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

Attainment Demonstration for the Liberty-Clairton $PM_{2.5}$ Nonattainment Area

Allegheny County Health Department
Air Quality Program

April 2011

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ACRONYMS AND ABBREVIATIONS

ACHD	Allegheny County Health Department
AQS	Air Quality System (EPA)
BACT	Best Available Control Technology
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CALPUFF	California Puff Dispersion Model
CALMET	California Meterological Processor (with CALPUFF)
CFR	Code of Federal Regulations
CMAQ	Community Multiscale Air Quality Model
DON	Degree of Neutralization
EC	Elemental Carbon
EGU	Electric Generating Unit
EPA	The United States Environmental Protection Agency
FMVCP	Federal Motor Vehicle Control Program
FLM	Federal Land Managers
FR	Federal Register
FRM	Federal Reference Method Monitor
MANE-VU	Mid-Atlantic/Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
MATS	Modeled Attainment Test Software
MM5	Mesoscale Model Version 5
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standard
NEI	EPA National Emission Inventory Database
NLCD	National Land Cover Data
NYSDEC	New York State Department of Environmental Conservation
NO_x	Oxides of Nitrogen
OC	Organic Carbon
OCMmb	Organic Carbonaceous Mass by Mass Balance
OTB/W	On-The-Books/On-The-Way Regional Controls
PA DEP	Pennsylvania Department of Environmental Protection
PBW	Particle Bound Water
PIT	Pittsburgh International Airport
PM	Airborne Particulate Matter of any size
$PM_{2.5}$	Particulate Matter less than 2.5 microns in diameter, or Fine Particulates
PM_{10}	Particulate Matter less than 10 microns in diameter
RACM	Reasonably Available Control Measure
RACT	Reasonably Available Control Technology
RFP	Reasonable Further Progress
RPO	Regional Planning Organization
RRF	Relative Response Factor
RVP	Reid Vapor Pressure
SANDWICH	Sulfate, Adjusted Nitrate, Derived Water, Inferred Carbonaceous Material Balance Approach

SIP	State Implementation Plan
SMAT	Speciated Modeled Attainment Test
SMOKE	Sparse Matrix Operator Kernel Emissions System
SO_2	Sulfur Dioxide
STN	Speciation Trends Network
TR	Transport Rule
TEOM	Tapered Element Oscillating Microbalance Monitor
Tons/year	Tons per year of pollutant emissions
TSD	Technical Support Document
USGS	United States Geological Survey
$\mu g/m^3$	Microgram per cubic meter
µm	Micrometer
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

1. Executive Summary

Particulate matter is a mixture of microscopic solids and liquid droplets suspended in air that include: acid salts (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). Fine particle pollution or $PM_{2.5}$ describes particulate matter that is less than or equal to 2.5 micrometer (μm) in diameter, approximately $1/30^{th}$ the diameter of a human hair.

Health studies have shown a significant association between exposure to fine particles and premature death from heart or lung disease. Fine particles can aggravate heart and lung diseases and have been linked to effects such as cardiovascular symptoms, cardiac arrhythmias, heart attacks, respiratory symptoms, asthma attacks, and bronchitis. These effects can result in increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days. Individuals that may be particularly sensitive to fine particle exposure include people with heart or lung disease, older adults, and children.

The United States Environmental Protection Agency (EPA) published air quality designations for the $PM_{2.5}$ standard based on air quality monitoring data from 2001-2003 in the Federal Register on January 5, 2005 (70 FR 944), effective on April 5, 2005. Included in the designations were the Pittsburgh-Beaver Valley $PM_{2.5}$ nonattainment area and, within that area, a Liberty-Clairton $PM_{2.5}$ nonattainment area. This SIP is an attainment demonstration of the Liberty-Clairton area.

This SIP is a control strategy and attainment demonstration of the 1997 federal ambient standards of 15 $\mu g/m^3$ annual average and 65 $\mu g/m^3$ 24-hour average $PM_{2.5}$. More recently new standards were issued, of 15 $\mu g/m^3$ annual average and 35 $\mu g/m^3$ 24-hour average $PM_{2.5}$. If necessary, a separate SIP submittal will be made to demonstrate attainment of these newer standards at a later date. However, the SIP included here adds these new annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and the hourly standard of 35 $\mu g/m^3$ to the list of standards in ACHD Article XXI §2101.10, since these are the standards at the present time.

The Pittsburgh-Beaver Valley nonattainment area is located in southwestern Pennsylvania and consists of Beaver, Butler, Washington, and Westmoreland counties and portions of Allegheny, Armstrong, Greene and Lawrence counties. Located within the Pittsburgh-Beaver Valley Area is a separate nonattainment area entirely in southeastern Allegheny County. This is known as the Liberty-Clairton nonattainment area, and comprises the boroughs of Glassport, Liberty, Lincoln, Port Vue, and the city of Clairton. The Liberty-Clairton $PM_{2.5}$ nonattainment area was designated as a separate, distinctively local-source impacted, nonattainment area because the combination of emissions from the local sources in a narrow river valley creates a local air quality problem uniquely different from the remainder of the Pittsburgh-Beaver Valley area.

At the time of designation, the Liberty-Clairton annual design value was 21.2 $\mu g/m^3$, based on 2001-2003 data; for 2006-2008 it is 18.3 $\mu g/m^3$. As this SIP demonstrates, attainment of the 15.0 $\mu g/m^3$ standard is expected to be reached by 2015. The Pittsburgh-Beaver Valley nonattainment area design value was 16.9 $\mu g/m^3$ for 2001-2003; for 2006-2008 it is 15.2 $\mu g/m^3$. According to

the Pennsylvania Department of Protection $PM_{2.5}$ SIP, the Pittsburgh-Beaver Valley area is projected to achieve a design value of 14.3 $\mu g/m^3$ by 2010.

Control measures that enable the Liberty-Clairton area to demonstrate attainment of the $PM_{2.5}$ NAAQS include:

- The Clean Air Interstate Rule (CAIR) or its replacement and the NO_x "SIP Call" reducing interstate pollution transport;
- Upgrades and shutdowns to United States Steel Corporation (U. S. Steel) Clairton Plant batteries and quench towers

Other changes affecting the area not used in the modeled demonstration of attainment include:

- Improved performance to RRI Energy Elrama Plant emission control system
- Upgrades to U. S. Steel Edgar Thompson Plant
- Pennsylvania Diesel Idling Law
- Liberty-Clairton voluntary municipal vehicle diesel retrofits
- Voluntary retrofit projects to several local diesel fleets including CSX Transportation, Port Authority of Allegheny County, Harsco Metals, and various construction vehicles
- Allegheny County voluntary school bus retrofit program
- Voluntary woodstove changeout program

Through these measures, Liberty-Clairton is anticipated to be in attainment by 2015, due to the heavy reliance on U. S. Steel Clairton Plant upgrades which will be completed by 2014.

The emission inventories used for this SIP was based on the regional MANE-VU (Mid-Atlantic/Northeast Visibility Union) inventories developed for long-range ozone, $PM_{2.5}$, and haze planning. ACHD corrected the total primary $PM_{2.5}$ (filterable + condensable) inventory for key sources in order to accurately address local emissions and incorporate reductions not previously included in regional modeling. This corrected inventory was then used to represent carbons in Liberty-Clairton, which have been shown to be the majority of excess primary $PM_{2.5}$. Regional inventories for other precursors or components of $PM_{2.5}$ were not modified for this SIP.

Years included in the inventory and modeling were 2002 for baseline case and 2014 for future projected case. For future case, uncorrected source emissions are as given in the 2012 MANE-VU inventory, while ACHD corrections were made according to a 2014 timeline. The future case inventory may be considered a conservative hybrid of 2012 and 2014 since it does not account for possible additional reductions in the 2012-2014 timeframe.

The modeling demonstration utilized a combination of the regional Community Multiscale Air Quality (CMAQ) modeling using the MANE-VU inventory and local CALPUFF modeling using the local corrected ACHD inventory. Procedures for modeling and attainment tests were followed according to EPA Modeling Guidance of April 2007 and the Allegheny County Health Department (ACHD) Liberty-Clairton $PM_{2.5}$ modeling protocol, dated October 15, 2007. Changes from the protocol are documented in this SIP. Work on the modeling was shared with an advisory modeling workgroup. Modeled impacts from regional and local modeling were combined on a conservation-of-mass basis, avoiding double-counting from different model runs.

Attainment test methodology was used to combine final modeled results with actual monitored results over the 2000-2004 timeframe. Total mass was reconstructed by $PM_{2.5}$ species by the SANDWICH technique (sulfate, adjusted nitrate, derived water, inferred carbonaceous material balance approach).

Results from the attainment demonstration showed an overall reduction of sulfates, nitrates, and primary $PM_{2.5}$ emissions throughout the Southwest PA domain, including 878 tons of primary particulate from the nonattainment area, leading to the following future projected design values for Liberty and Clairton:

Projected Annual Design Values (Standard = 15.0 µg/m³)
Liberty 14.3 µg/m³
Clairton 11.8 µg/m³

Projected 24-Hour Design Values (Standard = 65 µg/m³)
Liberty 42 µg/m³
Clairton 27 µg/m³

A Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures analysis was made for the nonattainment area. No additional controls, or combination of additional controls, would advance the attainment date by one year, so RACT and RACM are satisfied for this SIP.

A demonstration of Reasonable Further Progress is provided in this SIP. The most significant emission changes for primary $PM_{2.5}$ will be the installation of new coke batteries and quench towers at the U. S. Steel Clairton Plant, along with the closure of older units at that facility.

This SIP contains a contingency plan that provides assurance that should the Liberty-Clairton area fail to meet a milestone, or fails to attain the NAAQS by the attainment date, the area can be brought back into attainment as expeditiously as practicable.

2. Regulation Changes

The following regulation changes were made to Allegheny County's Article XXI in accordance with this SIP Revision. These regulation changes were enacted by County Ordinance 11-10-OR and became effective on May 24, 2010.

§2101.10 AMBIENT AIR QUALITY STANDARDS

The following ambient air quality standards are hereby adopted as part of this Article. The values specified herein represent minimum acceptable air quality, not necessarily desirable or satisfactory air quality. The adoption of these ambient air quality standards shall not in any manner relieve any person from the duty to fully comply with all requirements of this Article in areas where the concentration of air contaminants is less than such standards.

CONTAMINANT	CONCENTRATIONS AVERAGED OVER					
	1 yr.	**3 mos.**	**30 days**	**24 hrs.**	**8 hrs.**	**3 hrs**
PM-10						
National Primary & Secondary	**50[a]**			**150[a]**		
County					**450[d]**	
County Free Silica Portion					**100[d]**	
PM-2.5						
National Primary & Secondary	**15[i]**			**35[i]**		

. . .

[i] **as determined pursuant to 40 CFR 50.7 and Appendix N thereto**

. . .

§2101.20 DEFINITIONS

. . .

"PM-2.5" means particulate matter with an aerodynamic diameter less than or equal to a nominal two and one-half (2.5) micrometers as measured by an applicable reference method, or equivalent or alternative method, specified by EPA or by method specified in this Article.

. . .

Additions are in large print, bold, and underlined.

3. Problem Statement

3.1. Introduction

The Clean Air Act requires a State Implementation Plan (SIP) to be written for any area designated nonattainment for the annual $PM_{2.5}$ pollution standard of 15.0 µg/m³. In 2005, the United States Environmental Protection Agency (EPA) determined that the Liberty-Clairton area, a 12 square kilometer subset of both Allegheny County and totally within the borders of the Pittsburgh-Beaver Valley $PM_{2.5}$ nonattainment area, to be a separate $PM_{2.5}$ nonattainment area. The area was designated separate from the surrounding Pittsburgh-Beaver Valley area because of how pollutant concentrations are affected by specific features of Liberty-Clairton.

The Liberty-Clairton nonattainment area, consisting of Glassport, Liberty, Lincoln, and Port Vue Boroughs and the City of Clairton, is located roughly 10 miles southeast of the city of Pittsburgh. The area is made up of complex river valley terrain, approximately 3 miles wide by 5 miles long. It includes a 4-mile winding portion of the Monongahela River and is bordered by the Youghiogheny River to the east. The area includes rural land, densely populated residential areas, and industrial facilities. The population of the Liberty-Clairton area is about 25,000 people, about 1% the population of the Pittsburgh Metropolitan Statistical Area (MSA).

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

The Liberty-Clairton area is home to several industrial sources of $PM_{2.5}$ pollution. U. S. Steel Clairton Plant is the largest coke plant in the country, producing roughly 4.7 million tons of coke annually. In addition the Liberty-Clairton area is also home to Koppers Industries, Inc.'s Clairton Tar Plant, seven permitted minor sources, as well as numerous minor sources that do not require operational permits. Mid-Continent Coal and Coke was previously classified as a major source during 2000-2002.

The Pittsburgh-Beaver Valley $PM_{2.5}$ nonattainment area consists of Allegheny (without the Liberty-Clairton area), Beaver, Butler, Washington, and Westmoreland Counties, the municipalities of Washington, Elderton, and Plumcreek in Armstrong County, Monongahela Township in Greene County, and Taylor Township in Lawrence County.

The Liberty-Clairton $PM_{2.5}$ nonattainment area was designated a separate nonattainment area from the surrounding Pittsburgh-Beaver Valley nonattainment area because, in addition to the regional air quality problem, there is a localized air quality issue in the local sources and the specific geologic and meteorological features of the area. Large industry located along the river sides in the valley. The sharp difference in elevation between the industrial and residential areas and the high hillsides surrounding them create a significant river basin, and spikes in localized $PM_{2.5}$ concentrations coincide with temperature inversions.

The Liberty-Clairton and Pittsburgh-Beaver Valley $PM_{2.5}$ nonattainment areas are shown in Figure 3-1 below.

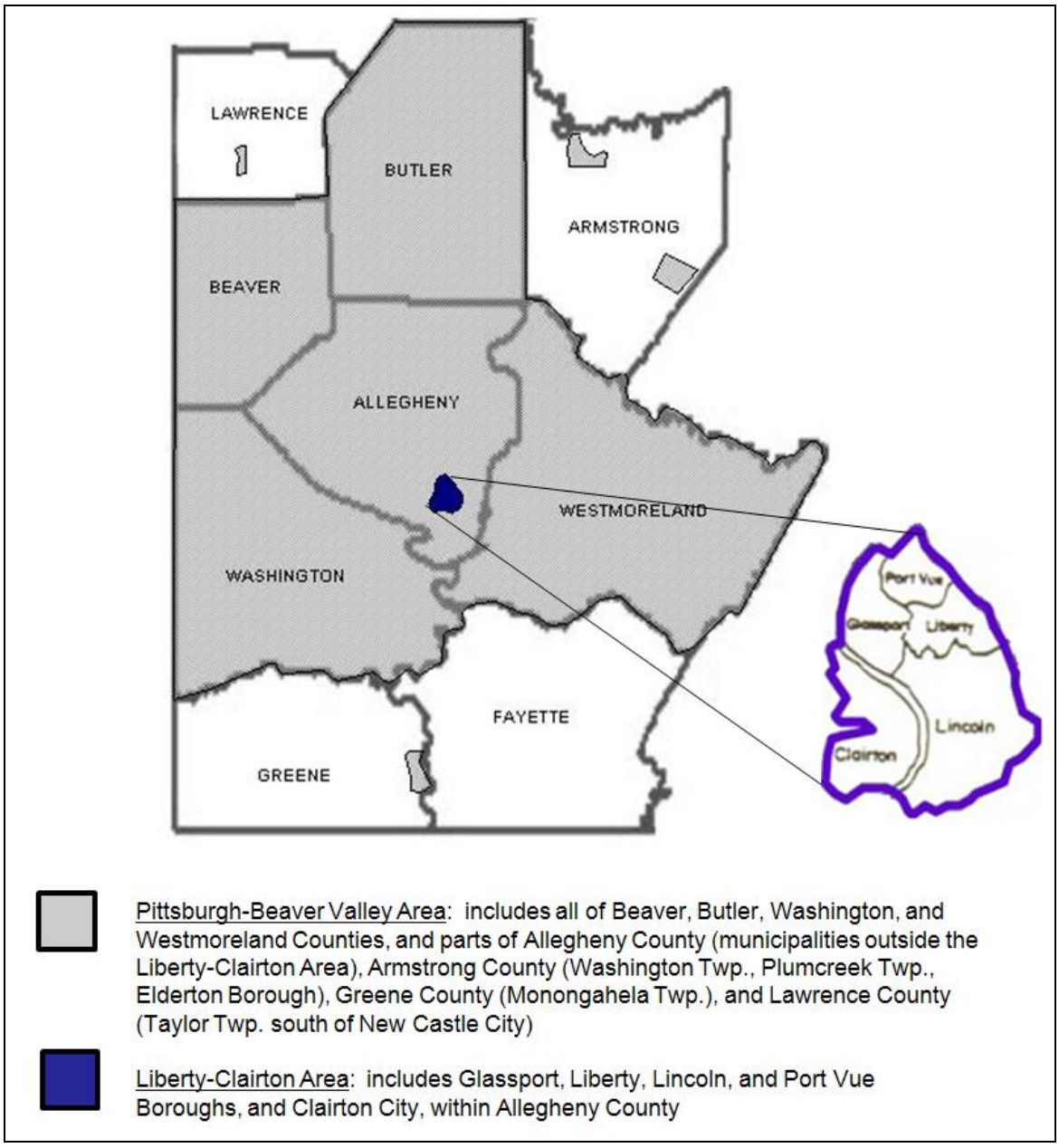

Figure 3-1: Map of the Liberty-Clairton Area within the Pittsburgh-Beaver Valley Area

Figure 3-2 shows average daily $PM_{2.5}$ concentration at multiple Allegheny County sites. Moon, South Fayette, North Park, South Park, and Springdale monitors were omitted due to their low sampling rate.

On many days the $PM_{2.5}$ concentration measured at the Liberty monitor reads very similar to all the other monitors in the region. However, when the regional concentrations rise, Liberty concentrations clearly rise higher than any other site. This happens frequently enough, and extremely high enough (up to 50-60 $\mu g/m^3$ above the other monitors on a 24-hour basis), that a control strategy needed to be considered for this area separate from, but in addition to, the control strategy for the rest of the Pittsburgh-Beaver Valley nonattainment area.

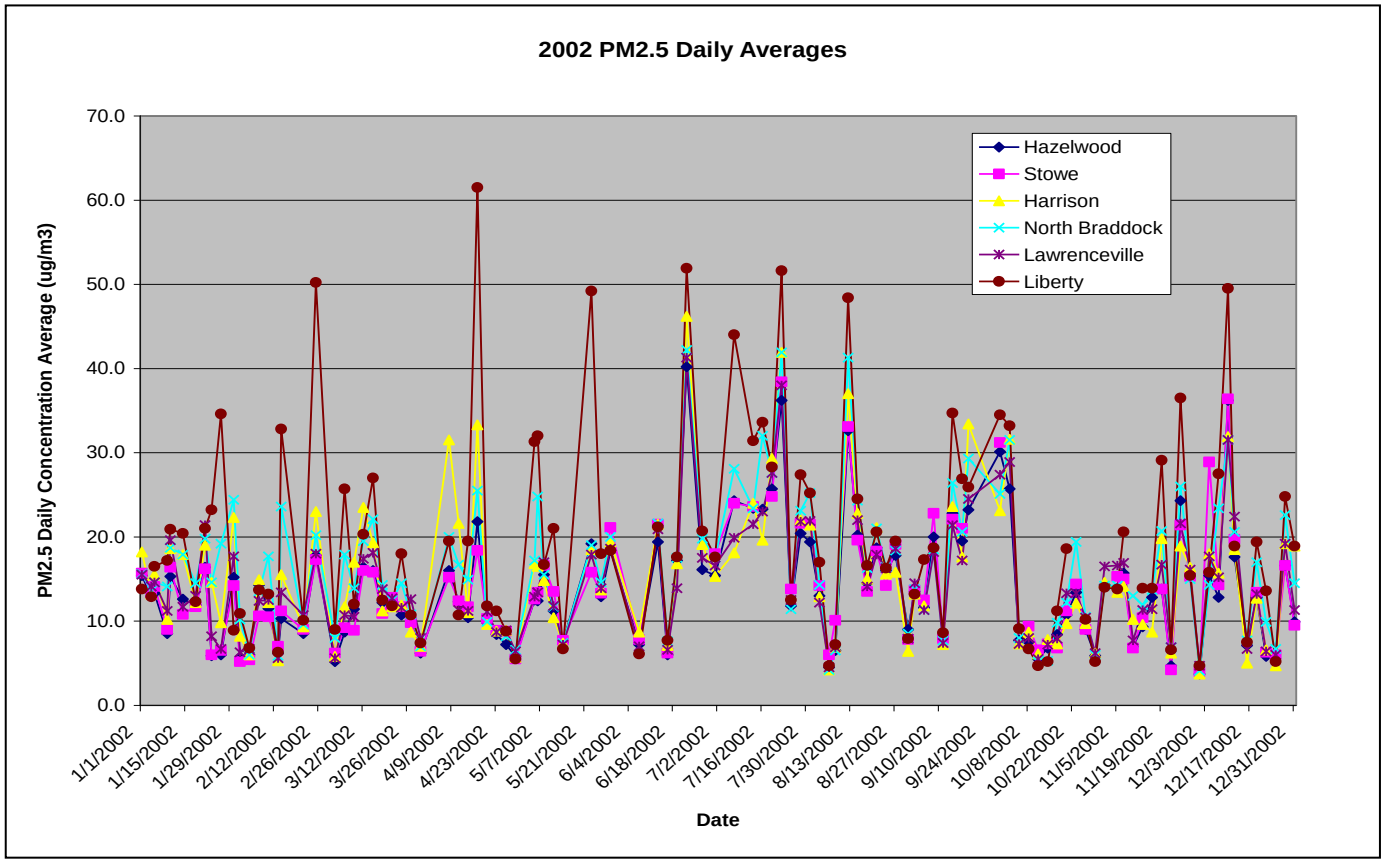

Figure 3-2: Daily $PM_{2.5}$ Concentrations During the 2002 Base Year, Comparing Multiple Allegheny County Monitors

A temperature inversion occurs when the air at the bottom of the basin becomes cooler than the air above it, i.e., the rate of cooling of the air is greatest at ground level whereas the rate of cooling of the air is less at elevated levels. The cooler air then becomes trapped at the lower elevation, filling the basin. As the major and minor sources of the area continue to emit $PM_{2.5}$ pollution, the lower, cooler air becomes buoyantly stable and unable to move upward to disperse into the regional flow. Figure 3.3 shows a comparison between base-year days in which $PM_{2.5}$

concentrations were above 50 µg/m³ at Liberty and days when temperature inversions greater than 3º Celsius occur.

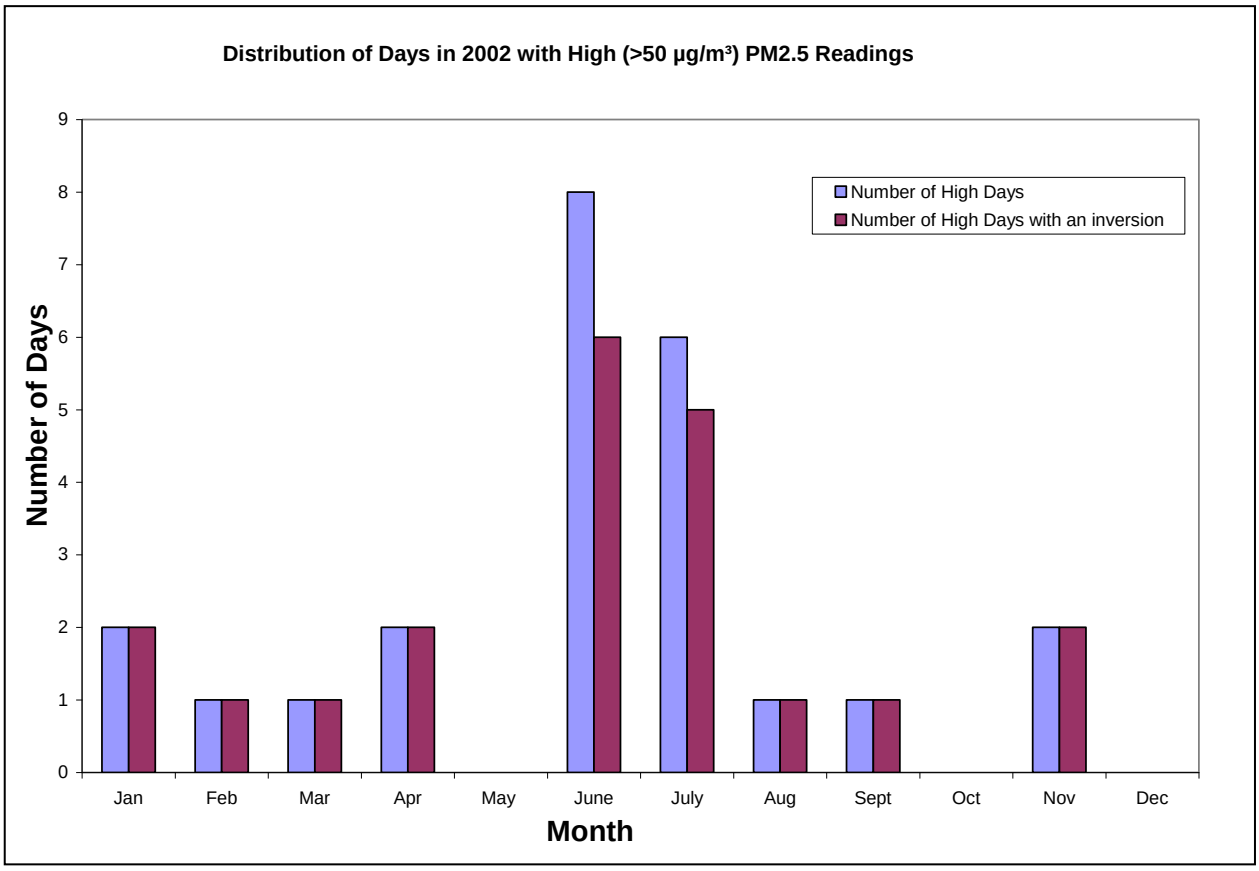

Figure 3-3: 2002 Base Year Days with $PM_{2.5}$ Concentrations Higher than 50 µg/m³ at the Liberty Monitor and Days with Inversions Greater than 3ºC

Three days in June and July had $PM_{2.5}$ concentrations greater than 50 µg/m³ without the presence of an inversion. However, as seen in Table 1, on the inversion-free high days the Liberty monitor was on average 10.2 µg/m³ higher than the urban Lawrenceville monitor, which is located in the city of Pittsburgh.

Additional inversion analysis is given in Appendix A. This analysis includes hourly continuous monitor averages with and without Liberty data during inversion days.

Table 3-1: Comparison of 2002 Liberty and Lawrenceville $PM_{2.5}$ Concentrations on Non-Inversion Days

Date	Liberty ($\mu g/m^3$)	Lawrenceville ($\mu g/m^3$)	Difference ($\mu g/m^3$)
6/11/2002	54.9	41.4	13.5
6/25/2002	62.6	51.7	10.9
7/18/2002	54.5	48.4	6.1

As per normal valley inversion action, the local $PM_{2.5}$ is released into the upper atmospheric flow upon the inversion's break. After the inversion break, the Liberty monitor returns to a level comparable to, and often less than, the concentrations measured at surrounding monitors.

3.2. Monitoring

$PM_{2.5}$ monitoring currently takes place at 8 different monitoring locations throughout Allegheny County. The Lawrenceville monitor, located roughly 2 miles from downtown Pittsburgh, is generally used to define urban concentrations of $PM_{2.5}$, and can be used to judge regional concentrations. Two Federal Reference Method (FRM) $PM_{2.5}$ monitors are used in the Liberty-Clairton area. The monitor at Liberty is located atop a school at high elevation near the center of the Liberty-Clairton area. The FRM monitor at Clairton is located atop a school at low elevation in the western portion of the area. Both were violating the annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ during the design year of 2002. FRM monitors located to the west and to the south of the area (South Park and Forward) have monitored attainment of both standards. Appendices A (monitored data) and C (model protocol) contain more details of monitor sites and data.

Liberty and Clairton annual design values are given below in Figure 3-4. The Clairton monitor is located in the general upwind direction of the Liberty monitor, causing readings to be nearly 4 $\mu g/m^3$ lower at Clairton than at Liberty for the 2007-2009 Design Value. Clairton concentrations show a distinct decline since the '00-'02 average, whereas movement at the Liberty monitor is smaller. Though located within the Liberty-Clairton nonattainment area, the Clairton monitor reflects the decline consistent with the entire Pittsburgh-Beaver Valley area, whereas the Liberty monitor remains constant due to the local sources and the meteorological conditions of the area.

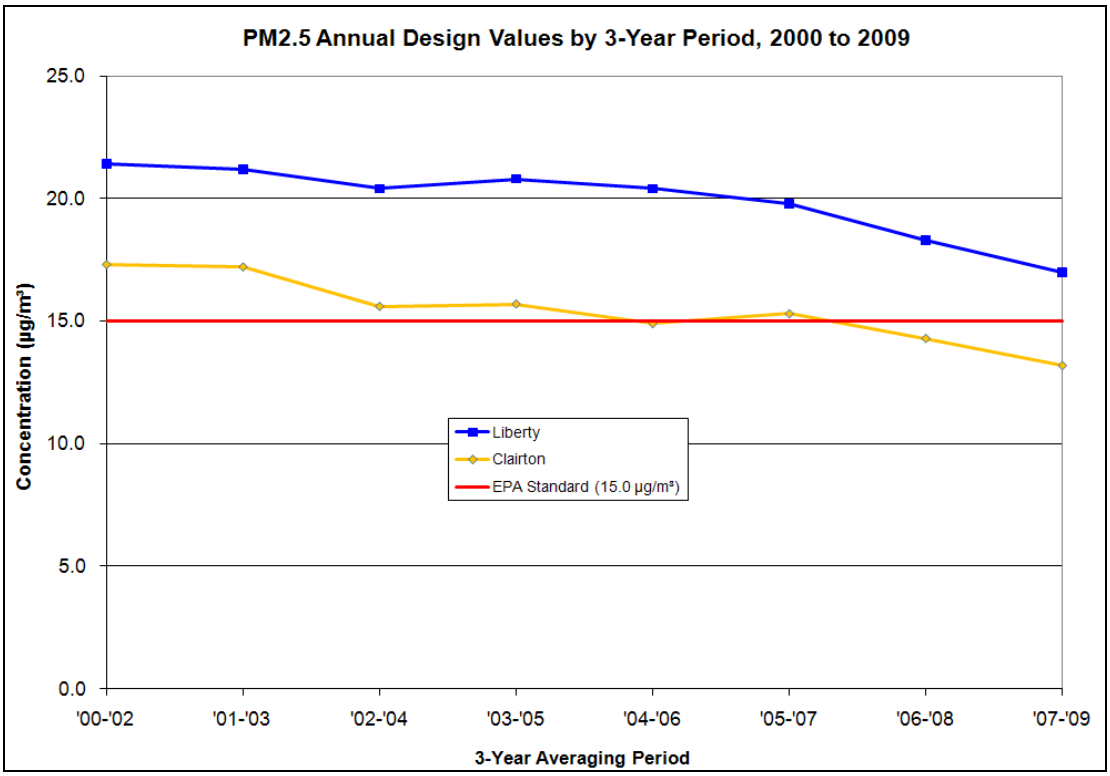

Figure 3-4: $PM_{2.5}$ Annual Design Values Since 2000

3.3. Data Analysis

The average 5 µg/m³ difference between annual $PM_{2.5}$ concentrations in Liberty and other monitors within the Pittsburgh-Beaver Valley nonattainment area can be attributed to the spikes in daily averages at Liberty. Primarily caused by inversions, as shown in Section 3.1, the days which can range as high as being 30 µg/m³ above Lawrenceville monitor data cause the annual average increase. Days which are not affected by inversions show Liberty following surrounding daily averages. Analyzing $PM_{2.5}$ concentrations and inversion days shows a strong correlation between the two.

3.3.1. Regional, Urban, and Local Concentrations

The localized excess in the Liberty-Clairton area has been determined through speciation data analysis. Up to 75% of ambient $PM_{2.5}$ concentrations in the Pittsburgh-Beaver Valley Metropolitan Statistical Area (MSA) can be attributable to upwind sources in Ohio, West Virginia, Indiana, and Michigan. This becomes roughly 11-13 micrograms per cubic meter of all the $PM_{2.5}$ pollution in the Pittsburgh-Beaver Valley nonattainment area. The same is true about the Liberty-Clairton nonattainment area, as it is a part of the Pittsburgh-Beaver Valley MSA. On non-inversion days, pollutant levels in the Liberty-Clairton area match those of the greater

region. However, the inversion-caused spikes average out to add roughly 5 µg/m³ to the annual average, causing the nonattainment (source apportionment results based on speciated data can be found in the report *Allegheny County $PM_{2.5}$ Source Apportionment Results using the Positive Matrix Factorization Model (PMF Version 1.1).*[1]*)*

A comparison of regional, urban, and local concentrations shows differences in the Liberty-Clairton area to the surrounding areas. The Lawrenceville monitor, located in the city of Pittsburgh, serves as a baseline for the regional averages of $PM_{2.5}$. The average 16.1 µg/m³ $PM_{2.5}$ concentration at the Lawrenceville monitor, impacted both by urban excess and the average 11-13 µg/m³ from out-of-state sources, increases to 20.7 µg/m³ at the Liberty monitor, signaling a localized excess of emissions at Liberty of 4.4 µg/m³. Figure 3-5 shows the speciation of both monitors, including the localized excess at Liberty.

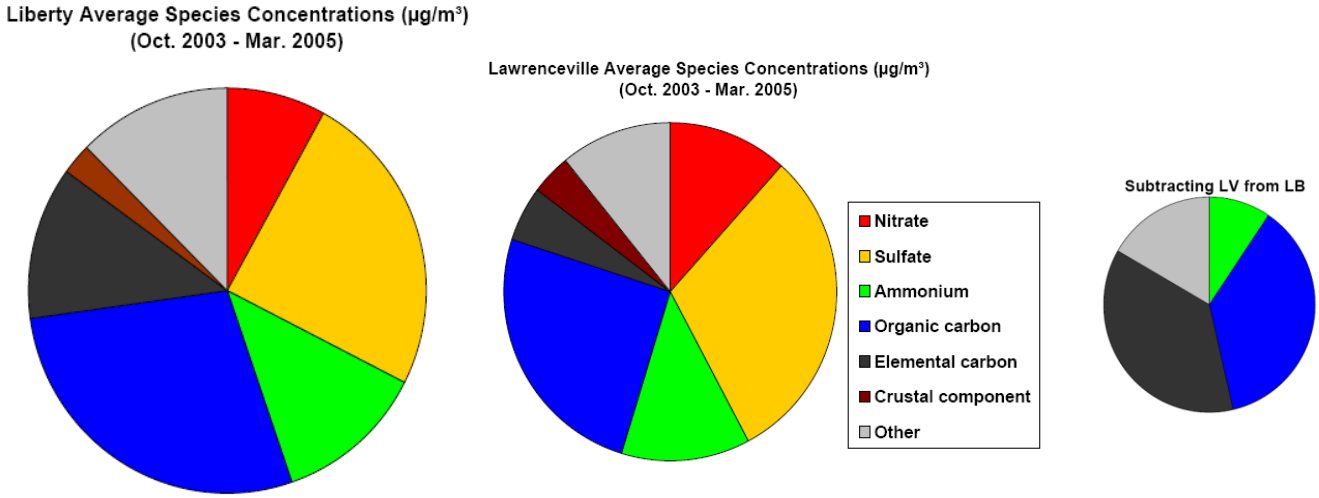

Figure 3-5: Regional, Urban, and Local $PM_{2.5}$ Concentrations

The following Figure 3-6 shows a close-up of the localized excess at Liberty by species (i.e., the subtracted species shown in Figure 3-5). The "other" component represents the difference between total mass and the sum of the major species. "Other" component can include particle bound water, trace elements, or compounds not measured.

[1] Report can be found online at http://www.achd.net/airqual/pubs/pdf/pmf0106.pdf and in Appendix E.

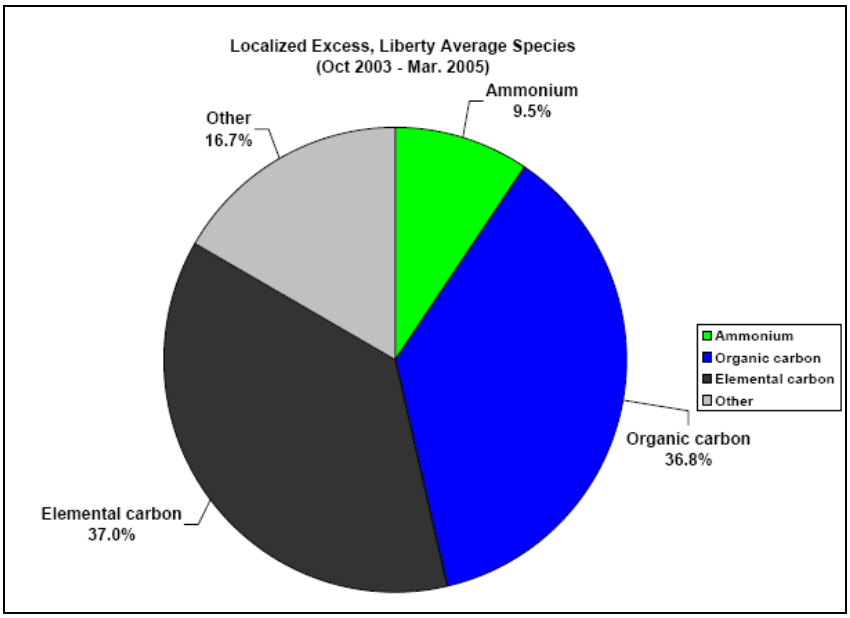

Figure 3-6: Localized Excess at Liberty

3.3.2. Speciation of $PM_{2.5}$ Data

Results from the Liberty $PM_{2.5}$ speciation monitor show that carbons, ammonium, and some trace elements are higher in the Liberty-Clairton area than in other monitored areas by 4 to 5 µg/m³. An in-depth analysis of speciated $PM_{2.5}$ components in Allegheny County can be found in the report *$PM_{2.5}$ Chemical Speciation and Related Comparisons at Lawrenceville and Liberty: 18-Month Results.*[2]

[2] Report can be found online at http://www.achd.net/airqual/pubs/pdf/speciation_report.pdf and in Appendix E.

4. Control Strategy

This section describes the control strategy implemented in order to reduce levels of $PM_{2.5}$ in the Liberty-Clairton nonattainment area.

Clean Air Interstate Rule (CAIR) – EPA's CAIR (70 FR 25162, May 12, 2005) was remanded to EPA for revisions by the United States Court of Appeals for the District of Columbia on December 23, 2008. EPA has proposed the Transport Rule (TR) as a replacement rule to CAIR, to be effective in 2011. The Transport Rule is expected to be as strict as or stricter than the 2005 CAIR. A comparison of CAIR and proposed TR emissions and controls can be found in the weight of evidence section of this document.

Pennsylvania transitioned from the NO_x SIP Call to the federal CAIR in 2009. CAIR is to provide the incentive for large electric generation units (EGUs) to reduce emissions below 2002 levels throughout the 28-state CAIR region. Pennsylvania and other nearby states were required to adopt a regulation implementing the requirements of the CAIR or an equivalent program. EPA approved the Pennsylvania CAIR program on December 10, 2009. On April 28, 2006, the EPA promulgated Federal Implementation Plans (FIPs) to reduce the interstate transport of NO_x and SO_2 that contribute significantly to nonattainment and interfere with maintenance of the 8-hour ozone and $PM_{2.5}$ NAAQS. The EGUs in Pennsylvania will be regulated under the FIP until the EPA approves a SIP revision for the implementation of CAIR for the affected EGUs, at which point the approved CAIR SIP revision will supersede the FIP requirements in Pennsylvania. The Pennsylvania CAIR regulation was published in the *Pennsylvania Bulletin* on April 12, 2008. (38 Pa.B. 1705). The Department submitted the SIP revision to the EPA on May 23, 2008.

Interstate Pollution Transport Reduction – In response to the federal NO_x SIP call rule, Pennsylvania and other covered states adopted NO_x control regulations for large industrial boilers and internal combustion engines, EGUs, and cement plants. The regulation covering industrial boilers and electric generators required emission reductions to commence May 1, 2003, while the regulation covering large internal combustion engines and cement plants required emission reductions to commence May 1, 2005. The EPA approved these regulations, found in 25 Pa. Code Chapter 145, on August 21, 2001 (66 FR 43795) and September 29, 2006 (71 FR 57428).

U. S. Steel Mon Valley Works – A consent order and agreement between ACHD and United States Steel Corporation (U. S. Steel) was signed in March 2008, and amended in September 2010, requiring a number of actions at the U. S. Steel Mon Valley Works Clairton and Edgar Thomson Plants in response to a number of visible emissions and opacity violations. These actions at the U. S. Steel Clairton Plant include a number of installations and shutdowns, rebuilding of coke ovens, and other miscellaneous actions. The consent order and agreement is incorporated in the installation permit for the proposed Quench Towers 5A and 7A, constituting a federally-enforceable agreement. The actions used in the attainment demonstration are as follows:

U. S. Steel Clairton Plant:

Batteries 7, 8, and 9 – Batteries 7-9 were permanently shut down on April 16, 2009. The original date for shut down was December 31, 2012 in the consent order and agreement. It is expected that the proposed new C Battery will replace the production of Batteries 7-9 at significantly lower emissions.

Battery 19 – U. S. Steel will replace 25 heating walls on Battery 19 by October 31, 2012. The battery will meet its opacity limits by December 31, 2012, including, as necessary, implementing an advanced patching plan.

Quench Towers 5A and 7A – In September 2010, ACHD and U. S. Steel amended the March 2008 consent order and agreement to include the construction of new low emission quench towers for Batteries 13-15 and Batteries 19-20 by December 31, 2013. The new Quench Towers 5A and 7A will be used as the primary quench towers for Batteries 13-15 and Batteries 19-20, respectively. The current Quench Towers 5 and 7 will serve as auxiliary quench towers.

Other actions by U. S. Steel included in the attainment demonstration are as follows:

U. S. Steel Clairton Plant:

B Battery – In June 2007, ACHD and U. S. Steel entered into a consent order and agreement to rebuild the B Battery heating walls, completed by June 30, 2010.

Other actions not included in the attainment demonstration but included in the U. S. Steel March 2008 consent order and agreement (amended in September 2010) are as follows:

U. S. Steel Clairton Plant:

Battery 15 – U. S. Steel completed three rounds of an enhanced preventive maintenance refractory repair plan, and the battery achieved compliance with its opacity limits by December 31, 2008.

Battery 20 – U. S. Steel will replace 88 heating walls by October 31, 2014, and the battery will meet its opacity limits by December 31, 2014 including, as necessary, an advanced patching plan and a revitalization plan of the battery heating system.

U. S. Steel Edgar Thomson Plant:

Basic Oxygen Process (BOP) – U. S. Steel implemented an enhanced operating and maintenance plan for the mixer baghouse and gas cleaning system, received an installation permit, and completed construction of an upgrade to the BOP emission capture system, and

achieved compliance with the visible emission standards at the BOP roof monitor by June 30, 2009.

Ladle metallurgical furnace (LMF) – U. S. Steel has implemented an enhanced operating and maintenance plan for the LMF, received an installation permit for an upgrade to the LMF baghouse, and will complete the installation by August 31, 2010.

Other measures not included attainment plan are as follows:

RRI Energy Elrama Plant – In 2007, Orion Power Midwest (now RRI Energy) and the PA DEP entered into a consent order and agreement to address exhaust stack opacity. The consent order and agreement requires Orion Power Midwest to continue efforts to improve scrubber performance and to enhance boiler and ESP performance. This consent order and agreement did not require PADEP plan approvals, and the impact is difficult to calculate, so the emission change was not included, however this should improve air quality in the nonattainment area.

Wood Stove Changeout Campaign – In 2005 through 2007, ACHD participated in EPA's Wood Stove Changeout Campaign, replacing 176 older woodstoves in the Southwestern Pennsylvania area with newer, cleaner units, resulting in an approximate 9 tons per year of total particulate removed.

Harsco Metal – Harsco Metals North America provides trucking for U. S. Steel. With American Recovery and Reinvestment (ARRA) funds, Harsco will voluntarily install diesel particulate filters on 11 dump trucks operating in and around U. S. Steel's Mon Valley Works. Once upgraded, these dump trucks will be 90-percent less polluting than they are today. It is estimated that these diesel particulate filters will remove 0.06 tons of particulate matter per year, 0.20 tons of carbon monoxide per year, and 0.91 tons of hydrocarbons per year.

Voluntary Diesel Retrofits – An ACHD fund has been allocated to provide voluntary diesel retrofits to municipal vehicles in the municipalities within the Liberty-Clairton nonattainment area. It is unknown at this time how many vehicles will be retrofitted, and the amount of particulates that will be reduced.

CSX Transportation – With ARRA funds, CSX Transportation will replace one vintage diesel switcher locomotive without emission controls with a two-engine GenSet switcher locomotive engine, cutting diesel particulate matter by approximately 0.5 tons per year, carbon dioxide by 172 tons per year, and nitrogen oxides by 16.6 tons per year. It will also save 15,000 gallons of diesel fuel annually and provide quieter operation for the nearby residents of McKeesport.

The Port Authority of Allegheny County – The Port Authority of Allegheny County will use ARRA funds for replacing two 1996-model transit buses with 2010-model cleaner diesel hybrid electric buses and to repower nine 2003-model diesel buses with engines that meet the new, higher 2007 emission standards. This will reduce particulate matter pollution by approximately 0.1 tons per year, carbon monoxide by 2.8 tons per year, and nitrogen oxides by 6.8 tons per year.

Constructors Association of Western Pennsylvania – Constructors Association of Western Pennsylvania will use ARRA funds for retrofit technologies – engine repowers, upgrades, and diesel particulate filters – to upgrade 23 diesel-powered, heavy non-road construction equipment in Western Pennsylvania. The various upgrades will reduce particulate matter pollution by 1.8 tons per year, carbon monoxide by 14.6 tons per year, hydrocarbons by 2.09 tons per year, and nitrogen oxides by 9.73 tons per year.

The City of Pittsburgh – The City of Pittsburgh will retrofit approximately 33 diesel engine municipal waste haulers with emission-reducing technology.

Diesel Idling Regulations – Both Allegheny County and Pennsylvania recently adopted a state-wide ban on unnecessary diesel idling. Drivers of diesel engine vehicles can be reported to ACHD and can be fined up to $500 if they are found to idle unnecessarily for more than 5 minutes in a one-hour period. Outreach and public education for these new regulations are currently underway.

5. Explanation of Proposed Attainment Date

Section 172(a)(2) of the CAA states that an area's attainment date "shall be the date by which attainment can be achieved as expeditiously as practicable, but no later than 5 years from the date such area was designated nonattainment." Liberty-Clairton was designated as nonattainment for annual $PM_{2.5}$ as of 2005. Therefore the initial 5-year attainment date for $PM_{2.5}$ would be 2010.

An agency may request an extension of that attainment date for up to 5 years, with reason for the need of this extension. This SIP proposes an attainment date of 2015. The extended attainment date is necessary in this case in order for U. S. Steel to complete construction of new equipment as per consent order and agreement.

The consent order and agreement between ACHD and U. S. Steel made in March 2008 outlined plans to shut down Batteries 7, 8, and 9 and replace them with a new Battery C, based on a newer and cleaner design. This project reduces emissions of direct $PM_{2.5}$ by approximately 208 tons per year, at a cost of about $500 million.

As part of an amendment to the consent order and agreement (in September 2010), U. S. Steel additionally agreed to construct new low emission quench towers for Batteries 13-15 and Batteries 19-20. The new Quench Towers 5A and 7A will reduce emissions of direct $PM_{2.5}$ by 593 tons per year. The quench tower installations are scheduled for completion by December 31, 2013.

These upgrades represent an extensive and expensive modernization of this facility. No combination of additional source changes or upgrades in the nonattainment area can provide the tonnage of emissions decreases or bring the date forward by a year. Therefore, the attainment date must be extended from 2010 to 2015.

Modeling in this SIP includes regional modeling done by MANE-VU, which contains CAIR, a program now remanded to EPA. EPA has proposed the Transport Rule (TR) as a replacement rule to CAIR, to be effective in 2011. This should not change the attainment date, either to move it forward or to delay it further. The Transport Rule is expected to be as strict as or stricter than CAIR. A comparison of CAIR and proposed TR emissions and controls can be found in the weight of evidence section of this document.

6. Emissions Inventory

Section 51.1008 of 40 CFR Part 51 requires an emissions inventory, based on the requirements of section 172(c)(3) of the CAA, for any $PM_{2.5}$ nonattainment area. As specified by the EPA, pollutants inventoried for the Liberty-Clairton $PM_{2.5}$ nonattainment area include PM_{10} and $PM_{2.5}$ along with precursors SO_2, NOx, VOC, and NH_3. Much of the particulate emissions within the nonattainment area are transported from the surrounding area, which includes the Pittsburgh-Beaver Valley $PM_{2.5}$ nonattainment area, the remainder of southwest Pennsylvania, and states to the west and south of Pennsylvania.

The emissions inventory for Liberty-Clairton was compiled for sources within the nonattainment area (City of Clairton, Glassport Borough, Liberty Borough, Lincoln Borough, Port Vue Borough). Sources in the emissions inventory include stationary point sources, area/nonroad sources, and mobile sources. The stationary point sources include two major sources (U. S. Steel Clairton and Koppers), two "synthetic minor" sources (Pennsylvania Electric Coil and Durabond), and one minor source that was formerly classified as a major source (Mid-Continent Coal and Coke). Mid-Continent was kept in the inventory for consistency between baseline and future cases. Three additional minor sources were included as $PM_{2.5}$ point sources in the modeling inventory but are not included in this section.

Emissions inventories for all source classifications were developed for the Mid-Atlantic Northeast Visibility Union (MANE-VU) for the Northeastern U.S. for use in regional analyses and SIPs. The Liberty-Clairton emissions inventory was developed from both the regional MANE-VU inventories and projections along with ACHD inventories for stationary point sources. Emissions given are "actual" values based on pollutant emission factors and throughputs or capacities of each emission source. The emissions values do not necessarily represent permitted or "allowable" limits.

The year 2002 was used for baseline emissions inventory and 2014 for the projected inventory for the Liberty-Clairton area, based on local direct $PM_{2.5}$ controls. Regional projections utilized on-the-books/on-the-way (OTB/W) controls through the 2012 timeframe. Since no additional projections are available at the time of this SIP, and since Liberty-Clairton controls focus on direct $PM_{2.5}$, regional projections for 2012 were used for precursors and non-point $PM_{2.5}$ emissions in combination with local projections for 2014 for stationary point $PM_{2.5}$ emissions. This is discussed more in the previous section (Section 5) and in the modeling section (Section 7) of this SIP.

Regional controls for SO_2 and NO_x in the MANE-VU inventory were based on CAIR. EPA has proposed the Transport Rule (TR) as a replacement rule to CAIR, to be effective in 2011. The Transport Rule is expected to be as strict as or stricter than CAIR. A comparison of CAIR and proposed TR emissions and controls can be found in the weight of evidence section of this document.

Source categories and methodologies used for the emissions inventory are described below. The inventory listings are included in Appendix F, and information on the development of regional baseline and projected inventories are given in Appendix G.

- Stationary point sources are sources for which ACHD collect individual emissions-related information. Revisions were made to 2002 point sources data based on newer estimates that do not reflect originally submitted data. Additionally, the future case includes revisions that were not part of the regional projections.

- Area sources, which are industrial, commercial, and residential sources too small or too numerous to be handled individually. These include but are not limited to commercial and residential open burning, architectural and industrial maintenance coatings application and clean-up, consumer product use, and vehicle refueling at service stations. The regional baseline 2002 and projected 2012 emissions were used for area source emissions. Area sources were given by county in the regional inventories – emissions were apportioned to the Liberty-Clairton area based on population counts.[3]

- Nonroad sources encompass a diverse collection of engines, including but not limited to outdoor power equipment, recreational vehicles, farm and construction machinery, lawn and garden equipment, industrial equipment, recreational marine vessels, commercial marine vessels, locomotives, ships, and aircraft. The regional baseline 2002 and projected 2012 emissions were used for nonroad emissions. Similar to area sources, nonroad emissions were apportioned to the Liberty-Clairton area based on population.

- Mobile sources include passenger cars and light-duty trucks, other trucks, buses and motorcycles. This data was compiled by PA DEP for Southwestern PA, with separate estimates for the Pittsburgh-Beaver Valley and Liberty-Clairton areas. For these estimates, 2009 was used as the future projected case and was used in this inventory since no additional data is available. Mobile source vehicle miles traveled (VMT) and emissions were estimated using GIS and the PennDOT Roadway Management System (RMS). Additional mobile source emissions information is given in Appendix F.

Point sources and corresponding revisions used in the ACHD local CALPUFF modeling are provided in Appendix H. Additionally, emissions inventories used for Reasonable Further Progress (RFP), including area/nonroad/mobile, have been provided in Appendix H.

Emissions inventory summaries for baseline and future projected cases are shown in Tables 6-1 and 6-2 on the following page.

[3] Taken from the U.S. Census, year 2000. Liberty-Clairton represents 1.69% of the total Allegheny County population.

Summary of 2002 Emissions Inventory

Table 6-1 below shows emissions totals for the Liberty-Clairton area for the baseline case (2002). These emissions represent sources only within the 5-municipality Liberty-Clairton area, not the larger modeled area.

Table 6-1: Baseline 2002 Emissions (Tons/Year)

Liberty-Clairton Area (2002)	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**NO_x**	**VOC**	**NH_3**
Stationary Point Sources	2201.438	2745.678	1358.522	5786.190	432.735	299.714
Area Sources	36.506	151.173	81.962	80.176	336.467	7.416
Nonroad Sources	23.005	29.016	16.170	227.673	119.244	0.078
Mobile Sources	4.918	7.228	12.077	283.422	200.841	13.867
Totals	2265.867	2933.095	1468.731	6377.461	1089.287	321.075

Summary of 2014 Emissions Inventory

Table 6-2 below shows emissions totals for the Liberty-Clairton area for the future projected case (2014). Similar to the baseline inventory, these emissions represent sources only within the 5-municipality Liberty-Clairton area.

Table 6-2: Future Projected 2014 Emissions (Tons/Year)

Liberty-Clairton Area (2014)	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**NO_x**	**VOC**	**NH_3**
Stationary Point Sources	1328.785	1881.461	1459.146	5282.002	581.492	255.456
Area Sources	35.464	157.867	86.464	86.239	307.013	8.176
Nonroad Sources	21.500	27.789	3.034	169.006	83.335	0.093
Mobile Sources	2.749	4.919	1.409	134.079	98.997	14.367
Totals	1388.498	2072.036	1550.053	5671.326	1070.837	278.092

7. Modeling Procedures

7.1. Design

Allegheny County Health Department (ACHD) followed modeling procedures outlined by the *$PM_{2.5}$ Model Protocol, Liberty-Clairton Nonattainment Area* (given in Appendix C) and by the EPA Modeling Guidance[4]. The modeling utilized a combination of regional CMAQ modeling using the MANE-VU inventory and local CALPUFF modeling using a local revised ACHD inventory. ACHD used the EPA-preferred Version 5.8 of the CALPUFF/CALMET model.

7.1.1. Protocol

Deviations or clarifications made to the modeling design since the development of the protocol are listed below:

- 2012 was selected in place of 2009 for the future case MANE-VU inventory and CMAQ impacts to incorporate additional regional sulfate/nitrate reductions in the 2009-2012 timeframe

- The MM5 prognostic data was used for upper air data in CALMET (NOOBS=1 mode) instead of solely using PIT Airport upper air data [airport upper air data is already incorporated into MM5 data]

- Dimensions for the long-range transport domain were expanded from 140 km to 150 km, in order to fully utilize the supplied MM5 data and to include additional EGUs in SW PA and Northern WV

- Allegheny County Airport surface meteorological data were included along with PIT Airport data in the 150 km CALMET meteorological processing

- R1, R2, RMAX1, and RMAX2 variables were set to 3.0 m for the 150 km CALMET domain (double the 1.5 m for the 20 km domain values) -- this was not specified in the model protocol

- Spacing for the "CMAQ-equivalent" receptor grid in CALPUFF was set to 500 meters

- Instead of shifting the "CMAQ-equivalent" grid receptors slightly to the southwest, an additional row of receptors were added within the CMAQ grid area (adding 24 receptors to the bottom of the grid, covering the Clairton nearby area)

[4] *Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze,* U.S. EPA, April 2007.

- For nitrates, sulfates, crustal (other primary $PM_{2.5}$, or "OPP"), direct RRFs from the CMAQ modeling were used; for ammonium and water, indirect (calculated) values were used for both baseline and future cases

- For the CALPUFF-modeled primary $PM_{2.5}$, modeled values were combined with CMAQ total carbons (elemental and organic); RRFs were then applied on a total carbon basis

- Speciation results for 2003-2004 were used for the species reconstruction by composition

- CALMET did not support 2001 land use data since the development of the protocol, so USGS NLCD 1992 data was used for land use (as proposed in the protocol)

An aerial map of the modeling domains is shown below in Figure 7.1, by MM5 grid, 150 km domain, and 20 km domain.

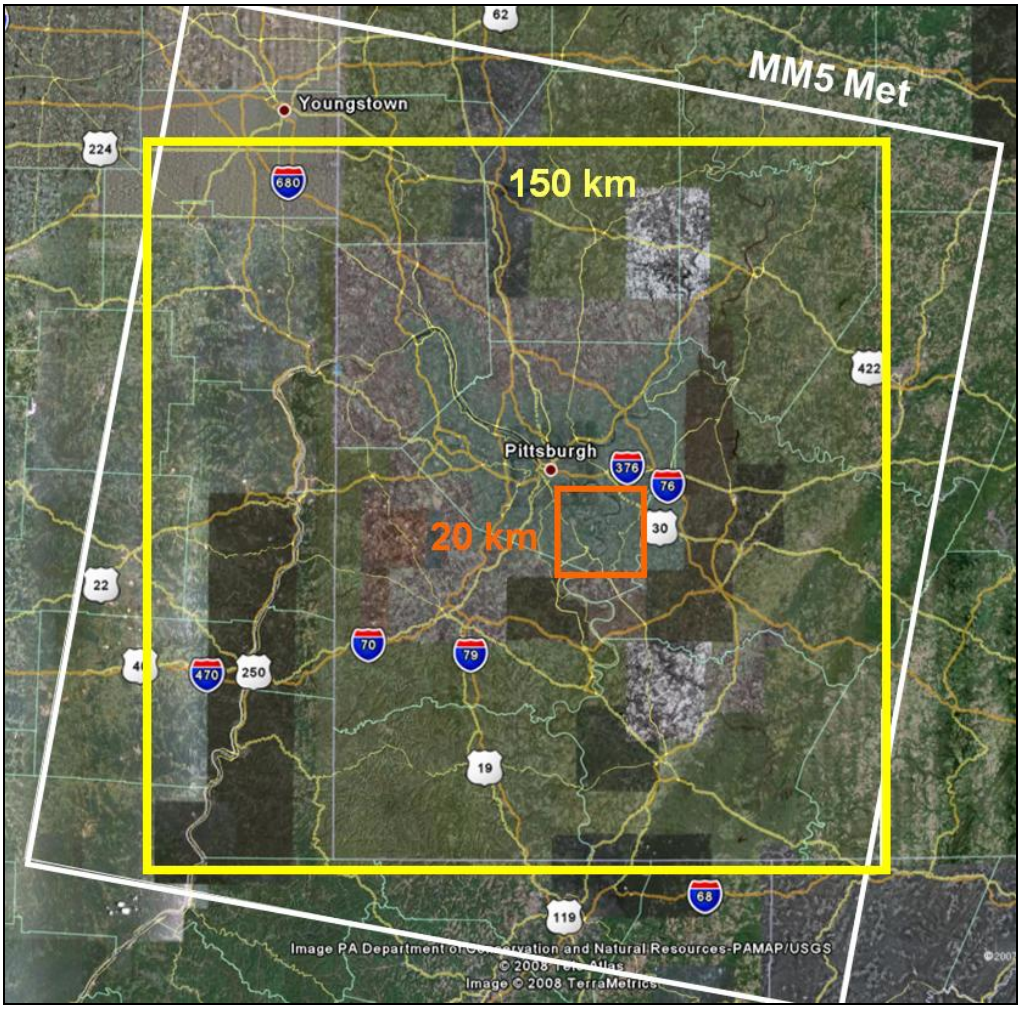

Figure 7-1: Modeling Domains

A map of the CALMET modeling domains by land use and terrain is shown in Figure 7-2 below (note: land use codes are those used by CALMET, not USGS). The 20 km x 20 km domain is seen by the darker terrain contours near the center within the larger 150 km x 150 km domain.

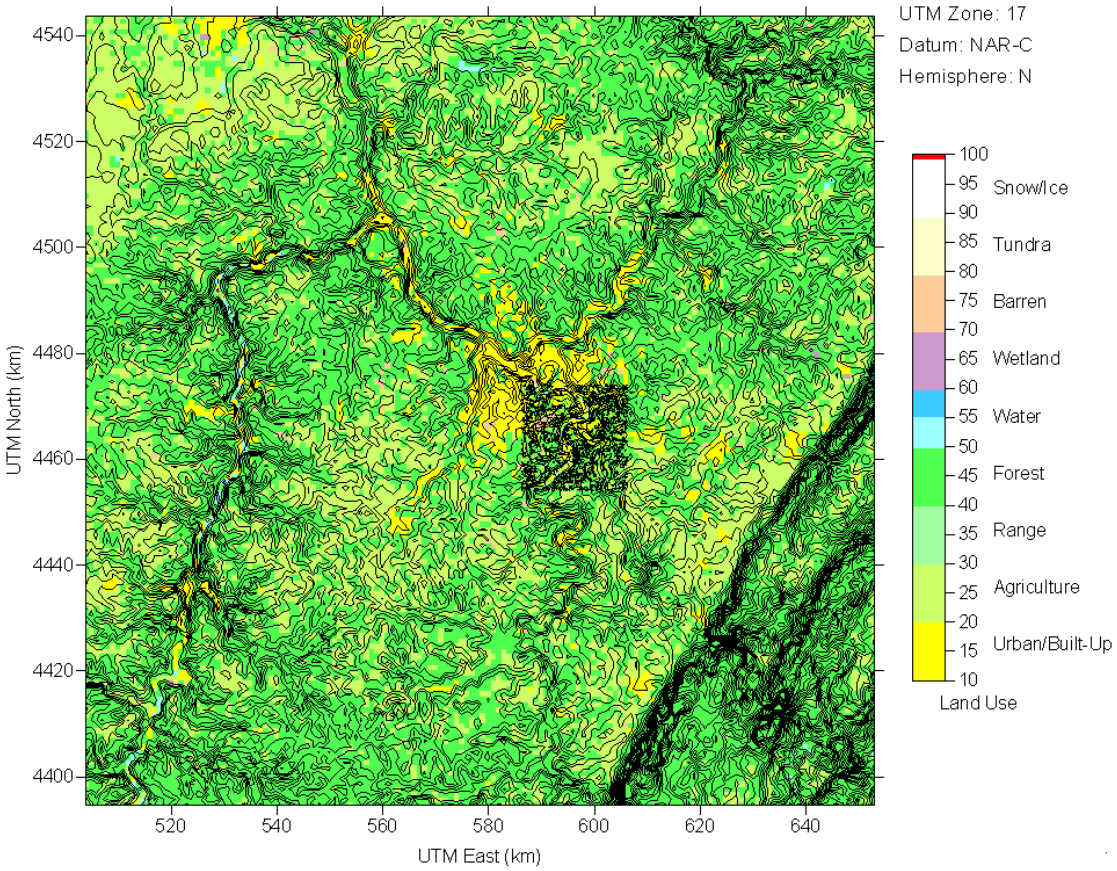

Figure 7-2: Modeling Domains by Land Use and Terrain

7.1.2. Years Modeled

Years modeled by ACHD were 2002 for baseline case and 2014 for future projected case. For the future case, uncorrected source parameters were as given in the 2012 MANE-VU inventory. [Accordingly, CMAQ impacts were as given in the 2012 regional results.] Revisions to local sources were made according to a 2014 timeframe, so the resulting future case ACHD inventory is a hybrid of 2012 and 2014 emissions.

It is assumed that 2012 emissions for uncorrected sources are representative through year 2014. Emissions of SO_2 and NO_x are steadily declining since 2002 due to regional controls. Only crustal component (fine soil, road dust, or "other primary particulate") is projected to increase, but by less than 1% per year. Since crustal component represents only a small portion of $PM_{2.5}$ at Liberty (3% in baseline timeframe), increases to crustal concentrations should be insignificant in comparison to concentrations of other major $PM_{2.5}$ components.

7.2. Methodology

The modeling methodology was based on excess primary $PM_{2.5}$ leading to the high concentrations at the Liberty and Clairton FRM monitors. The EPA Modeling Guidance outlines techniques that can be used to model primary $PM_{2.5}$ – this section describes the steps used to model the Liberty-Clairton area.

7.2.1. Sources Modeled

Since $PM_{2.5}$ in SW PA is composed of a combination of transported and locally-derived components, a large array of stationary point sources were included in the modeling inventories. The modeling domain included sources within a 150 km x 150 km area, encompassing SW PA along with parts of OH and WV. Emissions used were total "actual" primary $PM_{2.5}$ (filterable + condensible) for baseline and future projected cases.

The MANE-VU base and future inventories were reviewed for accuracy in coordinates, emissions, and stack parameters. Sources were reviewed in comparison to EPA's National Emissions Inventory (NEI) for 2002, as well as the ACHD 2002 inventory (Allegheny County sources only). Corrections made to the MANE-VU inventory for use in the corrected modeling are given in Appendix H, along with full inventories.

Regional controls for SO_2 and NO_x in the MANE-VU inventory were based on CAIR. EPA has proposed the Transport Rule (TR) as a replacement rule to CAIR, to be effective in 2011. The Transport Rule is expected to be as strict as or stricter than CAIR. A comparison of CAIR and proposed TR emissions and controls can be found in the weight of evidence section of this document.

Sources within the 20 km x 20 km domain, centered about the Liberty monitor, were also modeled as more representative source types (lines, volumes, etc.), based on previous modeling studies performed by ACHD. Many point (stack) sources also included building parameters to address possible downwash.

7.2.2. Combination of Impacts

Due to the large number of revisions made to the inventories, ACHD elected to combine modeled impacts from all point sources. This technique allows for proper adjustments for both near-field and distant sources, while keeping the integrity of the regional CMAQ results.

The modeled impacts for total carbons were combined using a conservation-of-mass technique that avoids double-counting. Average impacts from the uncorrected MANE-VU inventory across an "equivalent grid" were subtracted from the CMAQ impacts on a concurrent basis. The corrected ACHD inventory impacts for Liberty and Clairton were then added to the CMAQ

results, creating sub-grids of the original CMAQ grid cell. This is shown visually in Figure 7-3 on the following page.

CMAQ - Equivalent + Liberty, Clairton

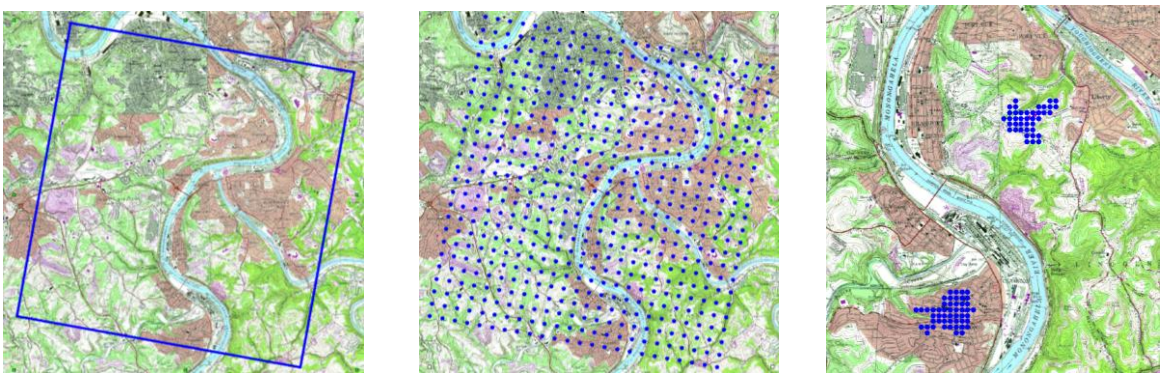

Figure 7-3: Combination of Modeled Impacts for Total Carbons

7.2.3. Reconstruction of Species

Modeled total primary $PM_{2.5}$ was used to represent total carbon in the modeling due to the analyses shown in the Speciation and PMF reports (Appendix E). The speciation analysis was performed using data in the 2003-2005 timeframe, and carbons represented 74% of the measured excess at Liberty. The carbon-rich factor from the PMF source apportionment report represents 24% of the total $PM_{2.5}$ (equating to approximately 5 $\mu g/m^3$ in the baseline timeframe).

Ammonium, chlorine, and "other" component are also small portions of the localized excess. Although these species are not modeled directly, they are accounted for in the reconstruction of species using the SANDWICH method given in the EPA Modeling Guidance. Reasoning is listed below:

- Organic mass by mass balance accounts for all differences between the FRM and other species
- Ammonium and chlorine concentrations have been shown to peak simultaneously with carbons, and can likely be attributed to similar sources; controls to carbons would likely apply to associated compounds
- "Other" component represents unknown mass from the speciation monitor, likely due to water associated with hygroscopic organics

Furthermore, the recommended method in the EPA Modeling Guidance for reconstructing ammonium and water is by indirect calculation (dependent on other species). A direct

ammonium method using measured/modeled ammonium is included as an option, but it was not used for the following reasons:

- There was much uncertainty in the inventories for ammonia and chlorinated compounds and the particle formation of these compounds within the Liberty-Clairton area

- The CALPUFF modeling was performed for primary $PM_{2.5}$, with no chemical transformation; inclusion of ammonia and/or hydrochloric acid would require transformation

- CMAQ-modeled ammonium reductions are based primarily on reductions in associated sulfate and nitrate and would not necessarily apply to excess primary ammonium

Future speciation analyses, reconstruction techniques, and inventories that incorporate more species may be developed for future SIPs.

The SANDWICH species reconstructions are shown in detail in the Attainment Demonstration section (Section 8).

7.2.4. Modeled Source Groups

Sources in the MANE-VU and ACHD inventories were apportioned to source groups for the modeling. A summary of source groups by model input file is provided in Appendix I. Source groups were generally assigned as follows:

- Distant sources were grouped by geographic region (distant EGU sources were modeled as a specific group)

- Near-field sources within or adjacent to the Liberty-Clairton area were grouped by facility or source type

A map of sources outside Allegheny County (excluding EGUs) is shown in Figure 7-4 for baseline case with corrected coordinates. These sources were grouped by county (or by state for OH and WV sources).

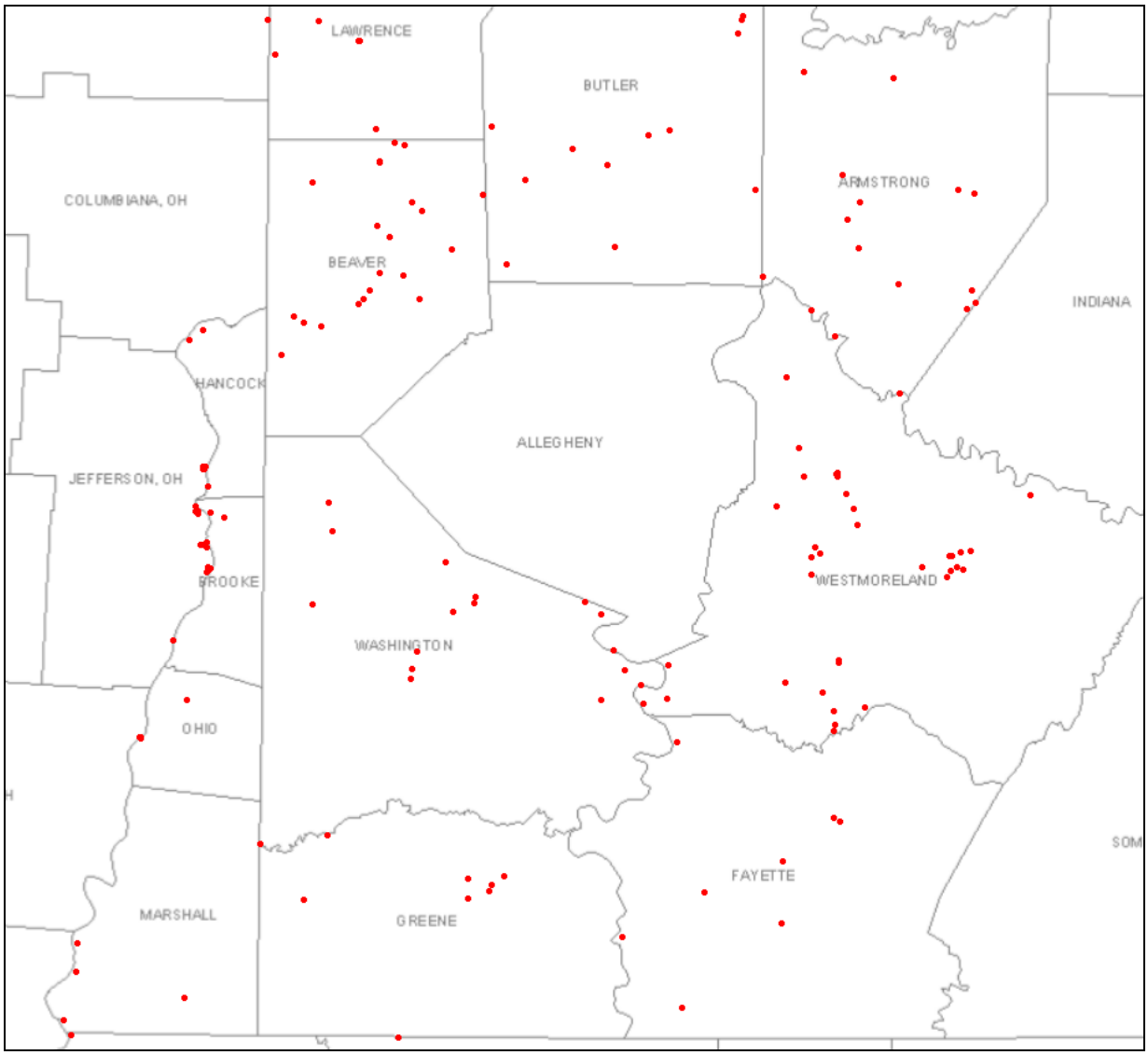

Figure 7-4: Map of Modeled Sources Outside Allegheny County (no EGUs)

A map of EGUs within the modeled area is shown below in Figure 7-5, for baseline case with corrected coordinates and facility names. These sources represent the majority of $PM_{2.5}$ emissions in the tri-state PA/OH/WV area.

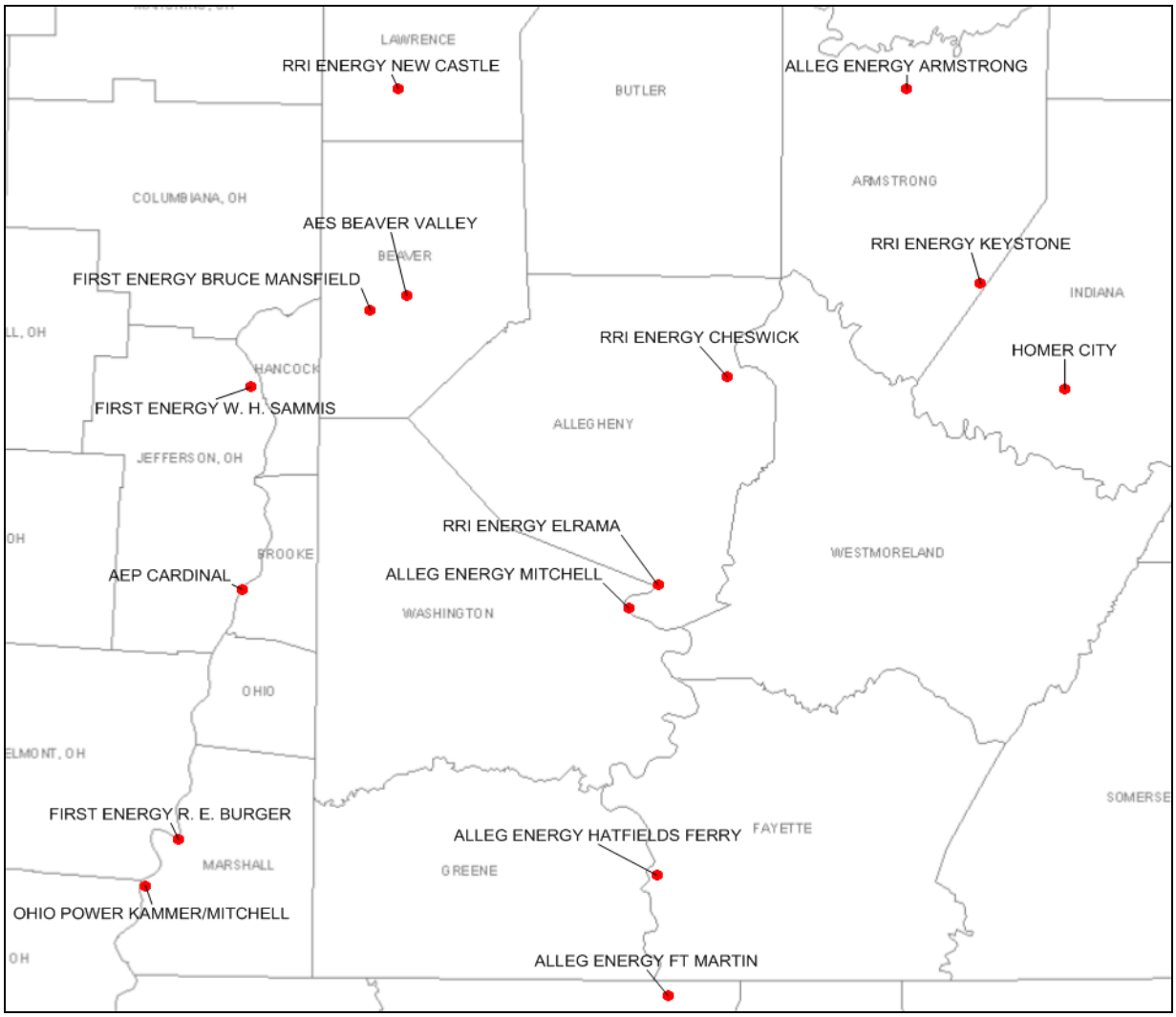

Figure 7-5: Map of Modeled EGUs

A map of Allegheny County sources (excluding RRI Energy Cheswick) is shown below in Figure 7-6 for baseline case with corrected coordinates. Sources outside the 20 km domain were grouped by geographical region.

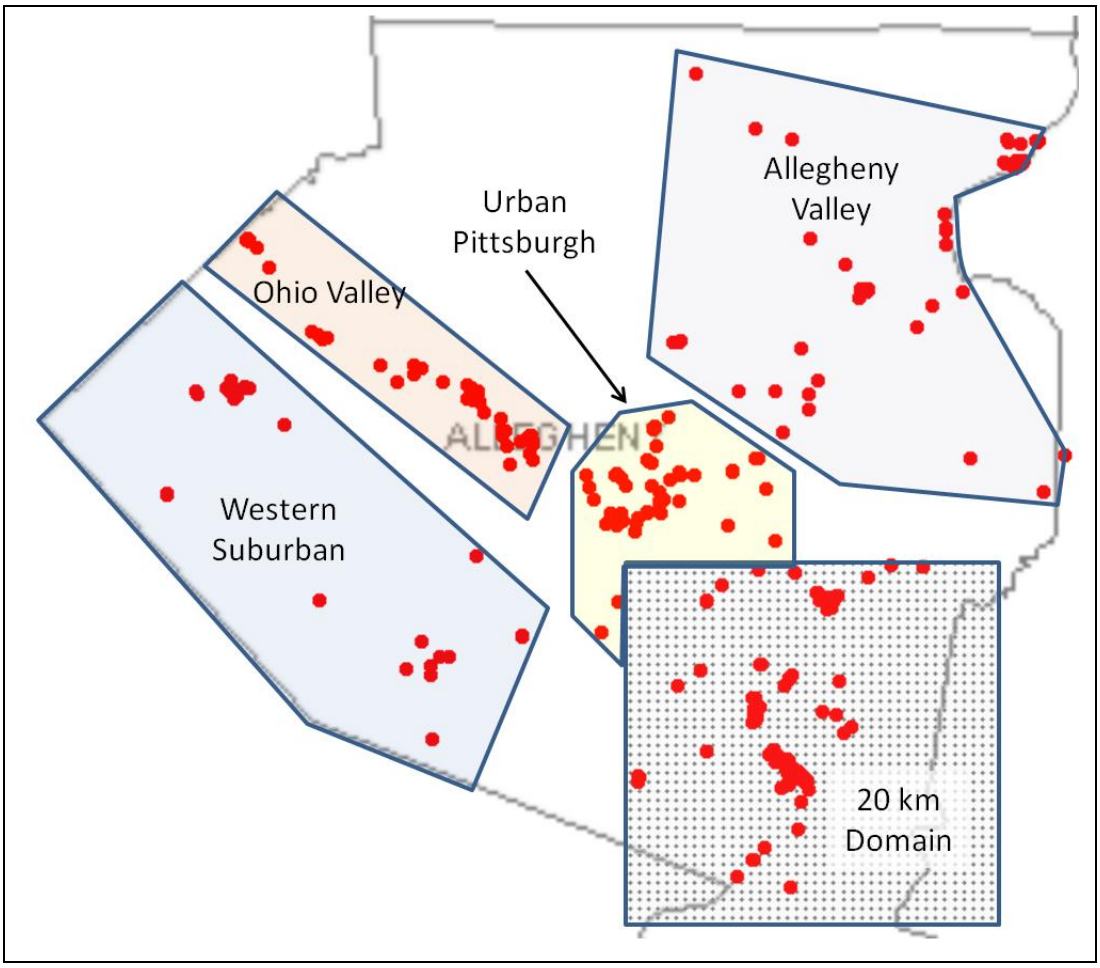

Figure 7-6: Map of Allegheny County Modeled Source Groups and 20 km Domain

A map of sources within the 20 km domain is shown below in Figure 7-7 for baseline modeled case with corrected coordinates. Labels are given for selected source groups or areas.

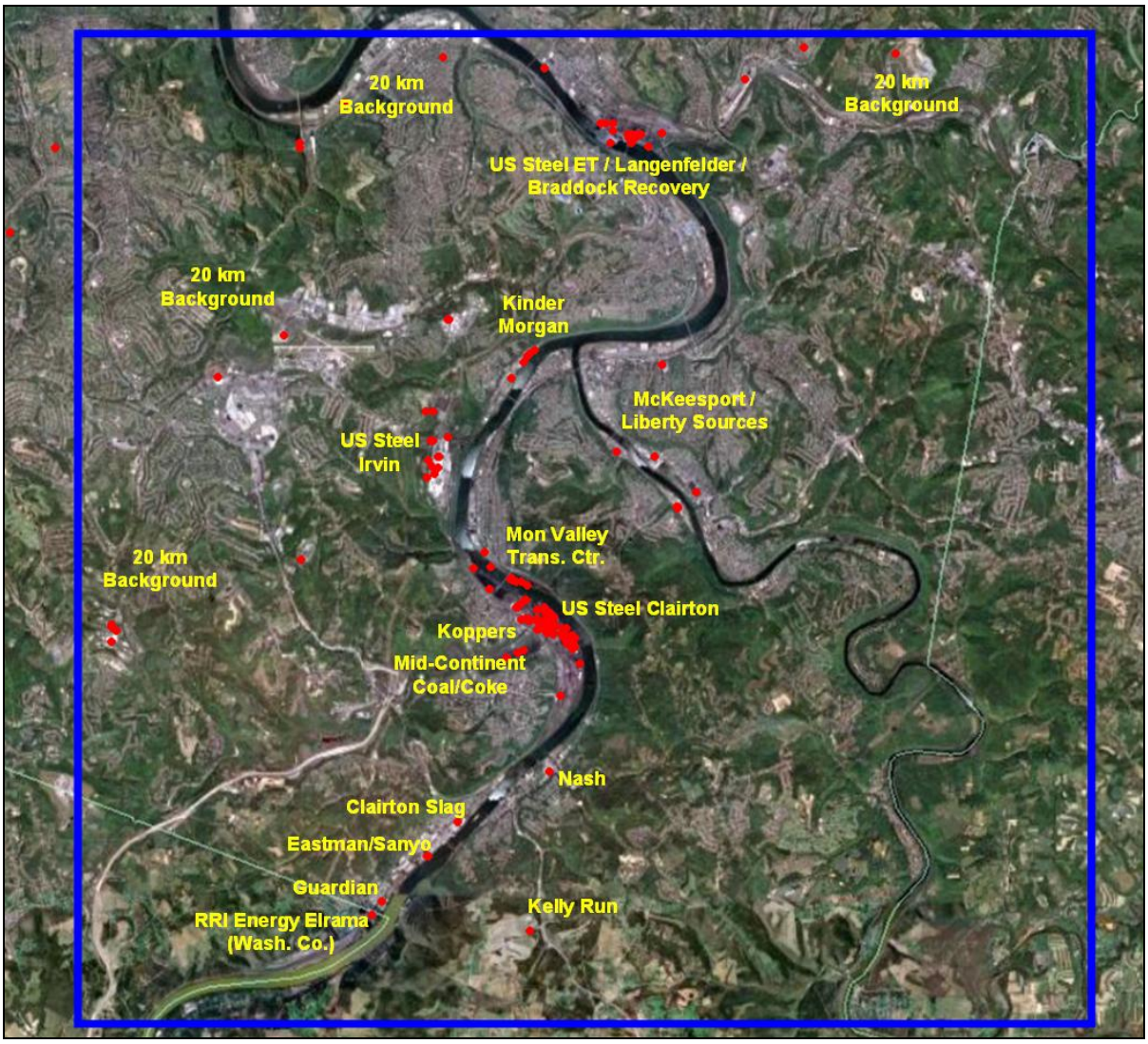

Figure 7-7: Map of Modeled 20 km Domain Sources/Groups

Building parameters were also included for all point sources within a 2.5 km radius of the Liberty monitor (5 km diameter) and for selected sources within or beyond a 5 km radius (10 km diameter). A map of near-field sources within or adjacent to the Liberty-Clairton area is shown below in Figure 7-8; sources shown in red included building parameters for stacks that may experience downwash. U. S. Steel Edgar Thomson sources (not shown on map) also included building parameters. The Liberty monitoring site is indicated by the white diamond in the center.

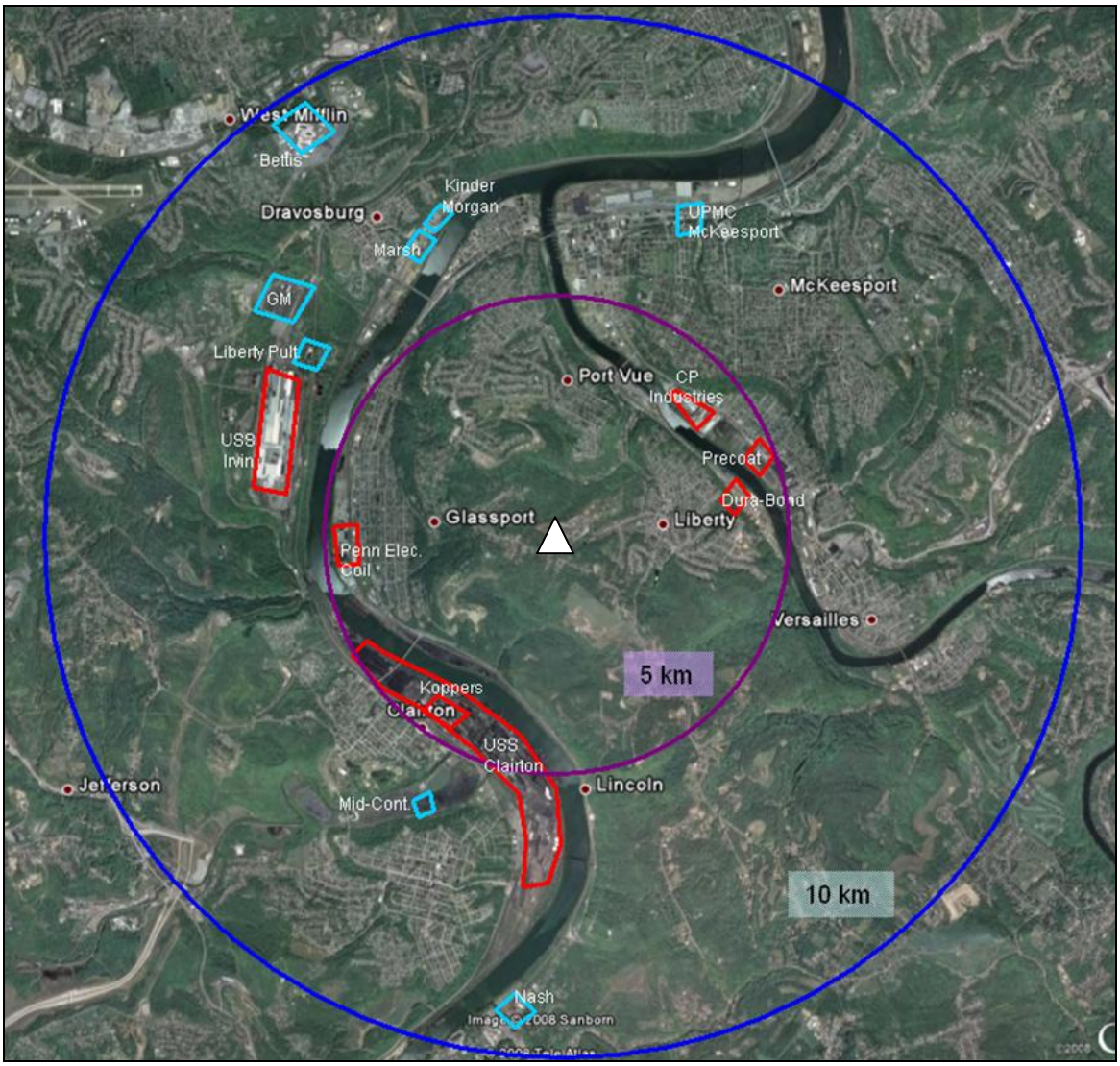

Figure 7-8: Map of Near-Field Sources with Building Parameters

7.2.5. Emissions Totals

Total modeled primary $PM_{2.5}$ emissions by area (or group) for the corrected baseline and future cases are shown in Table 7-1 below.

Table 7-1: Modeled Emissions Totals

Source Group/Area	Baseline 2002 Primary $PM_{2.5}$ (tons)	Future 2014 Primary $PM_{2.5}$ (tons)
Allegheny Co.*	873	927
Armstrong Co.	54	66
Beaver Co.	250	278
Butler Co.	321	339
EGUs (Distant)	51779	27934
EGUs (Near-Field)**	746	691
Fayette Co.	115	145
Greene Co.	146	157
Lawrence Co.	529	718
Ohio	372	367
Washington Co.	120	146
Westmoreland Co.	241	286
U. S. Steel Clairton	2186	1304
U. S. Steel Edgar Thomson	961	912
West Virginia	7570	6435
TOTAL	**66263**	**40705**

* Allegheny Co. without U. S. Steel Edgar Thomson, U. S. Steel Clairton, and RRI Energy Cheswick

** Near-field EGUs include RRI Energy Elrama and Allegheny Energy Mitchell plants

7.2.6. Combination of Impacts

For use in the calculation of design values, locally-modeled primary $PM_{2.5}$ impacts from CALPUFF were combined with CMAQ modeled results. For annual results, impacts were combined on a quarterly average basis. For the 24-hour results, impacts were combined on an hourly basis, and daily averages of the hourly values were used for the high-day analysis described later in this section. [Hourly impacts were used for the daily averages to ensure alignment of the 24-hour periods with no time differences between Local Standard Time (LST) and Greenwich Mean Time (GMT); MM5 prognostic data was formatted in GMT.]

CMAQ modeled values are given as one value per species for any given time period. Grid averages from the CALPUFF modeling were based on the average of all receptors within a

selected grid, i.e., the CALPUFF-modeled "CMAQ-equivalent" value for any time period is the average of all 600 receptors. For the nearby receptor grids, the Liberty value is an average of 40 receptors and the Clairton value is an average of 51 receptors.

7.2.7. Aggregation of Source Groups and Domains

Local CALPUFF modeling was performed on a source group basis in two modeling domains (long-range 150 km and near-field 20 km). Impacts needed to be combined accordingly for each receptor grid and modeled case (baseline or future) prior to combination with CMAQ values. The following steps were taken to combine impacts from model output files:

1) The post-processor CALSUM was used to combine outputs from different source groups in each modeled domain

2) The post-processor CALPOST was used to generate receptor impacts from the CALSUM files by averaging period (quarterly or hourly) for each domain

3) Receptor impacts from the 150 km and 20 km domains were summed via spreadsheet

4) Combined-domain receptor impacts were then averaged by time period (quarterly or daily)

5) Steps 1 and 2 were repeated for each grid and modeled case

For example, to generate baseline receptor impacts from the Liberty nearby grid for use in the annual test, CALSUM was used to combine the source group output files for each domain. Receptor impacts were then generated by CALPOST for each domain on quarterly average bases. The average receptor impacts from the 150 km and 20 km runs were summed via spreadsheet for each quarter. The averages of all receptors by quarter were then used as the Liberty Nearby quarterly values for baseline case.

[Note: The two nearby grids were actually run as one grid in the model files in order to conserve run time. Impacts were separated in the post-processing (Liberty nearby receptors: 1-40, Clairton nearby receptors: 41-91).]

Model input/output and post-processing files have been given in Appendix I (or on the accompanying DVD).

7.2.8. Combination of Annual Impacts

For the annual basis, quarterly average CALPUFF-modeled "CMAQ-equivalent" values were first subtracted from the total carbon (elemental + organic) quarterly averages from the CMAQ modeling. Quarterly averages from each of the nearby areas (Liberty and Clairton) were then

added to the result. This formula was used for both baseline and future projected cases. The combined impacts from each area are then used to generate Relative Response Factors (RRFs) for total carbons.

7.2.9. Combination of 24-Hour Impacts

Using the same methodology as the annual combination of impacts but on a different time scale, hourly CALPUFF-modeled "CMAQ-equivalent" averages were subtracted from each CMAQ hourly total carbons value. Hourly averages from the nearby runs were then added to the result, and daily averages (midnight-to-midnight 24-hour periods) were created from the hourly combinations.

For use in the 24-hour test, the top 25% of high modeled days per quarter were used for RRFs. Therefore, high days by sum of all modeled species were ranked by quarter. [Full 24-hour combination of impacts is given electronically on the DVD.] The top 23 days in each quarter were then used to generate average high-day modeled values for the species used for direct RRFs (sulfate, nitrate, OPP, and carbons).

8. Attainment Demonstration

8.1. Monitored Data Assumptions

The following assumptions were made for the Liberty and Clairton monitored data for use in the annual and 24-hour standard attainment tests.

- Liberty speciation data is assumed to be representative of both the Liberty and Clairton monitored areas. The Liberty species compositions are representative of Clairton, but at smaller overall concentrations. Liberty species compositions are therefore used with Clairton weighted FRM values in the design value calculation.

- Liberty speciation data is available from 4th quarter 2003 through 4th quarter 2004. It is assumed that these compositions are representative of the entire baseline timeframe of 2000-2004.

- Liberty speciation data recovery for 4th quarter 2003 is 67%, below the recommended recovery percentage of 75%. Since compositions are similar to that of 4th quarter 2004, and for a more robust speciation data set, it has been included in the species composition calculations.

- Clairton FRM data is available for 2001-2004. It is assumed that these years are also representative of the year 2000, which is excluded from the weighted FRM values.

- No 4th-of-July peaks or other valid anomalies are evident in the FRM and speciation data. All data has been included in the design value calculations.

- Degrees of Neutralization (DON) are held constant for baseline to future case. DON has been supplied with the pre-calculated EPA speciation SMAT/MATS data set.

8.2. Annual Attainment Test Methodology

Speciated Modeled Attainment Test (SMAT) methodology for the annual standard is given in the EPA Modeling Guidance.[5] Species reconstruction is based on the SANDWICH (sulfate, adjusted nitrate, derived water, inferred carbonaceous material balance approach) technique. The steps for the annual SMAT are listed below:

- *Calculate 5-year weighted FRM quarterly averages*. This is the 3-year average of the 2000-2002, 2001-2003, and 2002-2004 3-year quarterly averages. This is done for the Liberty and Clairton FRM monitored values.

[5] *Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze*, EPA, April 2007.

- *Calculate retained nitrate ($NO3_r$) by speciation sample*. This has been provided as part of the SMAT/MATS data set, pre-calculated by EPA. The formula used for retained nitrate is shown below, as given in the EPA Modeling Guidance:

$$\text{delta NO3 (ug/m3)} = 745.7/T_R * 1/24 * \sum_{i=1}^{24} (K_i^{1/2})$$

delta NO3 is the amount of volatilized nitrate

T_R is the reference temperature

K_i is the dissociation constant for ammonium nitrate

- *Calculate quarterly averages of non-dependent species*. Averages for nitrate, sulfate, other primary $PM_{2.5}$ (OPP), and elemental carbon, and concurrent FRM values are calculated. Quarterly averages for measured organic carbon are also calculated for comparison to an organic carbon minimum (or OC_{floor}). Quarterly averages for DON are also calculated for use in the retained ammonium calculation.

- *Calculate quarterly averages of retained ammonium ($NH4_r$)*. Averages for retained ammonium are calculated from quarterly sulfate, nitrate, and DON averages. The formula is given below, as given in the EPA Modeling Guidance:

$$NH4_r = DON*SO4 + 0.29*NO3_r$$

- *Calculate quarterly averages of particle bound water (PBW)*. Averages for PBW are calculated from quarterly sulfate, retained nitrate, and retained ammonium averages. The formula is given below for low acidity (DON >= 0.225), as given in the MATS User's Guide:

```
S =  SO4 / (SO4 + NO3r + NH4r)
N = NO3r / (SO4 + NO3r + NH4r)
A = NH4r / (SO4 + NO3r + NH4r)
 PBW = {202048.975 - 391494.647 *S   - 390912.147 *N  + 442.435 *(S**1.5)
            - 155.335 *(N**1.5)   - 293406.827 *(A**1.5)  + 189277.519 *(S**2)
            + 377992.610 *N*S    + 188636.790 *(N**2)  - 447.123 *(S**2.5)
            - 507.157 *(S**1.5)*N   - 12.794 *(S**3)  + 146.221 *(N**1.5)*S
            + 217.197 *(N**2.5)   + 29.981 *(N**1.5)*(S**1.5) - 18.649 *(N**3)
            + 216266.951 *(A**1.5)*S   + 215419.876 *(A**1.5)*N
            - 621.843 *(A**1.5)*(S**1.5)    + 239.132 *(A**1.5)*(N**1.5)
            + 95413.122 *(A**3)}    *    (SO4+NO3r+NH4r)
```

- *Calculate quarterly averages of organic carbon mass by mass balance (OCM_{mb}).* Averages for OCM_{mb} are calculated from the concurrent FRM quarterly averages minus the sum of the other species. This accounts for material associated with organics and/or uncertainties in the measured species. The calculated organic mass is compared to the OC_{floor} to ensure that the mass balance method does not lead to lower concentrations than measured.

- *Calculate quarterly species compositions; apply to weighted quarterly FRM averages.* This is done by calculating fractions of the total (minus 0.5 passive blank mass) by species, then recalculating species concentrations based on weighted FRM values.

- *Calculate quarterly Relative Response Factors (RRFs) from modeling.* For this demonstration, direct RRFs are calculated from baseline and future CMAQ modeling for sulfate, nitrate, and OPP. The combined ACHD modeling is used to generate total carbons RRFs (applied to sum of elemental and OCM_{mb}).

- *Calculate future quarterly species averages from RRFs, re-calculate ammonium and PBW.* The RRFs reduce the sulfate, nitrate, OPP, and carbons from the weighted baseline case values. Future case ammonium and PBW is calculated from the new quarterly averages.

- *Calculate the future design value.* This is done by adding the future case species by quarter (plus 0.5 blank) and averaging the quarterly future FRM values, rounded to the nearest tenth for comparison to the annual standard. For an area with strong concentration gradients such as the Liberty-Clairton, ACHD followed EPA Modeling Guidance by using a one-cell (single-site) analysis in place of a spatially-averaged array for the design values at Liberty and Clairton.

8.3. 24-Hour Attainment Test Methodology

The Speciated Modeled Attainment Test (SMAT) for the 24-hour standard uses the same methodology as the annual standard for reconstruction of species and RRFs. But, modeled and observed concentrations are based on specific high-day quarterly averages instead of overall averages, based on EPA Modeling Guidance.

- *Indentify observed (monitored) high days in baseline timeframe*. This is done by selecting the highest day in each quarter (for each FRM monitor) that is less than or equal to the 98^{th}-percentile value for the corresponding year (2000-2004). This method focuses on high days that represent seasonal highs rather than overall maximums.

- *Calculate quarterly species compositions for speciation high days*. This is done using the same technique as the annual species compositions, but the quarterly averages are based on the highest 25% (3 samples) of speciation samples by overall concentration.

- *Calculate weighted species compositions for baseline high days*. This is done by using the quarterly species fractions for each of the high days monitored observed days. The end results are quarterly species compositions for each year (2000-2004).

- *Calculate quarterly Relative Response Factors (RRFs) for high days from modeling.* The high modeled days are identified after summing all components, included the combined carbons from the ACHD modeling. The top 25% (23 days) by quarter are then averaged for sulfate, nitrate, OPP, and carbons. RRFs are calculated from the baseline and future modeled results.

- *Calculate future high days from RRFs; re-calculate ammonium and PBW for each future high day*. Using the same methodology as the annual test, high day species are reduced for the future case by the RRFs, and ammonium and PBW concentrations are re-calculated from the future sulfate, nitrates.

- *Calculate future design value.* Identify future 98^{th}-percentile days, calculate the 5-year weighted average of the projected 98^{th}-percentile days. Similar to the annual weighted FRM value, the weighted average is the 3-year average of the 2000-2002, 2001-2003, and 2002-2004 3-year averages, rounded to the nearest integer for comparison to the 24-hour standard.

8.4. Annual Standard Test Results

A summary of the annual design value calculations for Liberty is given in Tables 8-1 to 8-4. Spreadsheets showing the expanded design value calculations are given in Appendix J. All compositions and design values are given in µg/m³, while RRFs are dimensionless ratios.

Baseline quarterly compositions are calculated by the sum of the major species. RRFs are calculated by ratios of the modeled future case to baseline case results. The future case results are then calculated by multiplying the baseline results by the corresponding RRF by species.

Note: Attainment tests results using regional modeling data without Liberty-Clairton local modeling showed nonattainment for both 2009 and 2012. Therefore, a local modeling analysis was necessary in order show compliance for this SIP.

Table 8-1: Baseline Quarterly Compositions – Liberty Annual

QTR	Total $PM_{2.5}$	Blank	Organic Mass (by Balance)	Elemental Carbon	Total Carbon	Sulfate	Nitrate	Crustal (OPP)	Ammonium	Water
1Q	18.2778	0.5	4.8986	1.5001	6.3987	5.0112	1.9749	0.6142	2.2179	1.5608
2Q	22.0970	0.5	6.4918	3.0769	9.5687	6.3429	0.0000	0.6637	2.2698	2.7519
3Q	24.4259	0.5	8.6776	3.0518	11.7294	6.8741	0.0000	0.6204	2.1040	2.5980
4Q	19.1917	0.5	7.8132	2.6732	10.4864	3.9615	0.4413	0.5301	1.5890	1.6834
AVG	**20.9981**									

Table 8-2: Modeled Relative Response Factors (RRFs) – Liberty Annual

QTR	Total Carbon	Sulfate	Nitrate	Crustal (OPP)
1Q	0.6281	0.8418	0.9662	1.0609
2Q	0.5840	0.5897	0.8604	1.1010
3Q	0.5911	0.5581	0.8319	1.1148
4Q	0.6750	0.8021	0.9216	1.0777

Table 8-3: Future Projected Quarterly Compositions – Liberty Annual

QTR	Total $PM_{2.5}$	Blank	Total Carbon	Sulfate	Nitrate	Crustal (OPP)	Ammonium	Water
1Q	14.5383	0.5	4.0188	4.2186	1.9081	0.6517	1.9384	1.3027
2Q	13.5201	0.5	5.5883	3.7401	0.0000	0.7307	1.3384	1.6227
3Q	14.5860	0.5	6.9336	3.8365	0.0000	0.6916	1.1743	1.4500
4Q	14.3708	0.5	7.0779	3.1774	0.4067	0.5713	1.2898	1.3477
AVG	14.2538							

Table 8-4: Liberty Annual Design Values

Case	Year	Value
Baseline	2002	**21.0**
Future Projected	2014	**14.3**

A summary of the annual design value calculations for Clairton is given in Tables 8-5 to 8-8. Spreadsheets showing the expanded design value calculations are given in Appendix J. All compositions and design values are given in µg/m³, while RRFs are dimensionless ratios.

Table 8-5: Baseline Quarterly Compositions – Clairton Annual

QTR	Total $PM_{2.5}$	Blank	Organic Mass (by Balance)	Elemental Carbon	Total Carbon	Sulfate	Nitrate	Crustal (OPP)	Ammonium	Water
1Q	13.9271	0.5	3.6998	1.1330	4.8328	3.7848	1.4916	0.4639	1.6751	1.1788
2Q	17.3044	0.5	5.0513	2.3941	7.4453	4.9353	0.0000	0.5164	1.7661	2.1413
3Q	20.9413	0.5	7.4138	2.6073	10.0211	5.8730	0.0000	0.5300	1.7976	2.2196
4Q	14.7063	0.5	5.9382	2.0317	7.9700	3.0109	0.3354	0.4029	1.2077	1.2794
AVG	**16.7198**									

Table 8-6: Modeled Relative Response Factors (RRFs) – Clairton Annual

QTR	Total Carbon	Sulfate	Nitrate	Crustal (OPP)
1Q	0.8023	0.8418	0.9662	1.0609
2Q	0.6714	0.5897	0.8604	1.1010
3Q	0.6008	0.5581	0.8319	1.1148
4Q	0.7279	0.8021	0.9216	1.0777

Table 8-7: Future Projected Quarterly Compositions – Clairton Annual

QTR	Total $PM_{2.5}$	Blank	Total Carbon	Sulfate	Nitrate	Crustal (OPP)	Ammonium	Water
1Q	11.9447	0.5	3.8773	3.1862	1.4412	0.4922	1.4640	0.9839
2Q	11.2818	0.5	4.9991	2.9101	0.0000	0.5686	1.0414	1.2626
3Q	12.6319	0.5	6.0211	3.2778	0.0000	0.5909	1.0033	1.2388
4Q	11.4645	0.5	5.8017	2.4149	0.3091	0.4342	0.9803	1.0243
AVG	11.8307							

Table 8-8: Clairton Annual Design Values

Case	Year	Value
Baseline	2002	**16.7**
Future Projected	2014	**11.8**

8.5. 24-Hour Standard (65 µg/m³) Test Results

A summary of the 24-hour design value calculations for Liberty is given in Tables 8-9 to 8-13. Spreadsheets showing the expanded design value calculations are given in Appendix J. All compositions and design values are given in µg/m³, while RRFs are dimensionless ratios.

Quarterly species compositions are calculated in a similar manner used in the annual test, but the results are applied to high days for each quarter instead of averages. RRFs are calculated by ratios of the modeled future case to baseline case results for high days. The future case results are then calculated by multiplying the baseline results by the corresponding RRF by species.

Table 8-9: Baseline Quarterly High Days – Liberty 24-Hour

QTR	2000	2001	2002	2003	2004
1Q	46.7	61.9	50.8	60.4	64.2
2Q	64.2	63.9	58.2	66.6	59.6
3Q	48.6	56.4	59.9	60.8	64.2
4Q	60.3	57.5	56.8	64.8	68.5

Table 8-10: Baseline Quarterly Compositions – Liberty 24-Hour

QTR	Total $PM_{2.5}$	Blank	Organic Mass (by Balance)	Elemental Carbon	Total Carbon	Sulfate	Nitrate	Crustal (OPP)	Ammonium	Water
1Q	23.7667	0.5	7.8059	3.0633	10.8692	5.5200	1.7867	0.7400	2.5881	1.7627
2Q	48.8000	0.5	14.5477	7.4633	22.0110	14.0533	0.0000	1.0367	5.2700	5.9290
3Q	42.6333	0.5	17.5372	6.1533	23.6905	10.1200	0.0000	0.7300	3.3396	4.2532
4Q	43.0833	0.5	21.5537	7.2700	28.8237	6.8633	0.3217	1.0167	2.6670	2.8910

(Note: Total carbon is the total of organic carbon and elemental carbon.)

Table 8-11: Modeled Relative Response Factors (RRFs) – Liberty 24-Hour

QTR	Total Carbon	Sulfate	Nitrate	Crustal (OPP)
1Q	0.5451	0.8408	1.1309	1.1286
2Q	0.5046	0.4952	1.6330	1.1917
3Q	0.5233	0.5233	1.1323	1.1282
4Q	0.5597	0.6503	1.1297	1.1675

Table 8-12: Future Projected Quarterly High Days – Liberty 24-Hour

QTR	2000	2001	2002	2003	2004
1Q	34.2	45.3	37.2	44.2	47.0
2Q	33.2	33.1	30.1	34.5	30.9
3Q	25.8	29.9	31.7	32.2	34.0
4Q	36.7	35.0	34.6	39.5	41.7

Table 8-13: Liberty 24-Hour Design Values

Case	Value
Baseline	**64**
Future Projected	**42**

A summary of the 24-hour design value calculations for Clairton is given in Tables 8-14 to 8-18. Spreadsheets showing the expanded design value calculations are given in Appendix J. All compositions and design values are given in µg/m³, while RRFs are dimensionless ratios.

Table 8-14: Baseline Quarterly High Days – Clairton 24-Hour

QTR	2000	2001	2002	2003	2004
1Q	---	22.9	20.2	24.1	16.7
2Q	---	44.5	50.4	58.8	26.3
3Q	---	36.5	39.8	37.0	39.8
4Q	---	31.5	35.0	21.1	26.4

Table 8-15: Baseline Quarterly Compositions – Liberty 24-Hour (by percentage, applied to Clairton high days)

QTR	Total $PM_{2.5}$	Blank	Organic Mass (by Balance)	Elemental Carbon	Total Carbon	Sulfate	Nitrate	Crustal (OPP)	Ammonium	Water
1Q	23.7667	0.5	7.8059	3.0633	10.8692	5.5200	1.7867	0.7400	2.5881	1.7627
2Q	48.8000	0.5	14.5477	7.4633	22.0110	14.0533	0.0000	1.0367	5.2700	5.9290
3Q	42.6333	0.5	17.5372	6.1533	23.6905	10.1200	0.0000	0.7300	3.3396	4.2532
4Q	43.0833	0.5	21.5537	7.2700	28.8237	6.8633	0.3217	1.0167	2.6670	2.8910

(Note: Total carbon is the total of organic carbon and elemental carbon.)

Table 8-16: Modeled Relative Response Factors (RRFs) – Clairton 24-Hour

QTR	Total Carbon	Sulfate	Nitrate	Crustal (OPP)
1Q	0.7555	0.8018	1.0187	1.0702
2Q	0.5555	0.5198	1.0447	1.1634
3Q	0.5147	0.5641	0.9517	1.1445
4Q	0.6292	0.5828	1.0972	1.0999

Table 8-17: Future Projected Quarterly High Days – Clairton 24-Hour

QTR	2000	2001	2002	2003	2004
1Q	---	18.4	16.3	19.4	13.5
2Q	---	24.7	27.9	32.5	14.7
3Q	---	19.8	21.6	20.1	21.6
4Q	---	20.1	22.3	13.5	16.9

Table 8-18: Clairton 24-Hour Design Values

Case	Value
Baseline	**49**
Future Projected	**27**

8.6. Lincoln Area Analysis

The EPA Modeling Guidance recommends examination of "unmonitored" areas for possible future exceedances of the NAAQS standards by employing a combination of interpolated monitored and modeled relative response ratios within spatial fields across the area.[6] The Liberty and Clairton Monitors are part of a complete network for Allegheny County – according to monitoring network guidance, there are no "unmonitored" areas. However, for a more complete analysis, ACHD examined all locations between the Liberty monitor site and the U. S. Steel Clairton Plant, referred to as the "Lincoln area", which comprises portions of Lincoln, Liberty, and Glassport.

The Lincoln area corresponds to the area downwind from the Clairton plant, since wind is predominantly from the southwest in the area. A large portion of the area is not suitable as a neighborhood-scale location for monitoring $PM_{2.5}$ because it does not represent a highly populated area and is source-oriented, i.e., within an "area of influence" of the Clairton plant.

Monitored data since 1999 has shown that Liberty considerably exceeds monitored data in surrounding areas (including Clairton, North Braddock, Forward, and South Park) on both annual and 24-hour bases. Table 8-19 below shows the projected design values for Liberty, Clairton, and North Braddock (the nearest current $PM_{2.5}$ site outside the Liberty-Clairton area). All monitors are below the standards in the future case.

Table 8-19: Future Case Design Values

Site	Annual	24-Hour
Liberty	14.3	42
Clairton	11.8	27
North Braddock*	14.3	33

* North Braddock values are taken from the Pittsburgh-Beaver Valley SIP

Any flat-terrain interpolation from Liberty to other areas would show a decreasing concentration gradient. In the case of the Liberty-Clairton area, terrain and meteorology can strongly affect concentrations. Supplemental modeling was performed to examine the specific reductions of impacts in the Lincoln area. Modeled contour plots of the $PM_{2.5}$ impact reductions were generated as follows:

- Create a receptor grid at 250 meter spacing for a dense grid covering all hills and valleys in the Lincoln Area

[6] The Modeled Attainment Test Software (MATS) was developed by EPA to automatically calculate design values and interpolate for unmonitored areas. However, MATS does not recognize terrain and meteorology-driven scenarios that affect the Liberty-Clairton Area. Furthermore, testing of MATS version 2.2.1 showed inconsistent results with methodology given in the EPA Modeling Guidance. Therefore, MATS was not used in this attainment demonstration.

- Model all sources in the 20 kilometer domain for baseline and future cases

- Plot the percent reduction from the baseline case impacts on an aerial map to examine annual and 24-hour high percent reductions throughout the Lincoln area

The receptor grid used for the Lincoln area is given below in Figure 8-1. Receptors are shown as the yellow dots at 250 m spacing throughout the Lincoln area.

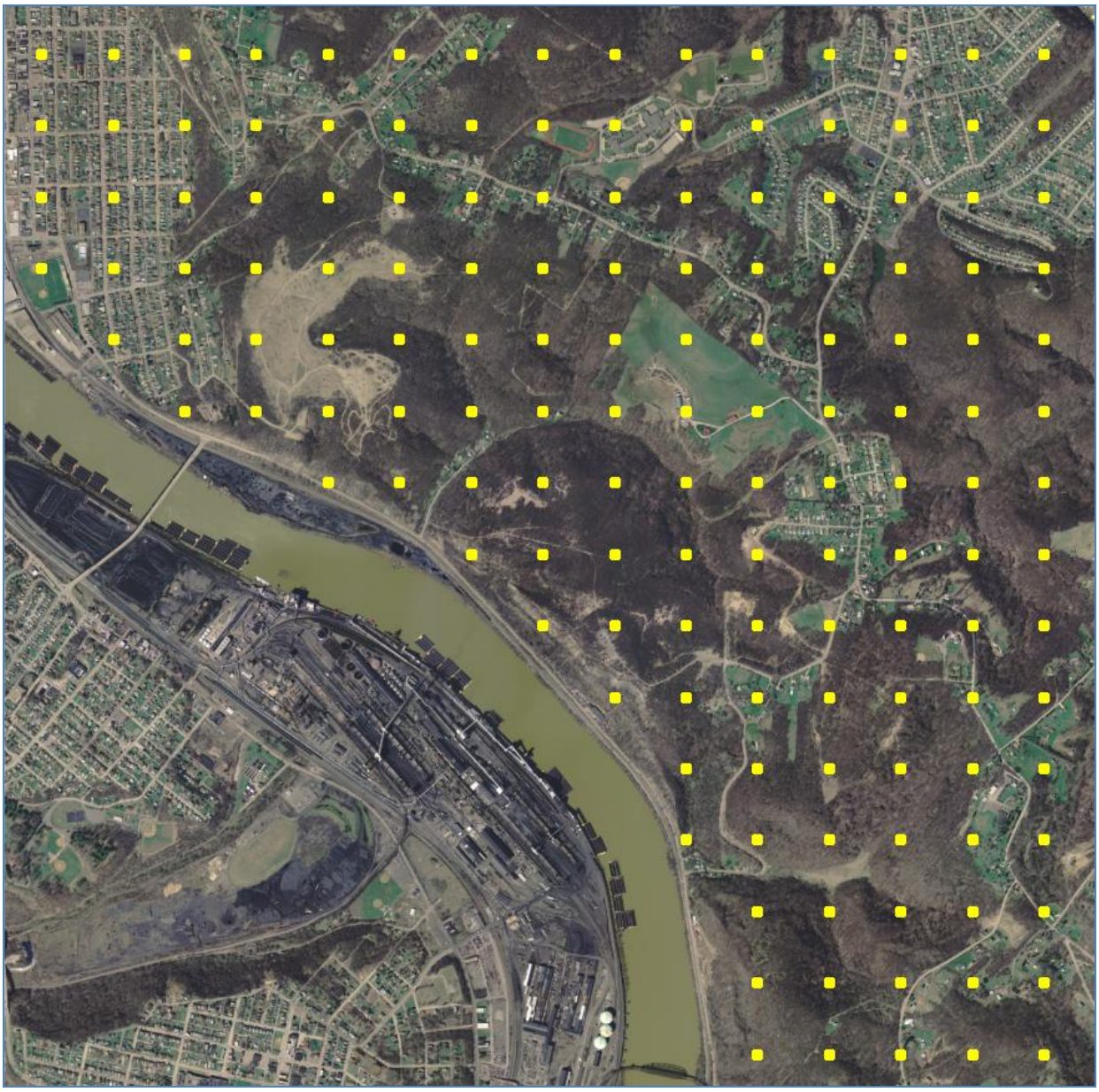

Figure 8-1: Receptor Grid for the Lincoln Area

A contour plot of annual impact reductions for the Lincoln Area is shown below in Figure 8-2. The contour labels indicate the percent reduction, which is calculated as the baseline minus future concentration, divided by baseline concentration (in %). The contours are color-coded yellow-to-red, with yellow as the lowest reductions and red as the highest.

Figure 8-2: Annual Impacts by Percent Reduction in Lincoln Area

The attainment test shows that the Liberty site is being reduced from a baseline weighted annual concentration of 21.0 µg/m³ to 14.3 µg/m³ due to modeled reductions of 45% (baseline to future). While actual monitored concentrations are unknown in the Lincoln Area, the contours

show percent reductions throughout the Lincoln area that are equal to or greater than the reductions at the Liberty monitor site.

Further examination of the annual reductions throughout area is shown in Figure 8-3.

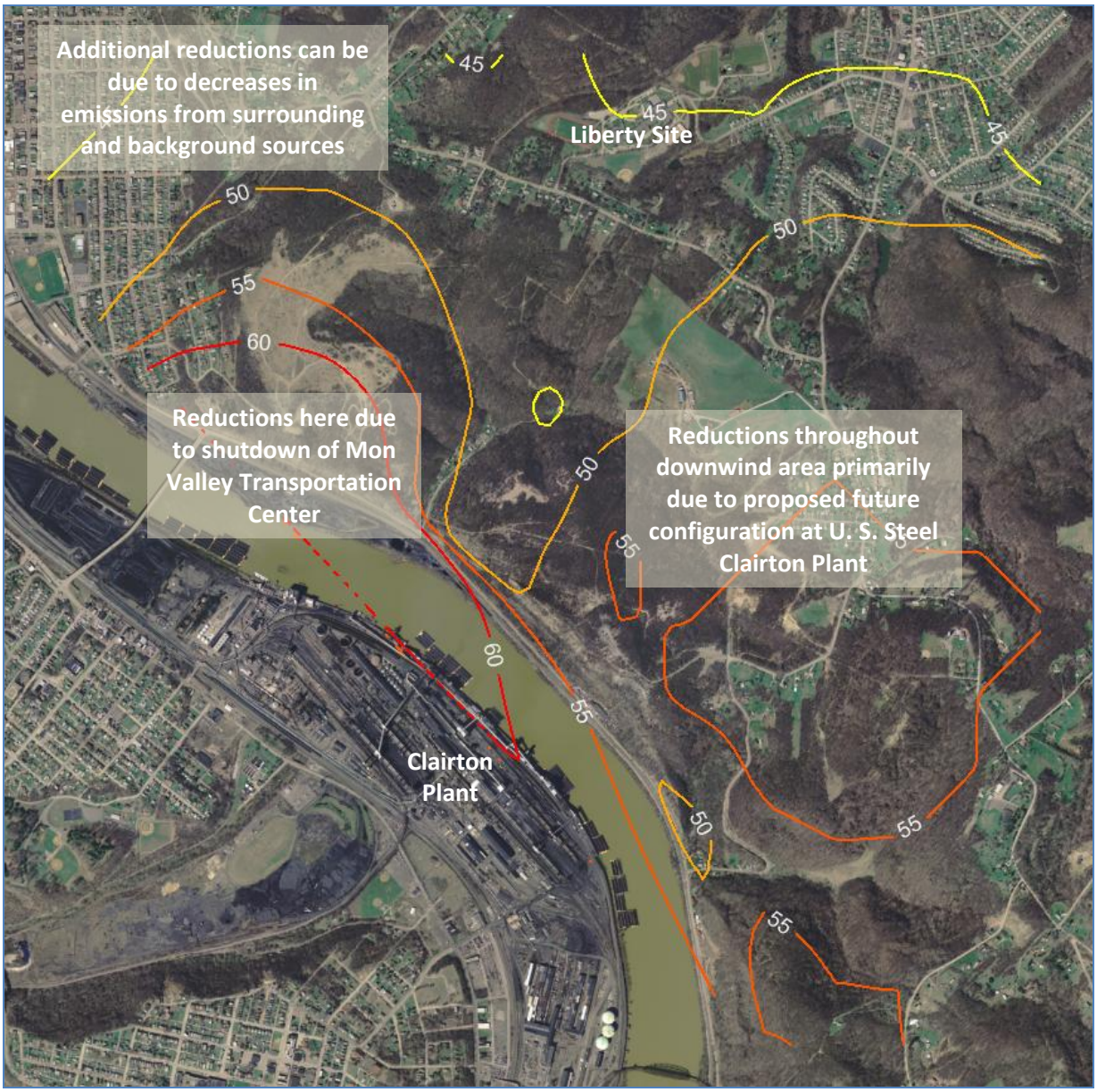

Figure 8-3: Annual Percent Reductions with Descriptions

The largest localized reductions occur near the site of Mon Valley Transportation Center, which was shut down in the future modeled case. The widespread reductions throughout the downwind area are primarily due to the proposed new configuration at the U. S. Steel Clairton Plant. Additional reductions throughout the area can be due to regional decreases in emissions from sources outside the Liberty-Clairton area.

A contour plot of 24-hour impact reductions for the Lincoln Area is shown below in Figure 8-4.

Figure 8-4: 24-Hour Impacts by Percent Reduction in Lincoln Area

The attainment test shows that the Liberty site is being reduced from a baseline weighted concentration of 64 µg/m³ to 42 µg/m³ due to modeled reductions of 50% (baseline to future). Similar to the annual percent reduction contours in Figure 8-2, the 24-hour contours show percent reductions throughout the Lincoln area that are equal to or greater than the reductions at the Liberty monitor site.

8.7. Model Performance

Model performance for regional CMAQ modeling has been performed by the New York State Department of Environmental Conservation (NYSDEC) and is included in Appendix K of this SIP. The CMAQ model performance examined prediction for major species throughout the modeled Mid-Atlantic/Northeastern U.S. For the Liberty-Clairton demonstration, the combined CMAQ/CALPUFF local modeling was examined for appropriateness in predicting the local excess component.

ACHD analysis has shown that localized excess in Liberty-Clairton is dependent on nighttime temperature inversions within complex terrain.[7] The modeled concentrations should therefore represent a diurnal trend similar to the monitored data. Plots of average hourly combined CMAQ/CALPUFF modeled concentrations compared to monitored concentrations (measured by the Liberty continuous TEOM) for baseline 2002 are given below in Figures 8-5 and 8-6, by year-round and quarterly average bases, respectively.

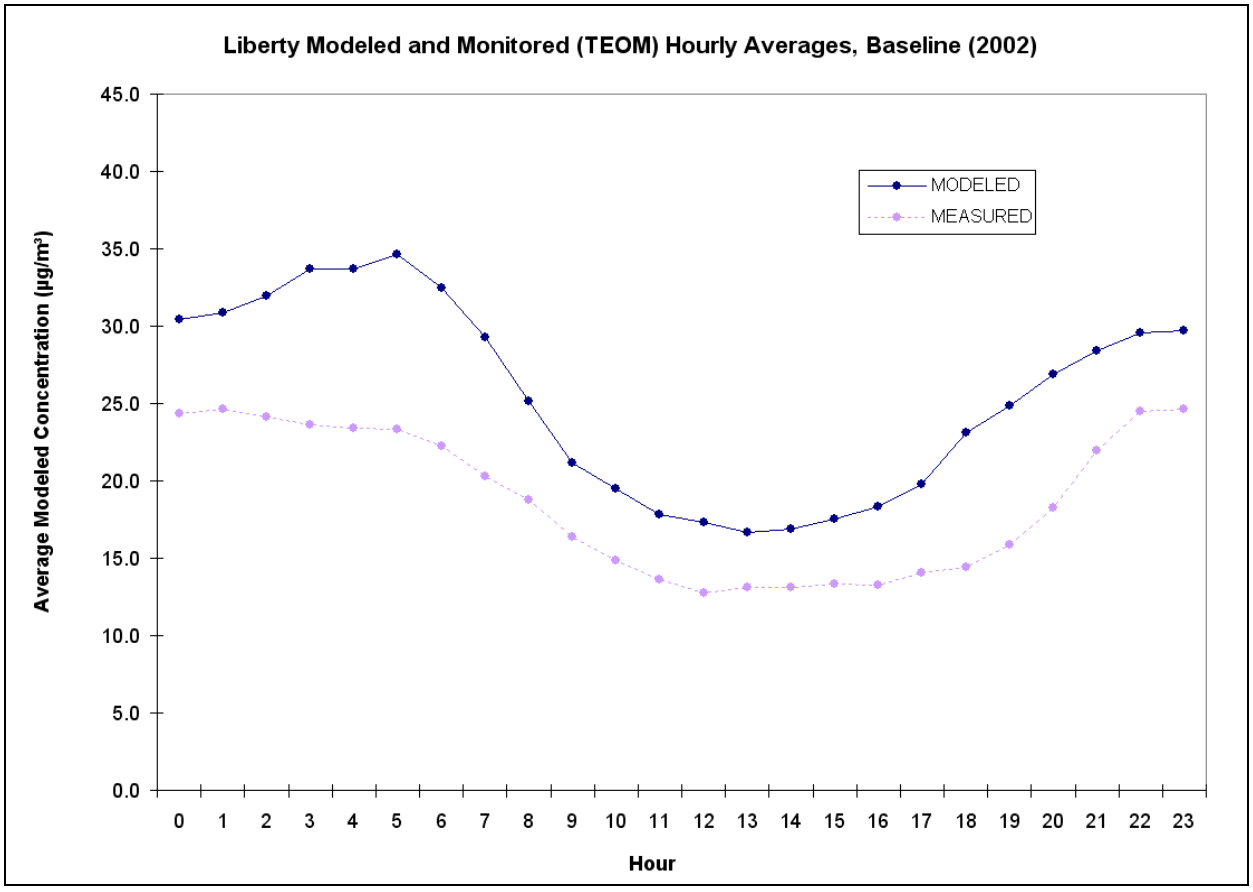

Figure 8-5: Hourly Average Liberty Modeled and Monitored $PM_{2.5}$ (TEOM), Baseline 2002, Year-Round Basis

[7] Inversion data for 2002 is shown in Appendix A.

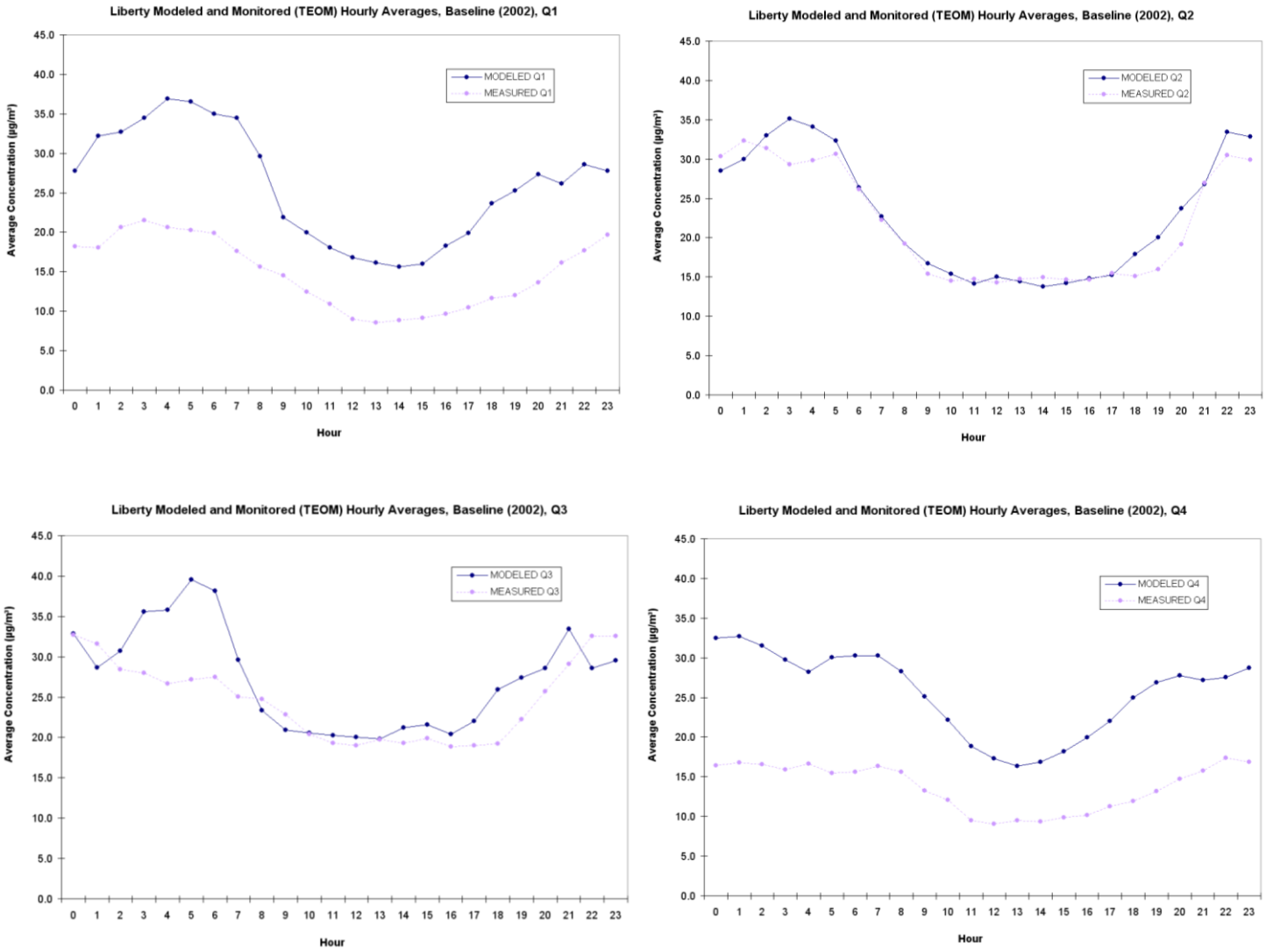

Figure 8-6: Hourly Average Liberty Modeled and Monitored $PM_{2.5}$ (TEOM), Baseline 2002, Quarterly Basis

The combined CMAQ/CALPUFF model simulation effectively recognized the diurnal trends in hourly data in all four quarters, with the best predicted hourly averages occurring in the 2nd and 3rd quarters. Differences in overall concentration show that the model overpredicted for all hours – however, the modeled concentrations are used for relative reductions from the base to future case instead of absolute comparison to the NAAQS.

In order to compare base to future case modeled diurnal trends, average hourly combined CMAQ/CALPUFF modeled Liberty concentrations for baseline and future cases are shown below in Figures 8-7 and 8-8, by year-round and quarterly bases.

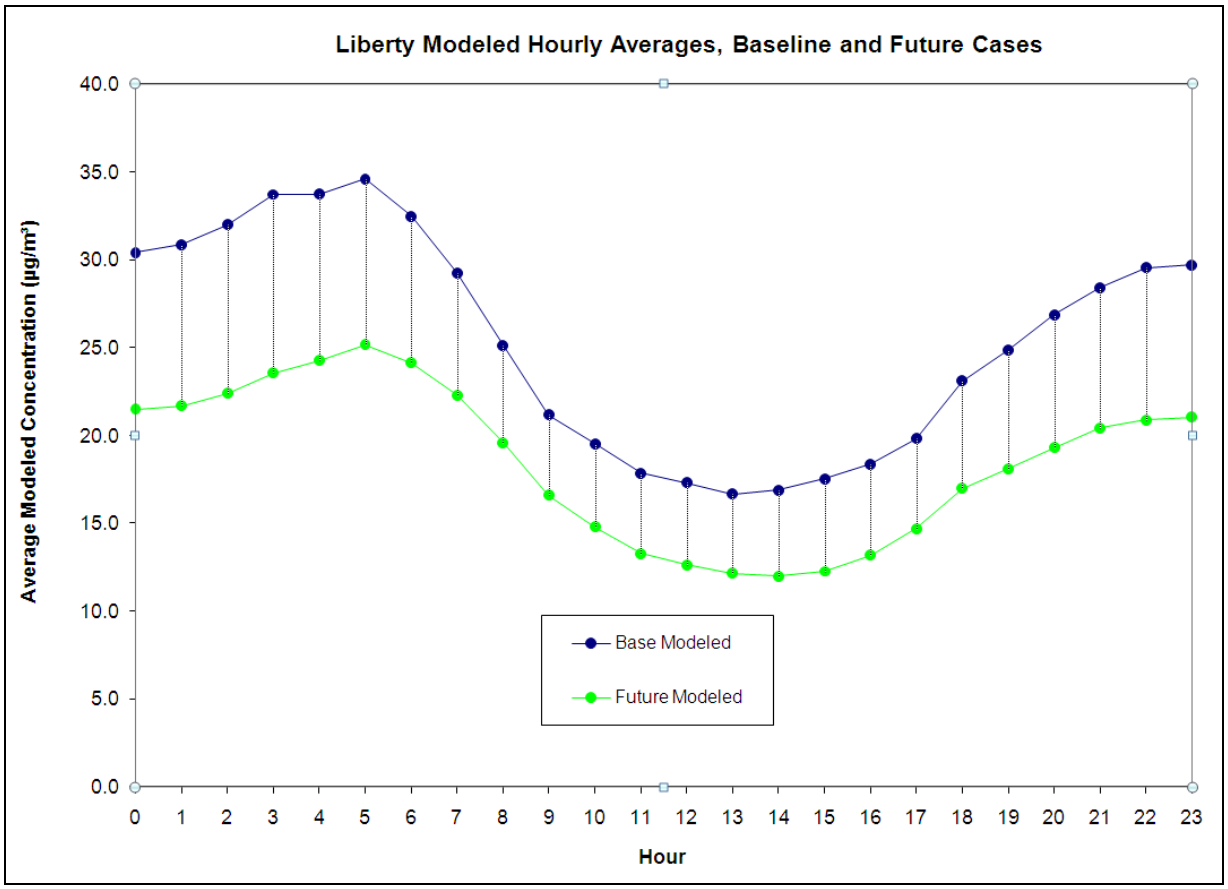

Figure 8-7: Hourly Average Liberty Modeled Baseline and Future Cases, 2002 and 2014, Year-Round Basis

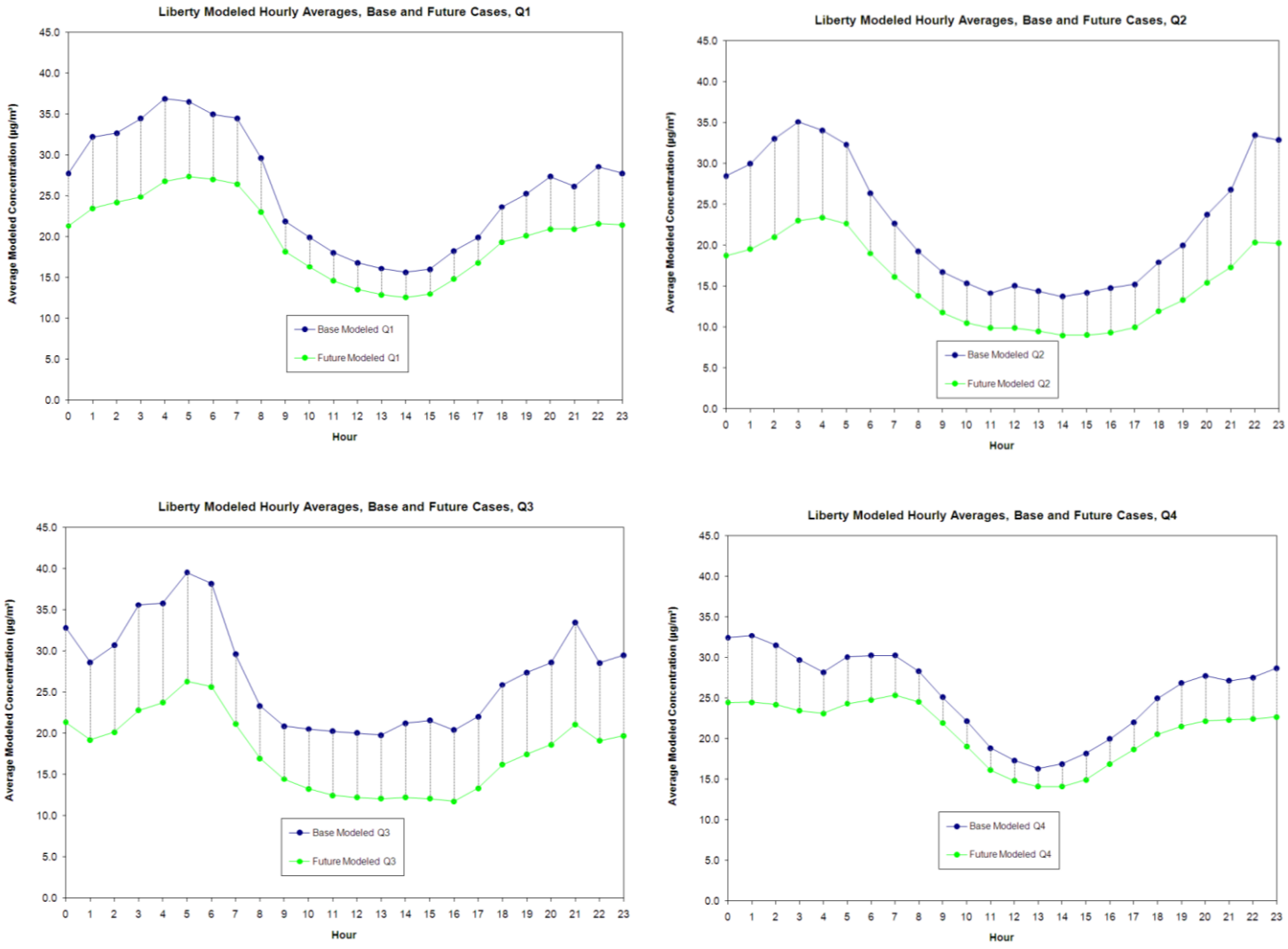

Figure 8-8: Hourly Average Liberty Modeled Baseline and Future Cases, 2002 and 2014, Quarterly Basis

The before and after model results show that the future case controls lower concentrations overall, with the largest reductions occurring during the nighttime inversion periods (indicated by the longer dotted high-low lines) in all four quarters. These plots demonstrate that the modeled response to the future control measures is effectively reducing the local excess that has been observed in hourly monitored data.

Combined CMAQ/CALPUFF modeled results were also compared on a daily basis to the FRM results from 2002. Modeled daily averages and FRM values for Liberty in 2002 are shown below in Figure 8-9 on a time-scale basis.

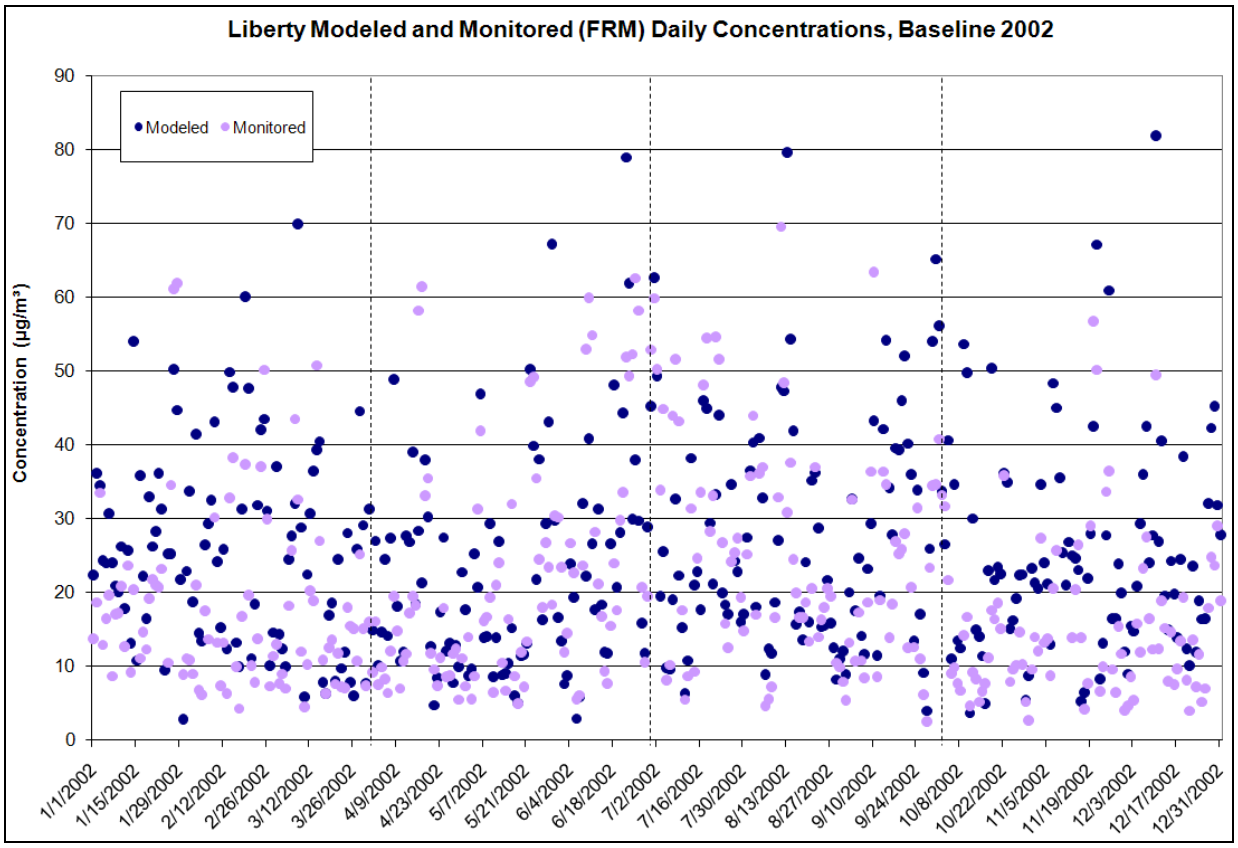

Figure 8-9: Daily Average Liberty Modeled and Monitored (FRM), Baseline 2002

Daily comparisons show that the modeled and monitored high days do not show an exact correlation, but similar high and low days do occur within each quarter (separated by the dotted lines). The long-term design value is based on quarterly reductions from each quarter, and the 24-hour design value is based on quarterly high day reductions. Therefore, the modeled concentrations are adequate for projecting relative reductions of monitored results on a quarterly basis.

The EPA Modeling Guidance recommends performance statistics for use in operational evaluation of the modeled results. Equations for the Mean Fractional Bias (MFB) and Mean Fractional Error (MFE) metrics are given on the following page.

Mean Fractional Bias (%)

$$FBIAS = \frac{2}{N}\sum_{1}^{N}\left(\frac{(Model - Obs)}{(Model + Obs)}\right)\cdot 100\%$$

Mean Fractional Error (%)

$$FERROR = \frac{2}{N}\sum_{1}^{N}\left(\frac{|Model - Obs|}{(Model + Obs)}\right)\cdot 100\%$$

These equations were used to test the accuracy of the modeled results compared to actual monitored data for the 2002 baseline case. "Goal" represents a good statistical relationship, while "criteria" represents average results (limits were used in regional model evaluations, given in the EPA Modeling Guidance). Comparison was done for total $PM_{2.5}$, since actual monitored results from the speciation monitor were not available for 2002.

Table 8-20: Statistics for the Modeled Daily Liberty Averages Compared to the Liberty FRM Values, Year-Round and by Season, 2002

DAILY Results	Mean Fractional Bias (MFB)	Mean Fractional Error (MFE)
1st Quarter	35.99%	45.76%
2nd Quarter	7.59%	39.56%
3rd Quarter	12.25%	30.52%
4th Quarter	45.91%	51.13%
Year-Round	25.43%	41.73%
GOAL	*≤ ± 30%*	*≤ 50%*
CRITERIA	*≤ ± 60%*	*≤ 75%*

Positive bias indicates that the model over-predicted for all seasons, with the 2nd and 3rd quarters performing the best (lowest) for bias and error. Year-round, 2nd quarter, and 3rd quarter statistics fell within the goal range, indicative of good results. 1st and 4th quarter results fell within the criteria range, indicative of average results.

Figure 8-10 shows a "soccer plot" that visually shows the daily statistics as data points within the goal and criteria ranges (red and blue boxes, respectively). Year-round, 2nd quarter, and 3rd quarter points lie within the "goal" of the soccer plot.

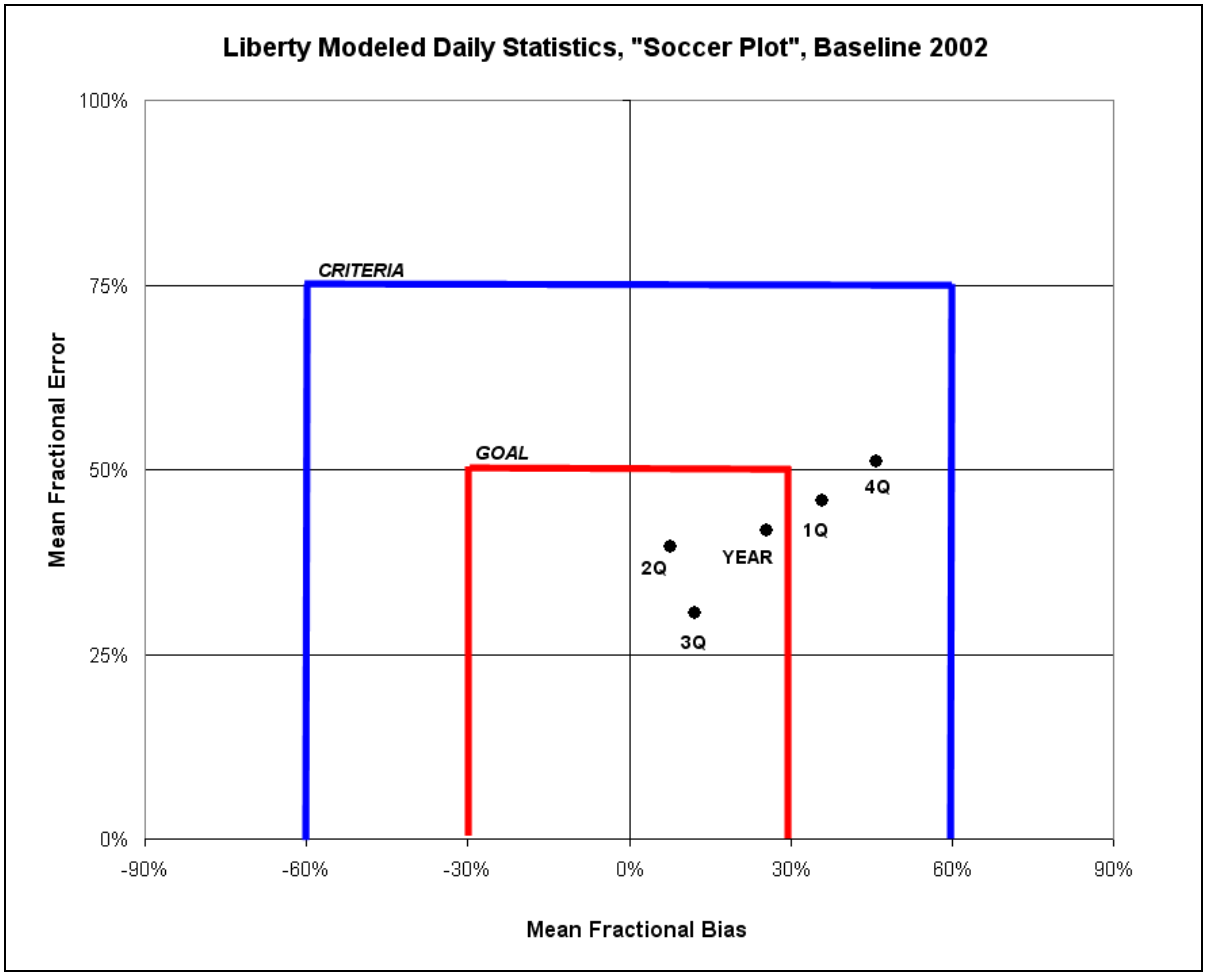

Figure 8-10: Liberty Daily Model Statistics, Baseline 2002

Figures 8-11 and 8-12 show correlation plots with linear regression statistics for year-round and seasonal combined CMAQ/CALPUFF Liberty daily modeled and monitored FRM results. The dotted red 1:1 lines represent perfect correlation.

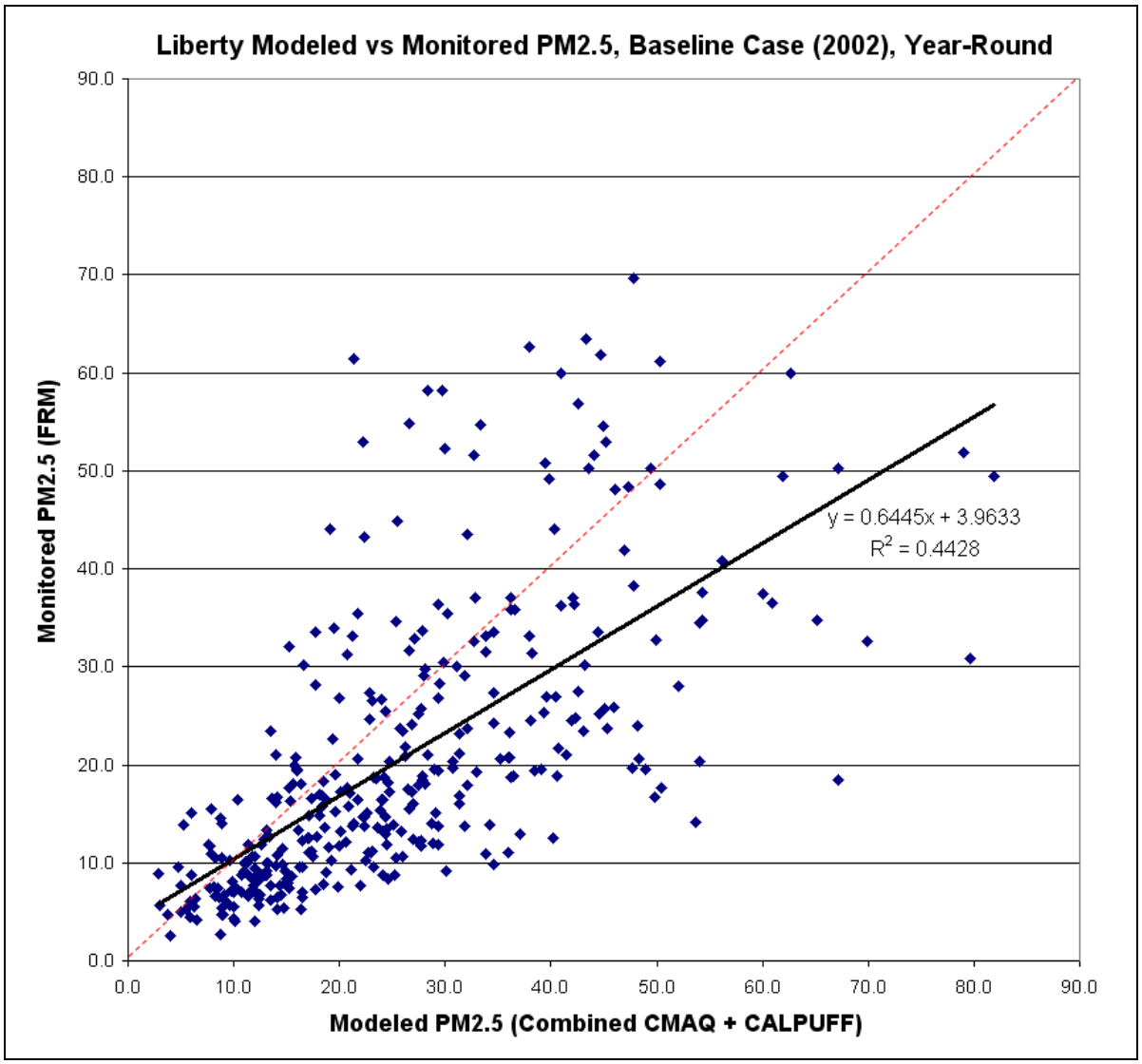

Figure 8-11: Liberty Modeled and Monitored Correlation, Daily Averages, Baseline Case 2002, Year-Round Basis

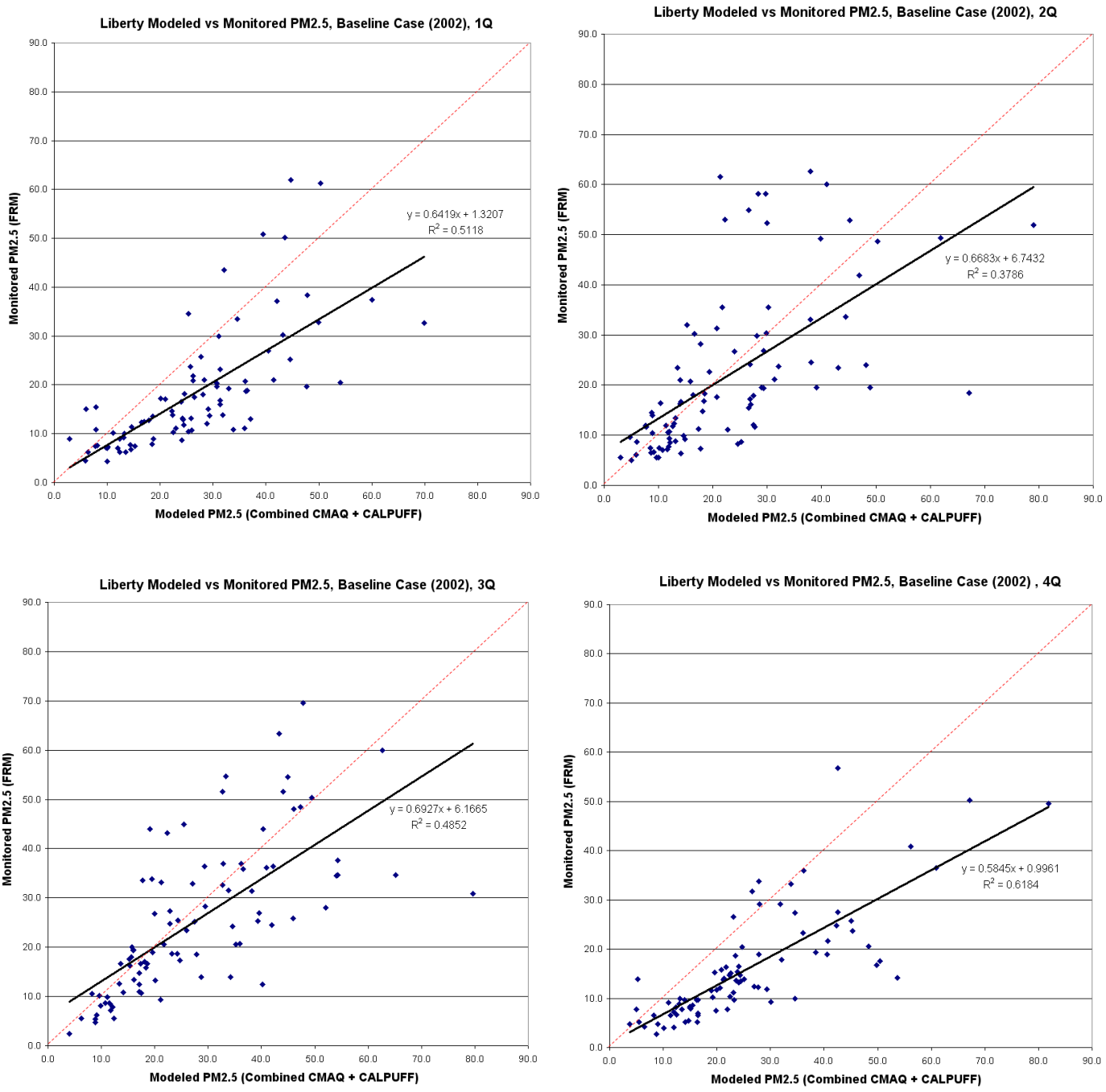

Figure 8-12: Liberty Modeled and Monitored Correlation, Daily Averages, Baseline Case 2002, Quarterly Basis

Similar to bias and error results, 1st and 4th quarter data (along with year-round) showed the best correlation between daily modeled and monitored results.

Table 8-21: Statistics for the Modeled Hourly Liberty Values Compared to Liberty TEOM Values, Year-Round and by Season, 2002

HOURLY Results	Mean Fractional Bias (MFB)	Mean Fractional Error (MFE)
1st Quarter	44.74%	69.56%
2nd Quarter	4.90%	52.85%
3rd Quarter	16.66%	48.80%
4th Quarter	43.35%	83.61%
Year-Round	28.62%	63.69%
GOAL	*≤ ± 30%*	*≤ 50%*
CRITERIA	*≤ ± 60%*	*≤ 75%*

The hourly statistics show shows that the model was less accurate on an hourly basis than a daily basis, but the hourly results do achieve goal for bias and criteria for error on a year-round basis. Seasonal results also show similar trends to the daily results, with 2nd and 3rd quarters producing the best statistics and 1st and 4th quarters producing the worst statistics.

9. Reasonably Available Control Technology and Measures

The requirements for Reasonably Available Control Technology (RACT) and reasonably available control measures (RACM) for each $PM_{2.5}$ nonattainment area, require a demonstration that the agency has adopted all reasonably available control measures, including RACT for stationary sources, necessary to demonstrate attainment as expeditiously as practicable and to meet any RFP requirements. In determining whether a particular emission reduction measure or set of measures must be adopted as RACM, the agency must consider the cumulative impact of implementing the available measures. Potential measures that are reasonably available considering technical and economic feasibility must be adopted as RACM if, considered collectively, they would advance the attainment date by one year or more.

Primary $PM_{2.5}$ is the pollutant of concern in the Liberty-Clairton nonattainment area. As presented earlier in this SIP, the area is too small, and conditions are not appropriate for SO_2 or NO_x from sources located within the nonattainment area to be able to convert to $PM_{2.5}$. So RACM, including RACT, was reviewed for primary $PM_{2.5}$ only.

Most of the emission reductions to reach attainment are dependent on the construction of new low emission quench towers at the U. S. Steel Clairton Plant. The new quench towers will result in a decrease of over 700 tons per year of primary $PM_{2.5}$. The batteries and quench towers have already engaged reasonably available control technology, and the entire five-municipal Liberty-Clairton region, beyond the batteries and quench towers, total less than 200 tons per year of primary $PM_{2.5}$. No combination of further controls in addition to those already imposed on the area would advance the attainment date by one year. ACHD has, therefore, adopted RACT and RACM as defined for this $PM_{2.5}$ SIP.

There are two stationary major sources: U. S. Steel Clairton Plant and Koppers Industries. Mid-Continent Coal and Coke Company was listed as a major source in 2000-2002 and is included here but has since been classified as a minor source. All three sources are required to have operating permits. There are seven other stationary minor sources required to have operating permits in the same area. A unit-by-unit analysis of all the RACT for the Liberty-Clairton area $PM_{2.5}$ is found in Appendix B.

The sole purpose of this RACT/RACM analysis is for determining whether there were additional reasonable controls available that could advance the attainment date by one year. 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.

A. RACT at U. S. Steel Clairton Plant and Alternatives Considered

U. S. Steel Clairton Plant is the largest source of $PM_{2.5}$ located within the Liberty-Clairton area. Both U. S. Steel and ACHD separately reviewed the $PM_{2.5}$ emissions units for the facility and found them to be satisfactory for this RACM demonstration.

As part of the Clairton Plant installation permit application for C Battery, U. S. Steel performed a Best Available Control Technology (BACT) analysis for all the affected emission units. The Clairton Plant batteries are of the conventional by-product coke oven type. The new installation of Battery C with the PROven system was determined to be BACT at the time. An alternative option of non-by-product recovery coke ovens using the Sun Coke Co. process and electric power generation was not considered technically feasible for integration into the other portions of the by-product coke oven plant.

The coke oven batteries 7, 8, and 9 were shut down in 2009. Coke oven batteries 1-3, 13-15, 19-20, and B have some of the nation's strictest standards, either as ACHD Article XXI regulations or as permit conditions, so there were few alternatives to operational controls to be considered.

For the new Quench Towers C, 5A, and 7A, double baffles are RACT versus alternative shorter quench towers with single baffles. Coke dry quenching (CDQ) was considered but found unacceptable for this project due to available space and cost. This was the same conclusion on the other remaining quench towers. Other options were reviewed but would required extensive construction and installation costs. Included in this review were a "wet Low Emission Quench (LEQ)," a "ThyssenKrupp EnCoke World Steel, Bochum Coke Stabilization Quenching (CSQ) process," a "Kress Indirect Cooling (KIDC) system," and others.

Alternatives to such pushing emissions control are the use of a coke side shed enclosure vented to a control device or a mobile capture and control unit. However, the shed system is too costly and the mobile capture is not technically feasible for this SIP. For battery process upsets, the atmospheric venting of raw coke oven gas through by-pass/bleeder stacks is first passed through a flare system. The alternatives to this are to use either regenerative thermal oxidation or catalytic thermal oxidation; however, these alternatives are too costly to be feasible for this SIP. Similarly, the impacts from the emissions of Boiler #1, Boiler #2, R1 Boiler, R2 Boiler, T1 Boiler, T2 Boiler, and the Desulfurization Plant Afterburner do not warrant additional control.

B. RACT at Koppers Industries, Inc. and Alternatives Considered

Koppers Industries, Inc.'s Clairton plant is a chemical processing plant where crude coal tar is debenzolized and distilled into pitch and various other products such as creosote, carbon black oil, and refined chemical oil.

For the tar refining process, gases from the fume vents, pressure reliefs, ejectors, chiller, and condensate separator are manifolded together and burned in the eight process heaters. As alternative controls, the fumes could be flared or catalytically oxidized – but neither of the two alternatives would result in added emission reductions. Flaring would be less efficient and catalytic oxidation is more costly, so they are unacceptable alternatives.

When manufacturing the rod pitch, the process utilizes a pitch cooler and dryer. A low temperature pulse-jet baghouse is used to control particulate emissions from the two units. As an alternative, a wet scrubber could be utilized, but there would be an undesirable wastewater disposal problem without gaining any emission reduction advantage.

C. RACT at Mid Continent Coal and Coke Co. and Alternatives Considered

Mid-Continent Coal and Coke Company is a metallurgical coke breeze screening unit, serving the U. S. Steel Clairton Plant. Total $PM_{2.5}$ emissions from this plant are less than 1 to 5 tons per year from all sources, including roads. No combination of sources that include this plant would advance attainment by a year.

The only emissions of interest from this plant are unpaved roadways. As alternatives, the roadway areas could have dust suppressant or watering; however, the emission reduction benefit from these alternatives is minimal because the amounts are small from the onset and the grounds tend to retain significant moisture.

10. Reasonable Further Progress

This section explains and demonstrates reasonable further progress (RFP) by achieving incremental emission reductions required until the area known as the Liberty-Clairton nonattainment area in Allegheny County reaches attainment of the federal $PM_{2.5}$ air quality standard. The data in this section is based on information that has been provided in other sections and appendices of this plan.

10.1. Reasonable Further Progress Requirements

The Clean Air Act (Act) requires attainment plans to meet RFP by achieving incremental emission reductions to ensure attainment of National Ambient Air Quality Standards (NAAQS) by the attainment date (Section 171(1)). The Act does not identify specific emission reduction benchmarks that must be met for PM attainment plans.

EPA's interpretation of the Act's RFP requirement in the Implementation Rule for the $PM_{2.5}$ NAAQS identifies the concept of achieving generally linear progress (72 FR 20633). According to 40 CFR 51 Subpart Z, Section 51.1000 (Definitions):

- The **RFP benchmark plan** is the RFP plan that shows generally linear progress from the baseline emissions year through the milestone inventory years.
- The **baseline year inventory** for RFP is the inventory for the year used as the base year for the attainment demonstration (for this plan, the baseline year inventory is 2002).
- **Milestone year inventories** occur in 2009 and 2012.
- **Full implementation inventory** is the level of emissions that demonstrates attainment. In the Liberty-Clairton nonattainment area the full implementation inventory is 2014.

Determination of RFP milestones involves several steps:

1. Determining the total reductions that must be achieved to reach attainment. The Plan satisfies this in Section 7, Modeling Procedures.
2. Determine the attainment year that is as expeditious as practicable. This plan identifies 2014 as the most expeditious attainment date practicable in the Liberty-Clairton nonattainment area.
3. Determining the fraction of reductions that are achieved in each milestone year.

The Implementation Rule recognizes that the attainment demonstration will identify the pollutants to be included in the RFP demonstration, the relative reductions needed for each of these pollutants, and the attainment year.

10.2. Reasonable Further Progress Calculations

Tables 10-1, 10-2, and 10-3 show benchmark calculations specified in EPA's Implementation Rule.

Table 10-1: Emissions Inventory Adjusted for Plan Control Strategy (in Tons per Year)

Description	2002	2009	2012	2014
Direct $PM_{2.5}$ Inventory After Plan Control Strategy	2,270.6	1,968.8	1,849.9	1,392.6
NO_x Inventory After Plan Control Strategy	229,571.7	120,414.1	108,565.5	108,565.5
SO_2 Inventory After Plan Control Strategy	587,201.4	141,772.8	132,598.7	132,598.7

NOTES:

- Direct $PM_{2.5}$ inventories are based on the Liberty-Clairton area only. They include direct $PM_{2.5}$ emissions from point, area, nonroad, and mobile sources.
- NO_x and SO_2 precursor inventories include point sources that were modeled within the 150 km $PM_{2.5}$ modeling domain described in Section 7, but limited to Pennsylvania sources outside the Liberty-Clairton area in accordance with guidance provided in 72 FR 20636. Precursor inventories also include area, nonroad, and mobile sources within the Pittsburgh-Beaver Valley area only.
- Regional control measures (CM) are already incorporated into the MANE-VU regional inventories.
- 2012 emissions for uncorrected sources are assumed to be representative through 2014. See Section 7.

Table 10-2: Determining Benchmark Milestones as Tons per Year of Reductions
(Calculations described in footnotes)

Column No.	2	3	4	5	6	7	8	9
Pollutant	**2002 Emissions Inventory[1]**	**Attainment Benchmark (tons/year)**	**Number of tons to be reduced[3]**	**Tons to be reduced by 2009 (relative to 2002)[4]**	**2009 EI Benchmark (tons/year)[5]**	**Tons to be reduced by 2012 (relative to 2002)[6]**	**2012 EI Benchmark, (tons/year)[7]**	**2014 EI Benchmark (tons/year)[8]**
Direct $PM_{2.5}$	2,270.6	1,392.6	878.0	512.2	1,758.4	731.7	1,538.9	1,392.6
NO_x	229,571.7	108,565.5	121,006.2	70,586.9	158,984.8	100,838.5	128,733.2	108,565.5
SO_2	587,201.4	132,598.7	454,602.7	265,184.9	322,016.5	378,835.9	208,365.5	132,598.7

[1] Column 2 shows the baseline inventories from Appendices F and H (Local ACHD and MANE-VU Regional inventories)
[2] Column 3 comes from Table 10-1, which shows that the 2014 inventory with plan controls that will bring the Liberty-Clairton area into attainment.
[3] Column 4 = Column 2 – Column 3
[4] Column 5 = 7/12 of Column 4;
[5] Column 6 = Column 2 – Column 5
[6] Column 7 = 10/12 of Column 4;

[7] Column 8 = Column 2 – Column 7
[8] Column 9 = Column 3

Table 10-3: Comparison of 2009 and 2012 RFP Benchmarks and Projected Levels

Year	Direct $PM_{2.5}$		NO_x		SO_2	
	Benchmark[1]	Projected Level[2]	Benchmark[1]	Projected Level[2]	Benchmark[1]	Projected Level[2]
2009	1,758.4	1,968.8	158,984.8	120,414.1	322,016.5	141,772.8
2012	1,538.9	1,849.9	128,733.2	108,565.5	208,365.5	132,598.7

[1] From Table 10-2, Columns 6 and 8
[2] From Table 10-1, shaded cells

As discussed earlier, EPA's Implementation Rule specifies that generally linear progress should be achieved and that emissions in the milestone years should be at levels that are roughly equivalent to the benchmark emission levels. The 2009 and 2012 projected levels shown in Table 10-3 are the milestone year emission levels for RFP. Table 10-4 presents calculations that demonstrate that the emission reductions achieved meet the RFP requirements. Cumulative emission reductions are the reductions achieved from the 2002 baseline emissions; they include the reductions in emissions of all three pollutants from the local control measures in the plan, as well as reductions in NO_x and SO_2 emissions from regional control programs. Note: $PM_{2.5}$ reductions from the shutdown of Batteries 7-9 began in April 2009. The RFP reductions used for 2009 $PM_{2.5}$ values were estimated as 71% of the total eventual reductions achieved by 2012.

Table 10-4: Fraction of Reductions Achieved in Each Milestone Year

Milestone Year	Emissions (tons/year)	Cumulative Emission Reductions (tons/year)	Percent of Emission Reductions Needed for Attainment	Percent Per Year
$PM_{2.5}$				
2002	2,270.6	-	-	-
2009	1,968.8	301.8	34	1.9
2012	1,849.9	420.7	48	1.9
2014	1,392.6	878.0	100	3.2
NO_x				
2002	229,571.7	-	-	-
2009	120,414.1	109,157.6	90	7
2012	108,565.5	121,006.2	100	5
2014	108,565.5	121,006.2	100	4
SO_2				
2002	587,201.4	-	-	-
2009	141,772.8	445,428.6	98	11
2012	132,598.7	454,602.7	100	8
2014	132,598.7	454,602.7	100	6

As shown in the Table 10-4, the $PM_{2.5}$ plan meets RFP requirements, with continuous and generally steady progress towards attainment by achieving between 1.9% to 3.2% emissions reductions per year of direct $PM_{2.5}$. Emissions from NO_x and SO_2 in both milestone years are below the attainment level. In terms of cumulative progress towards attainment, there is steady progress for NO_x and SO_2 pollutant as shown in Table 10-4, so that 100% of the necessary reductions are achieved by the attainment date.

With respect to direct $PM_{2.5}$, reductions will be achieved in the Liberty-Clairton by the end of 2009 and 2012, ensuring continuous progress towards attainment in year 2014. Attainment requires a sizable magnitude of reductions from the Liberty-Clairton area's major stationary source.

Due to the significant nature of the new measures anticipated to be put into effect by the area's major industrial source and the technical complexities of implementation, the final increment of the emission reductions needed for attainment, will not occur until the end of 2013.

In summary:

- Reductions in direct $PM_{2.5}$ and precursor emissions are being achieved as quickly as possible;
- There is a downward trend in emissions of direct $PM_{2.5}$ between 2009 and 2014 at a rate of 1.9% to 3.2% per year;
- The Liberty-Clairton area will reach attainment as expeditiously as practicable.

11. Contingency Measures

According to the Federal Register, Vol. 72, No. 79, Pages 20642-3, $PM_{2.5}$ contingency measures are additional control measures to be implemented in the event that an area fails to meet RFP or fails to attain the standards by its attainment date.

The Liberty-Clairton area was designated nonattainment in 2005. This attainment demonstration is based on an attainment date of 2015. Contingency measures are recommended to be based on approximately one year of additional emissions reduction. The emissions reductions anticipated by the contingency measures should be equal to approximately 1 year's worth of emissions reductions necessary to achieve RFP for the area.

Table 11-1: Calculation of Required and Excess Emission Reductions

Liberty-Clairton Area	**$PM_{2.5}$ (tons/year)**
Baseline (2002) Liberty-Clairton Area Emissions	2270.6
Projected (2014) Liberty-Clairton Area Emissions	1392.6
Change in Emissions	878.0
Target Reductions for Contingency Measures (1/10)	87.8

11.1. Indentified Contingency Measures to be Implemented

The Federal Register, Vol. 72, No. 79, Pages 20642-3 says that contingency measures should consist of other control measures for the area that are not included in the control strategy for the SIP. This could include federal measures and local measures already scheduled for implementation, along with measures to be implemented if attainment is not achieved.

Should reasonable further progress (RFP) not be met by 2009 or 2012, or should attainment not be achieved by 2015, the consent order and agreement with U. S. Steel (as amended in September 2010) specifies the following: within 30 months after receiving notice from ACHD that EPA is requiring implementation of the contingency measures, U. S. Steel's Clairton Plant will cease operation of the current Quench Tower 1 as the primary quench tower for Batteries 1-3 or implement emission reductions greater than or equal to 90 tons per year (unless a lesser amount is needed to demonstrate attainment of the annual $PM_{2.5}$ NAAQS). The use of a low

emission quench tower in place of the current Quench Tower 1 would lead to a reduction of 173 tons per year of primary $PM_{2.5}$, as given in Table 11-2.

Additionally, the consent order and agreement included coke oven wall rebuilds for Battery 20 to be implemented in late 2014. Emissions reduced by the improvements to Battery 20 are expected to be 9 tons/year. Total emissions reductions from the contingency measures are given in Table 11-2.

Table 11-2: Contingency Measures Emission Reductions

Process	$PM_{2.5}$ 2014 Inventory Value (tons/year)	$PM_{2.5}$ Contingency Value (tons/year)	$PM_{2.5}$ Reduction (Inventory – Contingency) Value (tons/year)
New Low Emission Tower for Batteries 1-3	274.8	102.5	172.3
Battery 20 – Rebuilds, Combustion Stack	17.5	9.4	8.1
Battery 20 – Rebuilds, Door Leaks	2.4	1.3	1.1
Total	294.7	113.2	**181.5**

The Federal Register states that emissions reductions anticipated by the contingency measures should be equal to approximately 1 year's worth of emissions reductions necessary to achieve RFP for the area. The emission reductions given in Table 11-2 satisfy the requirement for contingency measures.

Due to the shutdown of Batteries 7-9 at the U. S. Steel Clairton Plant in April 2009, reductions required for RFP in 2009 have already been achieved. RFP for 2012 is also projected to be achieved due to the shutdown of Batteries 7-9, pending future calculation of 2012 emissions inventories.

11.2. Contingency Measures – SO_2 and NO_x

The Pittsburgh-Beaver $PM_{2.5}$ nonattainment area is a separate nonattainment area; however, it completely encircles the Liberty-Clairton nonattainment area. As discussed in Chapter 3 of this SIP, it has been shown that the Liberty-Clairton area $PM_{2.5}$ due to long-range transport and due to SO_2 and NO_x conversion to nitrates and sulfates are consistent across both regions. The control strategy for these pollutants are discussed and presented in the Pittsburgh-Beaver $PM_{2.5}$ SIP. Contingency measures for these pollutants are similarly presented within that SIP.

The Liberty-Clairton $PM_{2.5}$ nonattainment area is located entirely within the borders of the Pittsburgh-Beaver $PM_{2.5}$ nonattainment area. The Liberty-Clairton area is so small that sulfur dioxide and nitrogen dioxide do not have time to convert to sulfates and nitrates. There is very little difference in sulfates and no difference in nitrates measured at Liberty from the monitors in the larger nonattainment area. The Pittsburgh-Beaver SIP demonstrates that a modeled excess of SO_2 and NO_x emissions provide for the required contingency measures.

11.3. Additional Contingency Measures

There are a number of control measures or voluntary emission reductions either are already implemented or on schedule to be implemented in the near future. EPA guidance encourages early implementation of contingency measures to guard against failure either to meet a milestone or attain the standard. EPA's guidance on early implementation of control measures encourages the early implementation of required control measures and of contingency measures as a means of guarding against failures to meet a milestone or to attain.

On October 9, 2008, Governor Rendell signed Senate Bill 295, which became Act 124 of 2008, the Diesel-Powered Commercial Motor Vehicle Idling Act (Act 124). Act 124 went into effect on February 6, 2009. PA DEP estimates that 50 percent of all long duration idling for Class 8 trucks will be eliminated in 2010 when the temperature exemption for sleeper truck rest expires. Statewide emission reductions are estimated to be 1610 tons, 45 tons, and 30 tons per year for NO_x, VOC, and $PM_{2.5}$, respectively. PA DEP and ACHD may also utilize enhanced enforcement to obtain additional emission reductions.

State-wide regulations are in development and are anticipated to be adopted in the relatively near future for NO_x controls for cement kilns, NO_x controls for glass furnaces, and PM controls for outdoor wood furnaces.

Regulations to reduce VOC emissions are in development, including controls on the manufacture and use of adhesives, primers, and sealants and regulations incorporating the Control Techniques Guidelines issued by the EPA in 2006, 2007, and 2008.

12. Transportation Conformity

Section 176 of the 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. EPA regulations issued to implement 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. Transportation agencies in Pennsylvania are responsible for making timely transportation conformity determinations. The responsible agency in the Pittsburgh Area is the Southwestern Pennsylvania Commission, the designated Metropolitan Planning Organization (MPO) under federal transportation planning requirements.

Pennsylvania proposes to establish budgets for highway emissions for direct $PM_{2.5}$ and NO_x in order to ensure that transportation emissions do not impede clean air goals in the next decade and beyond for the Pittsburgh-Beaver Valley nonattainment area, as well as for the Liberty-Clairton nonattainment area. The information in Table III-5, once the EPA approves it for purposes of conformity, will establish transportation conformity budgets for the Liberty-Clairton area.

Amendments to the 40 CFR part 93 transportation conformity regulations to address the 1997 $PM_{2.5}$ standard were published in the *Federal Register* on May 6, 2005 (70 FR 24280) to account for $PM_{2.5}$ and its precursors. Section 93.102 requires conformity determinations to be applicable to direct emissions of $PM_{2.5}$ and NO_x (unless a determination is made that transportation-related emissions are not significant contributors to $PM_{2.5}$), but to emissions of SO_x, VOC, and NH_3 only if a finding is made that transportation-related emissions of these pollutants are significant contributors to $PM_{2.5}$.

Motor vehicle emissions budget for SOx, VOC, and NH_3 are needed only if the state air agency director or the EPA Regional Administrator makes a finding that motor vehicle emissions budgets must be established in order to attain the NAAQS for $PM_{2.5}$. Because the reactions that form particulate matter from emissions of VOC are complex and highly variable, there is considerable uncertainty regarding the contribution of VOC to particulate formation.

Likewise, much uncertainty remains regarding the role of NH_3 in particulate formation. The Commonwealth of Pennsylvania is not considering VOC or NH_3 as $PM_{2.5}$ precursors for the purpose of the attainment plan for the Pittsburgh-Beaver Valley nonattainment area, because of the uncertainty surrounding their role in particulate formation. Therefore, this SIP revision is not establishing a motor vehicle emission budget for VOC or NH_3.

Tables 12-1 and 12-2 below show the annual and daily motor vehicle emission budgets compiled by the Southwestern Pennsylvania Commission (SPC) for the Liberty-Clairton area conformity determination over the period 2009-2012.[8] Budgets for $PM_{2.5}$ and NO_x show decreases over the future timeframe on annual and daily bases.

Table 12-1: Annual Motor Vehicle Emission Budgets (Tons/Year)

Year	$PM_{2.5}$	NO_x
2009	1.5	72.7
2011	1.4	58.9
2012	1.3	52.4

Table 12-2: Daily Motor Vehicle Emission Budgets (Tons/Day)

Year	$PM_{2.5}$	NO_x
2009	0.004	0.180
2011	0.004	0.146
2012	0.004	0.129

Tables 12-1 and 12-2 do not include road dust emissions from paved and unpaved roads, or construction-related fugitive dust emissions in the area source inventory, due to the extremely small area that Liberty-Clairton encompasses.

[8] Taken from *Air Quality Conformity Determination, Pittsburgh Transportation Management Area*, SPC, January 2009.

Figures 12-1 and 12-2 below show the predicted long-term estimates for annual and daily $PM_{2.5}$ from the SPC conformity assessment.

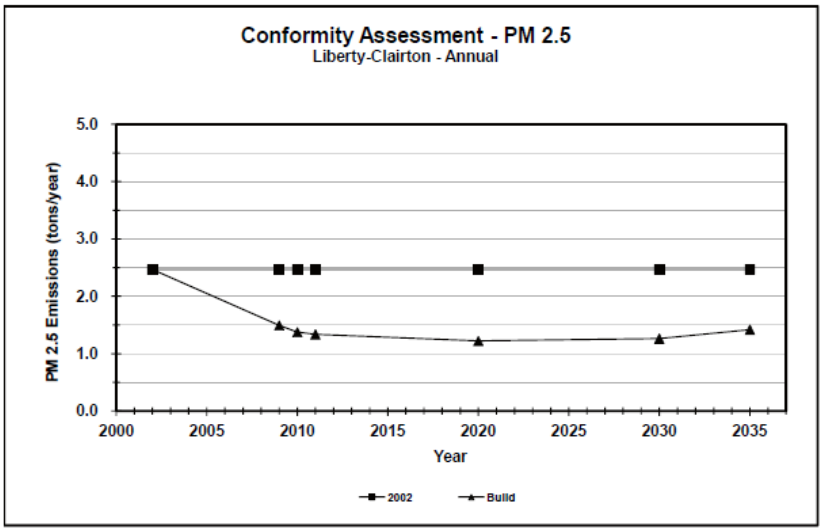

Figure 12-1: Conformity Assessment for the Liberty-Clairton Area, Annual $PM_{2.5}$

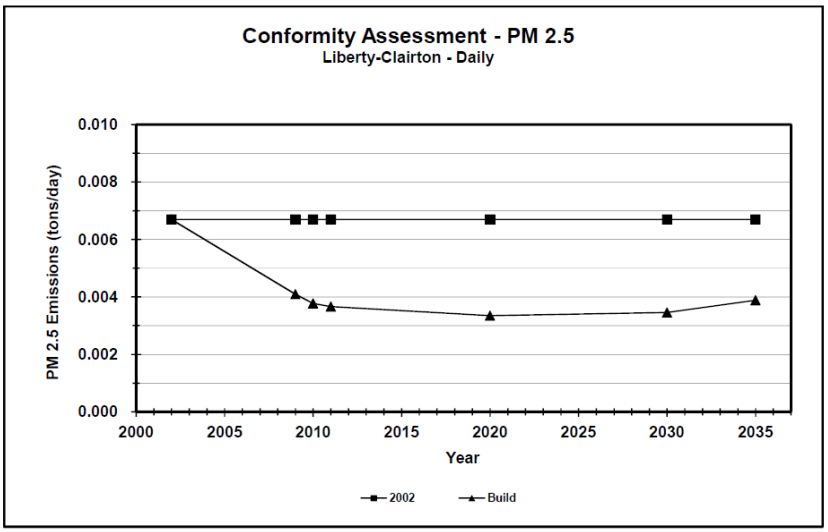

Figure 12-2: Conformity Assessment for the Liberty-Clairton Area, Daily $PM_{2.5}$

13. Weight of Evidence

The EPA's *Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze* (2007) encourages the use of corroboratory analyses to support the modeled attainment demonstration. These analyses, collectively referred to as "weight of evidence" (WOE), help bolster the assertions that an area will achieve attainment in the allotted time.

13.1. Local and Regional Trends

Within the five municipalities that make up the nonattainment area (Clairton, Glassport, Lincoln, Port Vue, and Liberty,) there are two $PM_{2.5}$ monitors, along with six other monitors that gauge $PM_{2.5}$ throughout Allegheny County. Figure 13.1 compares the $PM_{2.5}$ annual averages of each monitor throughout Allegheny County.

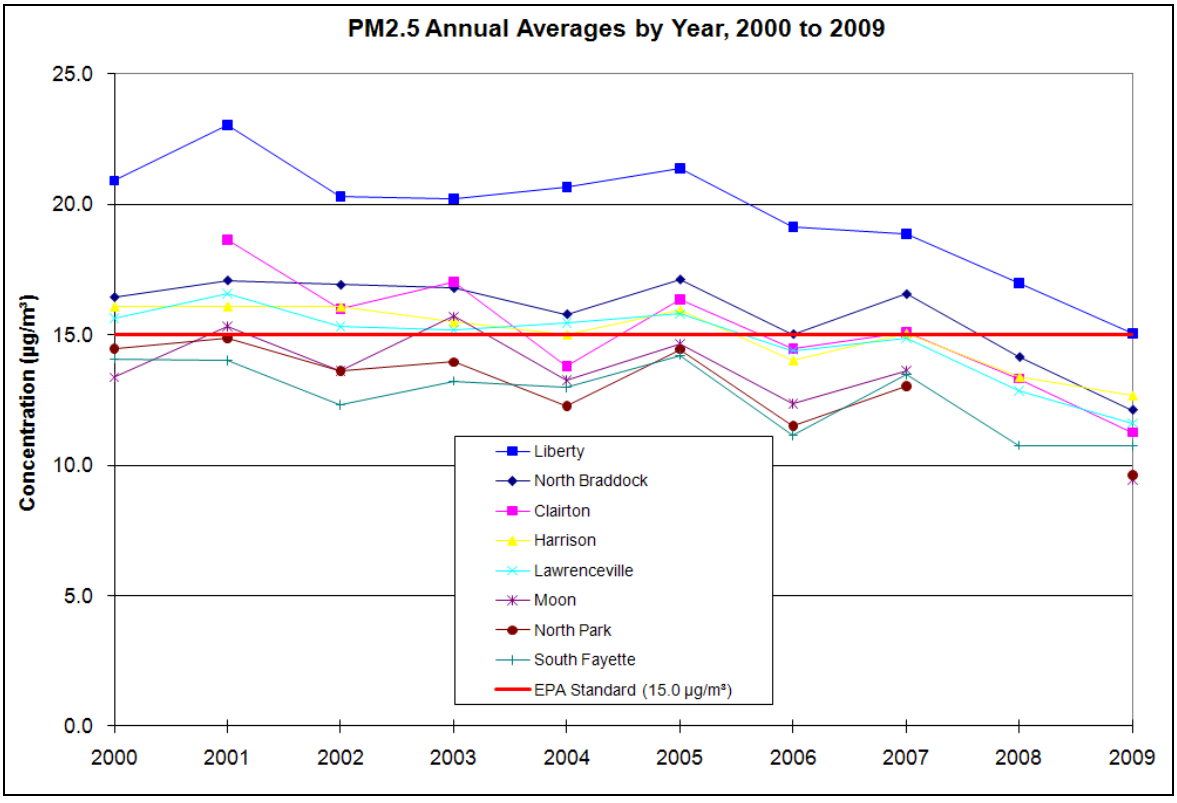

Figure 13-1: $PM_{2.5}$ FRM Annual Averages in Allegheny County, 2000-2009

Since 2005, all sites but Liberty and North Braddock had annual averages below the EPA standard. In 2009, all monitors recorded an annual average equal to or below the standard. [Note: Moon and North Park sites did not operate in 2008 and were restarted in 2009.] The

Design Values (3-year averages) for $PM_{2.5}$ show a more consistent and level trend toward lower concentrations, as seen in Figure 13.2.

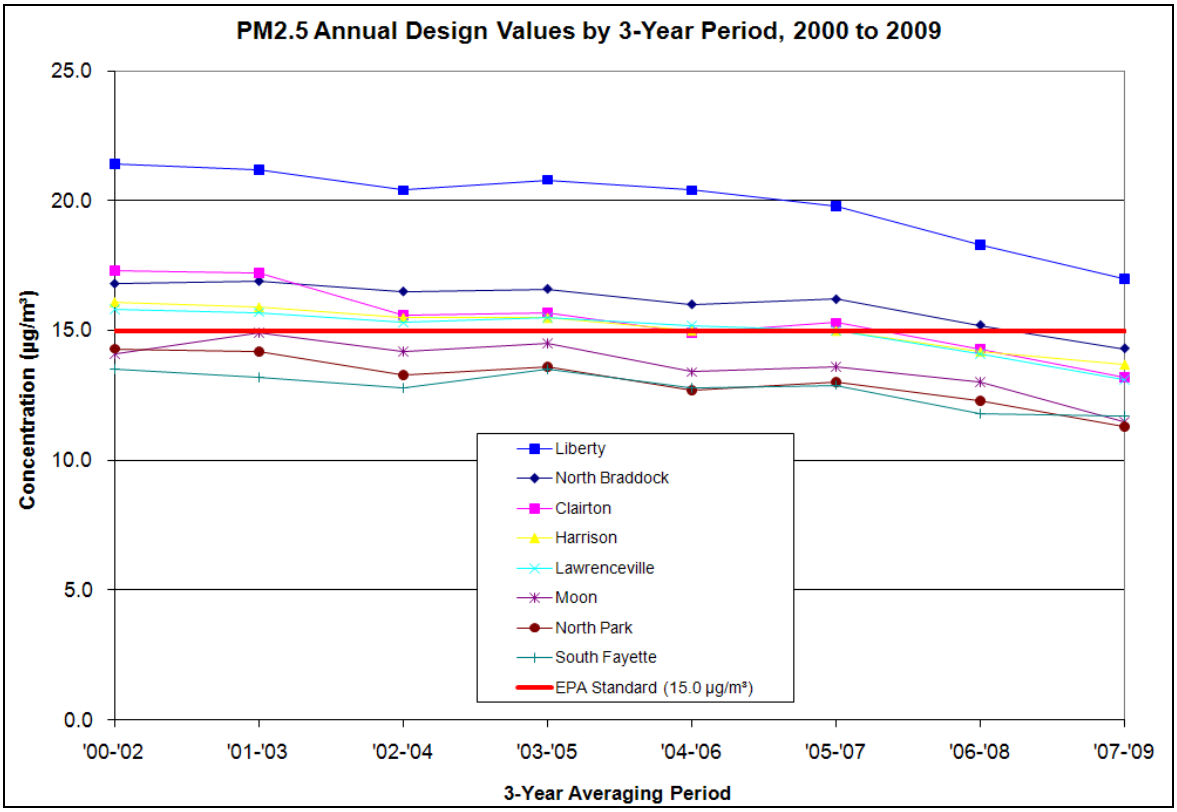

Figure 13-2: $PM_{2.5}$ FRM 3-Year Averages in Allegheny County, 2000-2009

While Liberty remains a clear outlier in comparison to other Allegheny County sites, concentrations have been decreasing consistently since the 2005-2007 average.

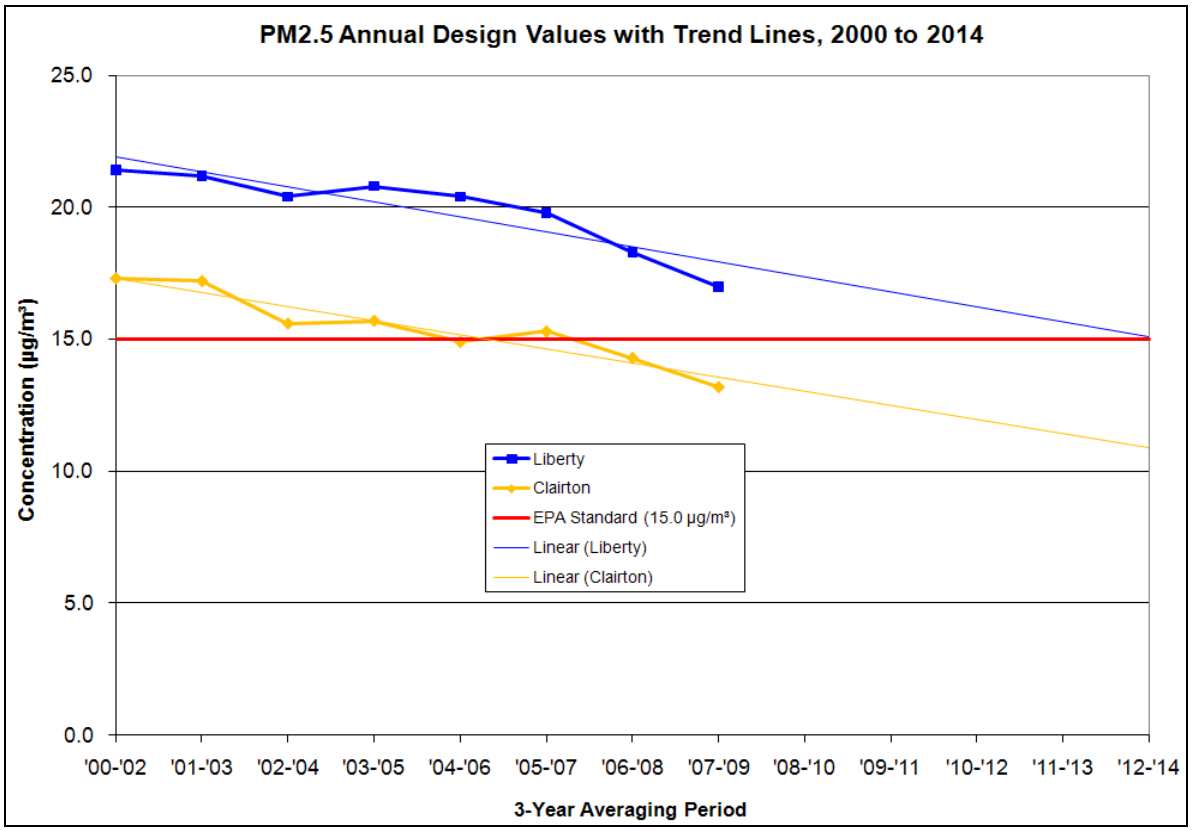

Figure 13-3: Liberty and Clairton Annual Design Values with Trend Lines

Based on monitored data alone, the linear regression trend lines in Figure 13.3 show declining design values of $PM_{2.5}$ through 2014. These trend lines do not account for any additional influences to future emission levels that are discussed in this SIP, such as the shutdown of batteries at the U. S. Steel Clairton Plant or diesel particulate-reducing projects in Allegheny County. Though not statistically significant[9], both sites show a marked long-term decline in $PM_{2.5}$ concentrations.

Because of regional transport of particulates, emissions from upwind states also contribute to localized exceedances. Reductions in regional emissions like those shown in the Reasonable Further Progress section of this SIP will help lower the regional portion of $PM_{2.5}$ at Liberty and Clairton.

[9] Based on EPA Region III's R Analysis of Pittsburgh-Beaver Valley and Liberty Clairton $PM_{2.5}$ Areas, October 2009

13.2. Wood Stoves & Wood-Fired Boilers

Wood burning stoves and outdoor hydronic wood boilers are on the rise in Allegheny County, which currently does not have any regulations concerning particulate emission controls on stove and boilers. Visible emission and odor regulations are in place which can manage wood burning stoves and boilers, but there is currently no regulation concerning the efficiency of models.

EPA-certified wood stoves can reduce particulate emissions 70-80% per unit. EPA-certified boilers, which burn cleaner than non-certified boilers, also reduce emissions. Many states, regions, and municipalities have begun looking into wood-stove and wood-boiler regulations to cut down on particulate pollution. Pennsylvania finalized its wood boiler rule on October 2, 2010, requiring the use of EPA-certified Phase 2 boilers in the state of Pennsylvania. ACHD has participated in EPA's Wood Stove Changeout Campaign, replacing 176 older woodstoves in Southwest Pennsylvania with newer, cleaner units. According to EPA[10], changing out 20 wood stoves results in a net reduction of 1 ton of particulate pollution. An awareness campaign to inform municipalities of pollution from wood stoves and boilers is underway by ACHD.

Receptor modeling showed that vegetative burning is a contributor of $PM_{2.5}$ at Liberty. The source apportionment results using the Positive Matrix Factorization Model (PMF Version 1.1) can be found in Appendix E.

Further work in this area, including local regulations against wood-burning stoves and boilers, will reduce particulate pollution further in the nonattainment zones.

13.3. National Regulations – CAIR and TR

The 2005 Clean Air Interstate Rule (CAIR) was used in the MANE-VU regional modeling and projected that each participating state would have a 60% reduction of NO_x (based on 2003 levels) and a 70% reduction of SO_2 over the course of 10 years. EPA listed Allegheny County as one of the nonattainment regions for particulates that would receive the greatest benefit in particulate reduction from CAIR. Surrounding states that contribute to regional trends, such as Ohio and West Virginia, were also covered by CAIR, which would help reduce regional particulate pollution that may be from a source outside Allegheny County.

CAIR was remanded to EPA in December, 2008. EPA has proposed the Transport Rule (TR) as a replacement rule to CAIR, to be effective in 2011. The Transport Rule is expected to be as strict as or stricter than CAIR. For a quantitative analysis, SO_2 and NO_x emissions from the 2012 CAIR inventory (used in the regional modeling for this SIP) were compared to emissions used for the proposed Transport Rule 2014 control case (as of October 2010). Emission totals for power plants (EGUs) in the 150 km modeling domain used for this SIP are given in Table 13.1.

[10] http://www.epa.gov/burnwise/index.html

Table 13-1: Future Case CAIR and TR Emissions

Plant Name	SO2 CAIR 2012 (tons)	SO2 TR 2014 (tons)	NOx CAIR 2012 (tons)	NOx TR 2014 (tons)
Cardinal	14045	14006	3668	2484
R E Burger	4062	5761	3078	3712
W H Sammis	24541	21550	8466	7750
Beaver Valley	3750	1626	4544	2290
Armstrong	13313	2822	2627	3779
Bruce Mansfield	18000	23101	4396	5455
Cheswick	4876	4527	1170	1246
Elrama	4595	4059	5847	6647
Hatfield's Ferry	23194	14507	6487	15412
Homer City	9925	12182	4032	3936
Keystone	10363	13055	2713	2603
Mitchell (PA)	1527	649	3204	2844
New Castle	15062	8988	3555	2888
Fort Martin	49567	7135	10858	7755
Kammer	28490	5188	14245	1353
Mitchell (WV)	15467	19956	3867	3368
TOTAL	**240778**	**159112**	**82756**	**73522**
DIFFERENCE (CAIR minus TR)	**81666**		**9234**	

Emissions in Table 13.1 show that the 2012 CAIR case included 90900 more tons of SO_2 and NO_x emissions than those in the proposed TR 2014 case. This indicates that modeled emissions from the tri-state EGUs were a conservative estimate of future modeled impacts.

For a qualitative analysis, committed SO_2 and NO_x control schedules used for the Transport Rule and progress updates for the tri-state EGUs are shown in Table 13.2.

Table 13-2: EGU Control Implementation Schedule and Progress

Plant Name	Committed SO2 TR Controls	Committed NOx TR Controls	Progress (as of February 2011)
Cardinal	FGD by 2010-2012	SCR before 2009	FGD installed on Units 1-2, Unit 3 underway
R E Burger	FGD by 2010-2011	SNCR before 2009	Units 4-5 shutdown in Dec. 2010 (no conversion to biomass)
W H Sammis	FGD by 2010-2011	SCR by 2012	FGD and SCR completed in Dec. 2010
Beaver Valley	---	SNCR before 2009	N/A
Armstrong	---	SNCR before 2009	N/A
Bruce Mansfield	---	SCR before 2009	N/A
Cheswick	FGD by 2010-2011	SCR before 2009	FGD completed in 2009
Elrama	---	SNCR before 2009	N/A
Hatfield's Ferry	FGD by 2009	SNCR before 2009	FGD completed in Oct. 2009
Homer City	FGD by 2012	SCR before 2009	Unknown
Keystone	FGD by 2009	SCR before 2009	FGD completed in 2009
Mitchell (PA)	---	---	N/A
New Castle	---	SNCR before 2009	N/A
Fort Martin	FGD by 2012	SNCR before 2009	FGD completed in Feb. 2010
Kammer	---	SCR by 2012	Unknown
Mitchell (WV)	---	SCR before 2009	N/A

Table 13.2 shows that the committed dates fall before the attainment year of 2014 used in this SIP and that most controls have been implemented ahead of schedule. Progress for Homer City and Kammer controls are unknown at the time of this SIP. Additionally, R E Burger has agreed to shut down its Units 4-5, in place of the proposed conversion to biomass.

13.4. Diesel Campaign

In addition to other strategies, ACHD has also been working to encourage diesel fuel engine retrofits on local school buses and municipal vehicles. The approximately 2,000 school buses in Allegheny County emit a total of about 12 tons of particulate matter, in addition to 370 tons of hydrocarbons.

Allegheny County offers 100% reimbursement grants for school bus retrofits to districts at which at least 40% of the students are eligible for free or reduced-cost lunches (based on income) and 75% reimbursement for all other districts. The utilization of diesel retrofits will allow the participating municipalities to reduce toxic diesel emissions 30-90%, depending on the type of retrofit chosen.

Currently a contractor that serves the Pittsburgh Public Schools has requested $450,000 for 37 school bus retrofits. In addition, the school districts within the Liberty-Clairton nonattainment

area are all eligible for the program, and the five townships that make up the area are currently working on a diesel retrofit project along with ACHD and the Allegheny County Partnership to Reduce Diesel Pollution.

The project will provide diesel retrofits to municipal vehicles in these townships and is currently underway. A Clean Air Fund grant of $200,000 has been allocated for the purpose of the project, and ACHD and the Diesel Partnership are working with the local governments to install retrofits on municipal vehicles.

Anti-idling regulations for school buses have been in effect since late 2004 in Allegheny County. School buses are not allowed to idle for longer than 5 minutes, unless actively picking up or discharging students. The regulation also restricts idling near school air intakes. Lowered idling times of buses reduces diesel consumption and diesel emissions.

Anti-idling regulations for trucks and transit buses have been in effect since 2005. Drivers of diesel engine vehicles can be reported to ACHD and can be fined up to $500 if they are found to idle unnecessarily for more than 5 minutes in a one-hour period.

In addition, Pennsylvania recently adopted a state-wide ban on unnecessary diesel idling. Outreach and public education for these new regulations are currently underway.

Emission reductions due to school bus and municipal vehicle retrofits and the anti-idling regulations are not factored into the modeled data of this SIP, and represent additional reduction strategies that are ongoing within Allegheny County and the Liberty-Clairton nonattainment area.

13.5. State and Competitive ARRA Clean Diesel Grants

The Allegheny County Health Department, with input from Group Against Smog and Pollution (GASP) and Clean Water Action, applied for and was awarded federal funds for projects to reduce diesel particulate pollution in the spring of 2009. A total of $3,498,106 will be distributed among five partners in a project that is scheduled during the 2009-2010 timeframe. The projects will help reduce diesel pollution in Pittsburgh, the Liberty-Clairton nonattainment area, and throughout Southwestern PA. The money comes from the American Recovery and Reinvestment Act (ARRA) and the National Clean Diesel Program. These projects will take place over the following year, and will be completed by September 2011.

The Port Authority of Allegheny County will use ARRA funds to assist in replacing two 1996-model transit buses with 2010-model cleaner diesel hybrid electric buses and to repower nine 2003-model diesel buses with engines that meet the new, higher 2007 emission standards. This will reduce particulate matter pollution by approximately 0.1 tons per year, carbon monoxide by 2.8 tons per year, and nitrogen oxides by 6.8 tons per year.

Constructors Association of Western Pennsylvania will use ARRA funds for retrofit technologies – engine repowers, upgrades and diesel particulate filters – to upgrade 42 diesel-powered, heavy

non-road construction equipment in Western Pennsylvania. The various upgrades will reduce particulate matter pollution by 1.8 tons per year, carbon monoxide by 14.6 tons per year, hydrocarbons by 2.09 tons per year, and nitrogen oxides by 9.73 tons per year.

Harsco Metals North America provides trucking for U. S. Steel. With ARRA funds they will install diesel particulate filters on 11 dump trucks operating in and around U. S. Steel's Mon Valley Works. Once upgraded, these dump trucks will be 90-percent less polluting than they are today. It is estimated that these diesel particulate filters will remove 0.06 tons of particulate matter per year, 0.20 tons of carbon monoxide per year, and 0.91 tons of hydrocarbons per year.

With ARRA funds CSX Transportation will replace one vintage diesel switcher locomotive without emission controls with a two-engine configuration that has the latest in emission control technology. The GenSet switcher locomotive engine will operate at CSX's McKeesport/Demmler rail yard, bringing immediate air quality benefits to the residential neighborhood nearby. The project will cut diesel particulate matter by approximately 0.5 tons per year, carbon dioxide by 172 tons per year, and nitrogen oxides by 16.6 tons per year. It will also save 15,000 gallons of diesel fuel annually and provide quieter operation for the nearby residents of McKeesport.

The Allegheny County Health Department will also receive $433,100 to equip diesel-powered municipal waste haulers with diesel particulate filters. The money comes from the ARRA via the State Allocation Grant Program. A previous project led by GASP and Clean Water Action installed diesel particulate filters on 13 waste haulers in the city, reducing diesel particulate pollution from each vehicle. This new funding will help ACHD, GASP, and Clean Water Action complete the project by retrofitting 33 of the remaining city vehicles.

Because of the frequent starting and stopping of the vehicles, and the proximity to all neighborhoods and families in the city, this project will significantly help local air quality. The project will take place from July 2009 through August 2010, by when all vehicles are scheduled to be retrofitted.

These projects are additional $PM_{2.5}$ reduction strategies outside of the modeled data within this SIP.

13.6. 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. According to a University of Pittsburgh study of housing and socio-demographic trends in Allegheny County[11], four of the five nonattainment municipalities have been in decline for nearly 50 years. In the 1990-2000 period, Clairton has experienced a change of -12.1%. Glassport had a decline of -10.6%, Port Vue of -8.9%, and Liberty of -2.7%. Lincoln

11 "Allegheny County Housing and Socio-Demographic Trends," co-author with Christopher Briem and Angela Williams Foster. Prepared for the Allgheny Couny Comprehensive Plan, University Center for Social and Urban Research, University of Pittsburgh and McCormick Taylor, Inc., Pittsburgh, December 2005.

experienced an increase in population of 1.3%, though this is only from a gain of 15 people within the 10 year period.

Lowering populations signal lower use of cars and a lower need for school buses and other diesel engine driven vehicles. Additionally, various consumption activities will decline (power use, water use, et cetera,) and lower amounts of waste will be produced. Combining all of this with the local regulations such as the school bus idling regulation, and national regulations and trends toward more efficient and clean cars and fuels, it is assumed that particulate emissions in the nonattainment areas will reach lower levels than the models show.

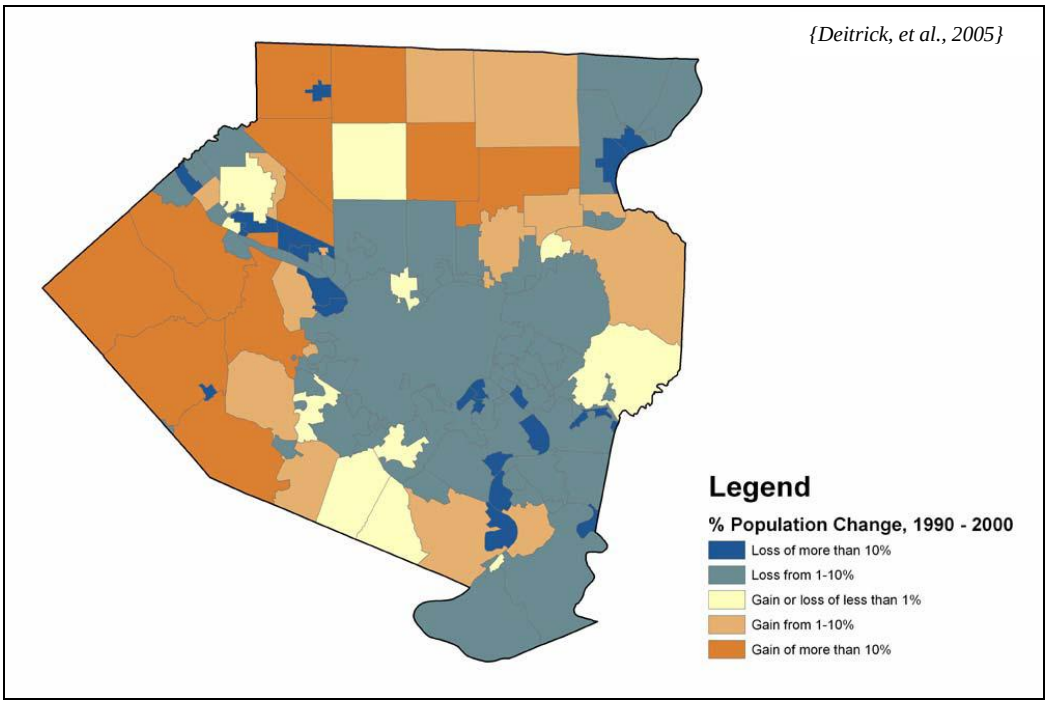

Figure 13-4: Population Trends for Allegheny County, 1990-2000

13.7. Monitored Data During Low Production

Economic recession in 2009 led to decreased levels of production at many industrial facilities in Southwest PA. To examine the effect of low production levels on $PM_{2.5}$ concentrations, 2009 continuous $PM_{2.5}$ (TEOM) and Federal Reference Method (FRM) data were compared to previously monitored data for previous years. Similar to speciation data comparisons, TEOM and FRM data from Liberty is compared to that from Lawrenceville to reveal differences between the regional and localized components. [Note: TEOM monitors are not considered "official" $PM_{2.5}$ monitors by EPA but can be used for short-term trends and for real-time reporting of data. Data shown here has not been corrected to make FRM-like.]

Long-term hourly averages for the continuous TEOMs are shown in Figure 13-5 for Liberty and Lawrenceville during the period of 2000-2008. Hours are given according to Eastern Standard Time (EST).

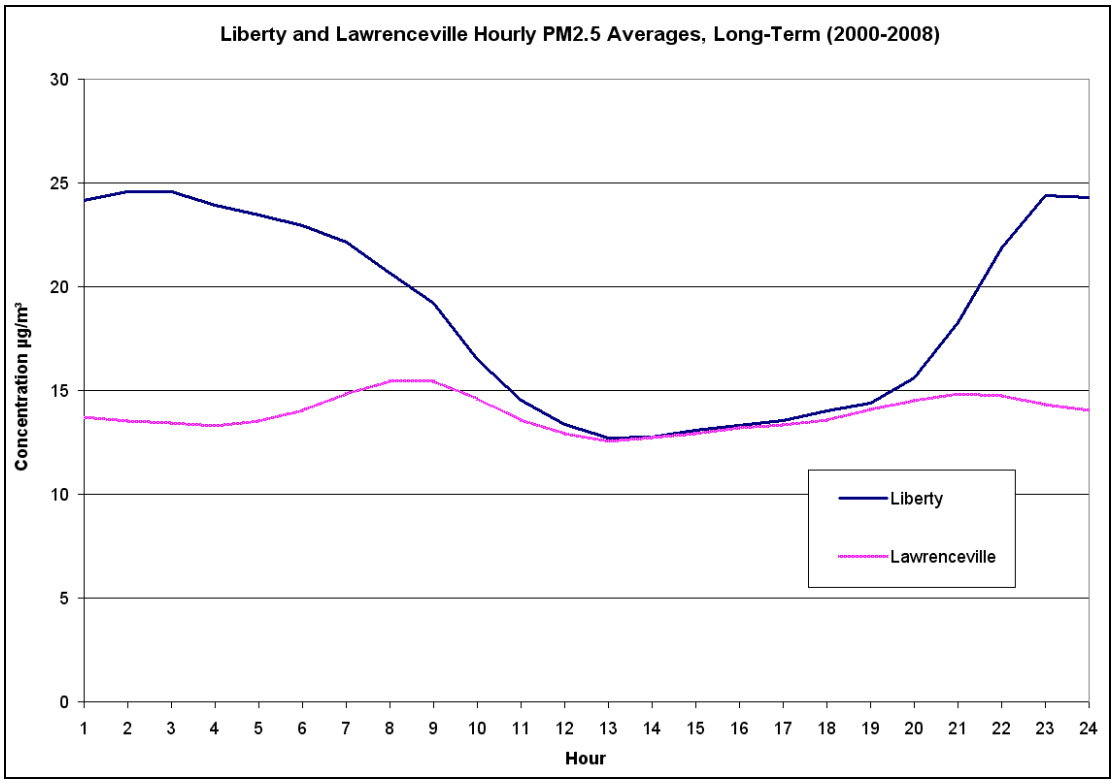

Figure 13-5: Long-Term Hourly $PM_{2.5}$ TEOM Averages at Liberty and Lawrenceville, 2000-2008

Long-terms trends show that Liberty TEOM concentrations are much higher than Lawrenceville during nighttime hours but are nearly similar during daytime hours (specifically during afternoon to early evening hours). This diurnal trend is due to the strong influence of inversions that lead to the nighttime accumulation of particles in the Liberty-Clairton area. Smaller peaks can be seen at Lawrenceville due during peak traffic periods, also possibly influenced by inversions.

Long-term hourly averages at each site were compared to averages for 2009 data. The Liberty long-term averages are shown along with 2009 averages in Figure 13-6 below.

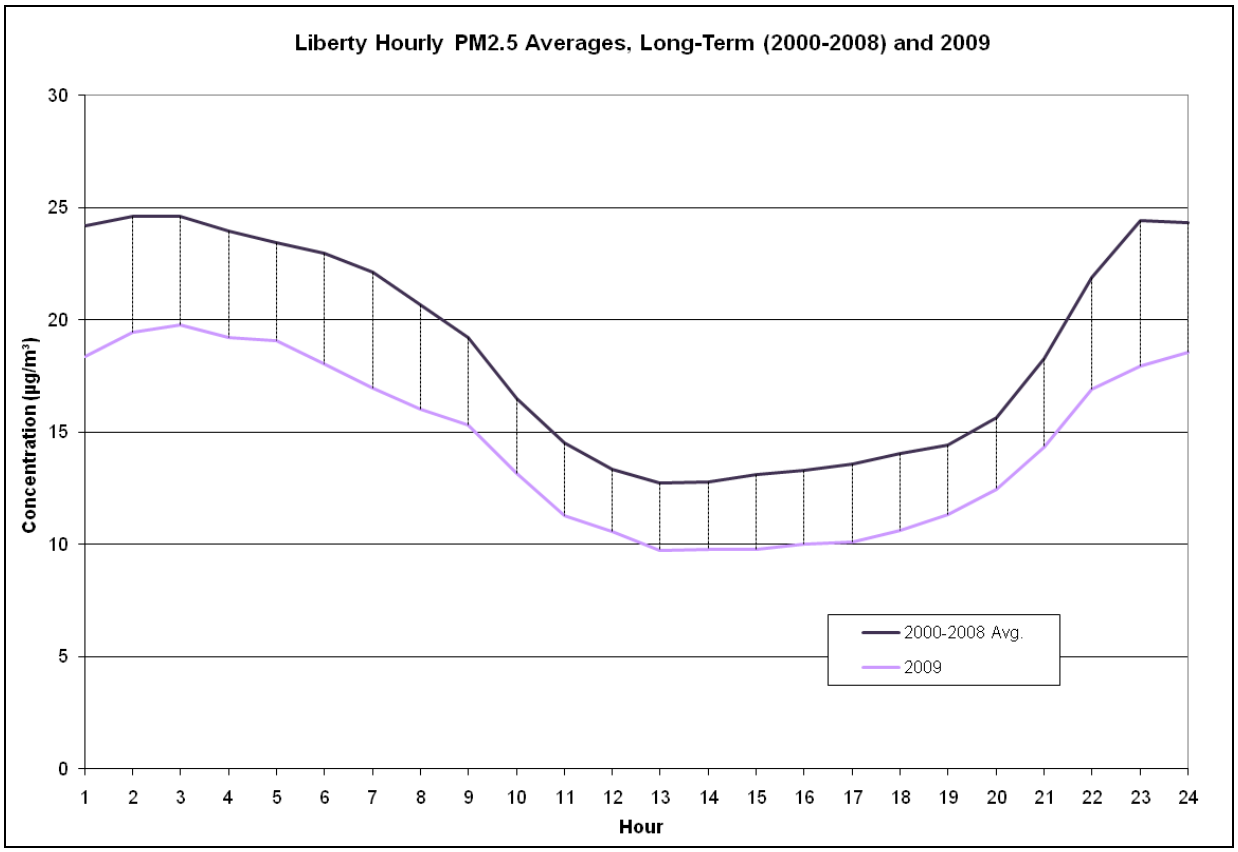

Figure 13-6: Hourly 2009 $PM_{2.5}$ TEOM Averages at Liberty Compared to Long-Term 2000-2008 Averages

Liberty TEOM data show the same diurnal trend in 2009 as in previous years but at lower concentrations. Additionally, the dotted high-low lines visually indicate a higher nighttime difference between long-term and 2009 data.

Figure 13-6 is similar to the before-and-after modeled hourly concentrations graph shown in the model demonstration discussion (Figure 8-5) in this SIP. This is evidence that controls used in the modeling demonstration should show actual results similar to the 2009 low-production scenarios.

The Lawrenceville long-term averages are shown along with 2009 averages in Figure 13-7 below.

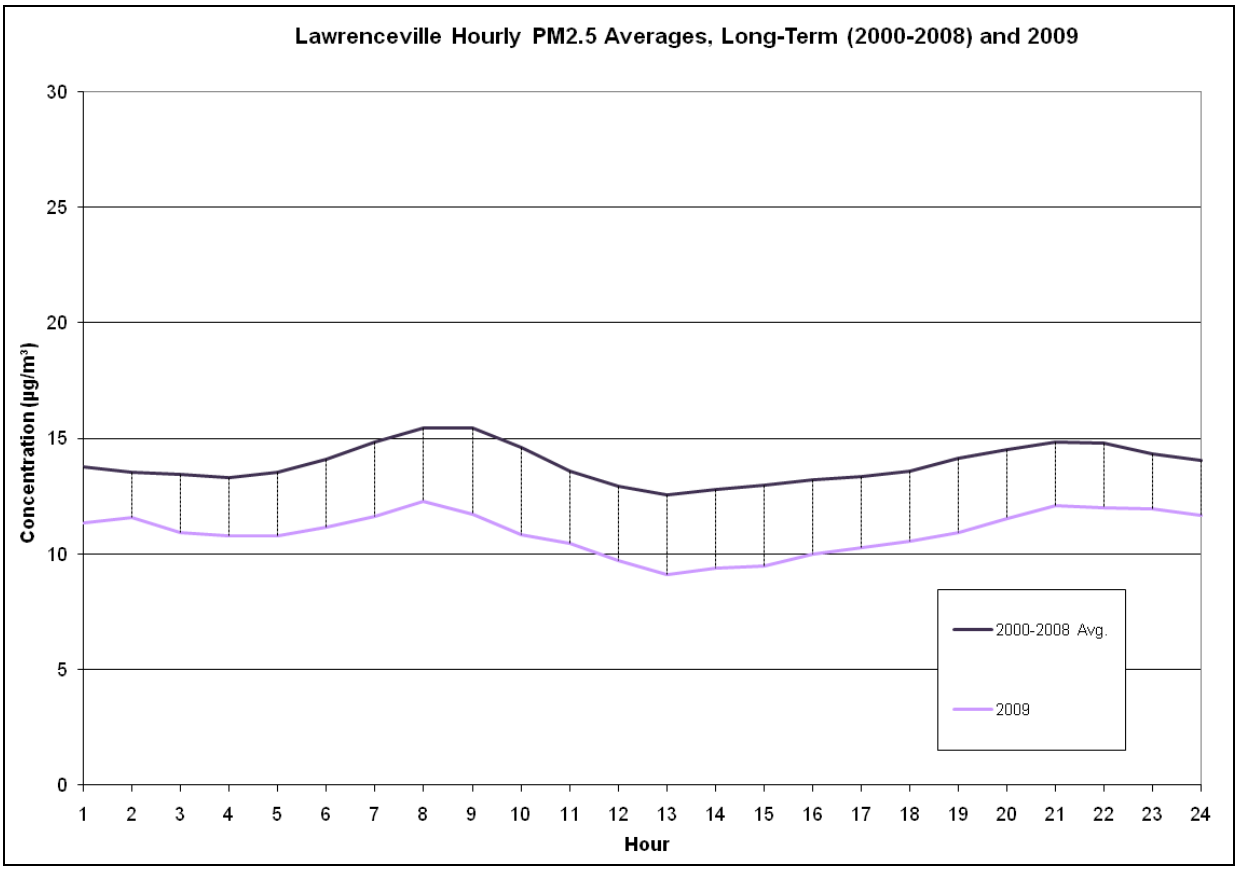

Figure 13-7: Hourly 2009 $PM_{2.5}$ TEOM Averages at Lawrenceville Compared to Long-Term 2000-2008 Averages

Lawrenceville TEOM data show an overall decrease in concentrations in 2009, with the high-low lines showing a slightly higher difference between long-term and 2009 daytime concentrations.

Decreases in overall concentrations at both sites can be due to regionally lower production levels, while lower nighttime levels at Liberty may be evident of lower local source production levels. To examine this, differences in concentrations between the two sites were calculated.

Table 13-1 below shows quarterly average FRM data over a 5-year timeframe for years 2005-2008 and for 2009. Averages are given for Liberty, Lawrenceville, and the difference between the two sites (Liberty minus Lawrenceville).

Table 13-3: $PM_{2.5}$ FRM Quarterly Averages, 2005-2008 and 2009

Liberty	**1Q**	**2Q**	**3Q**	**4Q**
2005-2008 Average	14.9	19.1	23.6	18.9
2009	15.0	13.7	15.1	16.4
Lawrenceville	**1Q**	**2Q**	**3Q**	**4Q**
2005-2008 Average	12.5	13.8	19.4	12.3
2009	12.7	11.2	12.9	9.7
Difference (Lib.-Law.)	**1Q**	**2Q**	**3Q**	**4Q**
2005-2008 Average	2.4	5.2	4.2	6.6
2009	2.3	2.5	2.2	6.7

The difference parameters for 2nd and 3rd quarters in 2009 are significantly smaller than in previous years, coinciding with low production levels at local sources.

At the U. S. Clairton Plant, Batteries 13-15 were idled from Mar.-Dec. 2009, along with B Battery from Apr.-Jun. 2009, due to recession. Batteries 7-9 were also permanently idled in April 2009. At the RRI Energy Elrama power plant, all boiler units operated at an average capacity of 8.1% from March to October 2009.

To further illustrate the lower localized source influence in 2009 data, a plot of the Liberty-Lawrenceville TEOM difference is shown in Figure 13-8 for 2009 and previous years. For this chart, hourly averages for 2000-2008 are compared to hourly averages for 2009. The hours have been shifted by 12 hours to show the nighttime period in the center of the chart.

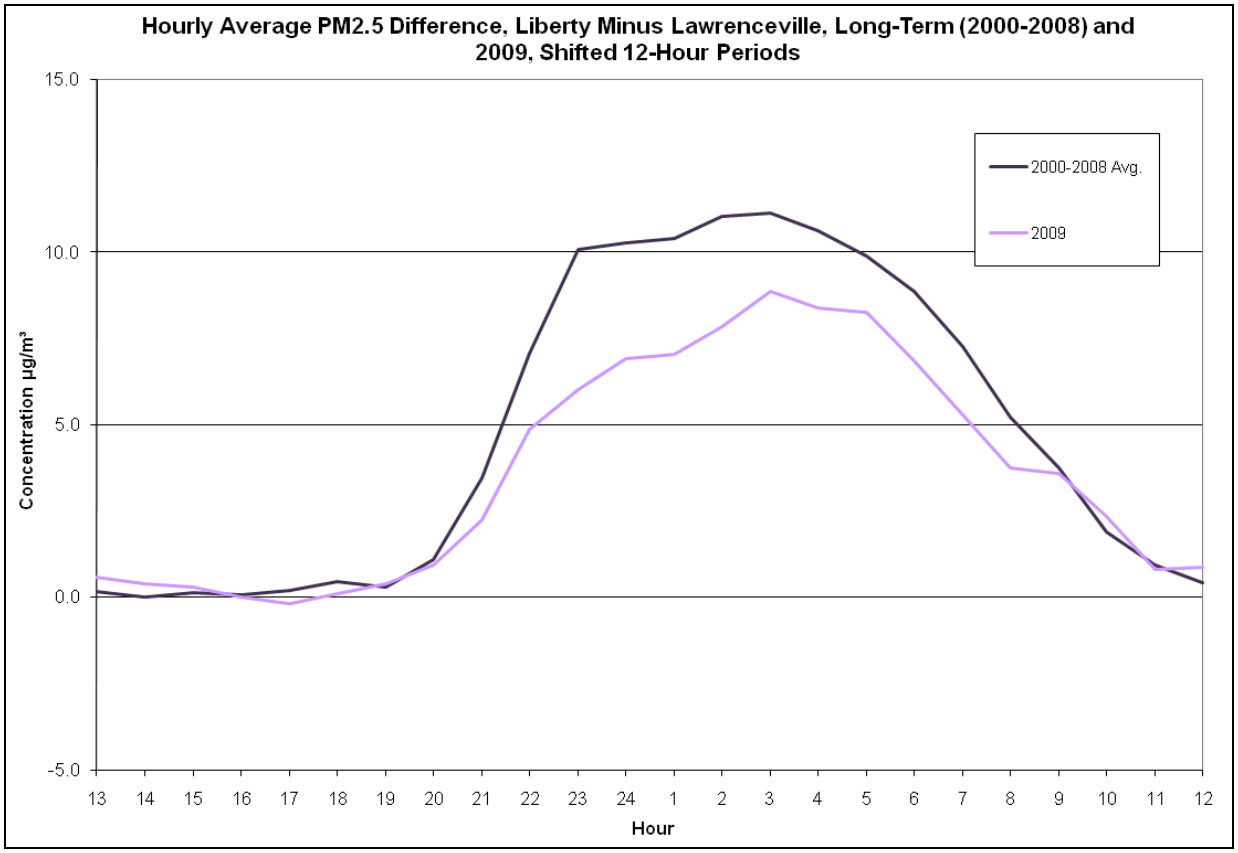

Figure 13-8: Hourly 2009 $PM_{2.5}$ TEOM Average Differences Between Liberty and Lawrenceville Compared to Long-Term 2000-2008 Data

The nighttime peak in the Liberty-Lawrenceville difference has been lowered in the 2009 data, reflecting the influence of reduced production in 2009 compared to that of normal production in 2000-2008. Decreases in concentration differences are greatest in the late evening/early morning period.

14. Emergency Episodes

Subpart H of 40 CFR part 51 specifies requirements for SIPs to address emergency air pollution episodes in order to prevent air pollutant levels from reaching levels determined to cause significant harm to the health of persons. No levels are currently recommended by EPA for $PM_{2.5}$ emergency episodes, however ACHD Rules and Regulations Article XXI §2106.03, which defines the procedures for emergency air pollution episodes as well as the values for air pollutants, includes PM_{10} levels. ACHD will use the levels set for PM_{10} as $PM_{2.5}$ levels.

ACHD assumes one $\mu g/m^3$ of $PM_{2.5}$ to be equal to at least one $\mu g/m^3$ of PM_{10}, therefore if any $PM_{2.5}$ monitor exceeds any of the levels listed for PM_{10}, it will be assumed that the PM_{10} levels have been exceeded, and appropriate action will be taken according to the predetermined Episode Actions of Article XXI §2106.04.

15. Legal Documents

15.1. Notice of Public Hearing and Comment Period

post-gazette.com
Pittsburgh Post-Gazette

Legal Notices Notice of Public Hearing on the Proposed Revision to the State Implementation Plan for PM2.5 for Allegheny County - Liberty-Clairton Area Attainment Plan

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The Allegheny County Board of Health will hold a public hearing on Thursday, December 16, 2010, at 6:00 PM at the Allegheny County Health Department Clack Health Center in Lawrenceville, 301 39th St., Bldg. 7, Pittsburgh, 15201, to take testimony on the proposed revision to Allegheny County's portion of the State Implementation Plan (SIP) for particulate matter 2.5 microns or less in diameter (PM2.5).

The SIP revision demonstrates that the Liberty-Clairton area will attain the PM2.5 National Ambient Air Quality Standards (NAAQS) by 2015 based on pollutant emission reductions and air dispersion modeling. Upon County approval, the revision will be submitted to EPA for approval as a SIP revision.

Copies of the proposed SIP revision may be examined beginning Monday, November 15, 2010, at the Allegheny County Law Library, Room 921 City-County Building, Grant Street, Pittsburgh, PA 15219, from 8:30 AM to 5:00 PM; at the Allegheny County Health Department Document Control Room, Building 7, Clack Health Center, from 8:30 AM until 4:00 PM Monday thru Friday; on the Allegheny County Health Department web site: www.achd.net; or by calling 412-578-8120 to request a mailed printed copy.

Oral testimony must be pre-scheduled by calling 412-578-8008 no less than 24 hours in advance of the public hearing. Speakers will be limited to five minutes and should bring a written copy of their comments.

The Board will accept written testimony beginning Monday, November 15, 2010, and concluding 4:00 PM Thursday, December 16, 2010, by mail to Board of Health, 3333 Forbes Avenue, Pittsburgh, PA 15213, by email to BOH@achd.net, or by fax to 412-578-8325.

Published on 11/12/2010

15.2. Transmittals of Hearing Notice to PA DEP and EPA

Allegheny County Health Department

DIRECTOR
Bruce W. Dixon, M.D.

AIR QUALITY PROGRAM
301 39th Street – Bldg. #7
Pittsburgh, PA 15201-1891
Phone: (412) 578-8120
Fax: (412) 578-8144

November 10, 2010

Ms. Diana Esher, Director
Air Protection Division
Region III (3AP00)
U.S. Environmental Protection Agency
1680 Arch Street
Philadelphia, PA 19103-2029

Dear Ms. Esher:

Enclosed is a Notice of Public Hearing scheduled to occur on December 16, 2010, regarding a proposed revision to Allegheny County's portion of the PA State Implementation Plan (SIP) for $PM_{2.5}$ for the Liberty-Clairton Nonattainment Area.

The SIP revision is available for download at http://www.achd.net/air/air.html. Hard copies and modeling file DVDs are available by request.

The SIP revision is being tracked as our Revision Tracking Number 67. Your comments are welcome.

Sincerely,

James Thompson, Manager
Air Quality Program

Enclosure

- Public Hearing Notice

25-093008

Allegheny County Health Department

DIRECTOR
Bruce W. Dixon, M.D.

AIR QUALITY PROGRAM
301 39th Street – Bldg. #7
Pittsburgh, PA 15201-1891
Phone: (412) 578-8120
Fax: (412) 578-8144

November 10, 2010

Ms. Joyce Epps, Director
Department of Environmental Protection
Bureau of Air Quality
Rachel Carson Building
400 Market Street, P.O. Box 8468
Harrisburg, PA 17105-8468

Dear Ms. Epps:

Enclosed is a Notice of Public Hearing scheduled to occur on December 16, 2010, regarding a proposed revision to Allegheny County's portion of the PA State Implementation Plan (SIP) for $PM_{2.5}$ for the Liberty-Clairton Nonattainment Area.

The SIP revision is available for download at http://www.achd.net/air/air.html. Hard copies and modeling file DVDs are available by request.

The SIP revision is being tracked as our Revision Tracking Number 67. Copies of this notice have also been sent to your Region V Pittsburgh Office for their information and review. Your comments are welcome.

Sincerely,

James Thompson, Manager
Air Quality Program

cc: Arleen Shulman

Enclosure
- Public Hearing Notice

25-093008

Allegheny County Health Department

AIR QUALITY PROGRAM
301 39th Street – Bldg. #7
Pittsburgh, PA 15201-1891
Phone: (412) 578-8120
Fax: (412) 578-8144

November 10, 2010

Mr. Mark Wayner
Regional Air Quality Manager
Department of Environmental Protection
Southwest Regional Office – Region V
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Dear Mr. Wayner:

Enclosed is a Notice of Public Hearing scheduled to occur on December 16, 2010, regarding a proposed revision to Allegheny County's portion of the PA State Implementation Plan (SIP) for $PM_{2.5}$ for the Liberty-Clairton Nonattainment Area.

The SIP revision is available for download at http://www.achd.net/air/air.html. Hard copies and modeling file DVDs are available by request.

The SIP revision is being tracked as our Revision Tracking Number 67. Copies of this submittal have been sent to Ms. Joyce Epps in Harrisburg for review. Your comments are welcome.

Sincerely,

James Thompson, Manager
Air Quality Program

cc: Steve Hepler

Enclosure
- Public Hearing Notice

25-093008

15.3. 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 C. Mohamed, 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:

12 of November, 2010

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.

COPY OF NOTICE OR PUBLICATION

Notice of Public Hearing on the Proposed Revision to the State Implementation Plan for PM2.5 for Allegheny County - Liberty-Clairton Area Attainment Plan

The Allegheny County Board of Health will hold a public hearing on Thursday, December 16, 2010, at 6:00 PM at the Allegheny County Health Department Clack Health Center in Lawrenceville, 301 39th St., Bldg. 7, Pittsburgh, 15201, to take testimony on the proposed revision to Allegheny County's portion of the State Implementation Plan (SIP) for particulate matter 2.5 microns or less in diameter (PM2.5).

The SIP revision demonstrates that the Liberty-Clairton area will attain the PM2.5 National Ambient Air Quality Standards (NAAQS) by 2015 based on pollutant emission reductions and air dispersion modeling. Upon County approval, the revision will be submitted to EPA for approval as a SIP revision.

Copies of the proposed SIP revision may be examined beginning Monday, November 15, 2010, at the Allegheny County Law Library, Room 921 City-County Building, Grant Street, Pittsburgh, PA 15219; from 8:30 AM to 5:00 PM; at the Allegheny County Health Department Document Control Room, Building 7, Clack Health Center, from 8:30 AM until 4:00 PM Monday thru Friday; on the Allegheny County Health Department web site: www.achd.net; or by calling 412-578-8120 to request a mailed printed copy.

Oral testimony must be pre-scheduled by calling 412-578-8008 no less than 24 hours in advance of the public hearing. Speakers will be limited to five minutes and should bring a written copy of their comments.

The Board will accept written testimony beginning Monday, November 15, 2010, and concluding 4:00 PM Thursday, December 16, 2010, by mail to Board of Health, 3333 Forbes Avenue, Pittsburgh, PA 15213, by

C. Mohamed

PG Publishing Company

Sworn to and subscribed before me this day of:
November 12, 2010

Linda M. Gaertner

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City Of Pittsburgh, Allegheny County
My Commission Expires Jan. 31, 2011
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Attorney For

Revision 67

SIP Revision for $PM_{2.5}$ for Liberty-Clairton

Certification of Hearing

Jason Maranche deposes and says that he is an Air Pollution Control Engineer with the Air Quality Program of the Allegheny County Health Department and hereby certifies that a Public Hearing was held on December 16, 2010 regarding the proposed revision to Allegheny County's portion of the State Implementation Plan (SIP) for particulate matter 2.5 microns or less in diameter (PM2.5); that the opportunity for written comments was given during the period November 15, 2010 through December 16, 2010 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 November 12, 2010; 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 Maranche
Air Pollution Control Engineer III
Air Quality Program
Allegheny County Health Department

December 17, 2010
Date

15.4. Summary of Public Comments and Responses

Comment and Response Document for the Proposed SIP Revision 67
Revision to State Implementation Plan for $PM_{2.5}$ for Allegheny County
Liberty-Clairton $PM_{2.5}$ Attainment Plan

December 16, 2010 Public Hearing
Public Comment Period ending December 16, 2010

PROBLEM STATMENT
Comments related to the description of the Liberty-Clairton $PM_{2.5}$ problem.

1. **Comment:** The Lawrenceville monitor was used to evaluate and compare regional concentrations of $PM_{2.5}$. ACHD has not adequately explained how it came to this conclusion and how this monitor can be used to evaluate regional concentrations of $PM_{2.5}$. The Lawrenceville monitor does not represent *background* $PM_{2.5}$ concentrations of Allegheny County or the Pittsburgh-Beaver Valley area nor is it representative of conditions *in* the Liberty-Clairton area.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: The Lawrenceville site has been used as the urban site for the Pittsburgh-Beaver Valley area. Speciation sites within the Pittsburgh-Valley area (excluding Liberty) have been shown to measure consistent concentrations for major species. The background site used for Pittsburgh-Beaver Valley in EPA's designation process was Dolly Sods, WV, a rural monitor located in a U.S. Wilderness area with lower concentrations than any of the Pittsburgh-Beaver Valley speciation sites. For comparison of regional and localized components of $PM_{2.5}$, the Lawrenceville site was therefore used as the regional site along with Liberty as the local site for the Liberty-Clairton area.

2. **Comment:** ACHD should update its $PM_{2.5}$ SIP document to include the most recent design values. This should also include updating various figures within the SIP document to include the most recently available $PM_{2.5}$ concentrations.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: The SIP has been updated with $PM_{2.5}$ design values through 2009.

CONTROL STRATEGY

Comments related to the controls used to show projected attainment.

3. **Comment:** U. S. Steel has concerns over the Department's reliance on emission reductions as a result of CAIR as a part of the strategy. If CAIR or other regional reductions are not met as outlined in the plan, U. S. Steel would be forced to implement contingency measures for which the Department has failed to show how they would enable the area to reach attainment.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Reductions projected by the Clean Air Interstate Rule (CAIR) represent the best data available for future $PM_{2.5}$ levels, specifically for sulfates and nitrates. Future projections, though not available at this time, are expected to be equal to or better than the CAIR reductions. The Pennsylvania CAIR regulation was made final in December 2009, and will be in place prior to the SIP attainment date.

4. **Comment:** EPA's Clean Air Interstate Rule (CAIR) is listed as one of the control measures used to demonstrate attainment of the 1997 Fine Particulate Matter ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS). However, CAIR cannot be used to demonstrate attainment of the 1997 $PM_{2.5}$ NAAQS if an area is requesting an extension of the attainment date beyond April 5, 2010.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: The Liberty-Clairton Area cannot reach attainment without precursor emission controls at local and distant power plants. The Transport Rule (TR) has been proposed as a replacement for CAIR; and controls in the final Transport Rule (to be effective in 2011) will be similar to those with CAIR. SO_2 and NO_x emissions used in the proposed Transport Rule (as of October 2010) for power plants in the tri-state area were found to be 90900 tons less than emissions modeled. Therefore, the modeled emissions using CAIR controls may be considered a conservative projection of future case emissions. A comparison of CAIR and TR emissions and controls has been added to the weight of evidence section of the SIP.

EMISSIONS INVENTORY

Comments related to the pollutant inventories used for the baseline and projected emissions.

5. **Comment:** ACHD and MANE-VU completed emissions inventory reviews and revisions with little or no input from sources other than U. S. Steel's Clairton Works. Since 2002 source testing and emissions inventory instructions have changed significantly; other than source testing at Clairton, ACHD and MANE-VU did not included source testing data from any other sources. U. S. Steel is concerned about a possible unknown “smoking gun" source

or a combination of other sources that would cause the area to fail to achieve attainment, thereby requiring U. S. Steel to solely implement contingency measures.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Most of the regional controls that will provide the majority of improvement in $PM_{2.5}$ are form the sulfur dioxide and nitrogen oxides sources where emission factors and emission rates are well known. Local emission inventories were reviewed against ACHD inventories for accuracy. Furthermore, the modeling results indicated that most sources outside of the immediate vicinity of the area did not show significant concentration gradients in comparison to specific U. S. Steel Clairton sources. Control of sources with small concentration gradients would show little or no relative reductions from baseline case to future projected case.

6. **Comment:** When Tables 6-1 and 6-2 are compared, it appears that ACHD anticipates emission increases for several pollutants for several types of sources, such as increases of PM_{10} from area sources; increases of SO_2 from stationary point sources and area sources (which is anticipated to result in a total increase of SO_2); increases of NO_x from area sources; increases of VOCs from stationary point sources; and increases of ammonia from area sources and mobile sources.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Emissions inventories given in Tables 6-1 and 6-2 are for particulate matter and precursors from sources within the Liberty-Clairton area only, and do not include the large amount of decreases expected from sources outside the area. The emissions inventory section has been revised on Page 20 of the SIP to more clearly indicate the represented area. SO_2 and NO_x emissions from the larger modeled area are presented in Table 10-1.

7. **Comment:** The original and revised SIPs incorrectly use estimated reductions from distant power plants to demonstrate attainment. The original and revised SIPs estimate that $PM_{2.5}$ levels in the Liberty-Clairton area will decrease to some extent as a result of reductions in emissions from upwind power plants, even though in the SIP such emissions reductions are not shown to be from legally-enforceable measures. Reductions may be included in an attainment model only when they are as a result of such enforceable measures. Therefore, the original and revised SIPs are underestimating the amount of $PM_{2.5}$ from upwind sources that exists in the air in the Liberty-Clairton area. This underestimation may be exacerbated by the fact that emissions reductions from upwind power plants were likely to be attributable in significant part to implementation of the Clean Air Interstate Rule. Because that rule was vacated by a court decision in 2008, many of the measures that power plants were planning to implement in order to comply with the rule have been delayed. Accordingly, the original and revised SIP may be underestimating the levels of $PM_{2.5}$ in Liberty-Clairton from upwind sources.

Commenter: John K. Baillie, Senior Attorney, Citizens for Pennsylvania's Future (PennFuture).

Response: The Pennsylvania CAIR rule was approved by EPA December 2009. Other states have implemented or are implementing their rules. EPA proposed the Transport Rule to replace CAIR in 2011. The Department fully expects the controls in the original CAIR or better to be implemented by the attainment date. $PM_{2.5}$ SIP modeling is a demonstration of predicted future actual impacts of the control strategy and expected actual emission changes in the future. Emissions changes from EGUs include expected permit changes, shutdowns and constructions, federal limits, or local limits, and best-estimated future actual operating levels and emissions. This follows the implementation guidance. The emission reductions are quantified in Appendices F-H; emissions information from sources beyond the northeast has been added to Appendix G.

MODELING PROCEDURES

Comments related to the methodology used for the baseline and projected dispersion modeling.

8. **Comment:** In Section 7.1.1, ACHD states that 2012 was selected in place of 2009 for the future to take advantage of regional sulfate/nitrate reductions; however, elsewhere in the documents, ACHD indicates that it expects emission increases for these pollutants in 2012. U. S. Steel would agree with ACHD's assertion that regional sulfate and nitrate reductions would be expected, but U. S. Steel questions the estimates provided in the SIP since they do not reflect such reductions.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Sulfate and nitrate components of $PM_{2.5}$ showed decreases from 2009 to 2012 based on long-range regional modeling of SO_2 and NO_x precursors. There are no increases of sulfate and nitrate expected during this timeframe. An annual increase of 81.32 tons of SO_2 as a precursor by 2014 is shown in Table 6-2, but for the Liberty-Clairton area only. SO_2 as a precursor within the Liberty-Clairton area does not represent upwind SO_2 that contributes to modeled particulate formation in SW PA.

9. **Comment:** In Table 7-1, ACHD shows an increase in surrounding counties that could impact the Clairton-Liberty Borough area. U. S. Steel questions how these increases were determined and questions their accuracy. If these estimates are accurate, U.S. Steel is concerned that the increases could cause the area to fail to reach attainment thus requiring U.S. Steel to implement contingency measures through no fault of U.S. Steel's.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Increases in primary $PM_{2.5}$ emissions from background non-EGU (electric generating unit) industrial sources in surrounding counties are based on growth factors

developed for the MANE-VU regional modeling effort. These sources do not show a significant modeled concentration gradient throughout the Liberty-Clairton area. Increases in these surrounding counties represent 354 tons, compared to the overall decrease of 25,912 tons from the most significant sources: those in Allegheny County, the West Virginia panhandle, and EGUs within the modeling domain.

10. Comment: Did ACHD account for stack parameter changes at EGUs that have installed flue-gas desulfurization projects in its modeling analysis, for example Allegheny Energy's Hatfield's Ferry Power Station? Altered stack configurations at these sites may impact the Liberty-Clairton PM-2.5 nonattainment area.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: ACHD accounted for stack parameter changes at EGUs within the modeling domain. The revisions are described in Appendix H.

ATTAINMENT DEMONSTRATION

Comments related to the assumptions and methodology used for the design value calculations.

11. Comment: In Section 8.1, ACHD lists several assumptions that it used in its attainment demonstration. U. S. Steel questions how ACHD assumed that the Liberty speciation data is representative of both Liberty and Clairton. This is not consistent with other claims made by ACHD. In addition, U. S. Steel questions the logic of this assumption if Clairton Works is the main source of $PM_{2.5}$. U. S. Steel asserts that this assumption is not accurately or adequately supported by the information provided in the proposed SIP revisions.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Liberty $PM_{2.5}$ speciation data was used for the relative composition calculations for the Clairton site, which is a few miles away. While the long-term annual concentrations are lower at Clairton than at Liberty, it is assumed that high days – specifically during variable or calm wind periods – exhibit similar $PM_{2.5}$ compositions throughout the Liberty-Clairton area. The use of Liberty species compositions is appropriate for Clairton compositions.

12. Comment: The Clean Air Act requires state implementation plans to meet the air quality standard everywhere the public has access, not just the spots where pollution monitors are located. ACHD cannot show that the air in the Lincoln Area will meet federal air quality standards. It seems counterintuitive that $PM_{2.5}$ levels will be the same in an area directly impacted by the stacks at the Clairton Works as they will be at a monitor further downwind. EPA recommends additional pollution controls or placing monitors in the area of concern to better characterize the problem.

Commenters: Joseph Osborne, Legal Director, The Group Against Smog and Pollution (GASP). John K. Baillie, Senior Attorney, Citizens for Pennsylvania's Future (PennFuture).

Response: The controlling standard of this SIP is the annual standard, which is a community-based standard. Analysis of the entire area will continue. ACHD will consider whether additional monitors should be placed in this area upon annual network reviews.

ATTAINMENT DATE

Comments related to the timeframe of the future projected attainment date and adequacy of extensions.

13. Comment: The $PM_{2.5}$ Implementation Rule requires the state to submit a mid-course review by April 2011 for each area that cannot demonstrate attainment by 2014 in lieu of any other form of tracking reasonable progress. As a reminder EPA is requiring the state to submit a mid-course review, which shall include an updated attainment demonstration as well as a review of the implementation status of measures included in the SIP submittal, and review of recent air quality data.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: ACHD recognizes the requirement for a mid-course review based on the attainment dates.

14. Comment: ACHD has not justified an extension from the April 5, 2010 attainment deadline. The Clean Air Act states that an area may be exempted from that requirement for up to five years if there is a demonstration that all local control measures that are reasonably available and technically feasible for the area are currently being implemented to bring about expeditious attainment of the standard by the alternative attainment date for the area. There has been no demonstration that local control measures could not be implemented sooner in the Liberty-Clairton area.

Commenter: John K. Baillie, Senior Attorney, Citizens for Pennsylvania's Future (PennFuture).

Response: The attainment plan includes the shutdown and replacement of expensive equipment at the U. S. Steel Clairton Coke Works. This is a complicated and extensive renovation, and as such, requires adequate time for safe and successful construction. The schedules had already been set within the construct of a consent order and agreement.

15. Comment: The Revised SIP cannot model actual attainment in 2015 based on monitor data from 2012, 2013, and 2014. In 2015, EPA will use air quality data from ACHD's monitors in 2012, 2013, and 2014 to determine whether the Liberty-Clairton area has attained

the annual NAAQS for $PM_{2.5}$. Because attainment in all parts of the Liberty-Clairton area depends on implementation of the control measures at Clairton Works required by the amended consent order, and because those measures will not be implemented until the end of 2013, it appears that area will actually attain the standard.

Commenter: John K. Baillie, Senior Attorney, Citizens for Pennsylvania's Future (PennFuture).

Response: The monitored attainment data will be based on one year of data for 2014, with subsequent years used for 3-year periods. This is permissible under EPA regulations.

REASONABLE FURTHER PROGRESS

Comments related to the analysis used to show reasonable further progress toward attainment before the future projected attainment date.

16. Comment: The implementation rule requires the attainment plan to demonstrate that emissions will decline in a manner that represents generally linear progress from the 2002 baseline year to the attainment year. Table 10-4 shows the fraction of reductions achieved in each milestone year in order to demonstrate attainment of the 1997 $PM_{2.5}$ NAAQS. However, this section does not show the substitution ratio for $PM_{2.5}$ and the precursor pollutants. This section should include the justification for your choice of substitution ratios. In doing so we suggest taking into account the relative proportion of the components comprising the total $PM_{2.5}$ mass at air quality monitors and considering the degree to which each PM component may contribute to $PM_{2.5}$ nonattainment.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: No substitution was used in the Reasonable Further Progress section. Decreases are demonstrated separately for each pollutant.

CONTINGENCY MEASURES

Comments related to the additional contingency controls used in case the plan fails to demonstrate attainment by the attainment date.

17. Comment: U. S. Steel also respectfully disagrees with ACHD's assertion that "the Liberty-Clairton area is so small that sulfur dioxide and nitrogen dioxide do not have time to convert sulfates and nitrates. There is very little difference in sulfates and no difference in nitrates measured at Liberty from the monitors in the larger nonattainment area." U. S. Steel believes that such a statement does not recognize the complexities associated with inversions that occur in the Clairton area.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Monitored data and supporting analyses for the baseline timeframe of 2000-2004 for this SIP indicated consistent trends for sulfates and nitrates throughout SW PA, with no outlying concentration variations at Liberty. If there was sufficient time for local conversion of SO_2 and NO_x to sulfates and nitrates, there would have been sizeable differences in these levels compared to the Lawrenceville monitor. The Department will continue to investigate the formation of sulfates and nitrates in SW PA in future $PM_{2.5}$ control plans.

18. Comment: U. S. Steel has concerns about the Department's and State's ability to enforce the anti-idling regulations to which both rely on in developing the SIP. U. S. Steel believes that the regulatory agencies will need to ensure that they appropriately enforce these requirements so that the anticipated reductions are realized.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: Due to the uncertainty of emission reductions expected from enforcing the idling law, this was not included in the attainment demonstration, but rather discussed as further evidence of expected improvements to air quality.

19. Comment: The Department should have considered anticipated reductions that would be expected from anticipated mercury rules. U. S. Steel believes that the Department has not adequately addressed the impacts of such forthcoming regulations. In addition, U. S. Steel believes that the Department should recognize the anticipated replacement rule as a contingency measure.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: The uncertainty in the specifics of the federal replacement rule and the Pennsylvania mercury regulations prevented this from being included in this SIP. Particulate improvements from this future rule will be considered in future $PM_{2.5}$ control plans.

20. Comment: ACHD calculated the contingency measure for $PM_{2.5}$ to be 87.8 tons/year. However, ACHD failed to quantify the emissions reductions associated with the contingency measures identified for 2009, and failed to identify any contingency measures for 2012. For areas requesting an extension of the attainment date beyond 2015, contingency measures are required for 2009, 2012 and 2015. Also, ACHD has noted that they are reserving the option to propose an alternative plan for contingency measures to be made final prior to the attainment date. Any changes ACHD makes must be submitted to EPA as a SIP revision.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: Emission reductions sufficient for 2009 and 2012 have already been met with the permanent shutdown of Batteries 7-9 and Quench Tower 3 by mid-2009. The SIP has been revised to reference the conditions of the consent order and agreement.

TRANSPORTATION CONFORMITY

Comments related to the determination that transportation projects will not impact the future attainment.

21. Comment: On page 68, ACHD indicates that much uncertainty remains regarding the role of NH3 in particulate formation. While U. S. Steel recognizes the challenges presented in determining the impacts of NH3 and its role in the formation of $PM_{2.5}$ in the area, U. S Steel believes that additional investigation in this area could be used to determine other potential contingency measures.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: The Department will continue to investigate the role of NH3 for future $PM_{2.5}$ control plans.

WEIGHT OF EVIDENCE

Comments related to the supporting evidence used to show that the Liberty-Clairton area shows decreasing trends of $PM_{2.5}$.

22. Comment: The Department should consider a wood stove and wood-fired boiler program considered as a contingency measure. There are ample studies available in which quantifiable benefits from various programs are presented.

Commenter: Coleen M. Davis, Senior Environmental Engineer, U. S. Steel Corporation.

Response: The 2005 woodstove exchange program did not have a significant impact on emission rates within the Liberty-Clairton area. The Department may consider a more extensive woodstove exchange program as a possible control strategy or contingency measure in a future SIP. Pennsylvania finalized an outdoor wood boiler regulation on October 2, 2010.

23. Comment: ACHD should review EPA's proposed Transport Rule to determine if the emission controls and schedules included in the rule would enhance the Liberty-Clairton $PM_{2.5}$ nonattainment area's attainment prospects. A qualitative analysis of the proposed Transport Rule could be included in the Weight of Evidence section of the ACHD's SIP document.

Commenter: Diana Esher, Director, Air Protection Division, U.S. EPA Region III.

Response: A comparison of EGU controls used in the Transport Rule compared to those used for the SIP modeling (CAIR controls) has been added to the weight of evidence section.

Controls used in the proposed Transport Rule were found to be similar to or better than the modeled controls.

GENERAL

Comments related to the $PM_{2.5}$ SIP in general.

24. Comment: The emissions projections for the Clairton Works' quench towers do not account for $PM_{2.5}$ pollution caused by increasing levels of total dissolved solids in the Monongahela River. Solids dissolved in the river water may be emitted from the quench towers as $PM_{2.5}$. The river has experienced increased levels of total dissolved solids in the past several years, likely leading to increased $PM_{2.5}$ emissions from the quench towers, yet the original and revised SIPs assume that the water used in the quench towers is not impacted by high levels of total dissolved solids. ACHD and U.S. Steel should consider pre-treating the river water used by the quench towers to remove excess total dissolved solids and further reduce Clairton Work's $PM_{2.5}$ emissions.

Commenter: John K. Baillie, Senior Attorney, and Tiffany Hickman, Western PA Outreach Coordinator, Citizens for Pennsylvania's Future (PennFuture).

Response: The emission rates for the quench towers were based on the estimates made during the permitting of these units, and the control strategy for 2014 should not be modified on the basis of recent poor water quality. Pre-treating the water would not advance attainment by a year. ACHD will forward concerns over future water quality issues with the PA DEP.

25. Comment: The revised SIP does not model attainment of the 2006 24-hour NAAQS for fine particulate matter. Effective December 18, 2006, the 24-hour NAAQS for fine particulate matter was reduced from 65 µg/m³ to 35 µg/m³. The revised SIP projects that the 24-hour of fine particulate matter at the Liberty monitor will be 42 µg/m³, significantly in excess of the 35 µg/m³ standard.

Commenter: John K. Baillie, Senior Attorney, and Tiffany Hickman, Western PA Outreach Coordinator, Citizens for Pennsylvania's Future (PennFuture).

Response: The nonattainment areas under the 35 µg/m³ 24-hour standard were made final in December 2009, which then require attainment plans to be developed by December 2012. The 35 µg/m³ implementation guidance has yet to be published, and the years to be used in the 35 µg/m³ plan are based around 2007 rather than 2002. Attainment of the 35 µg/m³ standard will be demonstrated in a future, separate SIP.

26. Comment: The original plan relied in part on an agreement between the County and US Steel to shut down Clairton batteries 1-3 on the belief the batteries were in such poor condition they could not be brought into compliance. The revised SIP relies on a new

agreement with US Steel to repair the batteries and keep them operating. If these old batteries are to come into compliance through a course of repairs, US Steel must carry out the repair plan with maximum care and attention to detail, and County oversight of the repair work and battery performance should be just as vigilant.

Commenter: Joseph Osborne, Legal Director, The Group Against Smog and Pollution (GASP).

Response: ACHD agrees with this comment.

27. Comment: Additional measures to reduce fine particulate matter pollution above and beyond those required by the amended Consent Order and Agreement still need to be determined and implemented. Such measures might include the accelerated construction of new coke batteries at Clairton Works and the accelerated shutdown or rebuild of old coke batteries. ACHD and U.S. Steel must also evaluate and implement additional measures to limit $PM_{2.5}$ emissions from U.S. Steel's J. Edgar Thomson Works, which is just upwind from the Liberty-Clairton area, and adds $PM_{2.5}$ pollution to the air in the Liberty-Clairton area.

Commenter: John K. Baillie, Senior Attorney, and Tiffany Hickman, Western PA Outreach Coordinator, Citizens for Pennsylvania's Future (PennFuture).

Response: The control strategy as described in the SIP has been demonstrated in the SIP to be more than adequate to meet the standards.

28. Comment: The original and revised SIP fail to evaluate volatile organic compound (VOC) contribution to $PM_{2.5}$ formation. Although the Clean Air Fine Particle Implementation Rule presumes that control measures for VOCs need not be considered in a SIP for $PM_{2.5}$, that presumption does not apply if the agency that develops the SIP has information that shows that it is not technically justified. In their comments to the original SIP, PennFuture and GASP presented ACHD with information that demonstrates that the presumption that VOCs do contribute to $PM_{2.5}$ formation in the Liberty-Clairton area. ACHD should evaluate the contribution of VOCs to $PM_{2.5}$ pollution and include appropriate control measures in the revised SIP.

Commenter: John K. Baillie, Senior Attorney, Citizens for Pennsylvania's Future (PennFuture).

Response: The Pennsylvania Department of Environmental Protection (PA DEP) addressed this issue for the entire Pittsburgh-Beaver Valley region in its $PM_{2.5}$ SIP. PA DEP considered the data in the CMU report on air toxics in Allegheny County and other available data that EPA suggests would be appropriate to consider in developing a demonstration to reverse the default presumption that VOCs do not need to be included in the $PM_{2.5}$ attainment plan for the Pittsburgh-Beaver Valley area. PA DEP concluded that there was too much uncertainty regarding the role of VOCs in the formation of fine particulate to reverse the

presumption at this time. Since the Liberty-Clairton area is small in size, and that VOCs require time to react in the atmosphere to create particulates, the Department has come to the same conclusion.

29. **Comment:** The new plan will lead to improved air quality sooner and below the margin of error. ACHD should continue working with industry in the Monongahela Valley and incorporate the concerns of the people into plans.

Commenters: A. Michele Tedder, MSN, RN, Community Outreach Director, Pediatric Environmental Medicine Center, Children's Hospital of Pittsburgh of UPMC. Patricia Jones, resident of the Mon Valley.

Response: ACHD appreciates all comments and will continue to control $PM_{2.5}$ in the Monongahela Valley.

15.5. Certifications of Approval and 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 $PM_{2.5}$ was adopted by the Allegheny County Board of Health on March 10, 2011.

Henry Miller, III, Esquire
Solicitor
Allegheny County Health Department

COMMONWEALTH OF PENNSYLVANIA)

COUNTY OF ALLEGHENY) S.S.

On the 15th day of April, 2011,

Henry Miller, III 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 15th day of April, 2011.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Janet M. Norkus, Notary Public
City Of Pittsburgh, Allegheny County
My Commission Expires May 29, 2011
Member, Pennsylvania Association of Notaries

NOTARY PUBLIC

The following certifications apply to the regulation changes to Allegheny County's Article XXI in accordance with the previously submitted SIP revision (June 2010). These regulation changes were enacted by County Ordinance 11-10-OR and became effective on May 24, 2010.

CERTIFICATION of APPROVAL and ADOPTION

To the best of my knowledge, information, and belief, I the undersigned hereby certify that the amendment to Sections 2101.10, 2101.20, ad 2105.21 of Article XXI, Rules and Regulations of the Allegheny County Health Department, Air Pollution Control, and Ordinance No. 16782 of the County of Allegheny, adopted by the Allegheny County Board of Health on March 10, 2010, enacted by the Allegheny County Council on May 4, 2010 (Ordinance 11-10-OR), approved by the Allegheny County Chief Executive on May 14, 2010, and effective May 24, 2010, as a revision to the County's Portion of the Pennsylvania State Implementation Plan for the Attainment and Maintenance of the National Ambient Air Quality Standards, were duly and properly enacted as prescribed by the Local Health Administration Law and the Second Class County Code, and as such, are fully and legally enforceable by the Allegheny County Health Department and the County of Allegheny as provided for by the within authority.

Henry Miller, III, Esquire
Solicitor
Allegheny County Health Department

COMMONWEALTH OF PENNSYLVANIA)

COUNTY OF ALLEGHENY) S.S.

On the 7th day of June, 2010,

Henry Miller, III 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 7th day of June, 2010.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Janet M. Norkus, Notary Public
City Of Pittsburgh, Allegheny County
My Commission Expires May 29, 2011
Member, Pennsylvania Association of Notaries

NOTARY PUBLIC

CERTIFICATION of APPROVAL and ADOPTION

To the best of my knowledge, information, and belief, I the undersigned hereby certify that the amendment to Sections 2101.10, 2101.20, ad 2105.21 of Article XXI, Rules and Regulations of the Allegheny County Health Department, Air Pollution Control, and Ordinance No. 16782 of the County of Allegheny, adopted by the Allegheny County Board of Health on March 10, 2010, enacted by the Allegheny County Council on May 4, 2010 (Ordinance 11-10-OR), approved by the Allegheny County Chief Executive on May 14, 2010, and effective May 24, 2010, as a revision to the County's Portion of the Pennsylvania State Implementation Plan for the Attainment and Maintenance of the National Ambient Air Quality Standards, were duly and properly enacted as prescribed by the Local Health Administration Law and the Second Class County Code, and as such, are fully and legally enforceable by the Allegheny County Health Department and the County of Allegheny as provided for by the within authority.

Michael H. Wojcik
Solicitor
County of Allegheny

COMMONWEALTH OF PENNSYLVANIA)

COUNTY OF ALLEGHENY) S.S.

On the 16 day of June, 2010,
Michael H. Wojcik 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 16th day of June, 2010.

Eileen F. Majersky
NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Eileen F. Majersky, Notary Public
City of Pittsburgh, Allegheny County
My Commission Expires May 9, 2013
Member, Pennsylvania Association of Notaries

Bill No. 5602-10

No. 11-10-OR

AN ORDINANCE

An Ordinance of the Council of the County of Allegheny ratifying amendments to Allegheny County Health Department Rules and Regulations pursuant to Section 12011 of the Local Health Administration Law, 16 P.S. §12001 et seq.

Whereas, Allegheny County, pursuant to the Local Health Administration Law, 16 P.S. §12001 et seq., created the Allegheny County Health Department, and the Allegheny County Board of Health; and

Whereas, the Local Health Administration Law at Section 12011 provides for the Board of Health to adopt regulations and submit such regulations to Allegheny County for approval or rejection; and

Whereas, on March 10, 2010, the Allegheny County Board of Health adopted the attached amendments to the Allegheny County Health Department Rules and Regulations, Article XXI, "AIR POLLUTION CONTROL;" and

Whereas, it is the desire of Council to ratify the Allegheny County Health Department regulation amendments as approved by the Board of Health.

The Council of the County of Allegheny hereby resolves as follows:

SECTION 1. Incorporation of Preamble.

The provisions set forth in the preamble to this Ordinance are incorporated by reference in their entirety herein.

SECTION 2. Ratification of Regulations.

Acting pursuant to the Local Health Administration Law and the Allegheny County Home Rule Charter, County Council hereby ratifies the amendments to the Allegheny County Health Department Rules and Regulations, Article XXI, "AIR POLLUTION CONTROL," attached hereto as Exhibit "A."

SECTION 3. Severability. If any provision of this Ordinance shall be determined to be unlawful, invalid, void or unenforceable, then that provision shall be considered severable from the remaining provisions of this Resolution which shall be in full force and effect.

SECTION 4. Repealer. Any Resolution or Ordinance or part thereof conflicting with the provisions of this Ordinance is hereby repealed so far as the same affects this Resolution.

Enacted in Council, this 4th ***day of*** May, ***2010.***

Council Agenda No. 5602-10.

Rich Fitzgerald
President of Council

Attest:
Allegheny County Council

Chief Executive Office MAY 14, ***2010***

Approved:
Dan Onorato
Chief Executive

Attest: Donna Fodi
Donna Fodi
Executive's Secretary

References

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