey (USGS) 7.5 minute topographical maps [digital elevation model (DEM) files] was used to obtain the necessary receptor elevations, and the maximum elevation option for importing the elevations was used in the modeling program.

I.3.7 SWPS and James River Combustion Turbines

CU requests a limit on the sulfur content of fuel oil in combustion turbines at the Southwest Power Station (Emission Points E41, E42, E43 and E44) and James River Station (Emission Points E11 and E12). CU wishes to limit the input fuel sulfur in the fuel oil to 0.1 percent by weight. This will reduce the potential SO_2 emissions from these six units. There are no daily or annual limitations on any other aspect of the operation of these units (fuel throughput, daily or annual operation, etc.).

I.3.8 Cavity Analysis

The ISCST3 program cannot model impacts that occur within the cavity regions of building downwash. As such, a cavity analysis was performed for all stacks in the original analysis. As stack and building heights have not changed for the emission points previously submitted with the PSD application, those cavity analyses are not re-examined here. For the stacks that are new with this submittal (EP-119 through EP-128), the SCREEN3 modeling program was run (version 96043). SCREEN3 was only used to calculate the impact from point sources within the cavity regions of buildings. CU ran the SCREEN3 model for each new point source using a 1 g/s emission rate. Predicted concentrations were then scaled to the source-specific maximum emission rate. If these predicted concentrations did not occur at an ambient receptor, then further analysis was not required. Since the SCREEN3 model generates 1-hour concentrations, the following approved EPA conversion factors were used to compute concentrations for longer averaging periods.

Table I-5: SCREEN3 Conversion Factors

Averaging Time	Conversion Factor
3-hour	0.9
8-hour	0.7
24-hour	0.4
Annual	0.08

Analysis of the output from the SCREEN3 model indicated that there were no predicted concentrations at an ambient receptor, and it was therefore not necessary to include the cavity concentrations in the final modeling analysis. The input and output files from the cavity analysis performed on the new stacks can be found on the CD-ROM located in Appendix D.

I.3.9 Background Concentrations

The background concentrations for PM_{10} and SO_2 were provided by the APCP. Actual monitored values are used in the analysis and the values used in this analysis are listed in Table I-6.

Table I-6: Ambient Background Concentrations ($\mu g/m^3$)

Averaging Period	PM_{10}	SO_2
3-hour	NA	78.3
24-hour	57	44.4
Annual	20	10.4

I.4 MODELING RESULTS

I.4.1 PM_{10} Results

As with the original modeling, after examining the modeling results at all load levels, it was determined that the model predicted that impacts greater than the 24-hour and annual modeling significance level occurred, and that refined modeling was required. Table I-7 lists the maximum predicted impacts from SWPS Unit 2. The model input and output files are provided in Appendix D on CD-ROM with one copy of this supplement.

I.4.2 Short-Term SO_2 Results

The original modeling, using the steady state 30-day emission rate of 0.12 lb/mmBtu, indicated that refined modeling would be required. When using the 3-hour and 24-hour emission rates, the model again predicted that impacts greater than the respective modeling significance levels triggered the requirement for refined modeling. Table I-7 lists the maximum impacts from SWPS Unit 2. The model input and output files are provided in Appendix D on CD-ROM with one copy of this supplement.

Table I-7: PM_{10} and SO_2 SIA Concentrations

Pollutant	Boiler Emission Rate	Averaging Period	UTM Coordinates (meters)		Year	Predicted Concentration (μg/m³)	Modeling Significance Level (μg/m³)
			East	North			
PM_{10}	0.018 lb/mmBtu	Annual	465276.7	4111822.3	2000	3.22	1
	0.018 lb/mmBtu	24-hour	466536.9	4110183	2001	11.92	5
SO_2	0.12 lb/mmBtu	Annual	465714.81	4114957.5	2000	0.31	1
	0.12 lb/mmBtu	24-hour	466014.8	4113508	1997	6.02	5
	0.12 lb/mmBtu	3-hour	464314.8	4111308	2001	27.97	25
	471.04 lb/hr	24-hour	466014.8	4113507.5	1997	8.67	5
	2,242.9 lb/hr	3-hour	464314.8	4111307.5	2001	191.9	25

I.5 NAAQS AND PSD CLASS II INCREMENT MODELING

I.5.1 Particulate Matter

I.5.1.1 PM_{10} REFINED MODELING METHODOLOGY

Once the SIA modeling was completed, plot files were run and the receptors were identified that recorded an impact greater than the PSD modeling threshold. The receptors that were identified were those that recorded an impact in any year of the 5-year meteorological data set greater than either the 24-hour or annual PSD modeling threshold. Once these receptors were identified, they were placed back into the model. As SWPS Unit 2 and its ancillary equipment did not have a significant impact at any other receptor in the original modeling domain, at all receptors outside of those identified in the SIA determination, SWPS Unit 2, by definition, does not have a significant impact, and no further analysis on those receptors is required. Only these receptors where SWPS Unit 2 had an impact greater than the PSD modeling significance threshold were examined for compliance with the NAAQS and PSD Class II Increments per NSR Workshop Manual directions.

I.5.1.2 PM_{10} CLASS II INCREMENT MODEL

After discussions with the APCP, it was determined that the SWPS Unit 2 PSD permit application triggered the PM_{10} major source baseline date in Greene County. As such, there are no other PM_{10} increment consuming sources to evaluate. The receptors identified in Part I.5.1.1 are the only ones at which PM_{10} Class II Increment is consumed. An examination of these receptors indicated that the maximum 24-hour and annual modeled concentrations were below the PSD Class II increment level, and no further analysis was required. The SWPS Unit 2 project will consume some increment in the immediate vicinity of the Southwest Power Station, but the majority is available for further growth in the area. Table I-8 lists the results from the PSD Class II increment analysis for PM_{10}. A list of all receptors at which the PM_{10} Class II Increment is consumed and the maximum predicted increment consumed is included on CD-ROM in Appendix D.

Table I-8: PM_{10} Increment Modeling Results

Pollutant	Averaging Period	PSD Class II Increment	Maximum Modeled Impact: SWPS Unit 2 and Ancillary Equipment			
			Easting	Northing	Year	Concentration
PM_{10}	24-hour	30	466536.9	4110183	2001	11.92
	Annual	17	465276.7	4111822.3	2000	3.22

The model input and output files are provided on CD-ROM in Appendix D.

I.5.1.3 PM_{10} NAAQS MODEL

Other sources in the area, both on- and off-site, must be taken into account when determining compliance with the NAAQS. CU assisted APCP in compiling a list of affected sources. The stack parameters, locations and emission rates for all sources were determined and manipulated into a useable format. Electronic DEM files were used to provide the elevation for all NAAQS sources. The resulting NAAQS inventory is included on the CD-ROM in Appendix D. The 24-hour and annual background concentrations were provided by the APCP and are listed in Table I-6. For the annual PM_{10} impact, the highest value in the five-year data set was used, and the background concentration was added to determine the overall ambient concentrations. For the 24-hour impact, modeling guidance indicates that the five year data set be evaluated as a whole, and the sixth highest 1st high in that data set be evaluated for compliance with the NAAQS standard. This value was found using a SAV file and the 1997-2001 meteorological data set. The sixth highest 1st high was found, and the appropriate background concentration was then added to determine the overall ambient concentration.

After examining the PM_{10} modeling results for the 24-hour and annual averaging periods, it was determined that SWPS Unit 2 will not cause the NAAQS to be exceeded at any point where the facility will have a significant impact. According to the Draft NSR Workbook, no further modeling is required for PM_{10}. Table I-9 lists the results from the NAAQS analysis.

Table I-9: PM_{10} NAAQS Modeling Results

Pollutant	Averaging Period	NAAQS	Maximum Modeled Impact: All NAAQS Sources				Background Concentration	Total Concentration
			Easting	Northing	Year	Concentration		
PM_{10}	Annual	50	465226.69	4111822.25	2000	15.82	20.0	35.82
	24-hour	150	465226.69	4111822.25	1998	59.91	57.0	108.91

I.5.2 Sulfur Dioxide

I.5.2.1 SO_2 REFINED MODELING METHODOLOGY

The SO_2 impact area was broken into three distinct models: the short-term 3-hour impact, the short-term 24-hour impact and the annual steady-state impact. In all three cases, the receptors that were chosen for incorporation into the modeling analysis were those that recorded an impact in any year of the 5-year meteorological data set greater than the respective PSD modeling threshold. Once these receptors were identified, they were placed back into their respective models. This was done once for the results from the 3-hour SIA modeling runs, once for the 24-hour SIA modeling runs and once for the steady-state 0.12 lb/mmBtu modeling runs. In each case, any receptor where SWPS Unit 2 did not have an impact greater than the corresponding PSD modeling threshold was eliminated from the refined modeling analysis as the proposed boiler, by definition, does not have a significant impact, and no further analysis on those receptors is required. Only these receptors where SWPS Unit 2 had an impact greater than the PSD modeling significance threshold were examined for compliance with the NAAQS and PSD Class II Increments per NSR Workshop Manual directions.

As previously stated, three separate grids were used in the SO_2 refined modeling analysis. The three grids were modeled separately, with the grid for the steady-state emission rate[2] (212 receptors), used to determine compliance with the annual SO_2 standard only, being somewhat smaller than the grids for the 24-hour short-term emission rate (2,054 receptors) and the 3-hour short-term emission rate (7,190 receptors). The same meteorological data files used in the screening analyses were used in the refined modeling analysis.

I.5.2.2 SO_2 CLASS II INCREMENT MODEL

After discussions with the APCP, it was determined that the SWPS Unit 2 PSD permit application triggered the SO_2 major source baseline date in Greene County. As such, there are no other SO_2 increment consuming sources to evaluate. The receptors identified in Part I.5.2.1 are the only ones at which SO_2 Class II Increment is consumed. An examination of these receptors indicated that the

[2] 0.12 lb/mmBtu on a 30-day rolling average

maximum 24-hour and annual modeled concentrations were below the PSD Class II increment level, and no further analysis was required. The SWPS Unit 2 project will consume some increment in the immediate vicinity of the Southwest Power Station, but the majority is available for further growth in the area. Table I-10 list the results from the PSD Class II increment analysis for SO_2. A list of all receptors at which the SO_2 Class II Increment is consumed and the maximum predicted increment consumed is included on CD-ROM in Appendix D.

Table I-10: SO_2 Increment Modeling Results

Pollutant	Emission Rate	Averaging Period	PSD Class II Increment	Maximum Modeled Impact: SWPS Unit 2			
				Easting	Northing	Date	Concentration
SO_2	0.12 lb/mmBtu	Annual	20	465414.81	4114107.5	2000	0.29
	0.12 lb/mmBtu	24-hour	91	466014.8	4113508	1997	6.02
	0.12 lb/mmBtu	3-hour	512	464314.8	4111308	2001	27.97
	471.04 lb/hr	24-hour	91	466014.8	4113507.5	1997	8.67
	2,242.9 lb/hr	3-hour	512	464314.8	4111307.5	2001	191.9

I.5.2.3 SO_2 NAAQS MODEL

Other area sources, both on- and off-site, must be taken into account when determining compliance with the NAAQS. CU assisted APCP in compiling a list of affected sources. The stack parameters, locations and emission rates for all sources were determined and manipulated into a useable format. Electronic DEM files were used to provide the elevation for all NAAQS sources. The resulting NAAQS inventory is included on the CD-ROM in Appendix D. The 3-hour, 24-hour and annual background concentrations were provided by the APCP and are listed in Table I-6. For the annual SO_2 impact, the highest value in the five year data set was used, and the background concentration was added to determine the overall ambient concentrations. For the 3-hour and 24-hour impacts, modeling guidance indicates that the second highest high in the meteorological data set be evaluated for compliance with the NAAQS standard. Once this value was found for each of the averaging periods, the appropriate background concentrations were then added to determine the overall ambient concentration.

After examining the SO_2 modeling results for the 24-hour and annual averaging periods, it was determined that SWPS Unit 2 will not cause the NAAQS to be exceeded at any point where the facility will have a significant impact. According to the Draft NSR Workbook, no further modeling is required for SO_2. Table I-11 lists the results from the NAAQS analysis.

Table I-11: SO_2 NAAQS Modeling Results

Emission Rate	Averaging Period	NAAQS	Maximum Modeled Impact: All NAAQS Sources				Background Concentration	Total Concentration
			Easting	Northing	Year	Concentration		
0.12 lb/mmBtu	Annual	80	465167.59	4112476.5	1998	12.99	10.4	23.4
0.12 lb/mmBtu	24-hour	365*	465714.8	4115708	2001	98.03	44.4	142.4
0.12 lb/mmBtu	3-hour	1,300*†	472714.8	4120208	2000	1,125.3	78.3	1,203.6
471.04 lb/hr	24-hour	365	465714.8	4115708	2001	98.06	44.4	142.5
2,242.9 lb/hr	3-hour	1,300	472714.8	4120208	2000	1,125.3	78.3	1,203.6

* 2nd Highest High
† Secondary standard

I.6 CONCLUSION

Although initial models predict that there were exceedances of the PSD modeling thresholds, further refined analysis verifies that the SWPS Unit 2 project will not cause or contribute to an exceedance of the NAAQS or PSD Class II Increments. Figures E-1 through E-13 show plots of the modeled concentrations and can be found in Appendix E. The operation of the SWPS Unit 2 project will not cause or contribute to a significant degradation of ambient air quality. After examining the results of the model, it has been determined that the PSD modeling requirements for CO, NO_2, SO_2, and PM_{10} have been fulfilled, and no further modeling is required.