Revision to the Allegheny County Portion of the Pennsylvania State Implementation Plan

Attainment Demonstration for the Allegheny, PA SO_2 Nonattainment Area 2010 Standards

Allegheny County Health Department
Air Quality Program

September 14, 2017

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ACRONYMS AND ABBREVIATIONS

ACHD	Allegheny County Health Department
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AQS	Air Quality System (EPA)
CAA	Clean Air Act
CAMD	Clean Air Markets Division
CFR	Code of Federal Regulations
cf	Cubic feet (or ft^3)
dscf	Dry standard cubic feet
EGU	Electric Generating Unit
EPA	United States Environmental Protection Agency
ERC	Emission Reduction Credit
FGD	Flue gas desulfurization
FR	Federal Register
lb/hr	Pounds per hour of pollutant emissions
MARAMA	Mid-Atlantic Regional Air Management Association, Inc.
MMIF	Mesoscale Model Interface program
mmBtu	Millions of British thermal units (Btu)
MW	Megawatt
$\mu g/m^3$	Microgram per cubic meter
NAAQS	National Ambient Air Quality Standard
NAA	Nonattainment Area
NEI	National Emission Inventory (EPA database)
PA DEP	Pennsylvania Department of Environmental Protection
PIT	Pittsburgh International Airport
$PM_{2.5}$	Particulate Matter less than or equal to a nominal 2.5 microns in aerodynamic diameter, also referred to as fine particulates
ppb	Parts per billion
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
SCOT	Shell Claus Off-gas Treatment
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
tpy	Tons per year of pollutant emissions
TSD	Technical Support Document
USGS	United States Geological Survey
USS	United States Steel Corporation
WRF	Weather Research and Forecasting model

1 Executive Summary

According to the United States Environmental Protection Agency (EPA), current scientific evidence "links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (e.g., while exercising or playing). Studies also show a connection between short-term exposure and increased visits to emergency departments and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly, and asthmatics."[1]

On June 2, 2010, the EPA promulgated a SO_2 national ambient air quality standard (NAAQS) of 75 ppb (196 µg/m³) on a 1-hour average basis. The new standard was published in the *Federal Register* on June 22, 2010 (75 FR 35520) and became effective August 23, 2010. The new SO_2 NAAQS is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.[2] (EPA also revoked the previous two existing primary standards "because they would not provide additional public health protection given a 1-hour standard at 75 ppb.")

Initial SO_2 nonattainment area (NAA) designations for the 1-hour standard were set by EPA on August 5, 2013 (75 FR 47191), effective October 4, 2013. These designations were based on areas with certified ambient air monitoring data collected from consecutive calendar years 2009-2011 during which the design value exceeded the 75 ppb NAAQS. The extent of these select NAAs was based on several factors, including monitored air quality, emissions and emissions-related data, meteorology, geography/topography, and jurisdictional boundaries. After considering these factors, EPA's technical support document (TSD) for area designations goes on to explain:

> "… EPA finds that the portions of Allegheny County that are nonattainment for the 2010 SO_2 NAAQS include the following: City of Clairton, City of Duquesne, City of McKeesport, Borough of Braddock, Borough of Dravosburg, Borough of East McKeesport, Borough of East Pittsburgh, Borough of Elizabeth, Borough of Glassport, Borough of Jefferson Hills, Borough of Liberty, Borough of Lincoln, Borough of North Braddock, Borough of Pleasant Hills, Borough of Port Vue, Borough of Versailles, Borough of Wall, Borough of West Elizabeth, Borough of West Mifflin, Elizabeth Township, Forward Township, and North Versailles Township. …"
>
> " … Available emissions, meteorological data, and geographical data suggest that the sources in the cities, boroughs and townships as identified … contribute to SO_2 NAAQS violations in Allegheny County." (U.S. EPA, 2013)

The jurisdictions named by EPA and the area comprised by these jurisdictions are shown in Figure 2-1 of the next section. This area, identified as the Allegheny, PA NAA, is characterized by complex terrain as can be seen by the cutout in Figure 2-1.

[1] See http://www3.epa.gov/airquality/sulfurdioxide/health.html

[2] NAAQS are given in CFR Title 40 Part 50: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/index.tpl

Areas deemed in nonattainment of the new NAAQS are required to meet established deadlines for planning and demonstrating compliance with the standard. Therefore, by April 6, 2015, 18 months after the effective date of nonattainment designations, State Implementation Plans (SIPs) for NAAs were due to the EPA. Because of technical complications regarding completion of a comprehensive attainment demonstration, the Allegheny County Health Department (ACHD) was unable to submit a SIP to EPA by the original due date. A subsequent notice published by EPA on March 18, 2016 (81 FR 14736) requires that a complete SIP be submitted by October 18, 2017. The SIP must demonstrate that, by October 4, 2018, NAAs under the state/local agency's jurisdiction will be in attainment of the new standard.

This SIP provides a control strategy and attainment demonstration of the 2010 SO_2 standard for the Allegheny, PA NAA. Based on 2014-2016 monitored data, the SO_2 design value for the Allegheny, PA NAA is 94 ppb on an hourly basis. Modeling for this SIP shows attainment of the 75 ppb standard for future case year 2018.

The primary control measures that enable the Allegheny, PA NAA to demonstrate attainment of the SO_2 NAAQS are described in Section 3 of this SIP. These measures include cleaner coke oven gas (COG) and the installation of new equipment at the U. S. Steel Mon Valley Works.

Section 4 provides the emissions inventory used for the SIP, and Section 5 describes the modeling used for the attainment demonstration. Reasonably Available Control Measures and Technology (RACM/RACT) analyses for the NAA are given in Section 6. Section 7 discusses Contingency Measures, Reasonable Further Progress (RFP), and nonattainment New Source Review (NSR), and Section 8 addresses Transportation Conformity for the area. Additional controls and conditions affecting the area that have not been used as part of the modeled demonstration have been included as "weight of evidence" in Section 9, supporting the case that the area will achieve emission reductions.

The modeling demonstration was performed using AERMOD. For meteorology, MMIF was used as developed from WRF meteorological modeling, with grid sizes ranging from 36 km for the continental U.S. to 0.444 km for the Allegheny, PA NAA. Years included in the inventory were 2011 for base case and 2018 for future projected case, with modeled simulations performed using 2012-2014 meteorological data.

Procedures for modeling and determination of attainment were followed in accordance with EPA's SO_2 SIP Guidance and Modeling Guideline and the ACHD Allegheny, PA SO_2 modeling protocol (see Appendix A).

The modeling demonstration showed that all locations within the NAA will achieve attainment of the NAAQS at maximum possible operating conditions for all sources in the NAA.

<u>Maximum Modeled 1-Hour Design Value (Standard = 75 ppb)</u>
Allegheny, PA NAA = 74.9 ppb

2 Problem Statement

2.1 Introduction

The Clean Air Act requires a State Implementation Plan (SIP) to be written for any area designated nonattainment for the 1-hour SO_2 standard of 75 ppb. In 2013, the United States Environmental Protection Agency (EPA) designated a portion of southern Allegheny County, PA as a SO_2 nonattainment area (NAA) for the 2010 standard (identified by EPA as the Allegheny, PA nonattainment area).

2.2 Location and Topography

The Allegheny, PA NAA, consists of numerous communities in the Monongahela Valley, namely, City of Clairton, City of Duquesne, City of McKeesport, Borough of Braddock, Borough of Dravosburg, Borough of East McKeesport, Borough of East Pittsburgh, Borough of Elizabeth, Borough of Glassport, Borough of Jefferson Hills, Borough of Liberty, Borough of Lincoln, Borough of North Braddock, Borough of Pleasant Hills, Borough of Port Vue, Borough of Versailles, Borough of Wall, Borough of West Elizabeth, Borough of West Mifflin, Elizabeth Township, Forward Township, and North Versailles Township.

The NAA is located roughly 10 miles southeast of the City of Pittsburgh and is made up of complex river valley terrain, approximately 10 miles wide (west to east) by 15 miles long (north to south). The area includes rural land, densely populated neighborhoods, and industrial facilities. The 2010 population of the Allegheny, PA NAA is 126,934, about 10.38% of the population of the Allegheny County.[3]

The river valleys lie at 718 feet in elevation above mean sea level (MSL), while adjacent hilltops can be greater than 1250 feet MSL. Large temperature differences can be observed between the hilltop and valley floor (e.g., 2° to 7° F) during clear, light-wind, nighttime conditions. Strong nighttime drainage flows can cause differences of up to 180° in wind direction with 3-4 mph downward flows. Spikes in localized SO_2 concentrations have coincided with temperature inversions.

The Allegheny, PA NAA is home to several industrial sources of SO_2 pollution. Among these sources are the U. S. Steel (USS) Mon Valley Works (Clairton, Edgar Thomson, and Irvin Plants). The Clairton Plant is the largest coke plant in the country, producing roughly 4.7 million net tons of coke annually. Several additional permitted major and minor sources and numerous small sources (not requiring operating permits) are also located in the NAA or just outside the NAA.

The Allegheny, PA SO_2 NAA is shown in Figure 2-1.

[3] U.S. Census Bureau data: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

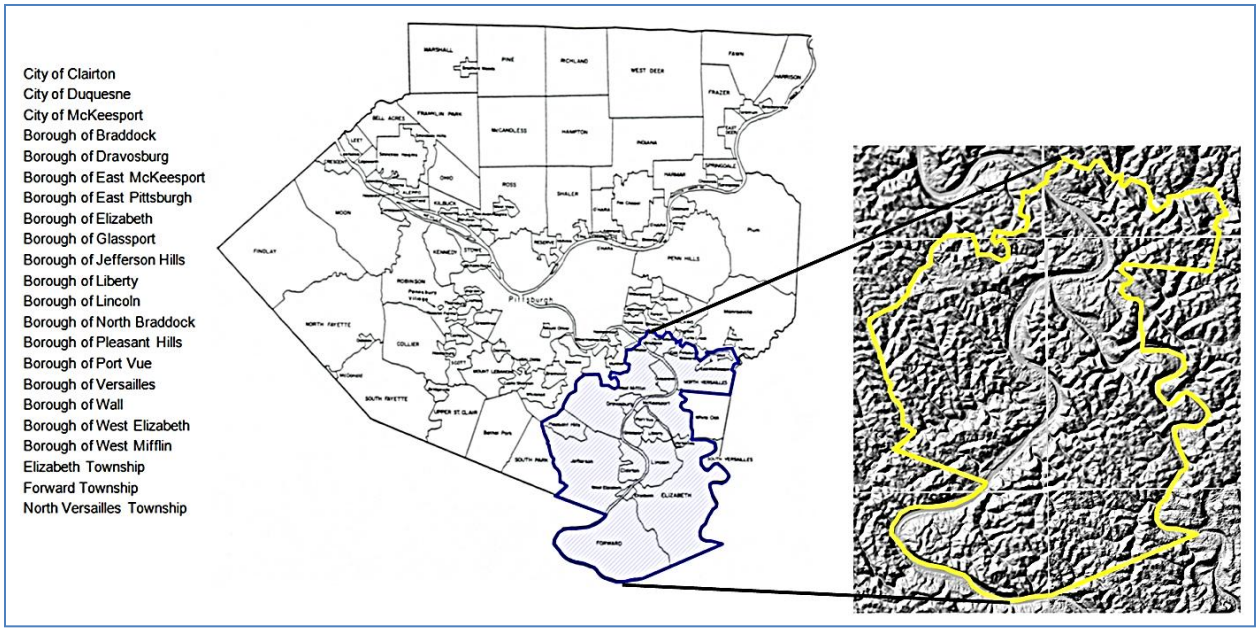

Figure 2-1. Allegheny, PA SO_2 NAA within Allegheny County, with Terrain Features

2.3 Meteorology

Temperature inversions contribute to elevated levels of SO_2. (Note that, for the local region, temperature inversions are measured at least twice daily by balloon-borne radiosondes sent into the atmosphere by the National Weather Service (NWS) forecasting office near the Pittsburgh (PIT) International Airport and are assumed to represent the stability condition all across the county.) A temperature inversion occurs when the air at the surface becomes cooler than the air above it, i.e., the rate of cooling of the air is greatest at ground level and less at elevated levels. The cooler, heavier air then settles at the lower elevation. As the major and minor sources in the area continue to emit SO_2 pollution and the lower, cooler air becomes buoyantly stable, the SO_2 is limited in its upward movement to disperse into the regional airflow. Typically, upon the inversion's break, local SO_2 is free to be spread by the upper atmospheric winds.

Figure 2-2 displays a wind, pollution, and temperature rose derived from ACHD Liberty Borough continuous monitoring data from 2012 through 2014. (The Liberty monitor is located near the center of the NAA.) As indicated on the graph, the most frequent and fastest winds were generally from the SW through W directions. Concentrations of SO_2 were largest from the S through SW directions. These are directions from which local and long-range transport carries substantial amounts of SO_2 to the Liberty monitoring site from large, stationary sources.

The first full, recent year of wind and SO_2 data from the ACHD North Braddock station (located near the top of the NAA) is 2015. The wind, SO_2, and temperature roses from this site are shown in Figure 2-3. Note that wind directions show a distinct valley flow characteristic, as this station is within the Monongahela River valley. Also, concentrations of SO_2 are largest from the SE through S directions.

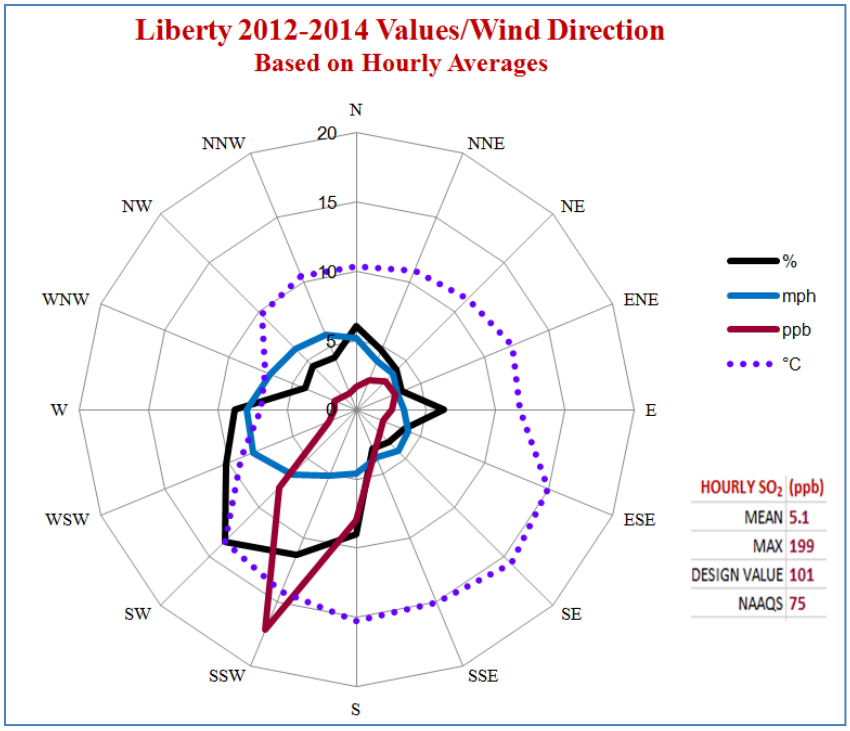

Figure 2-2. Wind Frequency and Speed, SO_2 Concentration, and Temperature Roses for the Liberty Monitoring Site, 2012 through 2014

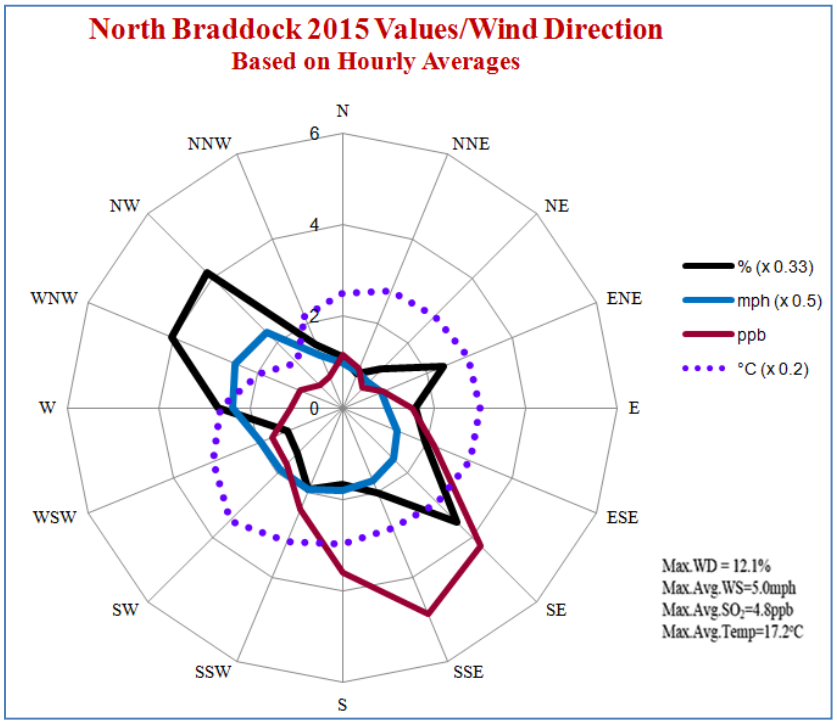

Figure 2-3. Wind Frequency and Speed, SO_2 Concentration, and Temperature Roses for the North Braddock Monitoring Site, January 8 through December 31, 2015

(Note: Values for wind frequency, wind speed, and temperature in Figure 2-3 have been scaled for better visual representation.)

More details of the distinctive meteorological and pollution characteristics in and around the Allegheny, PA NAA, especially from a historical perspective, can be found in the conceptual model section of Appendix A (Modeling Protocol). In addition, Appendix C (Meteorological Analysis) contains documentation of meteorological conditions affecting Allegheny County in general and the Allegheny, PA NAA in particular. Appendix C provides an analysis of meteorology when hourly SO_2 concentrations exceeded 75 ppb in 2011-15. This appendix also gives an evaluation of surface inversion conditions that influence dispersion potential within the NAA.

2.4 Monitored Data

SO_2 monitors are currently sited at five different locations throughout Allegheny County: Avalon, Liberty Borough, North Braddock, Lawrenceville, and South Fayette. The Avalon monitor, located roughly 6 miles northwest of downtown Pittsburgh, was originally established to measure impacts from the Shenango coke plant that ceased operation in early 2016. The Liberty and North Braddock sites, as indicated previously, are located within the Allegheny, PA NAA.

The monitor at Liberty is located on the roof of a school at a high elevation near the center of the Allegheny, PA NAA. The monitor at North Braddock is located atop a municipal building in the northern portion of the area. The South Fayette monitor near the southwestern edge of Allegheny County provides an indication of SO_2 entering the county from generally the S through W, and entering the NAA from generally the SW through W. Appendix B contains detailed monitored data and EPA Air Quality System (AQS) reports for these sites.

Allegheny County SO_2 one-hour design values (3-year average of the annual 99^{th} percentile of 1-hour daily maximum concentrations) for the 10-year timeframe 2007-2016 are shown in Figure 2-4.

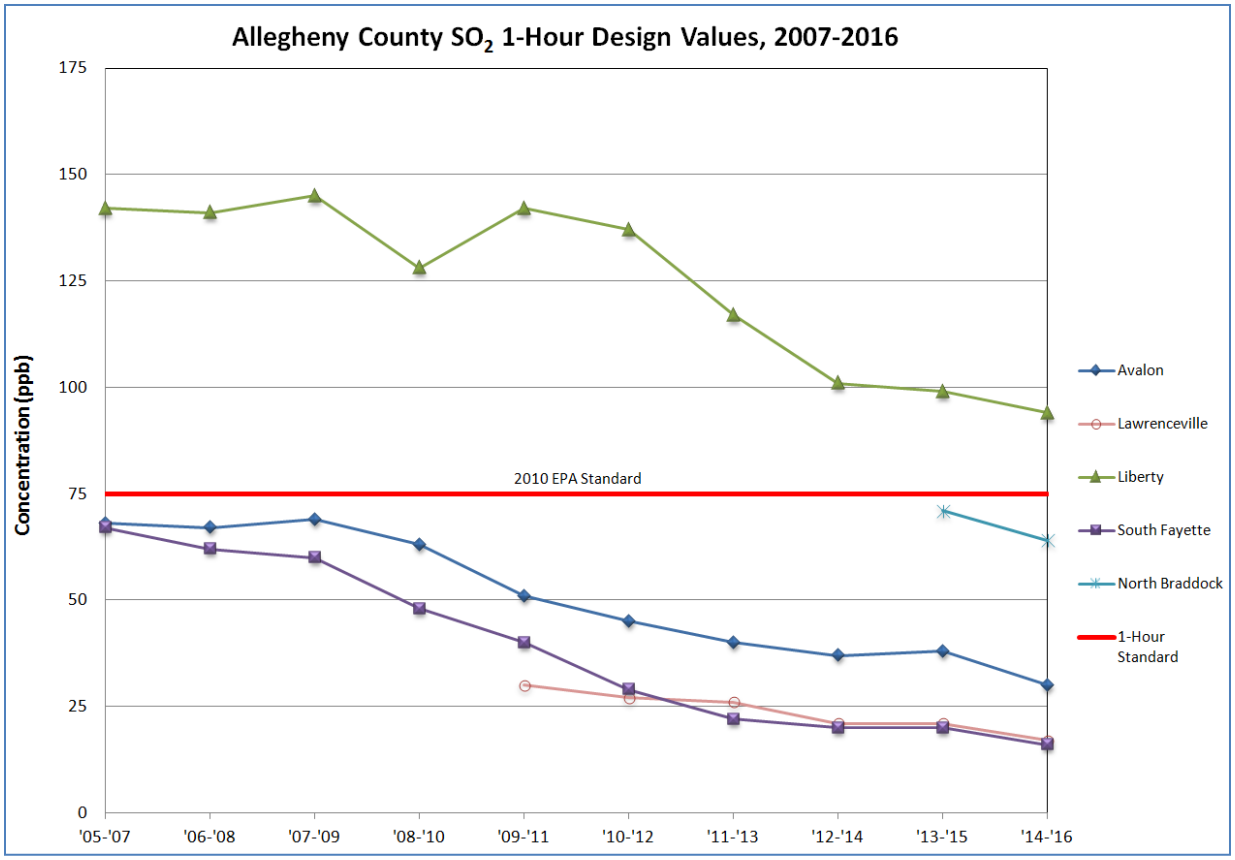

Figure 2-4. SO_2 1-Hour Design Values, Allegheny County, 2007-2016

The monitored network shows decreasing concentrations over the 10-year period, with the Liberty monitor showing concentrations that are higher than the other sites.

Note: Monitoring began at Lawrenceville in 2010 and at North Braddock in 2014; initial values for these sites in Figure 2-4 are two-year averages.

3 Control Strategy

3.1 Introduction

This section describes the control strategy needed to reduce levels of SO_2 in the Allegheny, PA NAA. These controls have been incorporated in the future case modeling for this SIP. The selection of these controls and, in some cases, their associated timetables for installation is designed to ensure that affected sources implement appropriate control measures as expeditiously as practicable in order to ensure attainment of the SO_2 NAAQS by the attainment date.

Federal enforceability for the limits given in this section will be achieved through installation permits effective on or before October 6, 2017. (These permits are included in Appendix K.) Note that while the permits will be enforceable upon issuance on or before October 6, 2017, the limits may not become effective until on or before October 4, 2018.

3.2 U. S. Steel Mon Valley Works

The United States Steel Corporation's Mon Valley Works, including the Clairton, Irvin, and Edgar Thomson plants, are the largest known individual sources of SO_2 in the Allegheny, PA NAA. The Clairton Plant is located in the City of Clairton on the west bank of the Monongahela River, S through SW of the Liberty monitor site. The Irvin Works are north of the Clairton Plant and also on the west bank of the Monongahela River. The Irvin Works is NNW of the Liberty monitor. The Edgar Thomson plant is on the east bank of the Monongahela River, a few blocks to the SSE of the North Braddock monitor.

Controls at the Clairton and Edgar Thomson Plants represent the majority of the SO_2 reductions required within the Allegheny, PA area for the future case. Controls at the USS Mon Valley Works are described below.

A. For the USS Mon Valley Works (all plants/properties):

   A 100 and 600 Vacuum Carbonate Unit (VCU) project has been initiated at the Clairton Plant to reduce the content of hydrogen sulfide (H_2S) in the "downriver" coke oven gas (COG) lines utilized at all Mon Valley Works plants.

   The 100 Vacuum Carbonate Unit (VCU) upgrade has already been completed by USS in 2016. An upgrade is planned for the 600 VCU that will add redundant controls for the downriver COG line. USS must also provide source monitoring results to demonstrate continuous efficient operation of the VCU system. Completion of the VCU project and full operation of both the 100 and 600 upgraded units must be on or before October 4, 2018.

   Figure 3-1 shows hourly H_2S grain content in COG (B Line) in 2016, before and after the 100 VCU upgrade. The upgrade was completed on April 20, 2016, leading to significant decreases in sulfur content in COG.

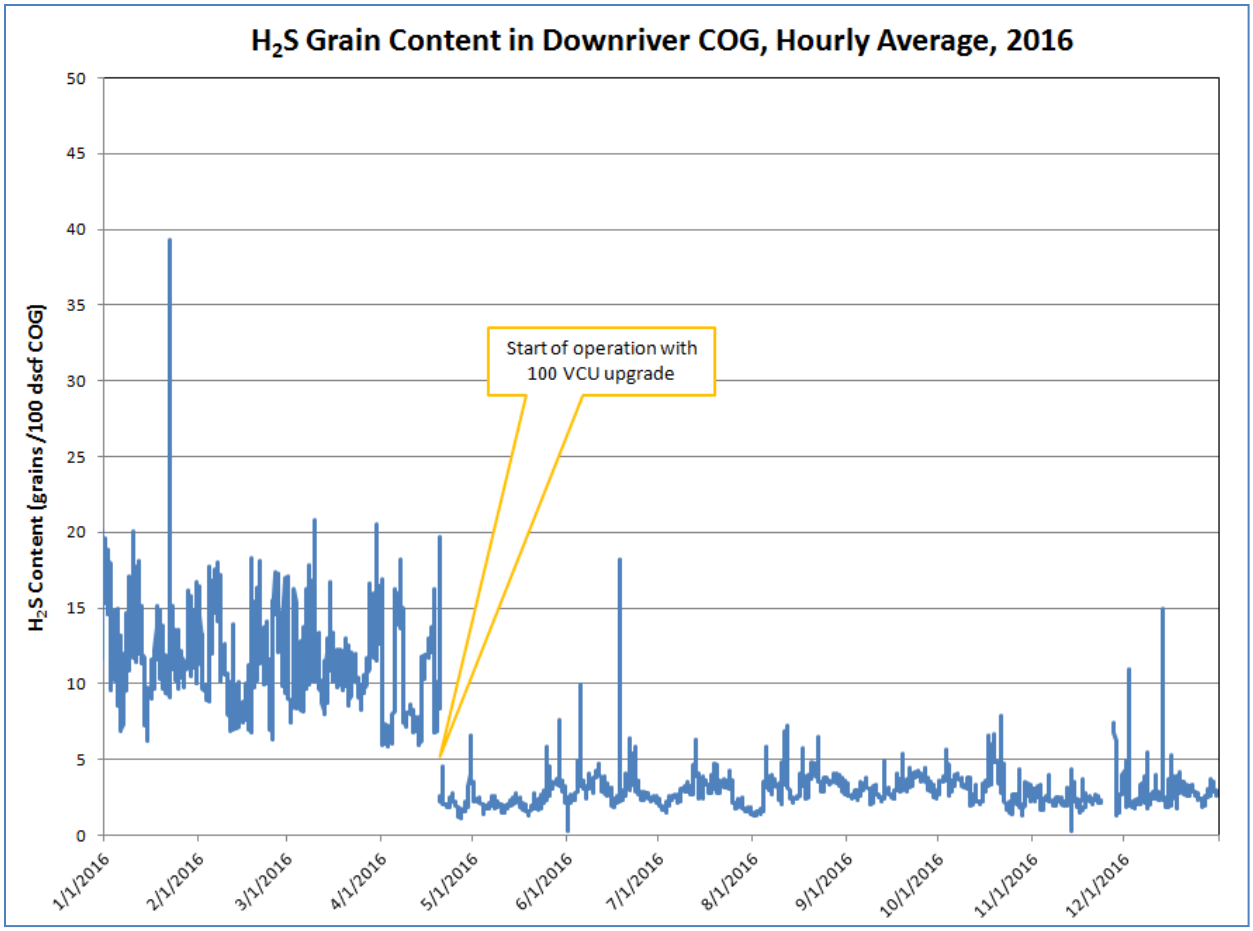

Figure 3-1. H_2S Content in COG, Before/After VCU Upgrade, 2016

In accordance with EPA's SO_2 SIP Guidance,[4] longer-term averaging will be allowed for several sources that utilize COG as a fuel, based on variability of sulfur content in the COG. Compliance for these sources will be based on the H_2S content as measured by continuous source monitoring devices, with SO_2 calculated from the combustion of H_2S. The SO_2 values will be calculated on an hourly basis, averaged over a block 24-hour basis (calendar day) and then averaged over a rolling 30-day basis. The SIP limits will be based on the 30-day averages, with an additional restriction of no more than three consecutive days above the supplementary 24-hour limits. Both the 30-day and 24-hour averages are lower than the modeled rates for sources with longer-term average limits. More information on the COG grain content and the longer-averaging methodology has been included in Appendix D (Emissions and Modeling Inventories).

To further reduce SO_2 emissions from COG operations, a tail gas recycling project is also planned for completion on or before October 4, 2018. This project would reroute sulfur-rich gases at the SCOT plant back into the by-products facility during planned and unplanned

[4] Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions, April 2014: https://www.epa.gov/so2-pollution/guidance-1-hour-sulfur-dioxide-so2-nonattainment-area-state-implementation-plans-sip

outages. More detailed descriptions of the COG projects are contained in Appendix J (Source Documentation).

Reductions from these COG controls result in substantial decreases of both actual and allowable emissions from the USS Mon Valley Works. Table 3-1 shows the maximum modeled rates and new short-term limits that will be adopted by October 4, 2018 for USS sources that are most affected by the COG controls. Note: a control case modeled rate is a constant "critical emissions value" (CEV) that was determined to be the maximum rate that demonstrates modeled attainment for every hour. This rate is equal to the SIP limit unless longer-term averaging is applied, coinciding with a lower limit on an average basis.

Table 3-1. Maximum Emission Rates and Limits, Base and Future Cases, USS COG Downriver Sources

Facility/Process	Base Case Modeled Allowable Rate (lb/hr)	Control Case Modeled Rate (lb/hr)	SIP Limit* (lb/hr)	Suppl. 24-hr Limit* (lb/hr)
US STEEL CLAIRTON Boiler 1	163.50	142.01 (aggregate basis)	118.44	134.06
US STEEL CLAIRTON Boiler 2	103.47			
US STEEL CLAIRTON Boiler R1	49.26			
US STEEL CLAIRTON Boiler R2	49.26			
US STEEL CLAIRTON Boiler T1	33.56			
US STEEL CLAIRTON Boiler T2	33.56			
US STEEL CLAIRTON SCOT Incinerator	37.68	24.00	24.00	--
US STEEL IRVIN Boiler #1	17.17	9.45	7.88	8.92
US STEEL IRVIN Boiler #2	18.20	10.02	8.36	9.46
US STEEL IRVIN Boilers #3-4 (aggregate)	17.90	9.85	8.21	9.30
US STEEL IRVIN 80" Mill Reheat	150.59	128.10	108.63	118.75
US STEEL IRVIN HPH Annealing Furnaces	32.70	14.39	12.00	13.58
US STEEL IRVIN Open Coil Annealing	25.05	13.79	11.50	13.02
US STEEL IRVIN Continuous Annealing	9.68	9.68	8.07	9.14

* If lower than the control case modeled rate, the SIP limit will be based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit

Note: the aggregate limit for the Clairton boilers would restrict all boilers collectively to a single hourly limit

B. At the USS Mon Valley Works - Edgar Thomson plant:

Construction of a new stack and a combined flue system is planned for the Riley Boilers 1, 2, and 3. All boilers will exhaust to the new stack, constructed to a minimum release height of 70 meters,[5] located adjacently to the boiler house on the northeast side of the building.

Allowable emissions for the boilers will be reduced on an aggregate basis. Actual emissions will also be reduced, as the boilers use downriver COG in combination with other fuels. Complete installation and operation of the new stack will be on or before October 4, 2018, with an aggregate short-term limit equal to the control case CEV as listed in Table 3-2 for the boilers.

Table 3-2. Maximum Emission Rates and Limits, Base and Future Cases, Edgar Thomson Boilers

Facility/Process	Base Case Modeled Allowable Rate (lb/hr)	Control Case Modeled Rate (lb/hr)	SIP Limit (lb/hr)
US STEEL EDGAR THOMSON Riley Boiler 1	371.35	556.91 (aggregate basis)	556.91 (aggregate basis)
US STEEL EDGAR THOMSON Riley Boiler 2	371.35		
US STEEL EDGAR THOMSON Riley Boiler 3	371.35		

Note: the aggregate limit applies to all Edgar Thomson boilers collectively for any hour

C. For Harsco Metals (Braddock Recovery Inc.):

A maximum short-term limit of 1.8 lb/hr for the rotary kiln dryer will be adopted on or before October 4, 2018. This source is located on Edgar Thomson property and utilizes COG supplied by USS.

D. For the USS Mon Valley Works (all plants):

Maximum modeled rates and new short-term limits as listed in Table 3-3 will be adopted on or before October 4, 2018. Some reductions given in Table 3-3 are partially associated with the COG controls if a source uses downriver COG in combination with other fuels, while other reductions are to allowable limits or potential emissions in general.

Clairton battery underfiring utilizes COG from different process streams than the downriver lines, but these streams are also associated with variability. The underfiring stacks have been assigned longer-term average limits, similar to sources that utilize the downriver COG lines, monitored for compliance by continuous source monitoring devices.

[5] Good Engineering Practice (GEP) stack height for these boilers is 96.75 m (more information is provided in Appendix J).

Table 3-3. Maximum Emission Rates and Limits, Base and Future Cases, Other USS Sources

Facility/Process	Base Case Modeled Allowable Rate (lb/hr)	Control Case Modeled Rate (lb/hr)	SIP Limit* (lb/hr)	Suppl. 24-hr Limit* (lb/hr)
US STEEL CLAIRTON Quench Tower 1	0.75	0.75	0.75	--
US STEEL CLAIRTON Quench Tower B	4.09	4.09	4.09	--
US STEEL CLAIRTON Quench Tower C	2.92	5.00	5.00	--
US STEEL CLAIRTON Quench Tower 5A	7.56	7.56	7.56	--
US STEEL CLAIRTON Quench Tower 7A	7.21	7.21	7.21	--
US STEEL CLAIRTON Batteries 1-3 Fugitives (Soaking)	6.32	6.32	6.32	--
US STEEL CLAIRTON Batteries 1-3 Fugitives (PEC Push.)	2.09	2.09	2.09	--
US STEEL CLAIRTON Batteries 1-3 Fugitives (Pre-Push)	0.18	0.18	0.18	--
US STEEL CLAIRTON Batteries 1-3 Fugitives (Hot Car)	15.66	10.64	10.64	--
US STEEL CLAIRTON Batteries 13-15 Fugitives (Soaking)	0.46	0.46	0.46	--
US STEEL CLAIRTON Batteries 13-15 Fugitives (PEC Push.)	2.20	2.20	2.20	--
US STEEL CLAIRTON Batteries 13-15 Fugitives (Pre-Push)	0.19	0.19	0.19	--
US STEEL CLAIRTON Batteries 13-15 Fugitives (Hot Car)	16.50	11.21	11.21	--
US STEEL CLAIRTON Batteries 19-20 Fugitives (Soaking)	1.53	1.53	1.53	--
US STEEL CLAIRTON Batteries 19-20 Fugitives (PEC Push.)	2.69	2.69	2.69	--
US STEEL CLAIRTON Batteries 19-20 Fugitives (Pre-Push)	0.23	0.23	0.23	--
US STEEL CLAIRTON Batteries 19-20 Fugitives (Hot Car)	20.21	13.73	13.73	--
US STEEL CLAIRTON B Battery Fugitives (Soaking)	1.06	1.06	1.06	--
US STEEL CLAIRTON B Battery Fugitives (PEC Pushing)	0.83	0.83	0.83	--
US STEEL CLAIRTON B Battery Fugitives (Pre-Push)	0.11	0.11	0.11	--
US STEEL CLAIRTON C Battery Fugitives (Soaking)	0.62	0.62	0.62	--
US STEEL CLAIRTON C Battery Fugitives (PEC Pushing)	1.54	1.54	1.54	--
US STEEL CLAIRTON C Battery Fugitives (Pre-Push)	0.10	0.10	0.10	--
US STEEL CLAIRTON C Battery Fugitives (Hot Car)	8.57	5.82	5.82	--
US STEEL CLAIRTON PEC Baghouse 1-3	15.30	7.10	7.10	--
US STEEL CLAIRTON PEC Baghouse 13-15	16.12	7.46	7.46	--
US STEEL CLAIRTON PEC Baghouse 19-20	19.73	7.78	7.78	--
US STEEL CLAIRTON PEC Baghouse B	15.85	7.50	7.50	--
US STEEL CLAIRTON PEC Baghouse C	13.58	8.65	8.65	--
US STEEL CLAIRTON Battery 1 Underfiring	31.84	14.52	10.41	13.27
US STEEL CLAIRTON Battery 2 Underfiring	31.84	12.76	9.15	11.66
US STEEL CLAIRTON Battery 3 Underfiring	31.84	14.74	10.57	13.47
US STEEL CLAIRTON Battery 13 Underfiring	33.50	17.48	13.93	15.70
US STEEL CLAIRTON Battery 14 Underfiring	33.50	17.60	14.03	15.80
US STEEL CLAIRTON Battery 15 Underfiring	33.50	23.43	18.67	21.04

Facility/Process	Base Case Modeled Allowable Rate (lb/hr)	Control Case Modeled Rate (lb/hr)	SIP Limit* (lb/hr)	Suppl. 24-hr Limit* (lb/hr)
US STEEL CLAIRTON Battery 19 Underfiring	61.53	36.85	29.37	33.09
US STEEL CLAIRTON Battery 20 Underfiring	61.53	33.88	27.00	30.42
US STEEL CLAIRTON B Battery Underfiring	91.54	29.82	21.38	27.26
US STEEL CLAIRTON C Battery Underfiring	21.00	44.67	32.03	40.83
US STEEL EDGAR THOMSON BF1 Casthouse (Roof+Fume)	2.73	2.01	2.01	--
US STEEL EDGAR THOMSON BF3 Casthouse (Roof+Fume)	2.29	1.69	1.69	--
US STEEL EDGAR THOMSON BOP Process (Roof)	4.43	6.64	6.64	--
US STEEL EDGAR THOMSON Continuous Casting (Roof)	5.25	5.25	5.25	--
US STEEL EDGAR THOMSON Blast Furnace 1 Stoves	353.03	98.50	98.50	--
US STEEL EDGAR THOMSON Blast Furnace 3 Stoves	353.03	90.00	90.00	--
US STEEL EDGAR THOMSON Casthouse Baghouse	45.10	45.10	45.10	--
US STEEL IRVIN #1 Galv Line	14.63	0.04	0.04	--
US STEEL IRVIN #2 Galv Line	3.87	0.01	0.01	--

* If lower than the control case modeled rate, the SIP limit will be based on a rolling 30-day average of 24-hour (calendar day) averages, with an additional restriction of no more than 3 consecutive days above a supplementary 24-hour limit

Notes:
- Clairton C Battery quenching and underfiring emissions are increasing for the control case due to stack tests that showed higher concentrations than initial estimates
- Irvin Galvanizing uses natural gas only
- Edgar Thomson BOP emissions increase for the control case due to a correction in the calculation of emissions
- Several Edgar Thomson sources use downriver COG as a fuel (or in combination with other fuels), but these sources are not being assigned longer-term average limits

3.3 Source Monitoring

U. S. Steel Mon Valley Works sources with longer-term average limits (as indicated in Tables 3-1 and 3-3) will be monitored for compliance by way of continuous source monitoring devices.[6] Hourly SO_2 emissions for each of the sources will be calculated from hourly H_2S measured by the monitoring devices and flow meter equipment that measures actual hourly flow of gas to each associated process. Stoichiometric conversion will be assumed for H_2S to SO_2.

Sulfur content in the U. S. Steel COG lines will be monitored at the following locations:
- Prior to the Irvin 80-Inch Hot Strip Mill in downriver stream "A Line"
- Exiting the Clairton VCU system as the downriver stream "B Line"
- Supplying the "Unit 1" Clairton Batteries: 1-3, B, and C
- Supplying the "Unit 2" Clairton Batteries: 13-15 and 19-20

[6] All other sources listed in this section will be verified for compliance via stack testing or other methods.

Example calculations for the H_2S to SO_2 conversion and the longer-term averaging methodology have been included in Appendix D.

3.4 Source Shutdowns

The following major source in the NAA ceased operations in 2015:

- Guardian Industries: The Guardian glass plant closed in August 2015, with the permit terminated in November 2015.

Any future operation at this location would require a new permit and new source review (NSR). Emissions Reduction Credits (ERCs) have not been requested for this source, and all structures have been removed from the property.

Documentation for this source, including termination of the Title V operating permit and proof of discontinuation of operations, are included in Appendix J.

3.5 Emissions Reductions

The control strategy shows attainment of the SO_2 NAAQS through a dispersion modeling demonstration. Total maximum base and control case emission rates for sources in the NAA, along with changes in emissions due to the control strategy, are given in Table 3-4 below, on both short-term (lb/hr) and long-term (ton/yr) bases.

Table 3-4. Maximum SO_2 Emission Rates in NAA, Before and After Control Strategy

Basis	Base Case	Control Case	Emissions Change
Short-term (lb/hr)	3292	1540	-1752
Long-term (ton/yr)	14420	6744	-7676

Modeled emissions are given by source/process in Appendix D.

3.6 Additional Control Considerations

The ACHD existing nonattainment NSR program, as required by Clean Air Act (CAA) sections 172(c)(5) and 173, will ensure that the reactivation, construction, and/or modification "of major stationary sources of SO_2 will not interfere with reasonable further progress toward the attainment of the 2010 SO_2 NAAQS."

In addition, to meet the general conformity requirement of the CAA section 176(c), ACHD will ensure "that actions by federal agencies do not cause new air quality violations, worsen existing violations, or delay timely attainment" of the SO_2 NAAQS and/or interim reductions and milestones.

4 Emissions Inventory

The Clean Air Act section 172(c)(3) requires that a SIP includes an inventory of actual emissions from all sources of SO_2. The emissions inventory for this SIP includes base year 2011 actual emissions from the National Emissions Inventory (NEI) for all sources/sectors within the boundaries of the NAA.

Additionally, estimates of future case actual emissions for 2018 have been provided in this section. Base and future year actual inventories by process, along with modeling source inventories at maximum allowable or potential rates, are contained in Appendix D.

Tables 4-1 and 4-2 below show the 2011 base year SIP emissions inventory and 2018 projected future year inventory for the Allegheny, PA nonattainment area, in actual tons, by emissions sector.

Table 4-1. Base Case (SIP) Emissions Inventory (Tons/Year)

Inventory	Point	Area	Nonroad	Onroad
Base Case (2011 NEI)	3249.20	158.85	1.17	8.11

Table 4-2. Projected Case Emissions Inventory (Tons/Year)

Inventory	Point	Area	Nonroad	Onroad
Future Case (2018 Projected)	2676.52	119.18	0.44	2.96

Emissions are given by source/process in Appendix D.

Future projected point source emissions were estimated by scaling 2011 base case emissions based on the proposed reductions from the control strategy. For the other sectors, MARAMA Alpha 2 projections[7] were used for 2018 based on EPA growth/control factors. NAA emissions were apportioned by population (10.38%) of total Allegheny County emissions for nonpoint sectors.

Emissions from sources outside of the NAA are not included in the above tables. However, some sources outside of the NAA have been included in the modeling demonstration in order to properly account for transported emissions into the NAA. See Appendices A and D for additional information.

[7] Mid-Atlantic Regional Air Management Association emissions inventories: http://www.marama.org/technical-center/emissions-inventory/2011-inventory-and-projections

5 Modeling

The modeling demonstration was performed using the AERMOD model according to the procedures outlined in the modeling protocol (Appendix A).

This demonstration is the first to utilize Weather Research and Forecasting (WRF) modeling and Mesoscale Model Interface Program (MMIF) data for regulatory modeling under 40 CFR Part 51. Ramboll Environ developed and evaluated the WRF/MMIF data for ACHD, and EPA Region III was consulted on the approach.

5.1 Design and Modeling Protocol

ACHD followed modeling procedures outlined by the modeling protocol given in Appendix A and according to EPA's SO_2 SIP Guidance and Guideline on Air Quality Models.[8] Modeling was performed using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (U.S. EPA, 2005; Cimorelli et al., 2005).

As discussed in more detail in the protocol, the EPA-recommended (guideline) air quality model for estimating the near-source (< 50 km) impacts of primary emitted pollutants is AERMOD. AERMOD has been demonstrated to perform adequately for many applications based on the results obtained from comprehensive field study results and when compared to the performance of the previous "workhorse" model of the EPA, the Industrial Source Complex Short Term, Version 3 (ISCST3) model (Perry et al., 2005). AERMOD along with additional models and techniques will be used to show that the emission control strategy proposed by Allegheny County will lead to attainment of the 1-hour NAAQS for SO_2 by the due date of October 2018.

Specifics of the modeling design include:

- Model: AERMOD version 16216r and most recent preprocessors
- Meteorology: prognostic WRF/MMIF data, for site-specific meteorological data
- Modeled years: 2012-2014
- Background based on multiple monitor sites
- Nested receptor grid at 200/100 m, with fenceline receptors at every 50 m
- Special characterization for buoyant fugitive sources
- Emissions: allowables (or potentials, if no permitted limit)

5.2 Meteorological and Dispersion Modeling Assistance

To better understand air-quality impacts from SO_2 emissions in Allegheny County, especially in the Allegheny, PA NAA, and to continue with effective programs to attain and maintain the NAAQS, ACHD contracted Ramboll Environ, an international, environmental consulting firm, to provide meteorological and dispersion modeling assistance to produce a more-realistic

[8] EPA's Guideline on Air Quality Models: https://www3.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

representation of SO_2 impacts in Allegheny County (ACHD contract title *Sulfur Dioxide Modeling Assistance II*).

The "dispersion" aspect of the modeling work was conducted by ACHD's analysis of ongoing county and federal meteorological station data. Weather data was processed for use with AERMOD via the Weather Research and Forecasting (WRF) model and the Mesoscale Model Interface (MMIF) program. WRF is a prognostic meteorological model originally developed with assistance from the National Center for Atmospheric Research, the National Oceanic and Atmospheric Administration, and other government and university organizations. MMIF was used to prepare WRF output for direct input into AERMOD. Large- and fine- mesh grids at numerous vertical levels were employed to simulate atmospheric conditions across Allegheny County, with a focus on the Allegheny, PA NAA. (See Maranche & Sadar (2016) and Sadar, Maranche & McNally (2014) for further discussion of the use of AERMOD and WRF for modeling SO_2 in Allegheny County.)

5.3 Methodology

This section describes the steps used to model the Allegheny, PA NAA. More information on the model methodology can be found in Appendices A and I.

5.3.1 Models Selection

The most recent version of AERMOD (v. 16216r) was used by ACHD and Ramboll Environ for the modeling of the NAA. The modeling was designed to include both regional and localized SO_2 impacts.

Meteorological inputs for AERMOD were generated by Ramboll Environ using the WRF model and MMIF tool. The MMIF grids followed the same grid resolutions as WRF, generating several layers of meteorological data for each modeled grid cell.

5.3.2 Modeling Domains

WRF was run for a nested 36/12/4/1.33/0.444 km domain structure by resolution, defined as follows:

- d01: 36 km continental U.S. (CONUS) domain
- d02: 12 km NEUS domain that includes states in the Midwestern and Mid-Atlantic Northeastern U.S.
- d03: 4 km domain that covers southwestern Pennsylvania and adjacent areas in West Virginia and Ohio
- d04: 1.33 km domain covering Allegheny County and portions of surrounding counties
- d05: 0.444 km domain surrounding the Allegheny, PA NAA

Figures 5-1 and 5-2 on the following page provide maps of the modeled WRF domains.

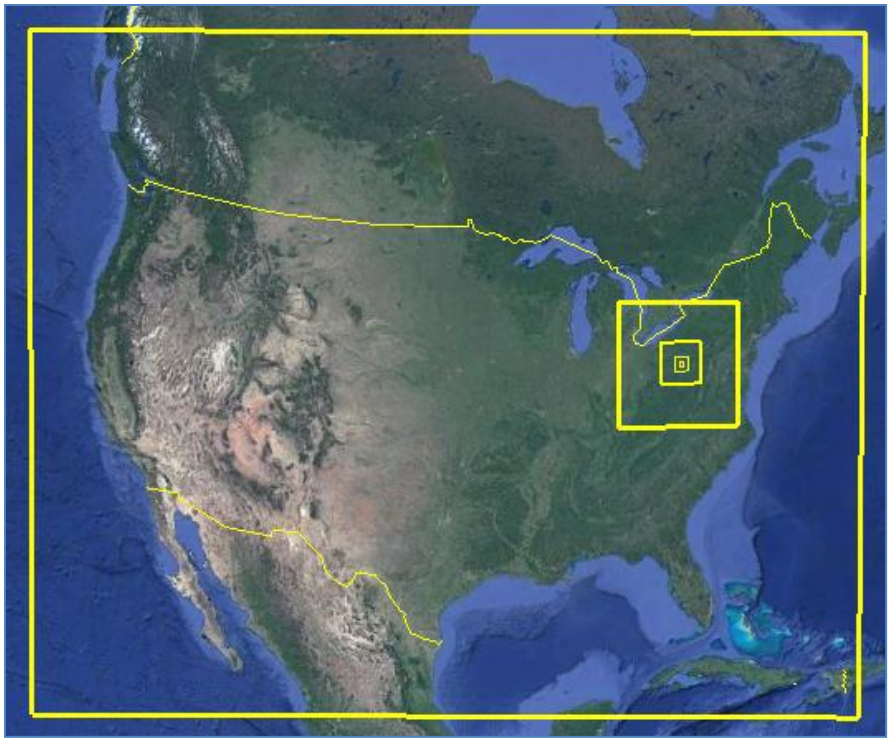

Figure 5-1. WRF Modeling Domains, 36/12/4/1.33/0.444 km Resolutions

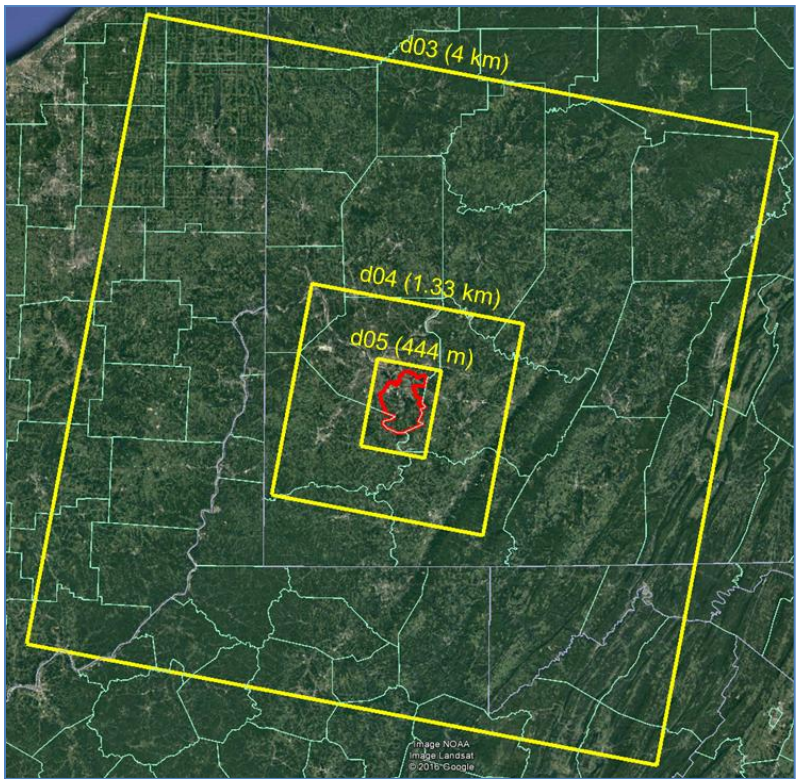

Figure 5-2. Close-Up, 4/1.33/0.444 km Resolution WRF Domains

The model domain for AERMOD was defined according to the model protocol and is similar in size to the 0.444 km WRF domain. Specific MMIF cells were selected from within the 0.444 km domain that best corresponded with the modeled sources.

5.3.3 Meteorological Data

MMIF was selected as the most appropriate meteorological data for the modeling demonstration. MMIF data can be extracted for any grid cell within a WRF domain. The 0.444 km domain was selected as the best representative domain for the Monongahela River valley in the NAA.

MMIF locations within the NAA selected for the AERMOD modeling are shown in Figure 5-3. Each of these cells provided site-specific onsite, upper air, and surface characteristics from MMIF as meteorological input to AERMET (the AERMOD preprocessor).

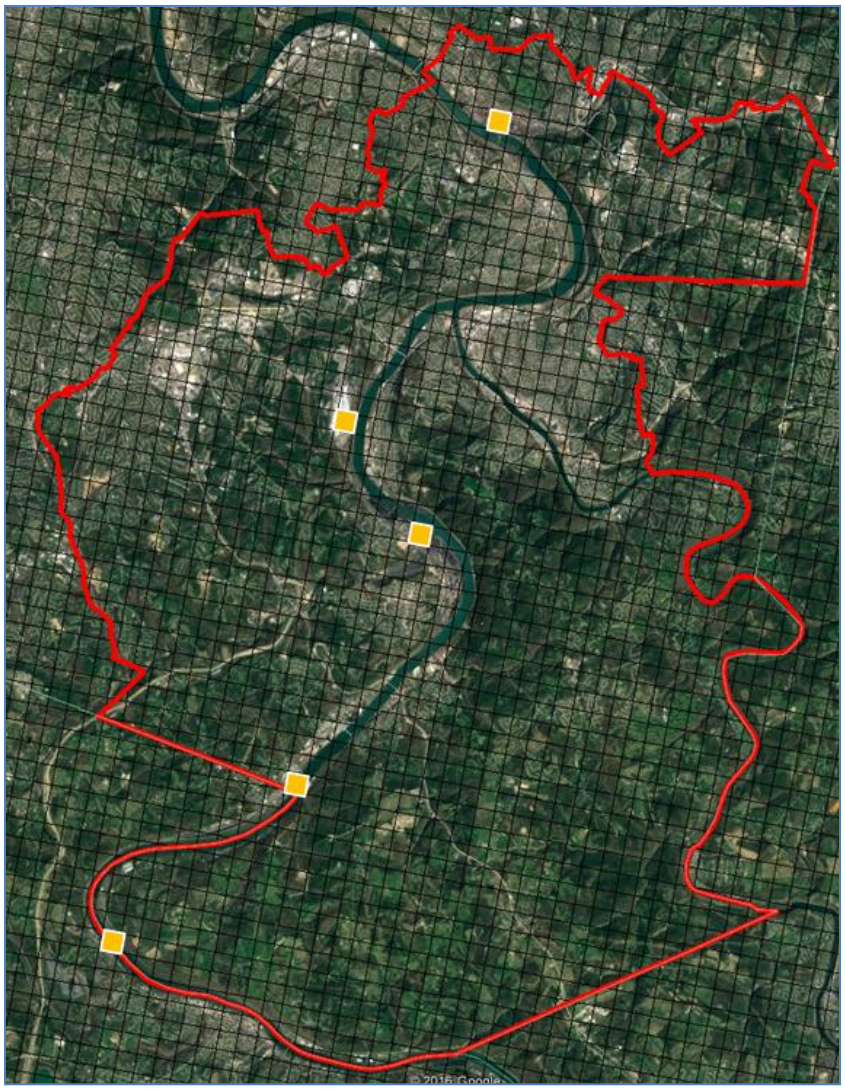

Figure 5-3. MMIF 0.444 km Cells within the NAA

Model runs were performed using 2012-2014 meteorological data for each source included in the model, with impacts stored in hourly concentration files. Total cumulative impacts were then summed in post-processing (with background added as an additional component) and design values were calculated from the 4th-highs at each receptor.

5.3.4 Receptor Grid

The receptor grid used for the modeling effort is shown below in Figure 5-4. The receptors were generated from USGS data at 10 m resolution, as processed by the AERMAP preprocessor. Receptors located within the fence lines of the three Mon Valley Works plants were excluded from the receptor grid.

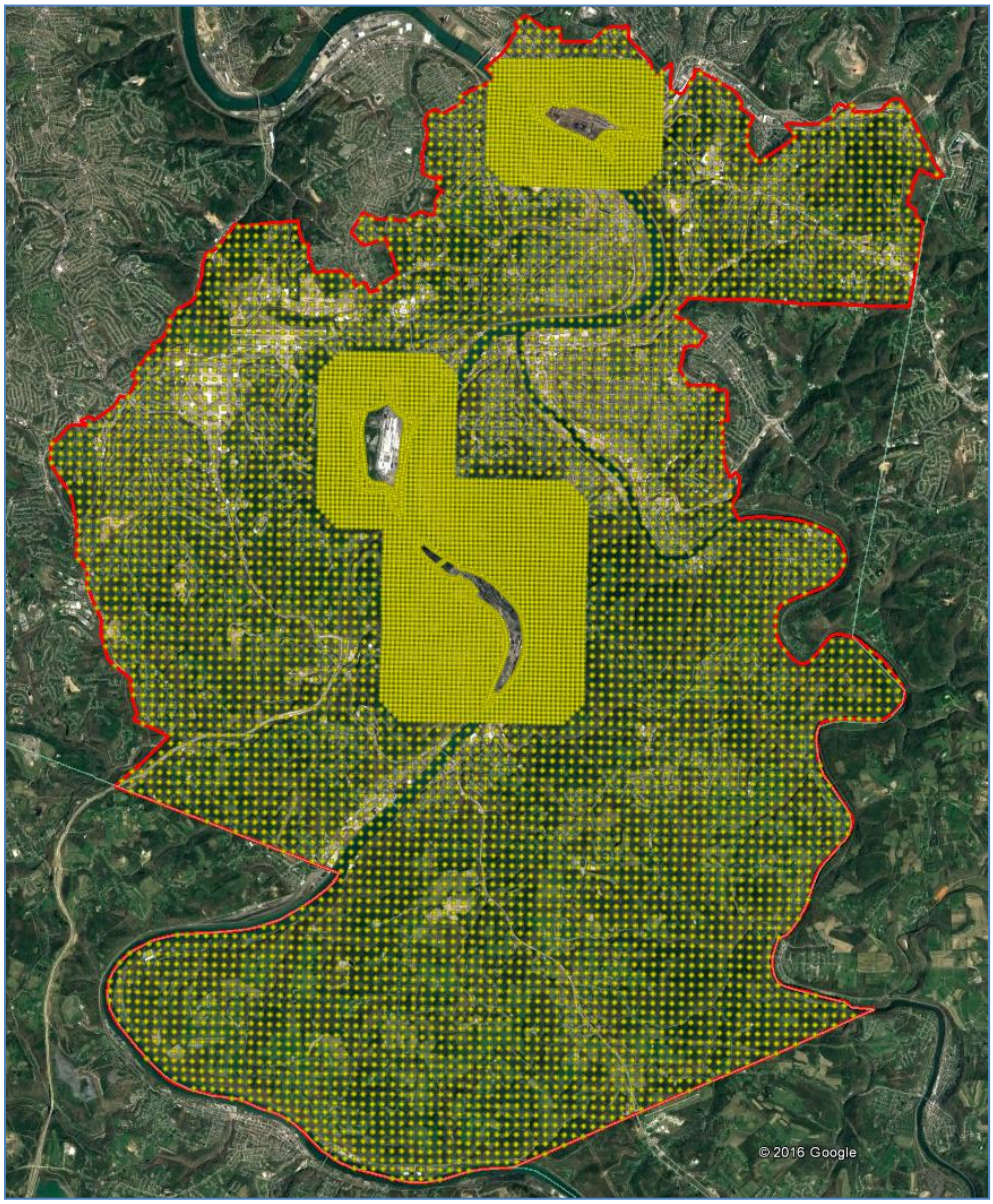

Figure 5-4. AERMOD Receptor Grid for NAA

Modeled design values were required to show attainment of the SO_2 NAAQS at each location within the receptor grid. Based on the NAAQS, this corresponded with a 3-year average of the 4th-highest daily maximum 1-hour modeled concentration that showed a value of 196.18 µg/m³ or lower.

More information on the model methodology and configuration can be found in Appendices A and I.

5.3.5 Sources Modeled

All sources potentially impacting the nonattainment area were considered for the modeling demonstration, based on procedures in the modeling protocol (Appendix A). Sources that were screened out from the modeling are described in Appendix E (Screening Analysis).

Point source facilities included in the modeling demonstration are as follows:

- USS Mon Valley Works (all plants)
- Harsco
- Guardian
- NRG Elrama
- Allegheny Energy Mitchell
- ArcelorMittal Monessen

Guardian, Elrama, and Mitchell were deactivated since the base case (and initial designation analysis) and were excluded from the future control case model runs. Documents for these sources, including inactivation of operating permits, are included in Appendix J.

All emissions from nonpoint sectors were assumed to be part of background concentrations, which were calculated from surrounding monitored data. (See Appendices A and I.)

5.4 Modeled Results

Below in Table 5-1 are the modeled design values for the base and control cases for the NAA, given in µg/m³. (The design values are the highest 3-year averages of the 4th-highest daily maximum 1-hour impacts at any receptor in the NAA.)

Table 5-1. Modeled Design Values, Base and Control Case

Modeled Impacts	Base Case	Control Case
Design Value (µg/m³)	1176.60	196.17

Note: 75 ppb of SO_2 = 196.18101 µg/m³ at 25°C and 1 atm[9]

[9] This conversion is built into AERMOD for ppb of SO_2 to µg/m³.

The highest modeled impact for the base case scenario was located in North Braddock, while the maximum control case location was in West Mifflin. Since both the base and control cases were modeled at maximum possible emission rates for all sources in the NAA, these locations may or may not correspond to highest impacts during normal or low operations. Model runs at lower capacities, using lower emissions and lower stack exit velocities, also showed concentrations below the NAAQS. The modeling demonstration also showed attainment of the former annual (0.03 ppm) and 24-hour (0.14 ppm) primary standards and the 3-hour secondary standard (0.5 ppm).

Figures 5-5 and 5-6 show classed post maps of base and future case modeled emissions by facility in tons/year. Larger/darker circles represent larger maximum emissions.

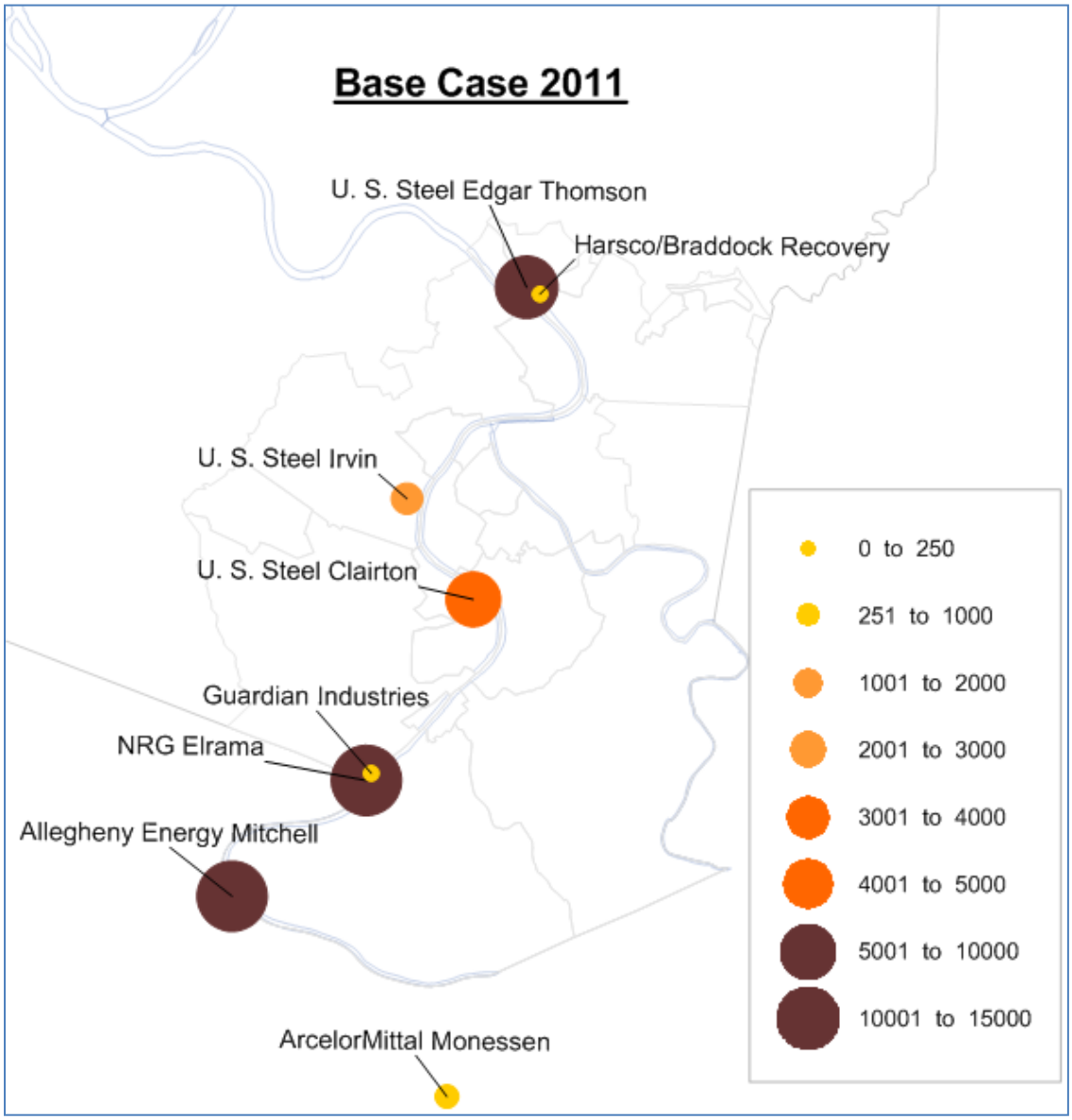

Figure 5-5. Base Case 2011 Maximum Modeled Emissions, by Facility (tons/year)

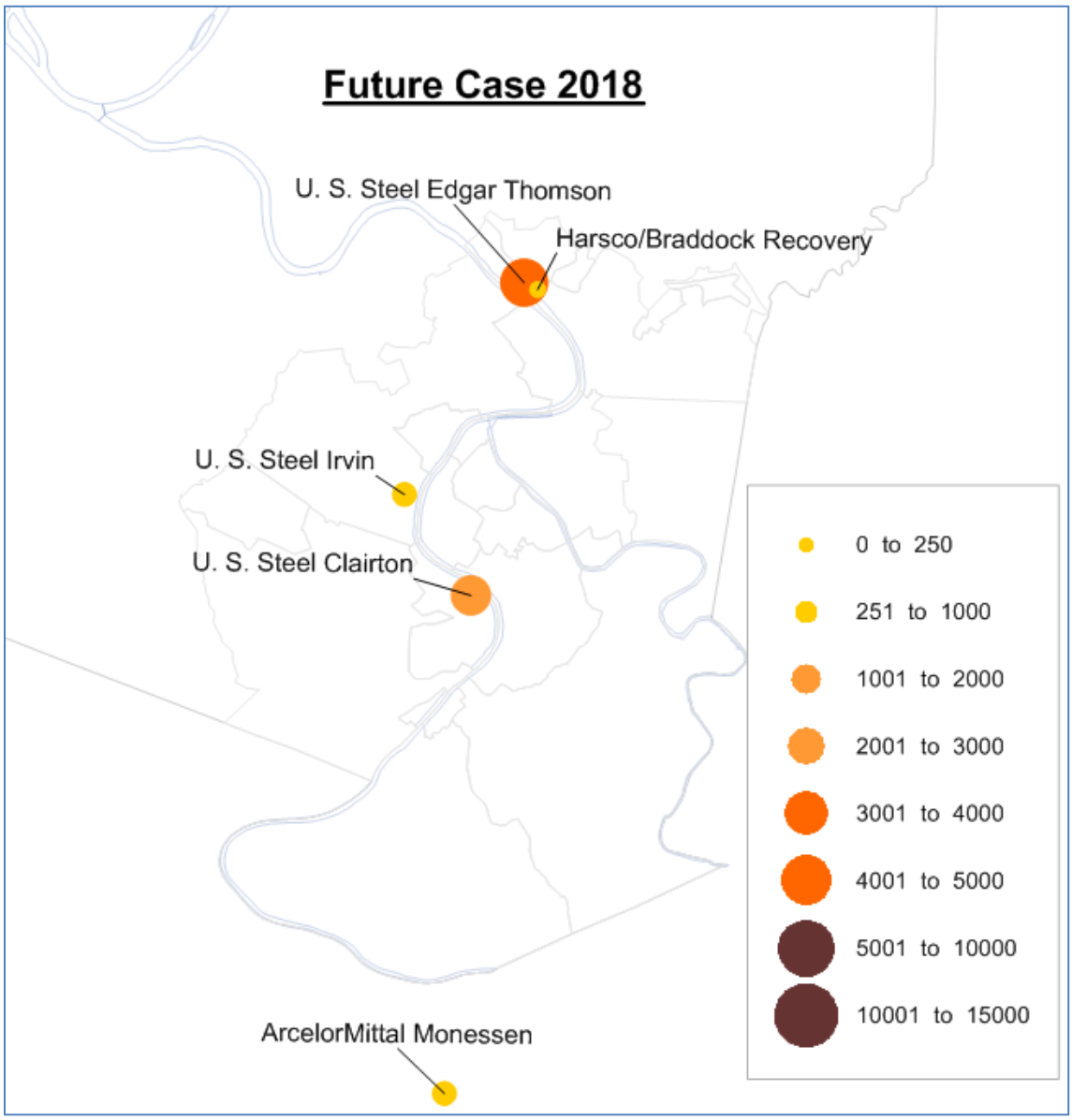

Figure 5-6. Future Case 2018 Maximum Modeled Emissions, by Facility (tons/year)

Table 5-2 on the following page presents the modeled control case design values by individual municipality for the NAA. These design values represent the highest modeled concentration anywhere within the municipality boundaries.

Table 5-2. Modeled Design Values, Control Case, by Municipality

Municipality	Control Case Design Value (µg/m³)
City of Clairton	143.57
City of Duquesne	59.94
City of McKeesport	98.16
Borough of Braddock	92.26
Borough of Dravosburg	132.51
Borough of East McKeesport	65.36
Borough of East Pittsburgh	68.67
Borough of Elizabeth	44.39
Borough of Glassport	169.18
Borough of Jefferson Hills	128.63
Borough of Liberty	146.42
Borough of Lincoln	196.14
Borough of North Braddock	195.07
Borough of Pleasant Hills	86.71
Borough of Port Vue	104.75
Borough of Versailles	46.95
Borough of Wall	53.14
Borough of West Elizabeth	45.43
Borough of West Mifflin	196.17
Elizabeth Township	89.39
Forward Township	66.82
North Versailles Township	83.98

More information on the modeled results can be found in Appendix I.

5.5 Model Performance

Model performance review provides a method to examine modeled data in comparison to actual measured data for the same timeframe. WRF and MMIF meteorological results were compared to measured airport and local site data, and dispersion model results (at actual emission rates) were compared to actual monitored results at Liberty and North Braddock.

Results showed good overall performance with known data. Highlights include the following:

- WRF showed good performance throughout southwestern PA at high-resolution
- MMIF showed a combination of in-valley and plateau flow that is representative of meteorology in the NAA
- AERMOD with MMIF showed the best performance compared to other models

- MMIF meteorological data outperformed other available meteorological data sets with AERMOD

- The use of ADJ_U* led to the most realistic planetary boundary layer parameters from AERMET processing of MMIF inputs

Detailed results from the model performance evaluations and analysis can be found in Appendices F through I.

6 Reasonably Available Control Measures and Technology

Section 172 of the Clean Air Act establishes planning requirements for areas that do not meet the NAAQS, including the application of Reasonably Available Control Measures (RACM) and Reasonably Available Control Technology (RACT). For the SO_2 NAA, a demonstration is required that the agency has adopted all reasonably available control measures, including RACT for stationary sources, necessary to demonstrate attainment as expeditiously as practicable.

6.1 RACT Analysis for U. S. Steel Facilities

The USS Mon Valley Works is the largest source of SO_2 within the Allegheny, PA NAA. As described in detail in the control strategy (Section 3), controls at these plants represent the majority of the SO_2 reductions required within the Allegheny, PA NAA in order to demonstrate attainment as expeditiously as practicable.

Based on the control strategy, RACT at the USS Mon Valley Works has been identified as follows, to be completed by Oct. 4, 2018:

- Upgrades to the 100 and 600 Vacuum Carbonate Units (VCUs) at the Clairton Plant to reduce the content of hydrogen sulfide (H_2S) in the downriver coke oven gas (COG) utilized at all Mon Valley Works plants.

- Source monitoring to demonstrate continuous efficient operation of the Clairton VCU system.

- A tail gas recycling project that would reroute sulfur-rich gases at the Clairton SCOT plant back into the by-products facility during planned and unplanned outages.

Additionally, Harsco Metals (Braddock Recovery Inc.) is located on the property of the USS Mon Valley Works Edgar Thomson plant. It is a minor source of all criteria pollutants and Hazardous Air Pollutant (HAPs), as defined in Section 2101.20 of Allegheny County's Article XXI regulations. However, the facility is considered a major source based on operation, management, or support of the Edgar Thomson Plant waste product recycling and briquetting process.

This facility receives waste products from USS, including furnace flue dust, slag and sludge, mill scale, and coke fines. Harsco dries these materials in a rotary kiln fired with coke oven gas (COG), and combines them with other materials to form briquettes. These finished briquettes are piled on-site and sent back to USS to be used in the furnaces.

The rotary kiln is controlled by a cyclone and a fabric filter for particulates, with no control for SO_2. However, as described in Section 3, lower sulfur content in USS-produced COG will lead to lower emissions for COG combustion sources. As a result, a lower maximum short term limit of 1.8 lb/hr of SO_2 for the rotary kiln will be adopted on or before October 4, 2018. Based on these considerations, ACHD has determined that a further SO_2 RACT evaluation is not necessary for the rotary kiln dryer.

6.2 RACT Analysis at Other Sources in the NAA

The following analyses apply to point sources in the NAA that are not mentioned in the control strategy (Section 3). Note: These reviews should not and cannot be used by any source to satisfy any RACT analysis required by that source in a present or future permitting project.

RACT at Koppers Inc. – Clairton Plant

Koppers Inc., Clairton Tar Plant is a tar refining facility that distills crude tar, petro tar, and decanted oil into various tar products, pitches, distillates, chemical oils, and creosotes. The recovery of the coal tar distillates is done by processing the tars through a series of flash and distillation columns, process heating units, centrifuges, and storage tanks. Emissions from the tar refining and creosote processes, railcar loading and various storage tanks are controlled by a thermal oxidizer.

The facility is a minor source of criteria pollutants as defined in Article XXI, §2101.20.

According to operating permit #0029, facility units with SO_x emissions are as follows:

- The direct-fired thermal oxidizer, which controls emissions from the tar refining and several other plant processes, has a SO_x emission limit of 1.776 ton/year. The thermal oxidizer is essentially controlling VOCs and HAPs. Restrictions are in place per the operating permit to require the thermal oxidizer to be properly operated and maintained according to good engineering practices and the manufacturer's recommendations, and to prohibit operating the thermal oxidizer with any fuel other than utility grade natural gas. With the existence of the latter, i.e., the fueling restriction, already in place, and the overall low emission limitation, no additional equipment was considered necessary for RACT.

- The 10 process heaters (B-001 through B-010) with a combined SO_x emission limit of 0.216 ton/year. All are fired with natural gas and none have an emission limitation greater than 0.047 ton/year. Given already existing low emission limitations, no additional equipment was considered necessary for RACT.

- Vehicle/roadway emissions of 0.512 ton/year. The permit requires maintaining records of the amount of gasoline and diesel fuel used in vehicles to verify the emission limitation is not exceeded. Lowered national limits on gasoline and diesel fuel sulfur content, will produce reduced emissions of SO_2. Given that, no additional equipment was considered necessary for RACT.

Based on the considerations above, no additional equipment is considered necessary for purposes of SO_2 RACT. No additional RACT was considered for this facility.

RACT at Clairton Slag Inc. – West Elizabeth Plant

Clairton Slag, Inc. is a materials trans-shipment terminal and hot asphalt plant. This source has facilities to mix hot asphalt cement. These facilities include cold aggregate handling, rotary dryer, hot elevator, hot screens, pugmill, asphalt heater, storage silo, and truck plant loadout. Although the facility has a cyclone and baghouse in place to control particulate emissions, no controls are in place to control SO_2 emissions of 1.11 ton/year from the asphalt cement process (rotary dryer, hot elevator, hot screens and pugmill) and 0.005 ton/year from the asphalt cement heater.

Given the insignificant emissions, no additional equipment is considered necessary for purposes of SO_2 RACT. No additional RACT was considered for this facility.

RACT at Eastman Chemical Resins Inc. – Jefferson Plant

Eastman Chemical Resins, Inc. (Eastman) operates an organic chemical manufacturing facility in Jefferson Hills Borough. Eastman primarily manufactures hydrocarbon resins, which are low molecular weight polymers, derived from organic chemical feed stocks. These resins are used in hot melt adhesives, sealants, coatings, plastics modification, pressure sensitive adhesives, cosmetics, and some medical devices.

The plant is comprised of four polymerization processes, a resin hydrogenation process, five finishing processes, and an emulsion process, five boilers ranging from 30 mmBtu/hr to 38.2 mmBtu/hr, a wastewater treatment plant, a pilot plant for testing formulations and processes and approximately 200 storage tanks of various sizes. The facility is a major source of volatile organic compounds (VOCs), nitrogen oxides (NO_x) and hazardous air pollutants (HAPs). SO_2 emissions, primarily from the natural gas-fired boilers, as well as various heaters, are very low, (less than 0.1 ton/year per unit).

Given the insignificant emissions, no additional equipment is considered necessary for purposes of SO_2 RACT. No additional RACT was considered for this facility.

RACT at Kelly Run Sanitation – Forward Twp.

The Kelly Run Sanitation, Inc. municipal solid waste landfill in Forward Township is approximately 400 acres in surface area and is composed of four units or cells and has an active landfill gas (LFG) collection system with one enclosed ground flare to control gas emissions. Total SO_2 emissions allowed by permit from this plant are 2.96 ton/year from all sources.

The primary source of emissions at the facility is the landfill itself, which emits VOCs and HAPs. This facility is subject to the Part 70 major source operating permit requirements by virtue of regulation, not the amount of emission of any pollutant. The Kelly Run Landfill is a minor source of criteria pollutant and HAP emissions.

Flare #2, an enclosed ground flare for combusting collected landfill gas VOC destruction, has a permit-established SO_2 limit of 2.64 ton/year. This control equipment is part of the VOC RACT.

No additional equipment related to control of landfill gas is considered reasonable for purposes of SO_2 RACT.

Additional permit allowed SO_2 emissions in the amount of 0.32 ton/year result from portable combustion sources, including a gasoline powered generator, a diesel-powered air compressor and two diesel-powered light plants.

Given the insignificant emissions, no additional equipment is considered necessary for purposes of SO_2 RACT. No additional RACT was considered for this facility.

6.3 RACT for Point Sources with Negligible Emissions

Table 6-1 below lists the point sources of SO_2 emissions in the Allegheny, PA SO_2 nonattainment area with negligible emissions. This group includes the facilities with emissions less than 0.06 tons per year. No RACT analysis has been done.

Table 6-1. SO_2 Point Sources in the NAA with Negligible Emissions

Facility	2011 SO_2 (tpy)
Facilities for which the SO_2 emissions are negligible (less than 0.06 ton per year) and no RACT analysis was performed	
BASIC CARBIDE/Elizabeth	0.001
BETTIS ATOMIC POWER LABORATORY/West Mifflin	0.053
CP INDUSTRIES/McKeesport	0.006
GARDNER DENVER NASH/Elizabeth	0.001
KINDER MORGAN LIQUIDS/Dravosburg	0.014
LIBERTY PULTRUSIONS/West Mifflin	0.002
MARATHON ASHLAND/Jefferson Hills	0.030
PENNSYLVANIA ELECTRIC COIL/Glassport	0.004
PEOPLES NATURAL GAS/Wall	0.005
SOUTH HILLS HEALTH SYSTEM/Jefferson Hills	0.033
TUBE CITY IMS/West Mifflin	0.003
TYK AMERICA/Jefferson Hills	0.009
VALLEY NATURAL GASES/West Mifflin	0.001

6.4 RACT for Terminated Facilities

One source in the NAA, Guardian Industries, permanently shut down in 2015. No RACT analysis was performed for this source. This facility had 2011 actual SO_2 emissions of 73.263 ton/year. Documentation for this source is included in Appendix J.

6.5 RACM for Nonpoint Sources

ACHD examined several RACM options for area, nonroad, and mobile sources in the Allegheny County nonattainment area. RACM/RACT and alternatives for point and nonpoint sources are summarized in Table 6-2 below.

Table 6-2. RACM/RACT and Alternatives Considered for the Allegheny, PA NAA

Source	Reasonably Available Control Measure	Alternative(s) Considered	Remarks
Residential Wood Burning –Stoves and Fireplaces	Currently no RACM.	1) Woodstove exchange program; 2) Education & outreach on burning clean; and 3) Replacement of old stoves when homes are sold.	Options 1 and 3 do not generate significant SO_2 reductions. Option 2 is difficult to quantify.
Residential Wood Burning – Wood Fired Boilers	Currently no RACM.	Compliance with county OWB regulation.	Does not produce significant SO_2 emissions reductions.
Residential Coal Furnaces	Currently no RACM.	Replace coal furnaces with natural gas or electric systems.	Coal furnace SO_2 emissions are negligible.
Four Stroke Gasoline Lawnmowers	Currently no RACM.	Gas for Electric mower trade program, Upgrade mower engine to higher Tier standards, native landscaping, and reduced commercial mowing.	Extremely small SO_2 reductions for trading programs and commercial mowing reductions, and unquantifiable reductions from native landscaping.
Recreational Marine Boats	Currently no RACM.	Reduce emissions or accelerate retirement of high emitting boats.	Recreational boats SO_2 emissions are negligible.
Diesel-Powered Short-Haul and Long-Haul Trucks	Currently no RACM.	Diesel retrofits or engine replacement, compliance with idling law, and emission/opacity testing.	Negligible SO_2 reductions.

6.6 RACM/RACT Summary

Emission reductions needed to reach attainment in Allegheny County are dependent on the control measures implemented at the U. S. Steel Mon Valley Works. The other identified RACM/RACT for the Allegheny, PA SO_2 nonattainment area are insignificant. ACHD has, therefore, adopted RACM and RACT as defined for this SO_2 SIP.

7 Contingency Measures, Reasonable Further Progress, and New Source Review

As outlined in EPA's SO_2 SIP Guidance, contingency measures are additional control measures to be implemented in the event that an area fails to meet Reasonable Further Progress (RFP) or fails to attain the standards by its attainment date. RFP includes annual incremental reductions in emissions prior to the attainment date. New Source Review (NSR) entails conditions that must be met by new sources or source modifications in a nonattainment area.

7.1 Contingency Measures

Planned SO_2 controls are expected to help assure compliance with the NAAQS. However, if SO_2 concentrations violate the NAAQS – i.e., ambient air quality reference monitors measure enough exceedances in a consecutive three-year period that would cause a design value above 75 ppb – a thorough analysis of circumstances that led to the violation will be conducted by ACHD. The analysis, which will begin immediately upon verification of a violation and take no longer than 10 days to complete, will include source and meteorological conditions contributing to the violation.[10]

Source(s) that are identified by ACHD as having been most likely responsible for contributing substantially to the violation will be required to submit to ACHD, within 10 days of notification by ACHD of findings of likely culpability, a written system audit report that details operating parameters of all SO_2 emissions units for the four 5-day periods up to and including the dates upon which the reference monitor registered each of the exceedances of the SO_2 NAAQS. Recommended provisional SO_2 emission control strategies for each affected unit must be included with the audit report.

Upon receipt of the written audit report and recommended strategies, ACHD will commence a 30-day evaluation period as part of its continuing investigation of the NAAQS violation. This evaluation period will be followed by a 30-day consultation period with the source(s).

If necessary, additional control measures will be implemented as expeditiously as possible to bring the NAA back into compliance. If a permit modification is necessary, ACHD would issue a final permit within the statutory timeframes required in Article XXI. Any new emission limits required by such permit would be submitted as a SIP revision to EPA.

7.2 Reasonable Further Progress (RFP)

Section 171(1) of the CAA requires Reasonable Further Progress (RFP) for a NAA that ensures attainment of a NAAQS by the applicable date through annual incremental reductions in emissions. However, SO_2 controls included in this SIP are based on point source controls, which generally involve single "steps" in reductions before and after implementation of controls. For

[10] All hourly monitored results are unofficial until fully validated, quality-assured, and certified. The immediate response to a violation would assume that concentrations are valid upon initial verification of proper monitor operation.

this SIP, time is required for completion of the control projects, including construction of a new flue system and stack at USS Edgar Thomson.

However, due to partially-completed projects by USS (including projects that have not been quantified for this SIP) and reductions to background/transported SO_2, a yearly downward trend in monitored design values of SO_2 since 2011 can be seen for the Liberty site in Figure 2-4 in Section 2 (Problem Statement). Steady decreases are evident for other sites such as South Fayette and Lawrenceville due to incremental decreases of background SO_2 emissions from all sectors.

As a way to estimate incremental changes in concentrations for the highest monitor (Liberty) in the NAA, a linear trend line was added to the 1-hour design values for Liberty for 2009 through 2016 and extrapolated to 2018, as shown in Figure 7-1 below.

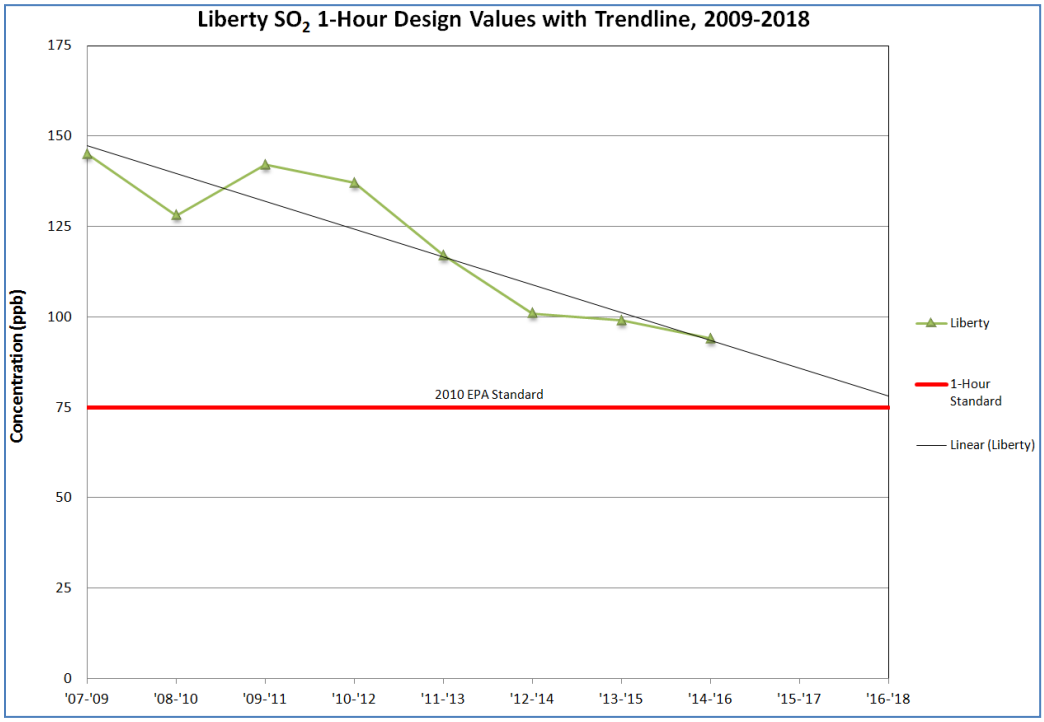

Figure 7-1. Liberty 1-Hour Design Value Trends, 2009-2018

Figure 7-1 indicates that a design value near the NAAQS could be expected even prior to implementation of all controls for this SIP, with a yearly incremental decrease in concentration over the 10-year timeframe of about 7.7 ppb per year.

The shutdown of Guardian Industries in 2015 is an additional decrease in emissions for the NAA, with a reduction of 57.31 tons of actual SO_2 emissions (based on 2015 emissions) and 136.40 tons of maximum allowable emissions.

Section 9 (Weight of Evidence) includes additional information that supports the continued decrease of SO_2 emissions in general for the NAA.

7.3 New Source Review (NSR)

Title 1, Part D, Subpart 1, §172(c)(5) of the Clean Air Act requires that, included in the nonattainment plan that is to be submitted under this part, are provisions that shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, to be in accordance with §173.

In Allegheny County, the procedures and conditions under which a new major stationary source or major modification may obtain a preconstruction permit in an area designated nonattainment for SO_2 are stipulated in the ACHD Rules and Regulations, Article XXI[11], Air Pollution Control, at §2102.06, "Major Sources Locating in or Impacting a Nonattainment Area."

To form the ACHD nonattainment NSR Program, §2102.06 incorporates by reference applicable portions of the Pennsylvania Department of Environmental Protection's New Source Review regulations codified at 25 Pa. Code Chapter 127.[12], as follows:

Table 7-1. ACHD Nonattainment NSR Incorporation

Article XXI Section, Title	25 Pa. Code Incorporated by Reference
§2102.06.a.1, Applicability	§127.203 (except §127.203(b)), §127.203a, and §127.204, as well as all terms used therein, and defined in §121.1
§2102.06.b.1, "Conditions for Approval"	§127.201 through §127.205 (except §127.201(f))), as well as all terms used therein, and defined in §121.1
§2102.06.b.3, "Conditions for Approval-Emission Offsets"	§127.206 through §127.210, as well as all terms used therein, and defined in §121.1
§2102.06.e, "Portable Facilities"	§127.212, as well as all terms used therein, and defined in §121.1
§2102.06.g, "Plantwide Applicability Limits"	§127.218, as well as all terms used therein, and defined in §121.1

[11] http://www.achd.net/air/pubs/pdf/Article21.pdf
[12] http://www.pacode.com/secure/data/025/chapter127/subchapetoc.html

The following delineates how the ACHD nonattainment NSR program meets the CAA §173 requirements through incorporation by reference of specific sections of 25 Pa. Code Chapter 127.

Table 7-2. ACHD Nonattainment NSR and CAA Requirements

CAA Section	Article XXI Nonattainment NSR Program	IBR's portion of 25 Pa. Code
§173(a)(1)(A) – Sufficient Offsets	§2102.06.b.3	§127.206 through §127.210
§173(a)(1)(B) – Location of a new source in a designated economic development zone	§2102.06.b.1	§127.205(6)
§173(a)(2) – Proposed Source must comply with LAER	§2102.06.b.1	§127.205(1)
§173(a)(3) – Certification that all major sources, owned and operated in the state by the same owner, are in compliance with all applicable requirements of the CAA	§2102.06.b.1	§127.205(2)
§173(a)(4) – the Administrator has not determined that the applicable plan is not being adequately implemented for the nonattainment area in which the proposed source is to be constructed	ACHD is adequately implementing all other SIPs	n/a
§173(a)(5) -- An analysis of alternative sites, etc., demonstrates that the benefits of the proposed source significantly outweigh the environmental and social costs	§2102.06.b.1	§127.205(5)
§173(b) – Prohibition on Use of Old Growth Allowances	Not applicable for this SIP	
§173(c)(1) – Offsets – Use of offsets from another nonattainment area	§2102.06.b.3	§127.208(8)
§173(c)(2) – Offsets – Emission reductions otherwise required by the Act shall not be creditable as emission reductions for purposes of any such offset requirement	§2102.06.b.3	§127.206(i), §127.207(1)(i).
§173(d) – Control Technology Information	Not applicable for this SIP	n/a

As outlined in the SO_2 SIP Guidance, the nonattainment NSR requirements apply on a pollutant-specific basis with respect to each nonattainment pollutant for which a source has the potential to emit in amounts greater than the applicable major source threshold for the pollutant, i.e., in major amounts (40CFR51.165(a)(1)(iv)). For new sources, in areas that are designated nonattainment for the 2010 SO_2 NAAQS, 100 tpy or more of SO_2 represents a major amount.

The ACHD nonattainment NSR program meets this requirement. Article XXI, at §2102.06.a, incorporates by reference 25 Pa. Code §§127.203, and 127.203a, which state that the requirements of the nonattainment NSR program are applicable to the construction of a new "major facility" or modification of an existing "major facility,' with the term "major facility" defined in §121.1, as "a facility which emits or has the potential to emit 100 tpy or more of a regulated NSR pollutant…"

As also described in the SO_2 Guidance document, nonattainment NSR requirements for SO_2 also apply to any existing major stationary source of SO_2 that proposes a major modification, i.e., a physical change or change in the method of operation that results in a significant net emissions increase (40 tpy or more) of SO_2 (40CFR 51.165(a)(1)(x)(A)). The ACHD nonattainment NSR program meets this requirement. Article XXI, at §2102.06.a.1 incorporates by reference 25 Pa. Code §127.203a, which states the manner in which significant net emission increases at an existing major facility are determined, and 25 Pa. Code §121.1, which defines "significant" with reference to a net emission increase as a rate of emissions that would equal or exceed 40 tpy for sulfur oxides.

Recent approval history of ACHD's nonattainment NSR regulations:

- May 14, 2012, the PA DEP nonattainment NSR program regulations, which are incorporated by reference into Article XXI as described above, were approved as a revision of the PA SIP (77FR28261).
- April 3, 2012 - Article XXI, §2102.06, updated effective to incorporate the U.S. EPA's 2002 NSR reforms.
- June 25, 2012 - These updates were submitted by PA DEP to EPA as a revision of the PA SIP.
- December 17, 2014 - EPA proposed approval of this SIP revision (79 FR 75104).
- March 30, 2015 - EPA granted final approval of the ACHD nonattainment NSR SIP revision (80 FR 16568).

8 Transportation Conformity

Section 176 of the Clean Air Act (CAA) provides a mechanism by which federally funded or approved highway and transit plans, programs, and projects are determined not to produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS or delay any interim milestones. EPA regulations in 40 CFR Part 93 pertaining to transportation conformity provide that motor vehicle emission "budgets" establish caps of these emissions that cannot be exceeded by the predicted transportation system emissions in the future.

Due to the small amount of SO_2 from the mobile sources in comparison to point sources, transportation conformity is not applicable to this SIP. Pursuant to 40 CFR 93.102(b)(2)(v), there has been no determination of transportation-related SO_2 as a significant contributor to a $PM_{2.5}$ nonattainment, and there is no established budget for SO_2 in Allegheny County.

8.1 Insignificance of Motor Vehicle Emissions

Furthermore, federal transportation conformity requirements in 40 CFR Part 93.109 allow for pollutants to be exempt from conformity analysis if motor vehicle emissions are found to be insignificant based on the following factors:

- The percentage of motor vehicle emissions in the context of the total SIP inventory
- The current state of air quality as determined by monitoring data for that NAAQS
- The absence of SIP motor vehicle control measures
- Historical trends and future projections of the growth of motor vehicle emissions

Each of these factors is examined in more detail below in regard to this SIP.

8.1.1 Motor Vehicle Emissions Constitute a Low Percentage of Total SIP Inventory

Sources in the emissions inventories given in Tables 4-1 and 4-2 of Section 4 include stationary point sources, area sources, nonroad sources, and onroad (mobile) sources. Emissions for mobile sources were generated using the Motor Vehicle Emissions Simulator (MOVES) model.

In the base year inventory of 2011, mobile sources accounted for 0.24% of the total emissions for the NAA. The projected inventory for 2018 shows an even smaller percentage, 0.11% of total emissions.

8.1.2 Current State of Air Quality as Determined by Monitoring Data

The Allegheny, PA NAA is currently not attaining the 2010 SO_2 NAAQS. However, the disparity between the NAA monitors (Liberty and North Braddock) and surrounding monitors as seen in Figure 2-4 in Section 2 indicate the dominance of stationary point source influences in the NAA. Section 3 of this SIP provides the control strategy required to attainment, based on point sources.

8.1.3 Absence of SIP Motor Vehicle Control Measures

Historically, there have been no Allegheny County SIP requirements for Transportation Control Measures (TCMs). TCMs are strategies that reduce transportation-related air pollution and fuel use by reducing vehicle miles traveled and improving roadway operations.

Onroad vehicles are subject to federal emission standards. In addition, a vehicle inspection and maintenance program is in place in the area, as well as vehicle idling restrictions, and low vapor pressure gasoline requirements during the ozone season. These controls were either required or selected for implementation in order to reduce emissions and to bring the larger Pittsburgh MSA into attainment of the ozone NAAQS.

Additionally, RACM analysis given in Section 6 listed options for onroad mobile sources, with none showing benefits for SO_2 for this SIP.

8.1.4 Historical Trends and Future Projections of the Growth of Motor Vehicle Emissions

Population trends given in Section 9 show that the NAA has decreased in population since 2000, suggesting a decrease in vehicle usage in the NAA. Additionally, ongoing clean vehicle/fuel programs will lead to continued decrease in vehicle emissions. The projections given in Table 4-2 of Section 4 also show the highest decrease by sector for onroad emissions (64% decrease).

8.2 Transportation Conformity Summary

Based on the above findings, ACHD concludes that the onroad sector is an insignificant contributor to nonattainment of the 2010 SO_2 NAAQS in the Allegheny, PA nonattainment area. Upon a positive adequacy review and approval of the information included in this SIP submittal for transportation conformity, no highway emissions analysis will be required for SO_2 for the area. Allegheny County is, however, subject to transportation conformity requirements for the 8-hour ozone standard, with SIP-approved MVEBs for NOx and VOC.

9 Weight of Evidence

Corroboratory analyses that support the modeled attainment demonstration, or "weight of evidence" (WOE), help bolster the assertions that an area will achieve attainment in the allotted time. Weight of evidence can also indicate that an area will continue to attain the NAAQS beyond the projected timeframe. Such analyses can include:

- Additional reductions/scenarios not quantified for the SIP
- Monitored data and emissions trends
- Declining population trends
- Cleaner fuels/vehicles

9.1 Additional Controls in the NAA

The following controls or scenarios have not been quantified for this SIP:

- The Consent Judgment between USS and ACHD in March 2016 will lead to additional reductions of SO_2 from the Clairton Plant battery fugitives and combustion stacks.

- An additional project under consideration at the Clairton Plant is the development of a switching valve replacement program for the No. 2 Control Room. This project would reduce the sulfur content in the underfire COG gas stream.

- The projected inventory totals in Section 4 (and provided in Appendix D) are initial estimates of projected actual emissions for 2018. ACHD believes that the control strategy in Section 3 may lead to greater SO_2 reductions than modeled in the demonstration and enforced by the emission limits.

- The modeling demonstration (according to SIP Guidance and the Guideline on Air Quality Models) included sources at maximum capacities along with 99th percentile background values added to each hour. In real-world operation, the modeled processes do not operate at their maximum capacity simultaneously. The modeling also assumes that maximum operation is occurring during all meteorological conditions. All possible future scenarios will likely be lower than as predicted by the modeling.

9.2 Monitored Trends

Monitored data has shown a steady decline in SO_2 concentrations throughout Allegheny County and southwestern PA in recent years. The highest monitor (Liberty) has also shown a steady decline over the past 10 years, as shown in Figures 2-4 and 7-1 in previous sections. The North Braddock monitor is currently showing attainment based on 2014-2016 data, and the Liberty 2016 99th percentile was the lowest recorded concentration to-date (64 ppb) and below the level of the NAAQS (75 ppb). These declining trends are expected to continue with decreases in overall emissions within the NAA and surrounding areas.

9.3 Local Major Source Modifications and Shutdowns

Major source modifications outside of the NAA that were not included in the modeling demonstration will lead to additional reductions of background and/or direct emissions that can affect the Allegheny, PA NAA. These modifications include the following:

- Bay Valley: The Bay Valley steam generation plant on the North Shore of Pittsburgh switched from coal to natural gas in mid-2014

- Shenango: The Shenango coke plant on Neville Island ceased operations in Jan. 2016

- Bruce Mansfield: The First Energy Bruce Mansfield power plant near Shippingport (Beaver County) will undergo servicing of its Flue Gas Desulfurization (FGD) system in 2018, increasing control efficiency of the FGD and potentially reducing SO_2 emissions in southwestern PA.

9.4 EGU Deactivations

The following coal-fired electric generating units (EGUs) adjacent to the NAA have been deactivated in 2012-2103:

- NRG Elrama Station: The power plant located in Elrama in Union Township in Washington County was deactivated in October 2012.

- Allegheny Energy Mitchell Station: The power plant located near New Eagle in Union Township in Washington County was deactivated in October 2013.

Appendix J contains documentation on these sources. Any future operation at these locations would require a new permit and NSR.

Several additional EGUs in the surrounding area have deactivated since 2011 or plan to deactivate in the next few years. These deactivations will lead the continued decrease of background and transported SO_2 emissions in the NAA.

On the following pages, Table 9-1 shows a summary of the unit deactivations by plant capacity (in MW) for 2011-2016 within the PJM territory, and Table 9-2 shows announced deactivations in the PJM region for 2017-2020. Figure 9-1 shows a map of the PJM electric transmission territory that includes PA and surrounding states.

Additionally, federal rules such as EPA's Mercury and Air Toxics Standards (MATS) and Interstate Air Pollution Transport provisions should lead to continued decreases in SO_2 emissions from upwind and surrounding EGUs.

Table 9-1. PJM Unit Deactivations by Plant Capacity, 2011-2016

Plant	Year	State	Decrease in Capacity (MW)
Brunot Island	2011	PA	30
Burger Plant	2011	OH	101
Chesapeake	2011	VA	67.3
Cromby	2011	PA	347.7
Eddystone	2011	PA	279
Hudson	2011	NJ	383
Indian River	2011	DE	90
Kitty Hawk	2011	NC	34
Albright	2012	WV	283
Armstrong	2012	PA	343
Bay Shore	2012	OH	495
Benning	2012	DC	550
Buzzard Point	2012	DC	240
Conesville	2012	OH	165
Crawford	2012	IL	532
Eastlake	2012	OH	837
Eddystone	2012	PA	309
Elrama	2012	PA	460
Fisk Street	2012	PA	326
Kearny	2012	NJ	250
Niles	2012	OH	217
Potomac River	2012	VA	482
R. Paul Smith	2012	MD	115
Rivesville	2012	WV	121
SMART Paper	2012	OH	25
Sporn	2012	WV	440
State Line	2012	IN	515
Viking Energy	2012	PA	16
Vineland	2012	NJ	23
Walter C Beckjord	2012	OH	94
Willow Island	2012	WV	189
Hatfield's Ferry	2013	PA	1590
Indian River	2013	DE	170
Ingenco Petersburg	2013	VA	2.9
Koppers Co. IPP	2013	PA	8
Mitchell	2013	PA	359
O H Hutchings	2013	OH	62
Piney Creek	2013	PA	31
Schuylkill	2013	PA	169
Titus	2013	PA	243

Plant	Year	State	Decrease in Capacity (MW)
Walter C Beckjord	2013	OH	222
Kearny	2014	NJ	21
Walter C Beckjord	2014	OH	244
AES Beaver Valley	2015	PA	125
Ashtabula	2015	OH	244
Bergen	2015	NJ	21
Big Sandy	2015	KY	800
Burger Plant	2015	OH	7
Burlington	2015	NJ	205
Cedar	2015	NJ	66
Clinch River	2015	VA	230
Dale	2015	KY	46
Eastlake	2015	OH	396
Edison	2015	NJ	504
Essex	2015	NJ	536
Gilbert	2015	NJ	98
Glen Gardner	2015	NJ	160
Glen Lyn	2015	VA	325
Kammer	2015	WV	600
Kanawha River	2015	WV	400
Lake Kingman	2015	VA	115
Lake Shore	2015	OH	245
Mercer	2015	NJ	115
Miami Fort	2015	KY	163
Middle Energy Center	2015	NJ	75
Missouri Avenue	2015	NJ	60
Muskingum River	2015	OH	1390
National Park	2015	NJ	21
O H Hutchings	2015	OH	277
Picway	2015	OH	95
Pottstown	2015	PA	2
Sewaren	2015	NJ	111
Sporn	2015	WV	580
Tanner Creek	2015	IN	988
Werner	2015	NJ	212
Will County	2015	IL	251
Avon Lake	2016	OH	94.6
BL England Diesel	2016	NJ	8
Dale	2016	KY	147
Harrisburg	2016	PA	14

Table 9-2. Future PJM Deactivations by Plant Capacity, 2017-2020

Plant	Projected Deactivation Date	State	Decrease in Capacity (MW)
Bayonne	2017	NJ	163
BL England	2017	NJ	303.9
Edgecomb	2017	NC	116
Hopewell	2017	VA	92
Hudson	2017	NJ	617.9
McKee	2017	DE	34
Mercer	2017	NJ	321
Mercer	2017	NJ	320.3
Roanoke Valley	2017	NC	209
Spruance	2017	VA	202
Yorktown	2017	VA	324
Sewaren	2018	NJ	451
Elmer Smith	2019	KY	52
Marcus Hook	2019	PA	50
Oyster Creek	2019	NJ	607.7
Bay Shore	2020	OH	136
W H Sammis	2020	OH	668.6
Wagner	2020	MD	135
Will County	2020	IL	510

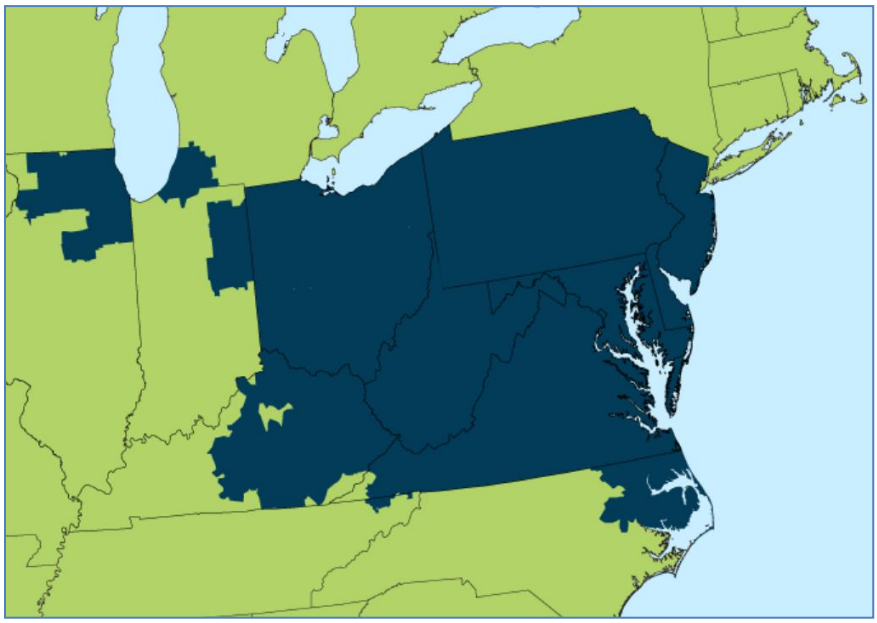

Figure 9-1. PJM Interconnection Territory

9.5 Population Trends

Allegheny County is unique in the fact that the population has been declining since the 1960s. Localized regions of population growth are occurring, but the general trend for the county is one of negative growth.

Total population in the NAA showed a decrease of 16,228 from 2000 through 2015. Figure 9-2 shows the percent change in population by municipality for 2000-2015.[13] The overall decrease in population for the NAA suggests less anthropogenic SO_2 emissions from vehicles, woodstoves, and other sources.

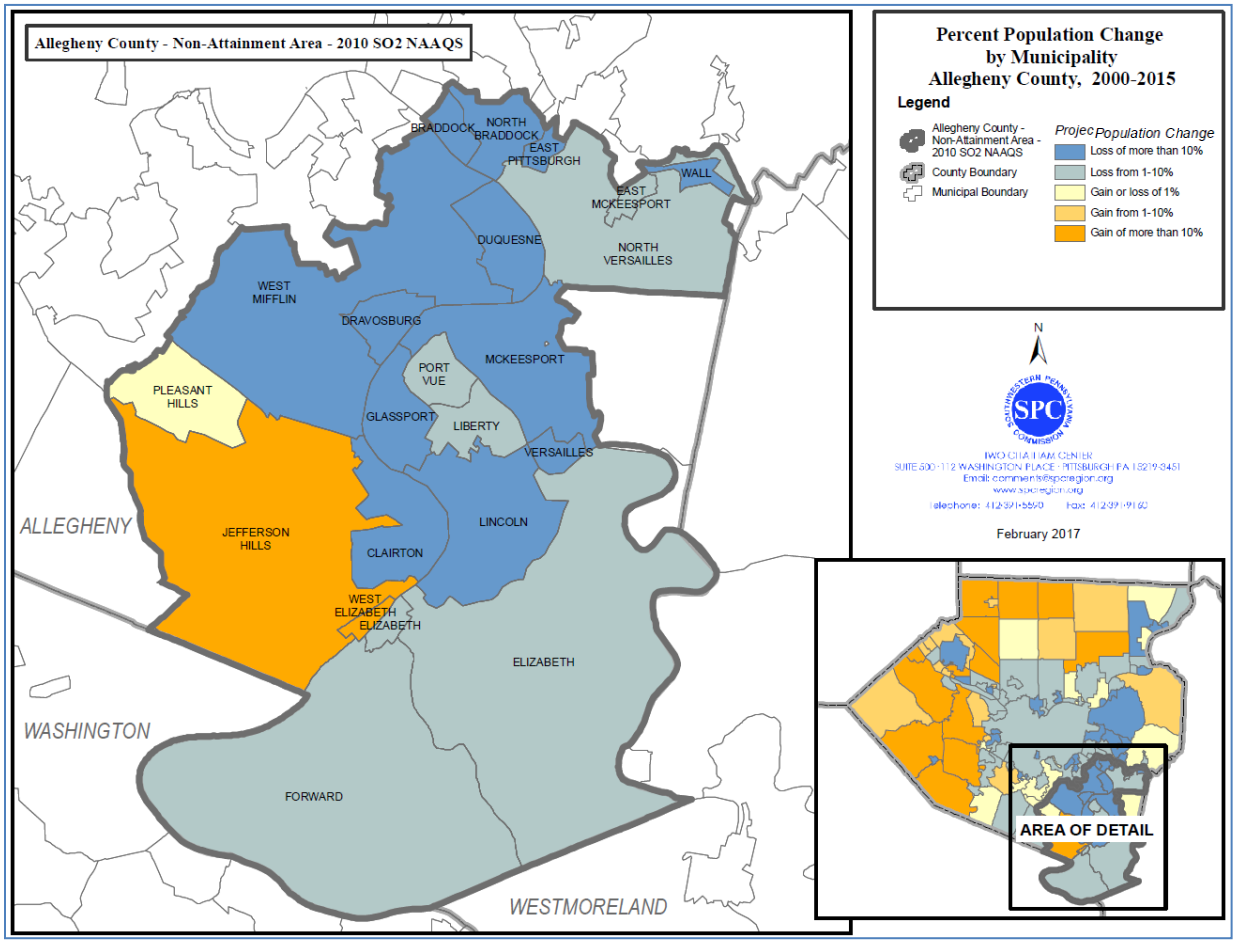

Figure 9-2. Percent Population Change in NAA, 2000-2015

All communities show decreases in population over the past decade and a half, except for the suburban areas of Pleasant Hills, Jefferson Hills, and West Elizabeth. Projections through 2040 show similar overall trends, with only the larger suburbs showing increases in population. These increases are due mostly to new housing plans, with little SO_2 impact.

[13] Data provided by the Southwestern Pennsylvania Commission (SPC)

9.6 National Clean Fuel/Vehicle Programs

Several national clean fuel and vehicle programs will lead to the continued decrease of SO_2 emissions in the NAA and nationwide.

- Since 2010, EPA requires the use of diesel fuel with 15 ppm sulfur specification (known as ultra-low sulfur diesel, or ULSD). All diesel fuel supplied to the US market must be ULSD and all vehicles must use ULSD. All nonroad, locomotive, and marine diesel fuel must be ULSD and all engines must use ULSD.[14]

- In 2015, EPA issued the final rule for light duty Tier 3 motor vehicle emissions and fuel standards. The Tier 3 gasoline sulfur program sets new vehicle emissions standards and lowers the sulfur content on gasoline from 30 ppm to 10 ppm beginning in 2017.[15]

- EPA and NHTSA (National Highway Traffic Safety Administrations) partnered for a program to reduce emissions and improve fuel efficiency of medium and heavy duty vehicles in two phases.

    - Phase 1 applies to vehicles model year 2014-2018 in the categories of combination tractors (semi trucks), heavy duty pickup trucks and vans, and vocational vehicles.[16]

    - Phase 2 encourages the development and deployment of new cost-effective technologies to improve fuel efficiency for medium and heavy duty vehicles from 2018 through 2027.[17]

While reductions from these programs are minor compared to point source controls, they will help to lower the overall nonpoint component of SO_2 concentrations in the NAA.

9.7 PA Commercial Fuel Oil Sulfur Limits

Pennsylvania is part of a regional planning organization, the Mid-Atlantic/Northeast Visibility Union (MANE-VU), established in 2000 to help the Northeast states plan for meeting regional haze requirements. MANE-VU states evaluated several categories for potential sulfur reductions and adopted a formal statement agreeing to pursue a regional low-sulfur oil strategy, among other means.

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[14] https://www.epa.gov/diesel-fuel-standards/diesel-fuel-standards-and-rulemakings
[15] https://www.epa.gov/gasoline-standards/gasoline-sulfur
[16] https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-phase-1-greenhouse-gas-emissions-standards-and
[17] https://www.epa.gov/newsreleases/epa-and-dot-finalize-greenhouse-gas-and-fuel-efficiency-standards-heavy-duty-trucks-0

In 43 Pa. Bulletin 806 (February 9, 2013) the Pennsylvania Department of Environmental Protection updated its regulations (25 Pa. Code §123.22) by lowering the allowable sulfur content of commercial fuel oil used in residential and commercial/industrial boilers, furnaces and other heaters in the five separate geographical "air basins" delineated in the state. Importantly, prior to the 2013 update, all of the state air basins except that which includes Allegheny County, had regulatory limits on sulfur content of commercial fuel oil. Thus, the newly revised state regulations provide heretofore unavailable limits to sulfur in fuel oil for Allegheny County.

Effective July 1, 2016, new limits on sulfur in commercial fuel oil for the Allegheny County Air basin are as follows:

No. 2 and lighter oil	500 ppm	(0.05%)
No. 4 oil	2,500 ppm	(0.25%)
No. 5, No. 6 and heavier oil	5,000 ppm	(0.5%)

While the amount of SO_2 reductions in Allegheny County attributable to this new regulation is not known, statewide SO_2 reductions would be approximately 21,000 tons per year from the reduced fuel oil sulfur content.

10 Legal Documents

10.1 Notice of Public Hearing and Comment Period

Pittsburgh Post Gazette Classifieds

Legal Notices

Posted May 01, 2017

NOTICE OF PUBLIC HEARING on t...

NOTICE OF PUBLIC
HEARING
on the Proposed Revision to the Allegheny County Portion of the Pennsylvania State Implementation Plan Attainment Demonstration for the Allegheny, PA Sulfur Dioxide (SO2) Nonattainment Area 2010 Standards
The Allegheny County Board of Health will hold a public hearing on Thursday, June 1, 2017, at 6:00 PM at the Allegheny County Health Department, Clack Health Center Bldg. 7, 301 39th St., Pittsburgh, PA 15201 to take testimony on the proposed revision to Allegheny County's portion of the Pennsylvania State Implementation Plan (SIP) for SO2.
The proposed revision demonstrates that the Allegheny, PA area will attain the 2010 SO2 National Ambient Air Quality Standards (NAAQS) by Oct. 2018, based on pollutant emission reductions and air dispersion modeling for industrial facilities within the Monongahela Valley. This revision will be submitted to EPA for approval as a SIP revision.
A copy of the proposed SIP revision may be examined beginning Wednesday, May 3, 2017, at the Allegheny County Health Department, Clack Health Center Bldg. 7, Document Control Room, from 8:30 AM until 4:00 PM, Monday through Friday.
The proposed SIP revision may also be found on the Allegheny County Health Department web site:
http://www.achd.
net/air/index.php
Oral testimony must be scheduled by calling 412-578-8120 at least 24 hours in advance of the public hearing. Speakers will be limited to five minutes and should provide a written copy of their comments at the hearing.
The Board will accept written testimony beginning Wednesday, May 3, 2017, and concluding 11:59 PM on Tuesday, June 6, 2017, by mail to ACHD Air Program, 301 39th Street, Bldg #7, Pittsburgh, PA 15201-1811, by email to aqcomments@alleghenycounty.us , or by fax to 412-578-8144.

10.2 Transmittals of Hearing Notice to PA DEP and EPA

COUNTY OF ALLEGHENY

RICH FITZGERALD
COUNTY EXECUTIVE

May 1, 2017

Ms. Cristina Fernandez, Director
Air Protection Division
Region III (3AP00)
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Ms. Fernandez:

Enclosed is a Notice of Public Hearing for a proposed revision to the Allegheny County portion of the Pennsylvania State Implementation Plan regarding the Attainment Demonstration for the Allegheny, PA Sulfur Dioxide (SO_2) Nonattainment Area 2010 Standards. The SIP revision itself is available for download at http://www.achd.net/air/index.php.

The SIP revision demonstrates that the Allegheny, PA area will attain the 2010 SO_2 National Ambient Air Quality Standards (NAAQS) by Oct. 2018, based on pollutant emission reductions and air dispersion modeling for industrial facilities within the Monongahela Valley.

This revision will be submitted to EPA for approval as a SIP revision, and is being tracked under our internal Revision Tracking Number 82.

The public comment period begins May 3, 2017 and concludes June 6, 2017. The public hearing will be held June 1, 2017. Your comments are welcome.

Sincerely,

Sandra Etzel, Supervisor
Air Quality Program Planning

cc: J.M. Maranche (ACHD)
File

Enclosure:

ALLEGHENY COUNTY HEALTH DEPARTMENT • AIR QUALITY PROGRAM
301 39TH STREET BUILDING #7 • PITTSBURGH, PA 15201-1811
PHONE (412) 578-8103 • FAX (412) 578-8144

COUNTY OF ALLEGHENY

RICH FITZGERALD
COUNTY EXECUTIVE

May 1, 2017

Mr. Krishnan Ramamurthy, Acting Director
Bureau of Air Quality
Department of Environmental Protection
Rachel Carson Building
400 Market Street
P O Box 8468
Harrisburg, PA 17105-8468

Dear Mr. Ramamurthy:

Enclosed is a Notice of Public Hearing for a proposed revision to the Allegheny County portion of the Pennsylvania State Implementation Plan regarding the Attainment Demonstration for the Allegheny, PA Sulfur Dioxide (SO_2) Nonattainment Area 2010 Standards. The SIP revision itself is available for download at http://www.achd.net/air/index.php.

The SIP revision demonstrates that the Allegheny, PA area will attain the 2010 SO_2 National Ambient Air Quality Standards (NAAQS) by Oct. 2018, based on pollutant emission reductions and air dispersion modeling for industrial facilities within the Monongahela Valley.

This revision will be submitted to EPA for approval as a SIP revision, and is being tracked under our internal Revision Tracking Number 82.

The public comment period begins May 3, 2017 and concludes June 6, 2017. The public hearing will be held June 1, 2017. Your comments are welcome.

Sincerely,

Sandra Etzel, Section Head, Planning
Air Quality Program

cc: Kirit Dalal (PA DEP)
Steve Hepler (PA DEP)
J.M. Maranche (ACHD)

Enclosure

ALLEGHENY COUNTY HEALTH DEPARTMENT • AIR QUALITY PROGRAM
301 39TH STREET BUILDING #7 • PITTSBURGH, PA 15201-1811
PHONE (412) 578-8103 • FAX (412) 578-8144

10.3 Proof of Publication and Certification of Public Hearing

No._____ Term,_____

Proof of Publication of Notice in Pittsburgh Post-Gazette

Under Act No 587, Approved May 16, 1929, PL 1784, as last amended by Act No 409 of September 29, 1951

Commonwealth of Pennsylvania, County of Allegheny, ss K. Flaherty, being duly sworn, deposes and says that the Pittsburgh Post-Gazette, a newspaper of general circulation published in the City of Pittsburgh, County and Commonwealth aforesaid, was established in 1993 by the merging of the Pittsburgh Post-Gazette and Sun-Telegraph and The Pittsburgh Press and the Pittsburgh Post-Gazette and Sun-Telegraph was established in 1960 and the Pittsburgh Post-Gazette was established in 1927 by the merging of the Pittsburgh Gazette established in 1786 and the Pittsburgh Post, established in 1842, since which date the said Pittsburgh Post-Gazette has been regularly issued in said County and that a copy of said printed notice or publication is attached hereto exactly as the same was printed and published in the regular editions and issues of the said Pittsburgh Post-Gazette a newspaper of general circulation on the following dates, viz:

01 of May, 2017

Affiant further deposes that he/she is an agent for the PG Publishing Company, a corporation and publisher of the Pittsburgh Post-Gazette, that, as such agent, affiant is duly authorized to verify the foregoing statement under oath, that affiant is not interested in the subject matter of the afore said notice or publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.

K. Flaherty

PG Publishing Company

Sworn to and subscribed before me this day of:
May 01, 2017

Linda M. Gaertner

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Linda M. Gaertner, Notary Public
Findlay Twp., Allegheny County
My Commission Expires Jan. 31, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

COPY OF NOTICE OR PUBLICATION

NOTICE OF PUBLIC HEARING

on the Proposed Revision to the Allegheny County Portion of the Pennsylvania State Implementation Plan Attainment Demonstration for the Allegheny, PA Sulfur Dioxide (SO2) Nonattainment Area 2010 Standards

The Allegheny County Board of Health will hold a public hearing on Thursday, June 1, 2017, at 6:00 PM at the Allegheny County Health Department, Clack Health Center Bldg. 7, 301 39th St., Pittsburgh, PA 15201 to take testimony on the proposed revision to Allegheny County's portion of the Pennsylvania State Implementation Plan (SIP) for SO2.

The proposed revision demonstrates that the Allegheny, PA area will attain the 2010 SO2 National Ambient Air Quality Standards (NAAQS) by Oct. 2018, based on pollutant emission reductions and air dispersion modeling for industrial facilities within the Monongahela Valley. This revision will be submitted to EPA for approval as a SIP revision.

A copy of the proposed SIP revision may be examined beginning Wednesday, May 3, 2017, at the Allegheny County Health Department, Clack Health Center Bldg. 7, Document Control Room, from 8:30 AM until 4:00 PM, Monday through Friday. The proposed SIP revision may also be found on the Allegheny County Health Department web site: http://www.achd.net/air/index.php

Oral testimony must be scheduled by calling 412-578-8120 at least 24 hours in advance of the public hearing. Speakers will be limited to five minutes and should provide a written copy of their comments at the hearing.

The Board will accept written testimony beginning Wednesday, May 3, 2017, and concluding 11:59 PM on Tuesday, June 6, 2017, by mail to ACHD Air Program, 301 39th Street, Bldg #7, Pittsburgh, PA 15201-1811, by email to aqcomments@alleghenycounty.us , or by fax to 412-578-8144.

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I hereby certify that the foregoing is the original Proof of Publication and receipt for the Advertising costs in the subject matter of said notice.

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Attorney For

Certification of Hearing

Jason M. Maranche deposes and says that he is an Air Pollution Control Engineer III with the Air Quality Program of the Allegheny County Health Department and hereby certifies that a Public Hearing was held on June 1, 2017 regarding the proposed revision to Allegheny County's portion of the State Implementation Plan (SIP) for sulfur dioxide (SO_2); that the opportunity for written comments was given during the period May 3, 2017 through June 6, 2017 in accordance with the requirements of 40 CFR 51.102; that notice of such hearing was given by publication in a newspaper of general circulation on May 1, 2017; and to the best of his knowledge, belief, and understanding, such proceedings were in full compliance with all applicable state and federal laws, regulations, and other requirements.

Jason M. Maranche
Air Pollution Control Engineer III
Air Quality Program
Allegheny County Health Department

6/9/17
Date

10.4 Summary of Public Comments and Responses

Summary of Public Comments and Department Responses on the Proposed State Implementation Plan Revision for the Allegheny, PA Nonattainment Area, 2010 SO_2 NAAQS

June 1, 2017 Public Hearing
Public Comment Period of May 3, 2017 through June 6, 2017

[Notice of the opportunity for public comment appeared in the legal section of the Pittsburgh Post-Gazette on May 1, 2017.]

General
Comments related to the SIP in general.

1. **Comment:** It is critical to maintain the balance of environmental responsibility and economic opportunity for our region and not risk the future of our remaining manufacturing jobs. U. S. Steel and the United Steelworkers are committed to environmental protection as well as the local economy. The Allegheny County Health Department should not unnecessarily curtail manufacturing operations while meeting requirements of the Clean Air Act for this SIP.

   Response: Allegheny County Health Department (ACHD) recognizes the commitment by U. S. Steel (USS) and its employees and understands the importance of the economy and environmental protection to stakeholders in Allegheny County. ACHD considers the requirements for this SIP to be reasonable and achievable.

2. **Comment:** Losing federal transportation funding would have a serious effect on our transit system in the short term and a devastating effect in the long term. Federal monies pay for some day-to-day operations but mostly contribute to capital costs for the Port Authority, including newer and cleaner buses. Expanding and protecting public transportation is also one of the best things we can do to improve air quality, as public transportation can reduce pollution from several vehicles. Corporations need to immediately begin working to help achieve compliance with air standards and generally need to be responsible to the community where they derive their profits.

   Response: ACHD recognizes the importance of transportation funding for the County. In the case of public transit, Clean Air Act §179(b)(1)(B), "Sanctions and Consequences of Failure to Attain – Sanctions," does allow for the approval of capital programs for public transit, construction of certain roads or lanes solely for the use of passenger buses and other activities generally associated with public transit.

3. **Comment:** While ACHD correctly cites EPA's Technical Support Document regarding the nonattainment designations, the boundaries for the Allegheny, PA nonattainment area are contrary to what PA DEP recommended in its April 8, 2013 recommendation letter to EPA, which did not include the municipalities of Braddock and North Braddock. ACHD's North Braddock monitor is currently showing attainment for 2014-2016 data. Additionally, Union Township in Washington County, in which the Elrama and Mitchell power plants are located, was not included within the nonattainment area. This should be mentioned in the Weight of Evidence section.

   Response: ACHD submitted a comment to the SO_2 designations docket (EPA-HQ-OAR-2012-0233) in April 2013, recommending a nonattainment area that did not include municipalities north of West Mifflin and did include Union Township and Finleyville Borough in Washington County. EPA's final designation for the Allegheny, PA area was based on five factors, including monitored air quality, emissions and emissions-related data, meteorology, geography/topography, and jurisdictional boundaries as applicable to the area. Further discussion of the designated area would not enhance the Weight of Evidence section.

4. **Comment:** There is no explanation in the SIP of the work practice standards that will assure continuous efficient operation according to 40 CFR Part 51 Appendix V, specifically for the VCU system. Detailed information on the work practices and reporting requirements that will ensure emission levels should be included in the SO_2 SIP.

   Response: 40 CFR Part 51, Appendix V, "Criteria for Determining the Completeness of Plan Submissions" states that the following shall be included in plan submissions for review by EPA: "Evidence that the plan contains emission limitations, work practice standards, and recordkeeping/reporting requirements, where necessary, to ensure emission levels." ACHD contends that work practice standards related to the VCU system are not an issue, as it is the technology itself that enables emission reductions, and therefore discussion of work practice standards in the SIP is unnecessary. Reporting requirements will be established in the applicable installation and operating permits.

Enforceability of Limits

Comments related to the enforceability of the SIP emission limits.

5. **Comment:** Page 8 states that "Federal enforceability for limits given in this section will be achieved through permit conditions or consent orders effective on or before October 6, 2017." Though federal enforceability for limits will be achieved through permit conditions or consent orders, the limits do not necessarily need to be effective on or before October 6, 2017. ACHD should clarify that it anticipates that the permits or consent orders would be federally enforceable or effective on or before October 6, 2017, with the limits themselves effective on or before October 4, 2018.

   Response: Section 3.1 of the SIP has been clarified accordingly that installation permits will be effective by October 6, 2017, with the limits to be effective by October 4, 2018. If full

implementation of all or any of the controls can be met sooner than October 4, 2018, earlier dates may be reflected in the permits. Installation permits will also be included in Appendix K in the final SIP submittal.

6. **Comment:** The draft attainment plan states that emission limits will be federally enforceable by permit conditions or consent orders effective on or before October 6, 2017. All emission limits needed to attain and maintain the NAAQS must be incorporated by reference into the SIP in order to be federally enforceable and should be submitted with the final attainment plan. The consent orders and permits must be made available for public comment prior to submittal to EPA for incorporation into the SIP as part of the attainment plan. ACHD should clearly indicate that a request is being made that EPA approve the consent order and/or permit limits into the SIP.

   Response: Permits or consent orders will be included in the final submittal to EPA. Clarification has been added to Section 3.2 accordingly.

Longer-Term Average Limits

Comments related to the longer-term averaging for limits assigned to sources with variability.

7. **Comment:** In regards to longer term averaging, ACHD has applied a 30-day average and an unnecessary supplementary limit. As stated; "The SIP limits will be based on the 30-day averages, with an additional restriction of no more than three consecutive days above the supplementary 24-hour limits." ACHD determined the 30-day rolling average in manner consistent with EPA's SO_2 SIP guidance; therefore, the supplementary limit is unnecessary and redundant and results in unwarranted restrictions and unnecessary data reduction and recordkeeping. The 30-day rolling average is much lower than the 24-hour average and the critical emissions value, rendering the 24-hour average limit unnecessary.

   ACHD's development of the 30-day averaging period clearly follows and does not deviate from EPA's guidance. According to the EPA guidance, it is appropriate to use longer term emission limits for variable emissions sources. EPA included the option for a longer term averaging period in response to concerns regarding the conservatism in the model (e.g., modeling emission units simultaneously at their maximum emissions) and variability in the sources – including, specifically the variability of sulfur in the fuel combusted as is the case at U. S. Steel – and analyzing the impact of emissions variability on air quality. According to the guidance, "EPA believes this approach provides appropriate flexibility while still requiring approximately the same control strategy and while still providing for attainment of the standard." Data reduction produced ratios to the critical emissions value that are in line with the ratios provided by EPA in the guidance.

   Furthermore, the EPA guidance for the 1-hour standard explicitly uses 30-day rolling average examples. Adding a "supplementary" limit that is not necessary only adds additional monitoring and recordkeeping requirements. Further, the EPA has not negatively

commented on the use of the longer term 30-day rolling average limits or ACHD's approach to developing 30-day rolling average limits. Thus, the supplementary limit is not necessary for the SIP, nor is it necessary for or used in the attainment demonstration. ACHD should remove any and all references to "supplementary (24-hour) limits."

Response: While the SIP Guidance uses 30-day averaging as examples, it also explicitly explains that averages "up to 30 days" may be adequate for longer-term average and does not preclude the use of any averages over a shorter period for supplemental restrictions. As mentioned in the EPA guidance and in Appendix D of the SIP, an "important factor in assessing whether a long term average limit provides appropriate protection against NAAQS violations is whether the source can be expected to comply with a long term average limit in a manner that minimizes the frequency of occasions with elevated emissions and magnitude of emissions on those occasions. Use of long term average limits is most defensible if the frequency and magnitude of such occasions of elevated emissions will be minimal. Consequently, supplemental limits on the frequency and/or magnitude of occasions of elevated emissions can be a valuable element of a plan that protects against NAAQS violations. Limits against excessive frequency (e.g., limitations on the number of times the hourly emissions exceed the critical emission value) and/or magnitude of elevated emissions (e.g., an hourly emissions limit, supplementing the longer term limit, which sets a cap on the magnitude of the peak hourly emissions rate) could further strengthen the justification for the use of longer term average limits."

ACHD followed the EPA guidance regarding the addition of a supplementary limit and considers the additional restriction to be appropriate for the SIP. The consecutive-day 24-hour supplementary conditions are designed to limit prolonged periods above the modeled critical emission values (CEVs), especially during inversion periods where the likelihood of exceedances is increased substantially. The 3-day consecutive basis is also consistent with the NAAQS standard, which is based on the 4th-highest day (determined by maximum hourly values) in a year. Recordkeeping requirements should be little affected by the supplementary conditions, since 24-hour block values are already required for calculation of the 30-day rolling averages.

8. **Comment:** Longer term averaging should not be used for limits since averaging would allow for some higher sulfur periods than the modeled values that show attainment on a 1-hour basis. Allowable emission excursions exceeding the SIP critical emission value (CEV) (non averaged limit) may not be so benign as EPA SO_2 Guidance suggests: "EPA's general expectation that, if periods of hourly emissions above the critical emission value are a rare occurrence at a source, particularly if the magnitude of the emissions is not substantially higher than the critical emissions value, these periods would be unlikely to have a significant impact on air quality, insofar as they would be very unlikely to occur repeatedly at the times when the meteorology is conducive for high ambient concentrations of SO_2."

   Temperature inversions that leverage pollutant levels are very common in Allegheny County. A recent analysis of air inversions in the County performed by ACHD staff showed that "weak or greater surface inversions were observed nearly 45% of mornings from July 29,

2014 through February 20, 2016 inclusive with some missing days in 2014." More recently, looking at April of 2017, there were 77% of days with a morning (7:00 a.m.) surface inversion of at least 1.0 °C. The high frequency of inversions will, in fact, very likely intersect with allowable higher SO_2 emission levels and will not be "unlikely" as suggested above by Guidance. Sources in the Mon Valley are predominantly in the lower level of the river valley, setting sets up situations for trapping air pollution, especially during with the numerous inversions in the county. There have been two monitor exceedances already in 2017, with an additional day reported at 75 ppb, even with VCU controls partially in place.

Hours above the critical emission value (CEV), while possibly accommodating facility issues such as variability, will not help the breathing public nearby or downwind of the source. It should also be remembered that there are already allowable monitor exceedances built into the one-hour SO_2 standard. EPA "links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms." Even a few hours above the critical emission value or even less than one hour could cause a local health effect immediately downwind of the higher emitting source(s). The one hour standard acknowledges these short term effects. In an area with significant inversions added to a river valley location, and continuously operating facilities, the strongest possible controls are called for.

There should be no averaging period at all, given the complexity of the airshed. Longer-term averaging would allow major polluters to comply with only 24-hour and even 30-day averages. The conservative control needed for this nonattainment area is the 1-hour, non-averaged CEV value.

Response: While ACHD understands the possibility for some hours to exceed modeled CEVs, ACHD considers longer-term averaging to be appropriate for limits for COG-combusting sources due to variability in sulfur content of coke oven gas. As stated in the EPA SO_2 SIP Guidance, longer-term average limits can provide "adequate assurance that the 1-hour SO_2 standard will be attained, so long as the limit reflects comparable stringency to the 1-hour average emission limit that modeling shows to provide for attainment." The variability and longer-term averaging analysis has been provided in Appendix D of the SIP.

The U. S. Steel facilities normally operate at levels below the modeled (CEV) rates. As shown in the example given in Appendix D, it is expected that only a few hourly emissions would exceed any of the modeled CEV emission rates during any given year. (Note that Figure 3-1 of the SIP shows the B Line COG to be below 5 gr H_2S/100 dscf COG for most hours following the VCU upgrade in April 2016.) As mentioned in the response to the previous comment, the supplementary condition of no more than 3 consecutive days above the 24-hour limit will restrict prolonged periods above the CEVs. Additionally, a plant-wide limit of 35 gr H_2S/100 dscf COG at any time is also effective for the U. S. Steel facilities, restricting any single-hour emissions.

9. **Comment:** With the use of longer-term averaging and hours that can exceed the modeled CEVs, a month's worth of emissions could be packed into a single hour, resulting in

extensive severe acute illness and possibly even fatalities. Weather patterns can easily cause ambient air levels to be at "about as bad as it gets" levels for two days, followed by a normal day, followed by two more high-level days. Longer-term averaging could overlook such unhealthy air quality events.

Response: As mentioned in the previous response, the U. S. Steel facilities normally operate at levels below the modeled (CEV) rates. While intermittent, alternating periods of high emissions (such as 2-day periods) are theoretically possible and could still show compliance with the longer-term limits mathematically, it is not expected to occur with the longer-term averaging methodology. Also as mentioned in the above response, a plant-wide limit of 35 gr H_2S/100 dscf COG at any time is also effective for the U. S. Steel facilities.

10. **Comment:** It is not clear from the SO_2 SIP how non-operating hours would be treated in the longer-term averaging. The SO_2 SIP Guidance notes in Appendix C (Page 3) in regard to longer-term averaging that: "Inherent in this recommended approach is that hours without operation are not included in the average." The longer-term averaging for this SIP should use this technique.

    Response: It has been clarified in Appendix D-4 of the SIP that hours without operation will not be used for the longer-term averaging. E.g., if a process operated for only 5 hours during a calendar day, the 24-hour average would be based on the average of the 5 hours, and zeros would not be used for the non-operating hours. Accordingly, the rolling 30-day averages would also use any 24-hour average with a value and exclude any days without operation.

    There are many possible ways to address data handling procedures for the longer-term averaging. ACHD feels that the exclusion of non-operating periods best reflects the intent of the longer-term averaging approach, which is to allow for variability in emissions while still restricting the short-term exposure to SO_2.

11. **Comment:** ACHD has not provided calculations regarding the "critical emissions values" for sulfur dioxide. In order to justify long-term averaging, ACHD must show that the sources would meet the 1-hour critical emission values. However, it is not shown how these values were calculated. Additionally, all of the steps required for the calculations for longer-term averaging and "comparable stringency" have not been included in the SIP in Appendix D. ACHD should explicitly state these values and calculations.

    Response: The critical emissions values (CEVs) are the constant hourly values used in the model that would demonstrate attainment for the control case scenario. Section 3.2 of the SIP has been reworded for clarification. The modeled CEVs as listed in Tables 3-1 and 3-3 were used as the bases for the longer-term averaging and adjustment ratios. The values provided in Appendix D are the results of calculations done via spreadsheet using several thousand records of data. The results given in Appendix D are an appropriate summary of the steps required for determination of variability and the use of longer-term averaging.

12. Comment: ACHD does not have enough data for its B Line VCU upgrade to determine "comparable stringency" values, since there are only eight months of data for this particular control. Due to the inadequacy of this data set, combined with the unpredictable and complicated meteorological conditions of the Mon Valley, ACHD should either use actual VCU data from a comparable site with 3-5 years of operating data, or forego long-term modeling altogether.

Response: Appendix D indicates that there were similar distributions of the H_2S grains with/without the VCU control, and that the H_2S data prior to the VCU upgrade are appropriate to use for overall variability for B Line. Three years of data (2014-2016) were therefore used for the variability calculations.

Additionally, longer-term averaging was not used for any of the modeled results. The modeled limits for the control case runs were the CEVs, at a constant rate for each hour for all sources modeled. The longer-term averaging allows for exceptions for some hours in relation to the CEV rates, based on the statistical probability that occasional hours above the modeled rates would not affect the overall predicted results.

Control Strategy

Comments related to controls needed to demonstrate attainment for the area.

13. Comment: EPA's April 23, 2014, Guidance for 1-Hour SO_2 Nonattainment Area SIP Submissions (EPA's SO_2 SIP Guidance) states that "the EPA expects the approvable compliance dates for control measures in the attainment demonstration to be as expeditious as practicable." Some projects and emission rates have a date of on or before October 4, 2018. ACHD should ensure that these limits are in place as expeditiously as possible in order to attain the standard by the attainment date.

Response: The design, construction, and implementation of all projects for this SIP necessitate the longer schedule than prescribed by the general NAAQS schedule. It is also anticipated that concentrations will be low enough in order to show one year of monitored attainment for year 2018, if not a design value for 2016-2018 below the NAAQS, for all monitor sites in the nonattainment area (NAA). Once monitored attainment has been achieved, the area must then be modeled using actual emissions from the three most recent years, which is also anticipated to show attainment.

14. Comment: As proposed, the SO_2 SIP will not meet the one calendar year of (emission sources) compliance information for modeling purposes, starting in January of 2017. All control sources should have had a completion and operational date allowing one calendar year of operation to demonstrate compliance before the attainment date of October 4, 2018. ACHD should impose immediate deadlines for implementing proposed control strategies, and not wait until the attainment date.

Response: See response to previous comment.

15. Comment: Considering the cooperative efforts made by industry that will require considerable capital expenditures, ACHD should focus on an achievable flexible control schedule for the SIP.

Response: A SIP must have a fixed schedule for control implementation and milestones that meets Clean Air Act requirements. While the control strategy includes some flexibility in limits to allow for fuel-based variability, the schedule prescribed in the SIP must be met for the SIP to be effective and approvable.

16. Comment: ACHD should explore additional opportunities for sulfur dioxide reductions at the U. S. Steel Facilities in addition to the projects discussed in the proposed SIP revision. These facilities contribute over 99% of the sulfur dioxide from stationary sources in the nonattainment area. Such opportunities might include the use of lower-sulfur coal, less fugitive emission releases, and efficiency initiatives. Additional controls may also lead to the public health benefit of reducing benzene and PM emissions as well as SO_2 emissions.

For example, ACHD can and should be doing something to require fewer leaking doors at the coke oven facility in Clairton. Further coke oven pressure controls, such as PROven (as implemented for the Clairton C Battery) should be considered as a means of fugitive reduction in batteries that have not yet implemented the technology. Emission free coke pushing, discharging, and traveling systems, as seen in Japan's SCOPE 21 coke oven emission reduction system, can further reduce hot car and pushing emissions.

Response: The SIP includes the most feasible plan identified in order to demonstrate attainment by 2018. Future projects not implemented or quantified by this SIP will lead to continued decreases of emissions from the facilities. ACHD will continue to promote low-emission technologies for sources in Allegheny County.

17. Comment: For the sources in Tables 3-2 and 3-3, it should be indicated how some sources will be demonstrating compliance with the limits. It is unclear if the compliance methods for these limits are going to be included in the revised permits or consent orders referenced in the previous comment. In addition to the limits themselves, compliance requirements need to be included in the attainment plan.

Response: Section 3.3 of the SIP has been clarified to indicate the methods of compliance for sources with and without longer-term averaging.

18. Comment: Because the proposed Edgar Thomson stack project is underway but not finalized, it should be afforded some flexibility in the event the project design requires modification. The details will be subject to a permit application that is currently being

prepared, and the intent of the SIP is not to limit the purpose and scope of permit applications in Allegheny County. U. S. Steel requests that the SIP recognize the anticipated permit being the primary means to demonstrate attainment. Language similar to the following is suggested for the SIP: "To the extent that the conditions in the current modeling demonstration change in the final design stages of the project, a permit application would include an updated modeling demonstration to ensure that attainment can be demonstrated on or before October 4, 2018." Appendix J should also be clarified accordingly.

Response: The SIP does not dictate all design aspects of the Edgar Thomson stack project but instead specifies in the control strategy only that all the boilers will exhaust to the new stack and the stack will be constructed to have a minimum release height of 70 meters. However, a SIP must contain an attainment demonstration with definitive coordinates and stack parameters for all emission release points. For any changes to stack location, dimensions, or flow rates, if the attainment demonstration is overall unaffected in terms of impacts, a supplemental modeling submittal may be acceptable (with or without a permit modification). If design changes lead to any differences in the attainment demonstration, however, a new SIP revision (to address the design changes only) would be required.

19. Comment: The SIP identifies a reduced sulfur limit for coke oven gas in the yet to be constructed Edgar Thomson Riley Boilers replacement stack. It does not however indicate how often in practice coke oven gas will be burned as other fuels such as natural gas or blast furnace gas can also be used. How the more stringent sulfur dioxide ambient limit might influence the blending or usage of the allowable fuels (blast furnace gas, coke oven gas, natural gas) is unclear here and at other sources. It could result in increases or decreases of other pollutant types such as nitrogen oxides or particulates. Other pollutants affected by the SO_2 SIP should be identified.

Response: The Edgar Thomson Riley Boilers currently operate with the option to use any of the three fuel types, including coke oven gas. ACHD expects that reduced sulfur content in the coke oven gas will not result in increases in emissions of other pollutants.

Emissions

Comments related to SO_2 emissions.

20. Comment: It should be noted in Weight of Evidence that the U. S. Steel VCU tray SO_2 reduction project will lead to greater SO_2 emission reductions than currently quantified, and the actual emission rates at the sources are reasonably and rationally expected to be less than the emission rates modeled.

Response: An explanation similar to above is already included in the Weight of Evidence section. Additionally, the projected future case actual inventory (Section 4 and Appendix D) includes estimates of scaled actual emissions resulting from the VCU and tail gas recycling controls.

21. Comment: The Bruce Mansfield Power Plant, located near Shippingport in Beaver County, PA, is planning to service its current Flue Gas Desulfurization (FGD) system during its fall 2018 outage period. This should increase the FGD's control efficiency and potentially reduce SO_2 emissions which could impact the Allegheny, PA NAA.

Response: A discussion of increased control efficiency the Bruce Mansfield plant has been added accordingly to the Weight of Evidence section of the SIP.

22. Comment: It should be noted in Weight of Evidence that the facilities covered by the SIP do not operate at their maximum capacity at the same time; and even if they were able to operate in such a fashion in rare circumstances, which they are not, such circumstances would need to occur when the worst case meteorological conditions were present. Not only is this not likely, it is not possible for U. S. Steel to maintain maximum capacity operations of all facilities simultaneously. For example, all PEC, boilers, combustion sources, fugitives and underfire stacks will not operate at their maximum at the same time. Batteries operate independently and each battery operates on its individual schedule with certain ovens out of service for maintenance, etc.

Response: An explanation similar to above is already included in the Weight of Evidence section.

23. Comment: Base case maximum SO_2 emission rates are not equivalent to results presented previously to stakeholders. This should be clarified.

Response: Previous results presented were in error and did not include all sources in the NAA. These emissions were corrected for the public comment version of the SIP.

Ambient Monitored Data

Comments related to ambient monitored data and related model performance in the nonattainment area.

24. Comment: On Page 1, the SIP states that the nonattainment designation was based upon "monitoring data collected from consecutive calendar years 2009-2011 during which the design value exceeded the 75 ppb NAAQS." While it is true the designation was made based on monitoring data generated from 2009-2011, SO_2 levels have dropped considerably since then as some of the data used for the designation is now eight years old. It should be noted that much has changed since then, and the most recent monitoring data suggests that the area is either in or approaching attainment. Additionally, upwind coal-fired electric generating units (Elrama, Hatfield, and Mitchell) have been shutdown, and reductions in background emissions from power plants are expected to continue with implementation of CAIR and MATS. While the burden to meet attainment has been solely placed on U. S. Steel sources, the nonattainment designation was the result of many sources of SO_2.

Response: ACHD does not control the attainment designations promulgated by EPA and must address nonattainment areas in accordance with the Clean Air Act. Evidence of declining concentrations and emissions (including coal-fired power plant deactivations) has already been included in Weight of Evidence and other sections. A discussion of possible continued reductions due to federal rules has been added to Section 9.4 (Weight of Evidence).

25. Comment: The SIP should take into account the fact that the Liberty monitor data for 2016 showed ambient air quality in compliance with the standard, and the North Braddock monitor has been in attainment with the standard since its installation in 2014. The SIP must consider these and other positive developments and not put unreasonable reliance on hypothetical models that are known to over-predict actual monitoring data.

Response: ACHD recognizes that recent concentrations have been decreasing, including those recorded during initial implementation of controls at U. S. Steel in 2016. Additional language has been added to Section 9.2 (Weight of Evidence) of the SIP accordingly. However, attainment of the EPA 2010 standard is based on "design values" that are calculated as 3-year averages of the 99th percentiles of daily maximum hourly concentrations by year. The design value for 2014-2016 was above the standard at Liberty (94 ppb), so attainment has yet to be achieved by monitored data. Additionally, attainment must be demonstrated at all ambient air locations within in the nonattainment area, which was demonstrated for the future case 2018 via modeling. (See comments/responses under Modeling for more discussion on model overprediction.)

26. Comment: The final attainment demonstration modeling result included background concentrations from 2014-2016 (see discussions in Appendix A and I). ACHD submitted its monitoring data for early certification and concurrence with EPA Region III. The 2016 SO_2 monitoring data for Allegheny County has been deemed complete and certified by EPA regional staff in EPA's Air Quality System (AQS).

Response: A request for early certification of ACHD 2016 SO_2 monitored data was sent to EPA Region III on March 7, 2017. ACHD acknowledges that AQS currently reflects certification of all 2016 SO_2 monitored data (from Allegheny County and surrounding PA DEP sites) that were used for background concentrations for the SIP.

27. Comment: The scope of the nonattainment area may be drawn too narrowly, due to insufficient monitoring for sulfur dioxide throughout the county. Specifically, there is no monitoring station for sulfur dioxide near Springdale, where the Cheswick Generating Station is located. This power plant is the largest source of sulfur dioxide in the county, and to date, ACHD has not adequately addressed impacts from this source. ACHD should install a monitoring station near Springdale to facilitate a more reliable designation of the nonattainment area.

Response: This SIP is intended to address air quality within the nonattainment area as designated under Round 1 of 2010 SO_2 NAAQS. These initial Round 1 designations were based on monitored data above the NAAQS along with other factors.

The area including and surrounding the Cheswick plant is being addressed under Round 3 of the 2010 SO_2 NAAQS (the Data Requirements Rule (DRR)), for which either modeling or monitoring can be used for air quality characterization. (There were no identified Round 2 areas for the state of Pennsylvania). This demonstration has yet to be finalized at the time of this SIP.

28. Comment: ACHD should install an additional monitor near the Grandview Golf Course, which would improve the reliability of air modeling results. One of the highest modeled levels was located on the Grandview golf course in North Braddock. The level at this location was higher than the level at the nearest SO_2 monitoring station, approximately 2000 feet away in North Braddock to the southwest. ACHD conducted a performance evaluation of the dispersion model for only one site, the Liberty monitor (see Appendix G), because the Liberty monitor was the only monitor showing nonattainment. A performance evaluation at an additional monitor near the Grandview Golf Course would provide improved data for evaluating attainment with the national ambient air quality standard and would also provide better data for evaluating the effectiveness of future models. ACHD has acknowledged that the complex terrain of the Mon Valley makes air modeling more difficult, and the ability to conduct performance testing at additional monitored locations would increase the confidence that a model is able to perform well under various conditions and in various areas. This is especially true where the maximum modeled SO_2 impact is located far away from the air monitor reflecting nonattainment, as in the present case. In order to capture the maximum SO_2 concentration downwind from the industrial facilities, ACHD should install an additional monitor near the Grandview Golf Course property.

Response: Modeling under the EPA guideline (40 CFR Part 51 Appendix W) is designed to represent air quality at all receptor locations in the NAA. The modeling was carefully reviewed for performance compared to current and historical data at all locations in the NAA. The model showed good performance at all impact zones, as described further in Appendices A, F, and I, including the North Braddock area and unmonitored locations such as the Grandview Golf Course.

29. Comment: ACHD should install and operate a monitor at the Glassport location. ACHD discontinued this monitor in 2006 because it was deteriorating and difficult to reach. But this monitor was operated for a number of years, demonstrating that it is feasible to operate a monitor at this location. More importantly, this monitor showed levels of sulfur dioxide that were much higher than at the Liberty monitor. While EPA prefers air modeling over air monitoring for purposes of SO_2 attainment demonstrations (forecasting of attainment in the future), this does not apply to attainment determinations (verification of attainment in the

past). Improvements in air quality levels at the Liberty monitor may not be representative of the larger area.

Response: Monitored data at the former Glassport monitor site were taken into consideration for this SIP, and this site was an important factor in the model evaluation for the NAA. Historical data from the Glassport site were used to determine appropriate modeled concentrations at this location. The types of industrial operations closest to this location have not changed much since the site was terminated, and current trends should be similar at the Glassport and Liberty locations for comparison to the modeled predictions.

30. Comment: A study should be done to determine if high design value areas need additional monitoring. The modeling done for attainment in the SIP did not show the Liberty monitor area as having the highest SO_2 design values; however, the Liberty monitor is the monitor that indicated nonattainment requiring development of the present SO_2 SIP. The modeling showed other areas to be among the highest design values.

Response: For a Round 1 nonattainment area under the 2010 SO_2 NAAQS, modeling is the recommended procedure with which to demonstrate attainment. (See above responses for more on model performance evaluation.) Determination of additional monitor sites is beyond the scope of this SIP and may be better addressed via ACHD's Annual Network Plan review.

31. Comment: It should be noted in Weight of Evidence that the best indicator to determine impacts is the existing Liberty monitor that is placed at or nearest highest impacts. Ambient air quality has greatly improved in the nonattainment area. The most recent data from the Liberty monitor indicates that the monitor is well under its way to demonstrate attainment with the NAAQS with 2016 demonstrating attainment. Appendix W considers the use of measured data in lieu of model estimates. It is acknowledged in Appendix W that there are some conditions where measured data may lend credence to modeling. In addition, Liberty monitor is a "neighborhood scale" monitor used to monitor and represent the emissions in the area of maximum concentration in the range of 0.5 to 4 kilometers. The monitor is properly sited as the modeled "hot spots" are located in close proximately (generally approximately within 1.5 km) of the monitor.

Response: In 40 CFR Part 58 Appendix D, neighborhood scale is that which "would characterize air quality conditions throughout some relatively uniform land use areas with dimensions in the 0.5 to 4.0 kilometer range. Emissions from stationary point and area sources may, under certain plume conditions, result in high SO_2 concentrations at the neighborhood scale." Liberty is not likely representative of concentrations fully within 4 km of the monitor site, since there are significant differences in terrain and land use at that distance. The former Glassport monitor site indicated that a nearby location can show different concentrations. The model demonstration and evaluation was configured so as to properly account for all known locations, historical and current, for adequate predictions throughout the nonattainment area.

32. Comment: It should be noted in Weight of Evidence that, historically, exceedances of the standard have been shown to occur when breakdowns occurred during an inversion. USS is implementing a project that would be used during such breakdowns that would reduce the effects of a breakdown.

Response: While many exceedances have coincided with breakdowns, exceedances have been measured during normal operation of sources. Additionally, source breakdowns do not preclude a source from culpability, and resulting monitored exceedances are not excluded from comparison to the NAAQS. ACHD acknowledges that the control strategy will reduce the effects on air quality during breakdown periods.

Meteorology

Comments related to the meteorology data used for the modeling demonstration and analyses included in the SIP.

33. Comment: In Section 2 of the SIP, the information presented in the lower right corners of Figure 2-2 and 2-3 is inconsistent. ACHD should present the hourly SO_2 information in Figure 2-3 for the North Braddock monitor in terms of hourly SO_2 (the mean, max, design value, showing that the monitor demonstrated attainment for 2014-2016.

Response: The intent of the pollution and meteorological roses in Figure 2-2 and 2-3 was to show meteorology variables in relation to SO_2 concentrations on a directional basis for the modeled years 2012-2014. The North Braddock meteorological data was not available at that time, and therefore a 3-year design value data was not included on the chart for comparison. Figure 2-4 (1-Hour SO_2 Design Values) shows the design values through 2016 by site.

34. Comment: ACHD utilized multiple sets of meteorological data in its SO_2 SIP attainment modeling demonstration, one for each source, modeled separately in AERMOD with impacts summed using CALPOST post-processing. (This is procedure is more fully described in Appendix I.) Typically air dispersion models like AERMOD utilize only one set of meteorological data that is considered representative of the entire modeling domain. This nontraditional method was justified using analyses outlined in Appendices G, H, and I, showing important localized wind patterns across the Allegheny, PA nonattainment area. EPA Region III conducted a separate analysis of local airport ASOS sites and the MMIF-generated met data to verify the wind field variability observed by ACHD and confirms that wind fields are quite localized inside the Allegheny, PA nonattainment area. These wind fields are largely a result of topographically influenced/forced wind patterns, especially where the primary modeled sources are located (Mon River Valley). While acknowledging that this approach has merit, EPA Region III would add that this approach should not be adopted in general practice without conducting proper consultations with the reviewing authorities. Full supporting evidence should be presented in future cases for the use of multiple meteorological data sets in any air dispersion modeling analyses.

Response: ACHD acknowledges that this method is nontraditional for steady-state wind field modeling applications using AERMOD. This technique of multiple meteorological data sets can be conceptualized as a way to better simulate non-steady-state conditions and micro-scale meteorology with the use of a steady-state model. ACHD also notes that the individual MMIF meteorological data sets by source are consistent with the WRF modeling as a whole, differing mainly at the lower verticals levels that simulate in-valley flow, while converging to regional flow once above valley influences. The MMIF meteorological data sets used in the demonstration are essentially the same virtual onsite data throughout the NAA, forced into the valleys at individual points in order to create more site-specific data at source locations.

35. **Comment:** It should be clarified if the MMIF data retrieved from the WRF D05 grid for ArcelorMittal is within a suitable distance from the edge of the WRF domain (as shown in Appendix H, Figure H-17). The meteorological data could be adversely affected by model dampening functions designed to prevent spurious waves from propagating along the model boundary.

    Response: The ArcelorMittal MMIF cell was 6 cells within the "usable" portion of a mesoscale model domain (shown by the blue rectangle in Figure H-17) and was not affected by any boundary issues. The red rectangle in the figure represents the extended portion (5 cells surrounding the edge of the usable portion) that would be unsuitable for modeling.

36. **Comment:** Wind speeds in the AERMET profile files were entered as missing above 50 meters; wind direction and temperature values, however, were retained. ACHD has provided a justification for removing model wind speeds above 50 meters in Appendices G and H, principally based on the Beaver Valley Nuclear Power Plant's met tower data and the U. S. Steel Clairton SODAR site. The Weather Research and Forecasting Model (WRF)-generated vertical wind speeds appear to increase much more severely with height than what is actually observed. ACHD believes that this increases wind shear and contributes to modeled overpredictions due to building downwash based on historical monitoring data in the Mon Valley. Excluding WRF-generated wind speeds above 50 meters appears to better match the historical data and is acceptable and supported by ACHD's analysis. EPA Region III's acceptance of this approach, however, is considered case specific to this modeling analysis.

    Response: ACHD recognizes that this approach is specific to this application, and results may vary for other modeling scenarios on a case-by-case basis. As explained in Appendices G and H, this technique was deemed to be the most representative of observed wind fields and led to the best model performance for this modeling demonstration. Wind speed bias at upper vertical levels may not be observed with other MMIF data and/or may not lead to excessive wind shear with other modeling applications.

37. **Comment:** EPA found no substantive discussion in ACHD's SIP or Modeling Protocol documentation regarding how AERSURFACE was run to produce the surface characteristics

input into AERMET Stage 3. The modeling files appear to use the surface characteristics extracted from the WRF simulation. The AERMET processing files provided to EPA Region 3 included AERSURFACE output files for each facility. The AERSURFACE file output has one sector with monthly varying values throughout the simulation period (2012-2014). EPA examined these files and noted significant year to year variability in the monthly Bowen ratios and to some extent the monthly albedo values for each site; surface roughness values (Zo) showed only slight year to year variability. EPA conducted a more detailed analysis (see AERSURFACE attachment) of these surface characteristics. ACHD should review this analysis and provide any other additional information it deems necessary to more fully document how surface characteristics were passed into its processed meteorological data for its final SO_2 SIP modeling demonstration. In the future, MMIF-extracted AERSURFACE values should probably be examined with some consideration to Section 3.1.1 of EPA's AERMOD Implementation Guide.

Response: The current configuration for MMIF from WRF is to use the WRF-generated surface characteristics that are representative of the full gridded cell. (For this SIP demonstration, each cell was an area of 444 x 444 meters.) This allows for continuity between the gridded WRF and extracted MMIF data, since WRF has several planetary boundary layer sub-models that differ from the AERMET mixed-layer scheme. ACHD opted to use the WRF-based surface characteristics for this demonstration, since MMIF generates a consistent set of surface data, the three AERMET staged-input files, and a batch file to run AERMET in one "package." Typical AERSURFACE runs based on a single onsite location would be too specific for any WRF/MMIF grid cell, since the matching of winds to the surface characteristics are important factors. This may account for some differences between WRF-based and AERSURFACE-based surface characteristics. AERMOD was tested using AERSURFACE-based surface characteristics, leading to some minor differences in impacts compared to runs using the WRF-based surface characteristics. ACHD acknowledges that additional analysis of surface characteristics may be useful with future MMIF applications.

38. Comment: In Appendix C, Tables 1 and 2 tables only include monitor data up to 2015. Using 2016 data would further support a finding that the area is in or closer to attaining the standard – without additional controls beyond what was in place in 2016. The Liberty monitor data for 2016 is an indicator that the area is on its way to demonstrating attainment.

Response: The meteorological analysis included in Appendix C was for the years 2011-2015, as the 2016 analysis was incomplete at the time of the SIP preparation. Therefore, only concurrent monitored data through 2015 was included in Appendix C. Monitored concentrations in 2016 have been referenced elsewhere in the SIP.

39. Comment: In Table 3 of Appendix C, ACHD explains that the data were reviewed from the NWS site KPIT as well as the ACHD meteorology station at the Liberty Borough monitor site. While this may be true and relevant, the tables do not indicate which data set took

priority in characterizing the meteorological conditions summarized in Table 3. ACHD should explain which data set took priority in its final SIP.

Response: The meteorological conditions were based on a combination of available data from the different sites as indicated in the far-left column of Table 3 in Appendix C and as described in the notes.

40. Comment: On Page 11 of Appendix C, ACHD concludes that November is the month with the strongest inversions. However, results are inconclusive given the range of temperature changes with height, the highest inversion layer top, and the longest break up times in the morning across all months of the year. No direct ties to the monitoring data were conducted but rather ACHD appears to consider only monthly averages and trends in high concentration values. It might be worthwhile for ACHD to complete more evaluations relating wind direction, wind direction variability, and wind speed to support ACHD's conclusions.

Response: The consideration of November as the worst month was based on strongest average strength of inversion, along with the highest top and longest break times as additional factors. More detailed daily analyses (not included in Appendix C) indicate a dependency on inversions during elevated SO_2 concentrations. Additionally, wind and pollution roses like those given in Figures 2-2 and 2-3 in the SIP narrative show the relationship between winds and SO_2 concentrations.

41. Comment: On Page 20 of Appendix C, ACHD states that for "improved understanding of air-dispersion characteristics and consequences, it is important to model with upper-air data that properly represents – both spatially and temporally – all locations within the modeling domain." The information in Appendix C supports concerns that the model is overly conservative and does not accurately predict ambient concentrations due to source emissions.

Response: This statement in Appendix C was based on findings that wind fields and vertical potential temperature gradients can vary from one site to another, and that the best possible meteorological data can lead to the best model results. This statement supports the use of WRF/MMIF, which generated site-specific upper air data for each MMIF location used in the model.

<u>Modeling Demonstration</u>

Comments related to the modeling and evaluations used for the attainment demonstration.

42. Comment: ACHD seeks to attain pollution levels less that 1% below the federal requirement. With such little room for error, just one variance from the modeled plan could knock us right out of attainment. Allegheny County residents deserve more than the bare minimum protections from harmful air pollution. Striving for more than the minimum requirement would leave room for errors in modeling and unexpected emission behavior,

prepare for forthcoming more stringent regulations, and demonstrate that ACHD's main interest is in the health of its residents and not merely to escape financial consequences from the federal regulatory agencies.

Response: The modeling demonstration was designed as a worst-case scenario according to 40 CFR Part 51 Appendix W, with all sources operating at maximum allowable capacities, along with 99th percentile background values added to each modeled hour. This scenario is unlikely to ever be achieved during actual operation of sources. If any circumstance leads to nonattainment in the area, contingency measures will trigger an investigation of the cause(s).

Additionally, ACHD makes every effort to complete timely plans in order to attain air quality standards and protect public health. The complexity of this SIP, along with delays in EPA's model releases and accompanying guideline (40 CFR Part 51 Appendix W), did not allow for completion by the original attainment date.

43. Comment: The dispersion model used (AERMOD) is well acknowledged to be overly and unreasonably conservative. Specifically, a study by the Indiana Department of Environmental Management (IDEM) in Northwest Indiana indicated that AERMOD over-predicted 84% of the modeled concentrations of 35 ppb or greater, and in no case was it shown to under-predict these concentrations. The model also shows over-prediction during time of low wind speed. It should be added to Weight of Evidence that the complex meteorology and terrain coupled with the dynamic nature of SO_2 sources noting the overly conservative nature of AERMOD makes it challenging to accurately characterize near-field impacts using current modeling.

Response: Modeling was performed using the most advanced EPA-preferred dispersion modeling techniques available. AERMOD model version 16216r with MMIF meteorology was utilized, along with the ADJ_U* option in order to properly account for impacts during stable low-wind conditions. This modeling effort represents the best possible simulation of emissions and meteorology within the complex terrain in the NAA, with special consideration given so as not to overpredict or underpredict impacts.

Based on the analyses shown in Appendices A (Modeling Protocol) and Appendices G-I (Model Performance/Evaluations), the model led to accurate predictions of pollutant impacts throughout the nonattainment area in comparison to monitored data. In regard to other studies with AERMOD (such as the IDEM study), ACHD's model configuration and results were specific to this demonstration. Results can vary on a case-by-case basis, especially for different source types, terrain, etc.

44. Comment: ACHD should correct its exclusion of various emissions from the Irvin facility from air modeling, including coke oven gas flaring. In the screening analysis, ACHD screened out intermittent sources under the rationale that the sources involve seasonal or emergency processes that would not occur frequently or at full capacity, resulting in an "unachievable level of emissions at full operation" (Appendix E, pages 21-22). Some of

these sources, including Irvin flares and Edgar Thomson miscellaneous blast furnace fugitives, may have been screened out improperly or incorrectly excluded from the emissions inventory altogether. It has not established that these emissions are included in the modeling, or that these emissions are zero when the rest of the facility is operating at full capacity. ACHD does not assert that these units cannot run when the facility is operating at full capacity but only asserts that they "cannot physically operate at full capacity while other processes are at full capacity," or that they "operate only during seasonal, emergency, or excess conditions." ACHD has not eliminated the possibility that these sources could run when the facility is operating at full capacity, even if at a lower capacity. By excluding these sources from the modeling altogether, ACHD may be under-representing emissions within the nonattainment area.

Response: As part of the screening effort, modeled impacts from these sources were evaluated at actual emissions and normal operating levels. These sources were determined not to be driving factors for nonattainment. At maximum allowable capacities (plant-wide for the Mon Valley Works), the flaring sources would not be applicable to the attainment modeling scenario since excess fuel would not be available. "Full capacity" for the facilities is synonymous with full capacities for all processes.

Additionally, as part of the 2010 NAAQS, once attainment is demonstrated by the monitor network, modeling at actual emission rates is then required as additional demonstration of attainment. Therefore, all intermittent sources would be accounted for in future model runs. This SIP revision is designed as a demonstration to show that the largest potential contributors to nonattainment have been controlled at worst-case conditions.

45. Comment: ACHD should evaluate impacts on attainment with national ambient air quality standards in other states, resulting from the transport of sulfur dioxide from the Mon Valley. Sulfur dioxide is a precursor to the formation of fine particulates ($PM_{2.5}$), but ACHD does not discuss the impact of sources on levels of sulfur dioxide or fine particulates outside this nonattainment area. In contrast, ACHD discusses the impact of upwind sources (outside the County) on sulfur dioxide levels in the nonattainment area. For example, it mentions the long-range transport of sulfur dioxide to the Liberty monitor. Page 4 of the SIP states that concentrations of SO_2 were largest from the S through SW directions, directions from which local and long-range transport carries substantial amounts of SO_2 to the Liberty monitoring site from large stationary sources. In addition, ACHD also included modeling of upwind sources outside the nonattainment area in order to properly account for transported emissions into the NAA.

Response: SO_2 as a precursor to $PM_{2.5}$ is better addressed via $PM_{2.5}$ modeling using photochemical modeling, and development of an attainment demonstration for the 2012 $PM_{2.5}$ NAAQS for Allegheny County is underway. There are no other $PM_{2.5}$ nonattainment areas for the 2012 NAAQS in the counties surrounding Allegheny County.

SO_2 nonattainment areas in surrounding counties are similar point source scenarios that are not due to local sources in those areas. While SO_2 emissions from distant sources do affect

background values of SO_2 in Allegheny County, they are not the driving factors for nonattainment in the Allegheny, PA SO_2 area, and vice versa. Sources that were immediately adjacent to the nonattainment area were included in the modeling demonstration if they were determined to be potential contributors to localized primary impacts.

46. Comment: It should be noted in Weight of Evidence that EPA's reliance on AERMOD comparisons only in space (and not time and space) is problematic and is a shortcoming in the model. Thus, EPA reviews modeling data in terms of space only and not time; therefore, actual monitoring data at any given hour when compared to the model is not significant. Since each hour has a different emission rate, comparison of different hours (as EPA recommends) is comparing apples and oranges. Additionally, it's possible that this deficiency could be corrected by multiplying the predicted value by a ratio of the emission rate for the monitored hour divided by the emission rate for the predicted hour (relative reduction ratio).

Response: ACHD recognizes that modeling has limitations for comparison to real-time measured concentrations and that AERMOD is generally better at predicting distributions of concentration rather than discrete events. However, AERMOD version 16216r (as used for the modeling) is the most recent and preferred EPA regulatory model for near-field applications. The use of multiple model years, along with the 99^{th} percentile values according to the NAAQS, allows for the exclusion of some modeled outliers. Additionally, the use of relative response ratios, while used for photochemical modeling demonstrations, is not a regulatory approach for AERMOD demonstrations.

47. Comment: In Appendix A (Modeling Protocol), it is mentioned that "some flagpole receptors were included in the demonstration for elevated receptors that were not accounted for in terrain processing by AERMAP. This applies to receptors located on the Clairton-Glassport Bridge." While not altering the ultimate results of the modeling demonstration, it is not necessary to add flagpole receptors in the manner prescribed. Appendix W does not specify that receptors should be placed at levels other than ground level for comparison to the NAAQS.

Response: While not mentioned in 40 CFR Part 51 Appendix W, it is a general and widely-used option with AERMOD to account for elevated locations above ground level (or the elevation generated by AERMAP) by the use of elevated "flagpole" receptors.

48. Comment: In Appendix E, under Initial Screening, it is not clear on how No. 3 – the screening of sources by nearby monitor direction/sector – is considered and developed in the SIP. The limits on the degree range of the wind direction sectors, any consideration of distance between sources and monitors, and any consideration of the frequency of winds from specific wind sectors is skipped over and not discussed. In addition, for sources with more than one emission point, "sources were modeled as an aggregated source or as

individual sources" but no discussion is given regarding how the source aggregation was accomplished.

Response: The use of monitors to screen out sources is described further in EPA documents such as the SO_2 NAAQS Designations Modeling Technical Assistance Document (Feb. 2016). This SIP was designed to account for distance sources by way of incorporation of monitored data into background values (see Appendix A-2).

For sources with more than one emission point in AERSCREEN, if the points were similar in stack characteristics, the emissions were aggregated to one single stack. For multiple points with different stack characteristics, AERSCREEN was run separately for each point, and impacts were totaled from each run.

49. Comment: In Appendix E, under Refined Screening, the methodology includes a broad interpretation of whether a source's contribution is included in background concentrations measured at the monitoring sites, as well as no indication of what constitutes an insignificant concentration gradient. Highest first highs were used as the criteria to compare to the NAAQS in the screening analyses, however, the analysis could have considered the actual form of the 1-hour SO_2 NAAQS. Additionally, Figure E-2 does not show anything of particular relevance to this study other than the fact that Pennsylvania is influenced by complex terrain throughout the whole state and wind directions at these secondary weather locations are driven by these terrain features. This discussion did not necessarily discredit the use of the KAGC data. The use of the MMIF (Mesoscale Model Interface Program) was only noted at the end of the meteorology discussion making most of the meteorology discussion defending KPIT and Liberty data sets moot. There should be a better review of using MMIF to process mesoscale data sets here or at least a stronger cross-reference to other Appendices.

Response: The refined screening for this SIP was derived to be a technique that would properly account for potential impacts from all sources within and surrounding the NAA. There is no prescribed method for the screening of sources beyond the use of the Significant Impact Level (SIL) and monitored data, and there is also no set approach for determining a significant concentration gradient.

ACHD's methodology focused on the worst-possible impacts from any source, which was based on the highest maximums and not the 4th-highest impacts. If highest possible impacts were shown to be below background, it could be assumed that 4th-highs would be considerably lower and already part of background.

Additionally, typical airport or local site meteorological data was used to assess general impacts in the NAA. In regard to Allegheny County Airport (KAGC) data, the effort simply favored Pittsburgh International Airport (KPIT) for distant sources and the Liberty site for sources within the NAA. The WRF/MMIF data was developed as highly site-specific data only for the final sources included in the attainment demonstration.

50. Comment: On Page 15 of Appendix F, ACHD concludes that WRF performed well in the 1.333 km and 0.444 km domains in spite of the statistical analysis for some parameters/seasons falling outside the benchmarks provided in Table 4. Part of the justification given for this conclusion was that there are a limited number of hourly surface stations within these domains and the benchmarks were developed using larger datasets. However, a statistical analysis should have or could have been completed using the 4 km or 12 km grids in which more surface observations would be present to assess the performance of the overall WRF data sets. An analysis over the coarser grids could provide additional support that the overall WRF model performance was acceptable.

Response: The model performance evaluation was conducted similarly to other evaluations, with emphasis on the finest resolution domains. Analysis was performed for the coarser grids, showing good results for airport locations, but this analysis was not presented in the final documentation.

51. Comment: For background data in the model, ACHD's current approach in the model for the attainment demonstration does not accurately pair background emissions with meteorological conditions; and, instead, requires that the peak background emissions be used during all meteorological conditions resulting in unrealistic modeling results. This results in additional conservatism in the model that results in over-prediction of SO_2 impacts.

Response: The method of paired hours of monitored background with predicted values is not a recommended technique for EPA regulatory demonstrations.

52. Comment: In Appendix G (Dispersion Model Performance Evaluation) battery line fugitive emissions were modeled as a series of point sources in a row, while the final demonstration utilized as a series of volume sources in a row with BLP-based varying release heights. The latter should be the more appropriate technique.

Response: Over the course of the development of the SIP demonstration, several versions of AERMOD were released. While ACHD was still evaluating the BLP-based method for source characterization, as well as version 15181 of AERMOD that incorporated the former BLP code, Ramboll Environ was tasked with the model performance using point sources for the buoyant fugitives. Subsequent evaluation by ACHD led to use of the BLP-based method in the final demonstration. Appendices A and I further explain the final configuration that was used.

53. Comment: Appendix G states that the selected model is still overly conservative which yields values that over-predict impacts at the higher ranges. Figure 21 indicates that the model consistently over-predicts at concentrations >100 µg/m³ while under predicting at lower concentrations. This is significant since the concentrations at concern for compliance are 196 µg/m³. The "winning model" predicted 26 counts above 196 µg/m³ compared to the

23 actual at Liberty, meaning that the model over-predict the occurrences of values of 196 by over 10%.

Response: The Dispersion Model Performance Evaluation was designed as a comprehensive first-step review of overall performance, including examination of predicted impacts at the monitor sites and comparisons to other models (model "shoot-out"). As further described in Appendices H and I, additional options and source characterization were used in the final modeling demonstration. Appendix I-1 shows that the final model is not leading to overprediction at the highest predicted hours.

54. Comment: In Appendix G on Page 40, it's stated that "Because the motivation for this study was assessing 1-hr SO_2 NAAQS attainment in Allegheny County, the greatest emphasis was placed on accuracy in predicting high-end concentrations." "The winner of the piecewise evaluation is just as accurate in the 3-year 99th percentile concentration and the robust highest concentration statistics as any of the models with higher CPM's. Therefore, the conclusion from initial model analysis remains; the best model performance for 1-hr SO_2 attainment modeling in Allegheny County, PA appears to be MMIF-based AERMOD with EPA guidance vertical levels, AERMET mixing height diagnosis and processing, and WRF domain of 444 m grid spacing." ACHD must identify the significance of the number of modeled values over 196 when comparing them to actual monitored values, since this is the value that will be used to determine the area is in attainment. Emphasis needs to be placed on this over the models performance with the 99th percentile and RHC values. The selection of the "winning model" is very subjective. It would seem that looking at CPM values and the counts over 196 as the major criteria, N=1, would have been a more appropriate model since the CPM is better and the model appears to more accurately predict counts over 196.

Response: Similar to the above response, ACHD used the analysis from the Dispersion Model Performance Evaluation for further development of the final model configuration as described in Appendices H and I. The final model configuration selected for the demonstration was closest to the N=2 configuration (see Page 1 of Appendix I-1).

55. Comment: In Appendix G, Figure 22 displays surface wind data for the 24-hour periods leading up to hours of highest modeled hourly SO_2 concentration near the Liberty monitor. The predicted maximum concentration of 504 µg/m³ occurred several hours following hours of an observed maximum of 249 µg/m³. This supports a finding that the model grossly over-predicts high concentrations by over a factor of two. As would be expected by the over-predictions, AERMOD significantly over-predicted the number of exceedances of the SO_2 NAAQS when compared to monitoring data (as ACHD's model has shown), which is of critical concern since this is the most significant feature of the attainment demonstration.

Response: Figure 22 in Appendix G was designed to show that the system is getting a high value for the right reason. As mentioned in previous responses, ACHD used a different model configuration for the final demonstration, with focus on 99th percentile values within the NAA.

56. Comment: Appendix G states: "Figure 24 and Figure 25 depict wind roses at the same locations in the 24 hours directly prior to the two highest observed SO_2 concentrations. The highest observed Liberty 1-hr SO_2 concentration during the three year study period was 422 µg/m³ at 5:00 AM, 3/13/2012. Figure 24 illustrates that the 24 hours leading up to this maximum were characterized by relatively low wind speeds both modeled and observed near Liberty, with most of these winds coming from the SW. Both the calm nature and SW direction of these winds compare to the modeled and observed conditions of the two maximum modeled concentration cases. At midnight on the morning of 10/24/2012, the 2nd-highest 1-hr concentration of 366 µg/m³ SO_2 was observed at Liberty. Very similar wind conditions were again observed at the monitor in the build-up to the maximum (Figure 25). This time, the modeled wind at the nearby sources was stronger, but predominantly from the same SW direction." (The commenter references the above comment, that the model is over-predicting.)

In addition, the Liberty monitor is a neighborhood scale monitor which makes any modeling vs. monitoring data discrepancies within 4 km suspect, as ACHD cannot be using modeling data to somehow challenge actual monitoring data. In Appendix G, model performance is tested based on a comparison with observed SO_2 concentrations at one location (the Liberty monitoring site). However, in the SIP analysis AERMOD is used across a wider grid that contains complex terrain, which is an area in which steady-state assumptions made by AERMOD can break down. It is not necessarily logical to conclude that because AERMOD gave better results at the Liberty monitor then it is necessarily accurate throughout the entire domain. The Liberty monitor is located near a specific industrial facility, so it could be that it only performed better in that location due to a reasonable representation of the emission sources and meteorology in the area closest to the monitoring site.

Response: The Dispersion Model Performance Evaluation used a radial receptor grid of 500 meters (the "near Liberty" area) for the evaluations shown in Figures 22-25. As specified in previous responses and in Appendices H and I, ACHD focused its performance evaluation on all locations within the NAA. ACHD deemed the use of monitor scales to be an appropriate method of comparison for predicted and measured data.

57. Comment: The version of CALPUFF used in the model performance evaluation is 5.8.4, which was the EPA regulatory default version of CALPUFF at the time this work was completed, as stated on Page 8 of Appendix G. However, an updated version of CALPUFF (version 7) was also publically available. Considering that other non-preferred models (SCICHEM) and non-default methods (use of prognostic meteorological data in AERMOD) were used, it is not clear why ACHD did not use the latest version of CALPUFF in its testing.

Response: ACHD concluded that if CALPUFF was selected for the demonstration, which would have required an alternative model justification according to 40 CFR Part 51 Appendix W, the regulatory version would have still been the preferred version for this

application. (Note: CALPUFF has now been removed from preferred regulatory model status.)

58. Comment: The dispersion model performance evaluation provided in Appendix G contains a discussion of 59 total AERMOD scenarios that were evaluated and one CALPUFF scenario. Based on the number of different scenarios that were considered using AERMOD versus the single CALPUFF and SCICHEM scenarios, one could conclude that AERMOD was the choice for the dispersion model to be used in this analysis from the beginning and that the performance evaluation was designed to define the appropriate AERMOD configuration to use for the regulatory analysis. It is not clear at what basis ACHD determined by default to use AERMOD in developing the SIP.

Response: Page 36 of Appendix G indicates that multiple CALPUFF configurations were tested using an initial 1-year WRF dataset, with results using the full 3-year WRF dataset shown only for the best-performing case. In regard to selection of the model, an extensive effort was put forth in order to determine the most appropriate model for this demonstration. If AERMOD with MMIF was the choice from the beginning, the task would have not included a model performance evaluation using other models. AERMOD with MMIF meteorology was selected after review of all model test results.

59. Comment: Appendix H states that the data completeness of the Clairton SODAR is only 61%. The SODAR results are used in several comparisons to MMIF data and 61% data completeness may be problematic when comparing to the MMIF from both the D04 and D05 domains.

Response: For comparisons to MMIF data, the SODAR results were the best available data for valley flow along with data from the Beaver Valley multi-level tower. Although 61% data recovery is not appropriate for use in modeling, the SODAR results presented enough data to make an adequate comparison of known-to-predicted meteorology.

60. Comment: ADJ_U* is appropriate for use in the SIP modeling. However, it is stated in Appendix I that "LOWWIND3 showed some results that were similar to ADJ_U*, possibly with a tendency toward under prediction for some sources and years. However, this option is available as a BETA option only. Overall, there was insufficient evidence based on model performance to request an alternative modeling approach using LOWWIND3." The commenter disagrees with ACHD's conclusion that insufficient evidence exists that LOWWIND3 is appropriate. Other studies show that AERMOD overpredicts when modeling low wind speeds (less than one meter per second), and under these conditions the model predicts high concentrations at all receptors regardless of wind direction. Since ACHD is using a threshold of 0.5 m/s, the risk of significant over-prediction during low wind speeds exists.

Response: Several different configurations of AERMOD were tested for the modeling demonstration. With LOWWIND3 available only as a BETA option, a robust alternative model justification would be required for use in a regulatory application. Without additional meteorological equipment and monitor sites, a conclusive demonstration for the use of LOWWIND3 would not likely be shown. Additionally, test runs using both ADJ_U* and LOWWIND3 led to underpredictions in the NAA, and the use of both options would not have been chosen for the final demonstration.

61. Comment: In Appendix I, in regard to modeled maximums, while some ratios appear acceptable (e.g., 1.06), others (e.g., 1.46, 1.49) are cause for concern. ACHD also claims that "Average ratios for the maximum expected to monitored areas fall within the range of 1 to 1.26, indicating that the model is performing well within the NAA." The use of average ratios to gauge the acceptability of the model is questionable. Average ratio is really of no value in determining the acceptability of the model, but the consideration of individual ratios and variance are – and some of variances and ratios result in significant overprediction of impacts which is cause for concern.

Response: Based on all known monitored data, past and present, ACHD considered the expected ratios to be the most appropriate method for determining performance in unmonitored areas.

62. Comment: Given the uncertainties of modeling details and future weather conditions, future concentrations are unlikely to match the modeled estimates. There is no indication of the uncertainty in the modeling, such as a standard error of the maximum concentration. If the error is roughly equally likely to be positive as negative, then the chance of nonattainment will be about 50%. If the magnitude of the estimation error is large, then the degree of nonattainment could be large. Even if the modeling were perfect (and no modeling is), weather conditions themselves are highly variable, changing not just day-to-day but over time, with the more extreme conditions being the least predictable.

Response: For modeling demonstrations according to 40 CFR Part 51 Appendix W, there is no requirement for an estimate of uncertainty for the modeled results. While it is understood that there are uncertainties with the input data and models used for the demonstration, the modeling is designed as a predictive tool for distributions of concentrations. For both monitored and modeled results, the largest outliers (above the 99^{th} percentile) are removed from the analysis. ACHD believes that the modeling conducted meets all regulatory requirements and that any uncertainties in the modeling are also understood by EPA as the reviewing authority.

63. Comment: The SIP should have a nonattainment area (NAA) informative isopleth map, or a substantially equivalent tabular form, that would report to the 22 communities in the NAA the maximum pollutant design levels to expect from the control strategy. To be helpful to the

communities, it should be in the main document as it would be unrealistic to search through multiple appendices for this information.

Response: A table with the maximum modeled concentrations by municipality for the future control case scenario has been added to Section 5.4 (Modeled Results) of the SIP.

64. Comment: The SIP states that since "both the base and control cases were modeled at maximum possible emission rates for all sources in the NAA, these locations may or may not correspond to highest impacts during normal or low operations." It is unclear whether normal or low operations might produce a different NAA maximum design value. The Guideline on Air Quality Models, recommends, "For point source applications the load or operating condition that causes maximum ground-level concentrations should be established … Where the source operates at substantially less than design capacity, and the changes in the stack parameters associated with the operating conditions could lead to higher ground level concentrations, loads such as 50 percent and 75 percent of capacity should also be modeled." Reduced load modeling where appropriate should be done and reported in the SIP.

Response: The Guideline on Air Quality Models additionally states: "As a minimum, the source should be modeled using the design capacity (100 percent load). … "A range of operating conditions should be considered in screening analyses. The load causing the highest concentration, in addition to the design load, should be included in refined modeling." ACHD did perform modeling at lower capacities, with all scenarios showing attainment. Additional language has been added to Section 5.4 for clarification. For a look at impacts from typical operating capacities, runs were also performed using projected future case actual emissions and the proposed future source configuration. (See Appendix D for future case emissions.) These runs showed a maximum concentration of about 75% of the NAAQS at any location in the NAA. Additionally, specific hourly SO_2 data as required by this SIP for COG sources will provide more detailed emissions for future case model runs.

Additional SIP Elements

Comments related to Contingency Measures, Reasonable Further Progress (RFP), and Weight of Evidence.

65. Comment: ACHD should provide a more specific description of its contingency measures. The Clean Air Act requires that the measures be specific enough to take effect without further action by the Administrator. (See 42 U.S.C. §7410(c)(9).) The SIP has not provided detail regarding how possible future violations will be addressed. ACHD only asserts that future violations will be identified and monitored, after which additional controls may be implemented, if necessary. Without a comprehensive description of specific control measures, the SIP falls short of the statutory requirement.

The EPA SO_2 SIP Guidance states that contingency measures should include "a comprehensive program to identify sources of violations of the SO_2 NAAQS and to

undertake an "aggressive" follow-up for compliance and enforcement." However, The Guidance also states that "this approach to contingency measures for SO_2 would not preclude an air agency from requiring additional contingency measures that are enforceable and appropriate for a particular source category." It is notable that in the past, ACHD has included more specific contingency measures in SO_2 SIPs and maintenance plans, than it is requiring now. ACHD has included several specific control measures, including lowering the hydrogen sulfide grain loading for coke oven gas, specific plan limits for types or amounts of high sulfur fuel, and lower sulfur dioxide emission limits. It is unreasonable for the ACHD to not include more specific measures and controls as contingency measures.

Response: Contingency Measures for this SIP define a detailed process for identifying the source(s) of violation of the SO_2 NAAQS and aggressively following up with implementing corrective actions.

66. Comment: The contingency measures involve the review of data over the most recent 3-year period for comparison to the NAAQS. Given the many uncertainties, it seems wise to plan for interim data reviews to detect a trend towards nonattainment, so that troubleshooting can begin earlier than after three years. ACHD and the community deserve this precaution. Companies may also benefit, if revealing the causes makes it possible to choose and take remedial actions in time to achieve attainment.

Response: ACHD's daily data validation process, along with real-time reporting of monitored values, already provides for ongoing reviews of elevated monitored data and causes of such periods. Essentially, all stakeholders are aware of elevated periods when they occur. Furthermore, the review of interim averages within any 3-year period can be misleading if a number of elevated periods occur in one year but not in the previous or following years. The NAAQS is based on the 3-year average of the 99^{th} percentiles and not the number (or magnitude) of exceedances in any one year.

67. Comment: In Reasonable Further Progress (RFP), ACHD states that incremental point source controls were not quantified for the plan because such controls take time to implement and many controls are still under construction. ACHD asserts that overall ambient quality data shows that there is a decrease in sulfur dioxide overall, even without completed point source controls. ACHD correctly states that "reasonable further progress" contemplates "annual incremental reductions in emissions." However, the data provided in this section only demonstrates overall ambient reduction in sulfur dioxide at the Liberty monitor. The data would have to show annual incremental reductions in sulfur dioxide emissions specifically at each source, in order to demonstrate Reasonable Further Progress. ACHD confuses the concept of "reasonable further progress" by setting forth a chart showing declining concentrations of sulfur dioxide at a monitoring site. ACHD provides further evidence of this confusion when it asserts that the "shutdown of Guardian Industries in 2015 is an additional decrease in emissions" for the NAA. Adding decreases in ambient concentrations to decreases in source emissions is like adding apples to oranges.

At best, ACHD implies there have been some emissions reductions "due to partially-completed projects by USS (including projects that have not been quantified for this SIP)." But, ACHD must quantify those emissions, and it must demonstrate "reasonable further progress" in this proposed plan revision. The fact that projects are only "partially-completed," and ACHD has not even quantified them for this plan, demonstrates that ACHD has failed to show "reasonable further progress.

Response: The EPA Guidance explains that the definition of RFP is "most appropriate for pollutants that are emitted by numerous and diverse sources, where the relationship between any individual source and the overall air quality is not explicitly quantified, and where the emission reductions necessary to attain the NAAQS are inventory-wide." Furthermore, it's explained that "the definition is generally less pertinent to pollutants like SO_2 that usually have a limited number of sources affecting areas of air quality which are relatively well defined, and emissions control measures for such sources result in swift and dramatic improvement in air quality. That is, for SO_2, there is usually a single "step" between pre-control nonattainment and post-control attainment. Therefore, for SO_2, with its discernible relationship between emissions and air quality, and significant and immediate air quality improvements … that RFP is best construed as "adherence to an ambitious compliance schedule." This means that the air agency needs to ensure that affected sources implement appropriate control measures as expeditiously as practicable in order to ensure attainment of the standard by the applicable."

Given that source controls are in effect "single steps" for RFP for SO_2, and the initial controls are only partially in place (for an 8-month period in 2016 for the VCU upgrades), incremental reductions cannot be classified. Emission reductions cannot be double-counted by applying them to both the control strategy and RFP. As a method to indicate downward progress, concentration data was used along with quantifiable reductions in emissions.

68. Comment: ACHD should remove the "weight of evidence" section. ACHD dedicates a significant part of its proposed revision to a discussion of "weight of evidence." But, it does not define this concept or describe how it applies in the context of this proposed revision. EPA's Guidance document says nothing about "weight of evidence" in sulfur dioxide plan revisions. The fact that EPA has defined and applied the concept of "weight of evidence" in guidance documents for attainment demonstrations for other pollutants, but did not do this for sulfur dioxide, indicates that EPA does not intend to apply a "weight of evidence" analysis to a sulfur dioxide attainment demonstration. "Weight of evidence" is more appropriate for certain pollutants (particulates, ozone, and regional haze), in some cases allowing for the exclusion of data showing nonattainment in favor of data showing attainment. EPA did not intend to extend this approach to sulfur dioxide. ACHD cannot avail itself of softened requirements for "reasonable further progress" and "contingency measures" (which ACHD has not met, in any case), and then apply a "weight of evidence" approach under the rationale that its attainment demonstration is uncertain.

Response: Weight of Evidence is not used for this SIP as proof to support modeling that does not show attainment or to imply that the modeling demonstration is uncertain. EPA

guidance does not disallow any additional supporting evidence to support the findings of the attainment demonstration. The intent of Weight of Evidence for this SIP is to bolster the demonstration and indicate trends toward attainment.

Commenters:

Below is a summary of the commenters and organizations represented. Copies of the submitted comments, including the transcript from the hearing, are available upon request.

- Citizens, Allegheny County and PA (identical comments from 45 commenters).

- Clean Air Council, submitted by Joseph Otis Minott, Esq., and Christopher D. Ahlers, Esq. Oral testimony also given by David Smith, Outreach Coordinator, on behalf of Clean Air Council.

- Group Against Smog and Pollution (GASP) and seven other groups (shared submittal, additional submitters/organizations below), submitted by Sue Seppi, Program Manager. Oral testimony also given by Sue Seppi on behalf of GASP.
    - Matthew Mehalik, Ph.D., Executive Director, Air Quality Collaborative
    - Thaddeus Popovich, Co-founder, Allegheny County Clean Air Now
    - Steve Hvozdovich, Pennsylvania Campaigns Director, Clean Water Action
    - Lisa Graves-Marcucci, PA Coordinator, Community Outreach Environmental Integrity Project
    - Adam Garber, Field Director, PennEnvironment
    - George Jugovic Jr., Vice President of Legal Affairs, PennFuture
    - Tom Schuster, Sr. Campaign Representative, Sierra Club

- Greater Pittsburgh Chamber of Commerce, submitted by Matt Smith, President.

- Mayor Jan Weigand, Borough of Liberty.

- Pennsylvania Coal Alliance, submitted by Rachel Gleason, Executive Director.

- Pennsylvania House of Representatives, House Manufacturing Caucus, submitted by State Representatives Eli Evankovich (54th Legislative District) and Michael Schlossberg (132nd Legislative District), co-chairs (also signed by 22 other members of the House Manufacturing Caucus).

- Pennsylvania Senate, Senate Manufacturing Caucus, submitted by Senators Kim L. Ward and Jim Brewster, co-chairs.

- Pittsburgh Regional Building and Construction Trades Council, submitted by William Brooks, President (with identical comments from 2 others).

- Pittsburghers for Public Transit, submitted by Dean Mougianis, Coordinating Committee Member.

- Roger Day, Citizen, Allegheny County.

- State Representative Dan Miller, 42nd Legislative District.

- Steel Rivers Council of Governments, submitted by David Pasternak, Treasurer.

- U.S. Environmental Protection Agency (EPA), Region III, submitted by Cristina Fernandez, Director, Air Protection Division.

- United States Steel Corporation (U. S. Steel) and United Steelworkers (USW) International Union (identical comments from 1342 commenters) and family members (additional 264 commenters).

- United States Steel Corporation (U. S. Steel), submitted by David W. Hacker, Counsel-Environmental.

10.5 Certification of Adoption

CERTIFICATION of ADOPTION

To the best of my knowledge, information, and belief, I the undersigned hereby certify that the revision to the County's Portion of the Pennsylvania State Implementation Plan for the Attainment and Maintenance of the National Ambient Air Quality Standards for Sulfur Dioxide (SO_2) was adopted by the Allegheny County Board of Health on July 12, 2017.

Michael A. Parker
Solicitor
Allegheny County Health Department

7/17/17
Date

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On the 17 day of July, 2017,

Michael A. Parker personally appeared before me, the undersigned authority, satisfactorily proven to me to be the person whose name appears above, and did in my presence execute the above certification for the purposes contained therein.

WHEREFORE, I have hereunto set my hand and official seal the 17 day of July, 2017.

Bernadette G. Kovac
NOTARY PUBLIC
COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Bernadette G. Kovac, Notary Public
City of Pittsburgh, Allegheny County
My Commission Expires Aug. 20, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

11 References

Allegheny County Health Department (ACHD) (2014). *SO_2 SIP Modeling Protocol, 2010 1-Hour SO_2 NAAQS, Allegheny, PA Nonattainment Area*. Air Quality Program.

ASTM International (2010). Standard D6589-05, "Standard Guide for Statistical Evaluation of Atmospheric Dispersion Model Performance," *Annual Book of ASTM Standards*, Section 11, "Water and Environmental Technology," Volume 11.07, "Atmospheric Analysis."

Maranche, J. & Sadar, A. J. (2016). "Meeting the Challenges of AERMOD Modeling in Complex Terrain for the 1-hour SO_2 NAAQS." Air & Waste Management Association, 109th Annual Conference & Exhibition, New Orleans, LA. June 20-23.

Perry, S. G., A. J. Cimorelli, R. J. Paine, R. W. Brode, J. C. Weil, A. Venkatram, R. B. Wilson, R. F. Lee, W. D. Peters. (2005). AERMOD: A Dispersion Model for Industrial Source Applications. Part II: Model Performance Against 17 Field Study Databases. *J. Appl. Meteorol.* **44**, 694-708. http://journals.ametsoc.org/doi/abs/10.1175/JAM2228.1

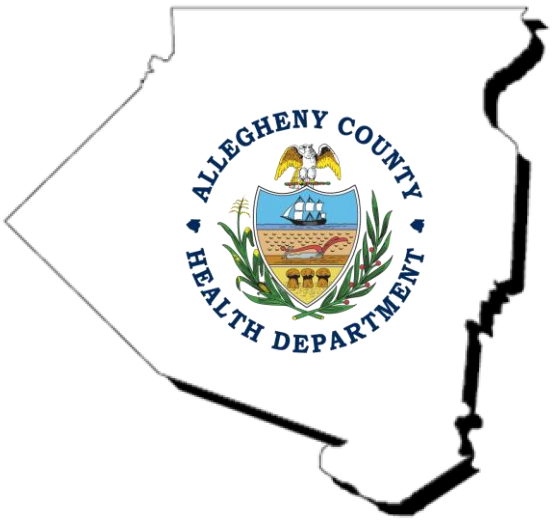
Sadar, A. J., Maranche, J. & McNally, D. (2014). "Providing Representative Meteorological Data to AERMOD for the Liberty Borough Sulfur Dioxide One-Hour National Ambient Air Quality Standard State Implementation Plan." Air & Waste Management Association, 107th Annual Conference & Exhibition, Long Beach, CA. June 24-27.

U.S. EPA (1992). "State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990," Proposed Rule, *57 Federal Register 13,498*. Information at: http://www.epa.gov/airquality/urbanair/sipstatus/index.html

U.S. EPA (2013). Area Designations For the 2010 SO_2 Primary National Ambient Air Quality Standard, Final Area Technical Support Document: Pennsylvania. http://www.epa.gov/so2designations/tsd/03_PA_tsd.pdf

U.S. EPA (2014). Guidance for 1-Hour SO2 Nonattainment Area SIP Submissions. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. April 23. http://www.epa.gov/airquality/sulfurdioxide/pdfs/20140423guidance.pdf

U.S. EPA (2017). 40 CFR Part 51 (Appendix W): Revision to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter; Final Rule. *82 Federal Register 5182*. January 17. [Effective date deferred to May 22, 2017.] https://www3.epa.gov/ttn/scram/appendix_w/2016/AppendixW_2017.pdf



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