

Mr. Karl Brooks  
Regional Administrator  
U.S. EPA, Region VII  
901 North Fifth Street  
Kansas City, KS 66101

Dear Mr. Brooks:

The Missouri Air Conservation Commission has recently revised or promulgated the following air quality plan contained in the Missouri State Implementation Plan (SIP). The following is enclosed for your review and approval into the SIP:

Redesignation Demonstration and Maintenance Plan for the Missouri Portion of the St. Louis Nonattainment Area for the 1997 Annual Fine Particulate Matter (PM<sub>2.5</sub>) National Ambient Air Quality Standard (NAAQS).

This revision to the SIP provides the documentation to support Missouri's request that EPA redesignate the Missouri portion of St. Louis nonattainment area for the 1997 annual PM<sub>2.5</sub> NAAQS to attainment. The plan demonstrates that the area has met all of the requirements for redesignation. This plan revision also includes the maintenance plan for the area, demonstrating that the area will continue to comply with this NAAQS. The maintenance plan establishes a transportation conformity emissions budget for on-road mobile emissions of nitrogen oxides (NO<sub>x</sub>) and direct PM<sub>2.5</sub>. Also included in this plan revision is a comprehensive 2008 base year emissions inventory (Appendix E), which was placed on the Web for a 30-day public comment period beginning July 13, 2011.

The commission adopted the enclosed plan action on August 25, 2011, after considering comments received at public hearing. The commission has full legal authority to develop the Missouri SIP pursuant to Section 643.050 of the Missouri Air Conservation Law. The state followed all applicable administrative procedures in proposing and adopting the plan action. Enclosed are the required SIP submittal elements for determination of plan completeness per 40 CFR Part 51, Appendix V. In order to comply with Attachment A of the "Regional Consistency for the Administrative Requirements of State Implementation Plan Submittals and the Use of 'Letter Notices'" memo dated April 6, 2011, a searchable pdf version of this document will be emailed to the EPA Regional Office and will be posted on our website at <http://dnr.mo.gov/env/apcp/stateplans.htm>. Also, due to their size, the appendices of this document have been submitted via disk(s) that have been included with the paper copy of the main document of this SIP revision.

Mr. Karl Brooks  
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In conjunction with this SIP submittal, the Air Program is withdrawing the Attainment Demonstration SIP for the St. Louis nonattainment area under the 1997 PM<sub>2.5</sub> standard. This plan was submitted to EPA on October 9, 2009, and deemed complete on November 10, 2009. The EPA has not taken action on this SIP document since it was deemed complete. On May 23, 2011, EPA issued a final rule determining that both sides of the St. Louis PM<sub>2.5</sub> nonattainment area have demonstrated attainment of the 1997 annual PM<sub>2.5</sub> standard with three years of quality assured clean air monitoring data (76 FR 29652, May 23, 2011). According to EPA guidance, the clean data determination alleviates the state's obligation to submit attainment demonstration SIPs because the area has already attained the standard. Therefore, the Air Program is hereby withdrawing this SIP document while concurrently pursuing redesignation for the area to attainment. Withdrawing this SIP document will not relax or remove any of the controls that are in place in the St. Louis area, and the maintenance plan will assure continued compliance with this standard.

Thank you for your attention to this matter. If you have any questions regarding this submittal, please contact Ms. Wendy Vit with the Missouri Department of Natural Resources' Air Pollution Control Program at P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Kyra L. Moore  
Interim Director

KLM:mlk

Enclosures:

- Copy of plan (appendices on disk(s))
- Copy of commission signature page certifying Missouri Air Conservation Commission adoption
- Copy of public hearing newspaper notice
- Copy of public hearing transcript introductory statement
- Copy of public comments and responses
- Copy of affidavit for the 2008 Base Year Inventory for public notice
- Copy of the Webpage posting the Comprehensive 2008 Base Year Inventory for public notice

c: Missouri Air Conservation Commission

**Redesignation Demonstration  
and  
Maintenance Plan for the Missouri Portion of the  
St. Louis Nonattainment Area for the  
1997 Annual Fine Particulate Matter (PM<sub>2.5</sub>)  
National Ambient Air Quality Standard**

**Prepared for the  
Missouri Air Conservation Commission  
Adoption: August 25, 2011**



**Missouri Department of Natural Resources  
Division of Environmental Quality  
Air Pollution Control Program  
Jefferson City, Missouri**

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## Executive Summary

On December 17, 2004, the Missouri counties of Jefferson, Franklin, St. Charles, and St. Louis along with the City of St. Louis were designated as a nonattainment area for the 1997 annual fine particulate matter (PM<sub>2.5</sub>) standard. PM<sub>2.5</sub> is defined as particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. The Missouri Department of Natural Resources' Air Pollution Control Program submits the following Maintenance Plan for the St. Louis area as part of a redesignation request. Per the federal Clean Air Act Amendments of 1990, a maintenance plan is required before an area can be redesignated from nonattainment to attainment of a National Ambient Air Quality Standard (NAAQS). This document provides the technical information required to support a request to redesignate the St. Louis PM<sub>2.5</sub> nonattainment area to attainment, therefore, the Air Program requests that the U.S. Environmental Protection Agency (EPA) redesignate the Missouri portion of the St. Louis nonattainment area to attainment status for the 1997 annual PM<sub>2.5</sub> standard. The Air Program also requests that EPA consider this maintenance plan on a parallel track with the redesignation request and approve the maintenance plan.

Fine particulate matter monitoring data shows that violations of the NAAQS are no longer occurring within the St. Louis region. Monitors located in the St. Louis metropolitan area have recorded three years of complete, quality assured ambient air quality monitoring data for 2007-2009, demonstrating attainment with the annual fine particulate matter standard. On May 23, 2011, EPA published a final rule in the Federal Register stating that the St. Louis PM<sub>2.5</sub> nonattainment area covering both Missouri and Illinois has attained the 1997 annual PM<sub>2.5</sub> standard based on three years of quality assured ambient air quality data (76 FR 29652, May 23, 2011). The improvement in air quality is attributed to emission reductions from a combination of federal and state emissions control measures which are both permanent and enforceable.

This document also addresses the Clean Air Act (CAA) requirements for a maintenance plan. The plan contains all the required elements to ensure maintenance of the annual fine particulate matter standard in future years. Based upon a comprehensive emission inventory developed for year 2008, the Air Program demonstrates maintenance through the year 2022 by showing the projected collective emissions of fine particulate matter and precursors would not exceed the inventory level of the attainment year, 2008. The projected future emissions through year 2022 demonstrate a downward trend. This downward trend is attributed to a combination of state and federal control measures. Based on emissions, it is expected that the air quality will continue to meet the annual fine particulate matter NAAQS throughout the maintenance period.

Several commitments are made to ensure maintenance of the annual fine particulate matter standard in the future. The Air Program commits to continue to enforce all applicable requirements in the state implementation plan and to continue to operate a fine particulate matter monitoring network to verify the continued attainment of the standard and implement contingency measures as required. The Air Program further commits to submit subsequent maintenance plan revisions within eight years from the date of redesignation and to prepare a comprehensive emission inventory update every three years.

The maintenance plan includes contingency measures should the area violate the NAAQS. The contingency measures are a commitment to implement additional emission reduction measures from a potential list of control options as expeditiously as possible, should the area ever violate the 1997 PM<sub>2.5</sub> NAAQS in the future.

Finally, the Air Program developed a transportation emission budget as required in the maintenance plan for transportation conformity determinations. The budget establishes a cap on emissions that cannot be exceeded by predicted highway and transit vehicle emissions. Emissions expected from implementation of highway plans and programs should be consistent with estimates of emissions from motor vehicles and necessary emission reduction contained in the applicable state implementation plan (SIP).

## 1. Introduction

Congress first enacted the Clean Air Act (CAA) in 1970. It was last amended in 1990. The CAA requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. There are two categories of NAAQS that are set by the EPA. The primary standards are health-based standards and are designed to establish limits to protect public health. The secondary standards are commonly referred to as “welfare-based standards” and are established to protect public welfare. These limits are intended to protect against decreased visibility, and damage to crops, animals, and buildings. Currently there are six pollutants with established primary level NAAQS. These pollutants are carbon monoxide, lead, particulate matter, sulfur dioxide, nitrogen oxide, and ozone. These pollutants are referred to as “criteria” pollutants. Fine particles, (commonly referred to as  $PM_{2.5}$ ) are a portion of the criteria pollutant known as particulate matter. The EPA establishes a standard for each criteria pollutant. If an area is found to exceed the value specified by the standard, it is classified as a nonattainment area for that specific pollutant. The states and/or tribes responsible for the affected area must then develop and carry out strategies and measures to attain the NAAQS. The goal is for any areas designated as “nonattainment” to be reclassified by the EPA to attainment for the pollutant.

The CAA requires that the EPA carry out a periodic review of NAAQS for the criteria pollutants. This review must include the scientific basis for (1) changing or reaffirming the NAAQS and (2) implementing the NAAQS. As required by the CAA, the EPA reviewed the particulate matter standards in the 1990’s. In July 1997, the United States EPA issued the NAAQS for  $PM_{2.5}$ . The 1997 annual standard was established at a level of 15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), based on the 3-year average of annual mean  $PM_{2.5}$  concentrations.

When EPA promulgates NAAQS, states are required to evaluate and make recommendations for their state as to the attainment status for all areas of the state. A formal recommendation on area boundaries for the 1997  $PM_{2.5}$  NAAQS was submitted to EPA in March 2004. In its submittal the Air Program recommended that the counties of Jefferson, Franklin, St. Charles, and St. Louis along with the City of St. Louis be designated as nonattainment for the annual fine particle standard. The Illinois counties of Madison, Monroe, and St. Clair are also part of the nonattainment area along with Baldwin Township in Randolph County. After working with Missouri and considering the information from air quality monitors, EPA issued official designations for the  $PM_{2.5}$  standard on December 17, 2004 and made final modifications in April 2005.

When EPA made  $PM_{2.5}$  nonattainment area determinations the St. Louis region was designated as a  $PM_{2.5}$  nonattainment area with a compliance date of 2010. The nonattainment designations triggered the requirement to develop an attainment plan to bring the area into compliance. A significant requirement of a  $PM_{2.5}$  plan is an attainment demonstration to identify effective emissions control strategies and confirm that attainment can be achieved after implementation of the strategies by the attainment date. Missouri submitted an attainment demonstration in October of 2009. However, if a clean data determination is made prior to EPA’s action on the plan, then the requirement for an attainment plan is suspended while the area continues to maintain the standard. A clean data determination is made by submitting quality assured monitoring data to

demonstrate that the area has attained the NAAQS. The three years of quality assured air monitoring data in the St. Louis area from 2007 – 2009 demonstrate that the area has attained compliance with the 1997 annual PM<sub>2.5</sub> standard. EPA issued final approval of the clean data determination on May 23, 2011. It is also noted that monitoring data in the St. Louis area from 2009 – 2010 is also in compliance with the 1997 annual PM<sub>2.5</sub> standard.

The Air Program requests that the EPA redesignate the Missouri portion of the St. Louis Metropolitan Nonattainment area to attainment status for the 1997 annual PM<sub>2.5</sub> NAAQS. The St. Louis area has met all criteria necessary to be redesignated to attainment status, including three years of certified ambient air monitoring data recorded for years 2007 – 2009 demonstrating attainment with the annual PM<sub>2.5</sub> standard. A maintenance plan is required before an area can be redesignated to attainment status. This document contains both maintenance plan and also all the requirements for redesignation for the Missouri portion of the 1997 annual PM<sub>2.5</sub> nonattainment area.

### 1.1 National Ambient Air Quality Standard for Fine Particulate Matter

When EPA establishes a NAAQS, this standard applies to the concentration of a pollutant in ambient outdoor air. Ambient air is considered to be the air that someone in the general public would breathe. If the air quality in a geographic area meets or is cleaner than the national standard, it is designated an attainment area; areas that do not meet the national standard or contribute to another area that violates the air quality standard are designated as nonattainment areas.

Fine particulate matter, or PM<sub>2.5</sub>, is a mixture of microscopic solids and liquid droplets suspended in air. PM<sub>2.5</sub> describes particulate matter that is 2.5 micrometers in diameter and smaller - 1/30th the diameter of a human hair. Fine particles are generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds are chemically transformed into particles.

EPA established the fine particle standards in July of 1997 after evaluating health studies and conducting an extensive peer review process. The 1997 annual standard was established at a level of 15 µg/m<sup>3</sup>, based on the 3-year average of annual mean PM<sub>2.5</sub> concentrations.

### 1.2 Health Effects from Elevated Concentrations of PM<sub>2.5</sub>

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.

Roughly one out of every three people in the United States is at a higher risk of experiencing PM<sub>2.5</sub> related health effects. One group at high risk is active children because they often spend a lot of time playing outdoors at times when concentrations of fine particles are higher. In addition, children's bodies are still developing and they breathe more air per pound of body weight than adults do. The elderly population is also often at high risk due to reduced lung capacity and preexisting medical conditions. People of all ages who are active outdoors are at increased risk because during physical activity, PM<sub>2.5</sub> penetrates deeper into the parts of the lungs that are more vulnerable to injury.

### 1.3 Geographical Description of the St. Louis Nonattainment/Maintenance Area

The St. Louis PM<sub>2.5</sub> nonattainment area is a bi-state region that violated the 1997 annual PM<sub>2.5</sub> standard (Figure 1-1). The following is a list of the counties contained in the St. Louis Missouri-Illinois PM<sub>2.5</sub> nonattainment area:

- St. Louis County, MO
- St. Louis City, MO
- St Charles, MO
- Jefferson County, MO
- Franklin County, MO
- Madison County, IL
- Monroe County, IL
- St. Clair County, IL
- Baldwin Township of Randolph County, IL

Figure 1-1. 1997 Annual PM<sub>2.5</sub> Nonattainment Area for St. Louis (MO-IL) region



## 2. Redesignation and Maintenance Plan Requirements

An area designated as nonattainment for a pollutant can be redesignated to attainment if specific conditions are met. Missouri followed the EPA published memorandum entitled “Procedures for Processing Requests to Redesignate Areas to Attainment” (September 4, 1992) in preparing the redesignation demonstration and the maintenance plan. The memorandum provides guidance regarding the processing of requests for redesignation of nonattainment areas to attainment for ozone, carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide, and lead.

Furthermore, the CAA lists five obligations that the EPA must meet during the redesignation process. Section 107(d)(3)(E) states:

The Administrator may not promulgate a redesignation of a nonattainment area (or portion thereof) to attainment unless –

- (i) the Administrator determines that the area has attained the national ambient air quality standard;
- (ii) the Administrator has fully approved the applicable implementation plan for the area under section 110(k);
- (iii) the Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions;
- (iv) the Administrator has fully approved a maintenance plan for the area as meeting the requirements of section 175A; and
- (v) the State containing such area has met all requirements applicable to the area under section 110 and part D.

These 5 obligations must be met before redesignation to attainment status; however, a state may submit both the redesignation request and the maintenance plan at the same time so that rulemaking on both may proceed on a parallel track. This document outlines Missouri’s redesignation request and demonstrates how the Air Program supports EPA’s promulgation obligations towards the redesignation of the St. Louis nonattainment area under the 1997 PM<sub>2.5</sub> NAAQS.

### 2.1 Attainment of the Standard

Requirement (i) for redesignation states that EPA must determine that the area is attaining the applicable NAAQS. For the 1997 annual PM<sub>2.5</sub> NAAQS, this determination must be demonstrated using the design value based on the average of three (3) consecutive years’ annual arithmetic means. This design value must be lower than the level of the NAAQS, 15.0 µg/m<sup>3</sup>. Section 3 presents information that demonstrates St. Louis has attained the NAAQS for PM<sub>2.5</sub>. This demonstration is based on three years of quality assured monitoring data as specified in 40 CFR 58. On May 23, 2011, EPA published a final clean data determination in the Federal Register stating that the St. Louis PM<sub>2.5</sub> nonattainment area covering both Missouri and Illinois has attained the 1997 annual PM<sub>2.5</sub> standard based on three years of quality assured ambient air quality data (76 FR 29652, May 23, 2011).

## 2.2 Implementation Plan Approval

Requirement (ii) for redesignation states that the EPA administrator must have fully approved the applicable implementation plan for the area under section 110(k) of the CAA. The State of Missouri Plan for PM<sub>2.5</sub> and Attainment Demonstration for the St. Louis Metropolitan Area was proposed for public hearing on August 27, 2009, was adopted by the Missouri Air Conservation Commission (MACC) on September 24, 2009 and was submitted to EPA in October 2009. This PM<sub>2.5</sub> SIP was deemed to be complete on November 10, 2009.

As stated earlier, EPA has published a final rule in the Federal Register stating that the St. Louis PM<sub>2.5</sub> nonattainment area covering both Missouri and Illinois has attained the 1997 annual PM<sub>2.5</sub> standard based on three years of quality assured ambient air quality data (76 FR 29652, May 23, 2011). Once an area attains the standard for a criteria pollutant, certain SIP element requirements that are developed to demonstrate and achieve attainment become unnecessary because the area has already attained the standard. These SIP elements that are tied to demonstration of attainment are no longer required as long as the area does not violate the standard. These particular SIP elements would never be required if the area is redesignated to a maintenance area for the pollutant. Guidance on this subject is found on page 6 of the EPA's Memorandum, *Procedures for Requests to Redesignate Areas to Attainment*, from John Calgani, Director, Air Quality Management Division, dated September 4, 1992 which states "requirements for reasonable further progress ... will not apply for redesignations because they only have meaning for areas not attaining the standard."

This guidance is reaffirmed in EPA's May 10, 1995 Memorandum from John S. Seitz, Director, Office of Air Quality Planning and Standards, titled *Reasonable Further Progress, Attainment Demonstration, and Related Requirements of Ozone Nonattainment Areas Meeting the Ozone National Ambient Air Quality Standard*. Page 6 of the 1995 Seitz memo details that suspensions are only valid while the area is in compliance with the standard and how the suspended requirements are relieved:

*Thus, a determination that an area need not submit one of the SIP submittals amounts to no more than a suspension of the requirement for so long as the area continues to attain the standard. If EPA ultimately redesignates the area to attainment, then the area will be entirely relieved of these requirements to the extent the maintenance plan for the area does not rely on them.*

As such, following the submission of the maintenance plan and redesignation request, the Air Program intends to withdraw the above mentioned PM<sub>2.5</sub> Attainment Demonstration, which was submitted to EPA in October 2009, because the area has already attained the NAAQS. All controls and state regulations that are included in Missouri's approved SIP will continue to remain in place to ensure that the air quality improvements that have resulted from these regulations remain permanent and enforceable. By withdrawing the attainment demonstration, the EPA administrator will no longer be required to approve or disapprove this plan. The attainment demonstration is no longer applicable because the area has attained the standard and therefore, only SIP elements that include permanent and enforceable control measures, such as regulations and consent agreements, need to be approved in order to satisfy this requirement for

redesignation. Missouri has adopted all other necessary provisions to ensure the protection of the standard including the Prevention of Significant Deterioration Program (PSD), under State rule *10 CSR 10-6.060, Construction Permits Required*. Additional information about the control measures used to attain the 1997 annual PM<sub>2.5</sub> standard can be found in Section 4 of this document.

### 2.3 Permanent and Enforceable Improvement

Requirement (iii) for redesignation states that EPA must determine that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions. Therefore, EPA must determine that the improvement in air quality between the year violations occurred and the attainment year is attributed to permanent and enforceable emission reductions. Section 4 of this document presents the emission reductions that were achieved from federal and state measures in the St. Louis area. The emission reductions are not based on temporary shutdowns or adverse economic conditions, but due to permanent and enforceable control measures. This Maintenance Plan and redesignation request includes a commitment to continue to enforce all applicable requirements of past revisions to the SIP after St. Louis PM<sub>2.5</sub> nonattainment area is redesignated to attainment.

### 2.4 Maintenance Plan

Requirement (iv) for redesignation states that EPA must have fully approved a maintenance plan for the area as meeting the requirements of section 175A. Under Section 175A of the Clean Air Act, this PM<sub>2.5</sub> Maintenance Plan is the state's SIP revision to provide for continued attainment of the PM<sub>2.5</sub> NAAQS for the St. Louis nonattainment area for a period of at least ten years after EPA has formally redesignated the area to attainment. To be approvable, the state is required to have a public hearing on the Maintenance Plan prior to adoption. The Maintenance Plan must contain the following elements:

- A comprehensive “attainment year” emissions inventory of primary PM<sub>2.5</sub> and the precursors of secondary PM<sub>2.5</sub>: oxides of nitrogen (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>). In the Clean Air Fine Particle Implementation Rule (72 FR 20586, April 25, 2007), EPA did not make a finding that all precursors should be evaluated in each nonattainment area. Fine particulate matter, SO<sub>2</sub>, and NO<sub>x</sub> were required to be evaluated, however ammonia and volatile organic compounds were not;
- A projection of the emissions inventory forward to a year at least ten years after redesignation and a demonstration that the projected level of emissions is sufficient to maintain attainment of the PM<sub>2.5</sub> NAAQS;
- A commitment that, once redesignated, the state will continue to operate an appropriate monitoring network to verify maintenance of the attainment status;

- A demonstration of legal authority to implement and enforce all control measures contained in the SIP;
- Provisions for future updates of the inventory to enable tracking of emissions levels, including an annual emissions statement from major sources;
- Motor vehicle emissions budgets for transportation conformity for the ten-year maintenance period;
- A commitment to submit a revised Maintenance Plan eight years after redesignation;
- A commitment to enact and implement additional contingency measures expeditiously in the event that future violations of the NAAQS occur; and
- A list of potential contingency measures that would be implemented in such an event.

This Maintenance Plan and redesignation request has been prepared in accordance with the requirements specified in EPA's guidance document and additional guidance received from EPA staff. Subsections 2.4.1 – 2.4.9 of this document describe how EPA's requirements for a maintenance plan have been met.

#### *2.4.1 Public Participation*

In accordance with Section 110(a)(2) of the CAA, the Missouri is required to hold a public hearing prior to adoption of this maintenance plan and the subsequent submittal to the EPA. The Air Program notified the public and other interested parties of an upcoming public hearing and comment period thirty (30) days prior to holding such hearing for this maintenance plan as follows:

- Notice of availability of the maintenance plan and redesignation request was posted on the Department of Natural Resources' Air Pollution Control Program website by March 29, 2011: <http://www.dnr.mo.gov/env/apcp/stateplanrevisions.htm>
- The public hearing date to receive comments on the maintenance plan and redesignation request was held on April 28, 2011, beginning at 9:00 am at the Elm Street Conference Center, Bennett Springs Conference Room, 1730 East Elm Street, Jefferson City, Missouri.
- A public comment period was open after the redesignation request and maintenance plan was posted on Department of Natural Resources' Air Pollution Control Program website on March 29, 2011, and closed on May 5, 2011, seven (7) days after the public hearing.
- Notice of availability of the 2008 St. Louis PM<sub>2.5</sub> Nonattainment Area Base Year Inventory was posted on the Department of Natural Resources' Air Pollution Control Program website on July 13, 2011: <http://www.dnr.mo.gov/env/apcp/stateplanrevisions.htm>

- A public comment period was open after the 2008 St. Louis PM<sub>2.5</sub> Nonattainment Area Base Year Inventory was posted on the Department of Natural Resources' Air Pollution Control Program website by on July 13, 2011, and allowed for a public hearing to be held in regards to the document if requested. The public comment period closes on August 12, 2011.
- No public hearing was requested for the 2008 St. Louis PM<sub>2.5</sub> Nonattainment Area Base Year Inventory

#### *2.4.2 Comprehensive "Attainment Year" Emissions Inventory of Primary PM<sub>2.5</sub> Emissions and the Precursors to Secondary PM<sub>2.5</sub>*

The Air Program has developed a comprehensive emission inventory for the St. Louis PM<sub>2.5</sub> nonattainment area which includes the emissions from the following four source categories: point sources, area sources, on-road mobile sources and off-road mobile sources. The attainment year emission inventory, as required in the maintenance plan, is detailed in Section 5 of this document.

#### *2.4.3 Projected Emission Inventory for 2022*

The Air Program has compiled a list of growth and control factors and developed a county level emission inventory for the future year of 2022. These projected emissions show substantial decreases between 2008 and 2022 in cumulative emissions that contribute to PM<sub>2.5</sub> concentrations in the ambient air. This future year emission inventory is detailed in Section 5 of this document and the Air Program asserts that these projected future emission levels are sufficient to maintain attainment of the 1997 annual PM<sub>2.5</sub> NAAQS.

#### *2.4.4 Continued Monitoring Commitment*

The Air Program is committed to continue monitoring PM<sub>2.5</sub> concentrations in the St. Louis area and throughout the state in accordance with 40 CFR Part 58 and EPA approved Annual Monitoring Plans. Missouri will continue to quality assure the ambient air monitoring data in accordance with 40 CFR 58 and submit the data into the AQS in a timely fashion. Detailed information about the PM<sub>2.5</sub> monitoring network in the St. Louis nonattainment area, along with further discussion about the Air Program's continued monitoring commitment, can be found in Section 3 of this document.

#### *2.4.5 Legal Authority to Implement and Enforce*

The Missouri Air Conservation Commission has the legal authority to develop, implement and enforce regulations regarding air pollution including the requirements of this SIP submittal under section 643.050 of the Revised Statutes of Missouri, also known as the Missouri Air Conservation Law.

#### *2.4.6 Provisions for Future Updates to the Emission Inventory*

The Air Program is committed to provide future updates of the inventory to enable tracking of emissions levels during the 10-year maintenance period. State Regulation *10 CSR 10-6.110, Reporting Emissions Data, Emission Fees, and Process Information*, requires that all installations located in the state that are required to obtain air quality construction or operating permits must report their annual emissions to the Air Program. The methods for calculating and reporting their emissions are detailed in each installation's applicable permit. The data collected on emissions inventory questionnaires from permitted sources form the basis of the point source emissions inventory that is compiled on an annual basis. In addition, in compliance with the Federal Air Emission Reporting Rule (73 FR 76539), the Air program develops a comprehensive emissions inventory of point, area, and mobile sources every three years.

#### *2.4.7 Motor Vehicle Emission Budgets*

The Air Program has developed motor vehicle emissions budgets that will be used in Transportation Conformity Determinations in the St. Louis area through 2022. Section 6 of this document details the Transportation Conformity Process in the St. Louis area and specifies the 2022 motor vehicle emissions budgets for NO<sub>x</sub> and direct PM<sub>2.5</sub> emissions.

#### *2.4.8 Commitment to Revise Plan*

Under Section 175A of the Clean Air Act, an area designated as maintenance for a NAAQS is required to submit a second maintenance plan eight (8) years after redesignation of any area as an attainment area under Section 107(d). This second maintenance plan is intended to maintain the NAAQS for ten (10) years after the expiration of the initial ten year period. The Air Program recognizes the importance of an up-to-date, current maintenance plan, and commits to updating it as necessary.

#### *2.4.9 Contingency Measures*

The Air Program is committed to maintaining compliance with the 1997 annual PM<sub>2.5</sub> standard. If future violations of the standard take place, the Air Program will enact contingency measures as expeditiously as possible, but no later than 24 months after the Air Program has determined that a violation has occurred. This will allow for the area to come back in compliance with the standard as quickly as feasible, should future violations occur. Further information about this commitment to enact contingency measures, and a potential list of contingency measures that would be evaluated if the area falls out of compliance with this standard in the future are located in Section 7 of this document.

## 2.5 Section 110 and Part D Requirements

Requirement (v) for redesignation states that, all the requirements of the section 110 and part D of the CAA that were applicable prior to submittal of a complete redesignation request must be met. These requirements include an emissions inventory for a representative base year. The Air Program posted the base year 2008 inventory for the St. Louis PM<sub>2.5</sub> nonattainment area on a 30 day public notice beginning July 13, 2011. It is included as Appendix E to this document. However, other certain requirements are suspended when a nonattainment area achieves the NAAQS because these requirements are correlated to the attainment of the air quality goal and thus the intention of these requirements has been fulfilled with achievement of the NAAQS without the necessity of further submittals as long as the area does not violate the standard again. The requirements for reasonable further progress that are needed for attainment are suspended for redesignation requests as long as an area is in attainment. Furthermore, once the maintenance plan is approved and the area is redesignated to attainment, the requirements to demonstrate attainment and reasonable further progress will no longer apply. Guidance on this subject is found on page 6 of the EPA's Memorandum, *Procedures for Requests to Redesignate Areas to Attainment*, from John Calgani, Director, Air Quality Management Division, dated September 4, 1992 which states "requirements for reasonable further progress ... will not apply for redesignations because they only have meaning for areas not attaining the standard." Applicable section 110 and Part D requirements that specifically apply to the maintenance plan are addressed in this document.

### 3. PM<sub>2.5</sub> Monitoring

A state requesting redesignation must show that the area is attaining the applicable NAAQS. EPA, in turn, must determine that the annual PM<sub>2.5</sub> NAAQS in ambient air is demonstrated if the average annual number of expected exceedances is less than or equal to one. This section presents information that demonstrates St. Louis has attained the NAAQS for PM<sub>2.5</sub>. This demonstration is based on three years of quality assured monitoring data as specified in 40 CFR 58.

#### 3.1 PM<sub>2.5</sub> Monitoring Data Analysis Requirements

In 1992 the U.S. EPA published “Procedures for Processing Request to Redesignate Areas to Attainment”. This is a guidance document that details requirements nonattainment areas must meet to be redesignated to attainment.

The following are requirements regarding the use of ambient air monitoring data in demonstrating that the area is attaining the applicable NAAQS, as one of the conditions;

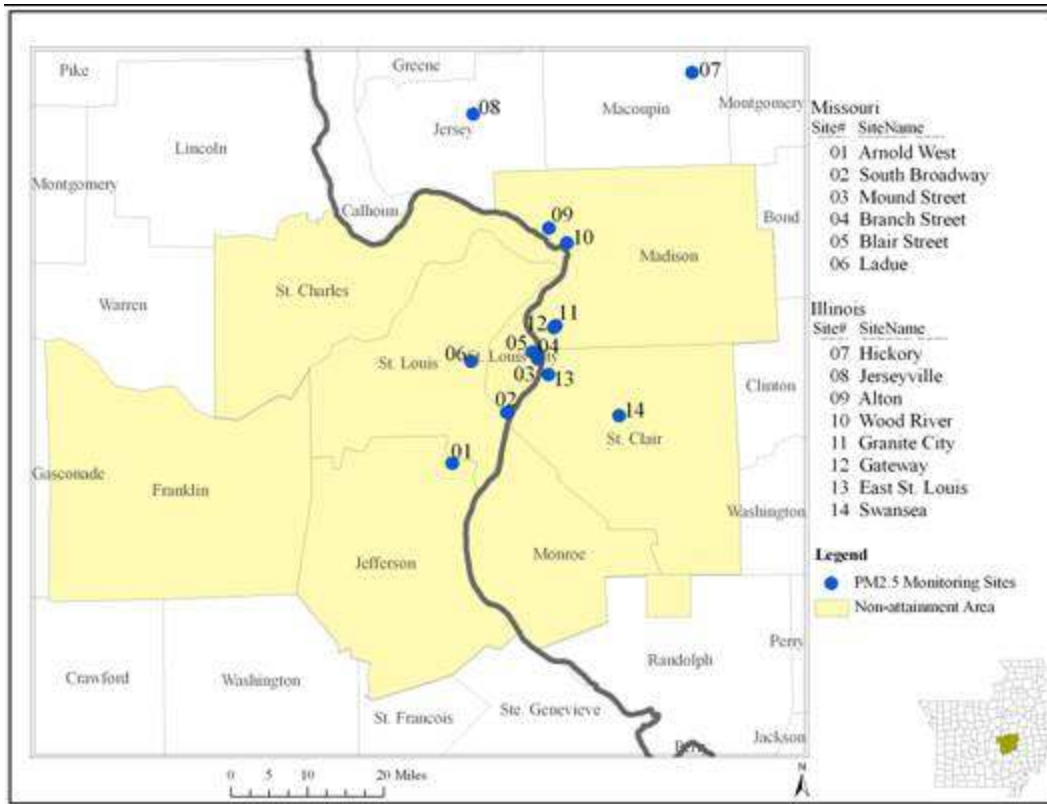
- Monitoring data must show that the non-attainment area is attaining the NAAQS
- The data should be collected and quality assured in accordance with 40 CFR 58 and recorded in the U.S. EPA Air Quality System (AQS) database in order for it to be available to the public for review.

The following subsections illustrate how each of the requirements has been addressed.

#### 3.2 St. Louis Area PM<sub>2.5</sub> Ambient Air Monitoring Network

There are currently fourteen (14) sites that monitor PM<sub>2.5</sub> in the St. Louis Region. Twelve (12) monitors are located within the St. Louis nonattainment area. Each side of the Missouri and Illinois nonattainment area has 6 monitors. In addition, Illinois operates two (2) monitors downwind of the nonattainment area. The St. Louis, Missouri network has recently been modified to include the use of PM<sub>2.5</sub> Federal Equivalent Method (FEM) continuous air samplers. Two (2) sites, Arnold West and Ladue now monitor continuous PM<sub>2.5</sub> concentrations. FEM samplers are less labor-intensive compared to Federal Reference Methods (FRM) samplers. PM<sub>2.5</sub> monitoring sites are shown in Figure 3-1.

Figure 3-1. PM<sub>2.5</sub> Monitoring Network in the St. Louis Area



### 3.3 St. Louis Area PM<sub>2.5</sub> 24-hour and Annual Concentration Data

To determine whether the NAAQS has been met, the annual PM<sub>2.5</sub> design value has been calculated for the 3-year period, 2007-2009. The current U.S. EPA method for calculating the annual PM<sub>2.5</sub> design value is to average each monitor's annual average values over a 3-year period and compare the calculated design values to the 15.0 µg/m<sup>3</sup> level of the NAAQS. Violations of the standard are determined on a per monitor basis. The calculated annual PM<sub>2.5</sub> design values for the monitors in the St. Louis nonattainment area for 2007-2009 are presented in Table 3-1. The 2007-2009 data shows that the design values at all monitoring sites are less than the level of the annual PM<sub>2.5</sub> NAAQS, demonstrating that the area now attains the annual PM<sub>2.5</sub> air quality standard.

**Table 3-1. 2007-2009 St. Louis, MO Annual PM<sub>2.5</sub> Design Values in µg/m<sup>3</sup>**

County	Monitoring Site	2007	2008	2009	Design Value
St. Louis City	Blair Street	13.9	12.9	11.5	12.8
St. Louis City	Branch Street*	15.5	13.4	12.0	13.6
St. Louis City	South Broadway	14.0	12.5	11.9	12.8
St. Louis City	Mound Street*	14.3	12.7	11.5	12.8
St. Louis	Clayton**	13.1	12.0	<u>11.3</u>	12.1
St. Louis	Ladue***	-	-	<u>11.1</u>	-
Jefferson	Arnold West***	-	-	<u>9.0</u>	-

\*Middle Scale: Design value cannot be compared to the annual standard.

\*\*Sampling discontinued.

\*\*\*FEM-TEOMS: Continuous sampler. Sampling began in 2009.

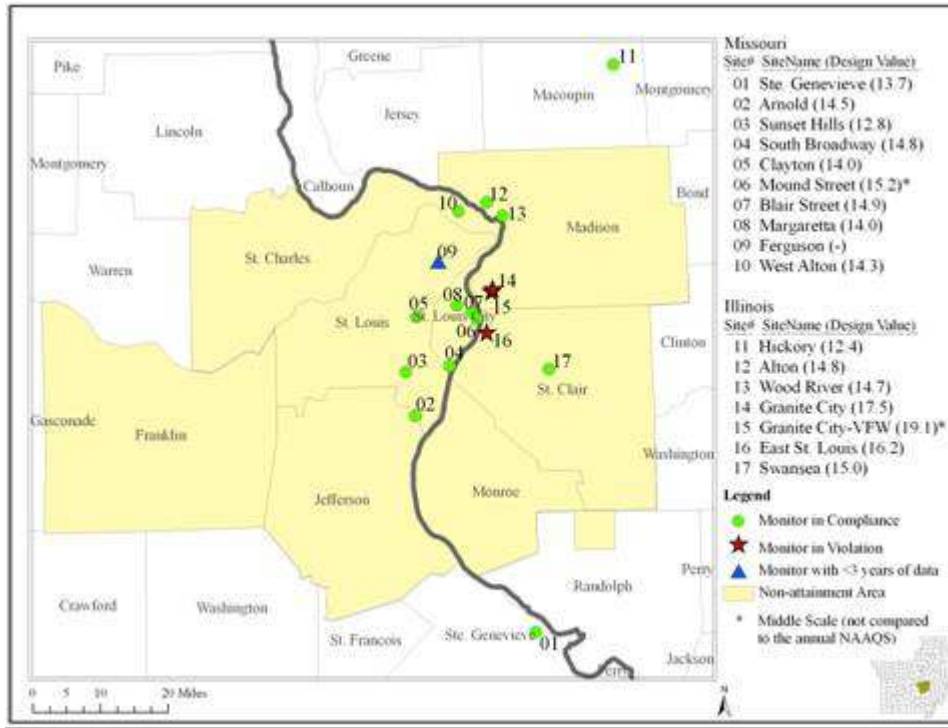
Underlined: Average is based on incomplete data.

The two maps in Figure 3-2 compare the 2001-2003 to 2007-2009 design values relative to the annual NAAQS in the St. Louis region. The 1997 annual PM<sub>2.5</sub> NAAQS is met when the annual arithmetic mean concentrations averaged over 3 years is less than or equal to 15.0 µg/m<sup>3</sup>.

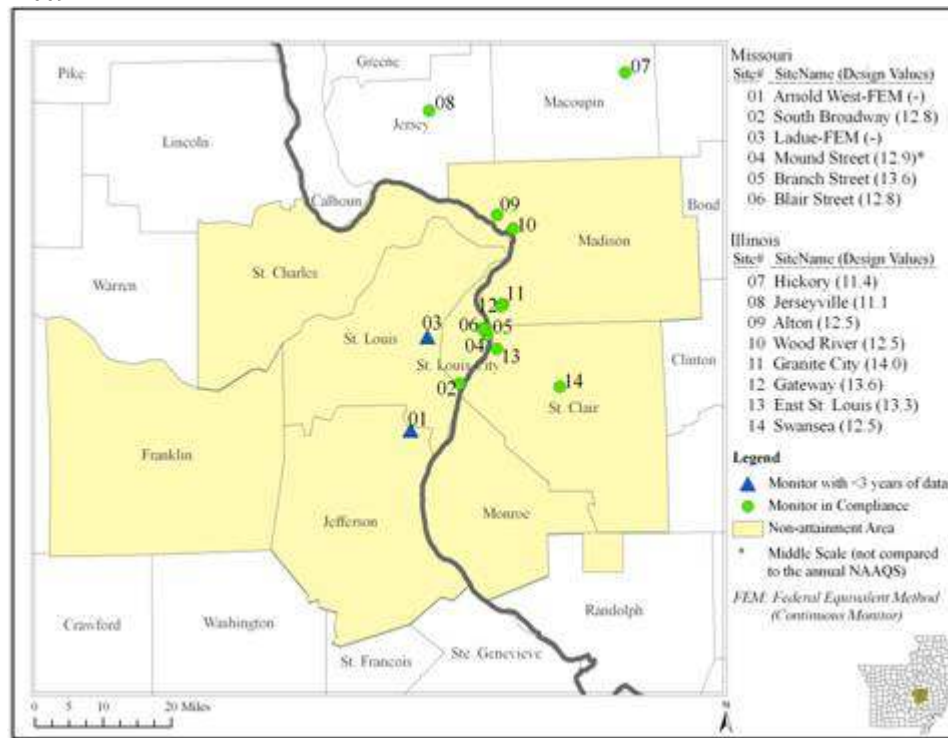
As indicated by the annual design values in the figure, the PM<sub>2.5</sub> concentrations have improved throughout the St. Louis region. According to 2001-2003 monitoring data, there were two (2) sites that violated the annual standard. Based on 2007-2009 data, all sites in the area are now in compliance with annual standard.

Figure 3-2. Comparison of the Annual Design Values in the St. Louis Area Between 2001-2003 and 2007-2009

2001-2003



2007-2009



### 3.4 PM<sub>2.5</sub> Speciation Data in the St. Louis PM<sub>2.5</sub> Nonattainment Area

During the designation process for the 1997 PM<sub>2.5</sub> standard, a speciation analysis was performed at monitors located in the St. Louis area. The speciation analysis is important in determining the largest contributing components to PM<sub>2.5</sub> monitors. This analysis was performed at three separate monitors for the years 2004, 2005, and 2006. Three monitors were selected for the analysis in order to analyze three separate area classifications: urban (Blair Street), suburban (Arnold), and rural (Bonne Terre).

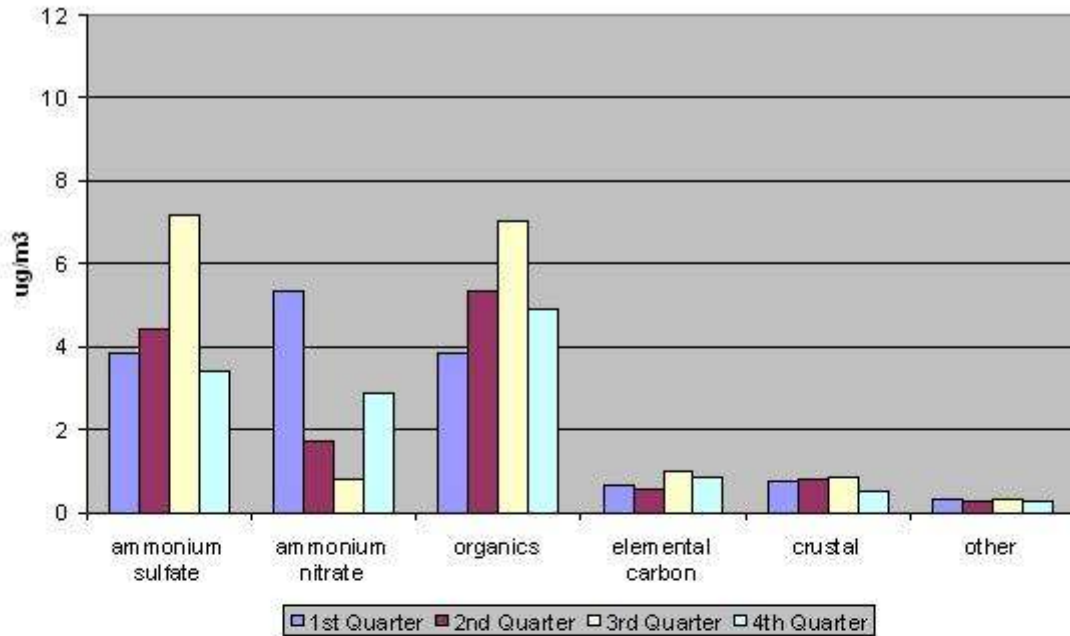
Quarterly average measurement results from these sites have been analyzed using the following assumptions, similar to those used in analyzing data from the Interagency Monitoring of Protected Visual Environment (IMPROVE) network: all sulfate is ammonium sulfate (although a small amount may actually be uncombined sulfuric acid); all nitrate is ammonium nitrate; organic mass is 1.8 times organic carbon as reported with PM<sub>2.5</sub> data minus annual site average organic carbon blank; elemental carbon is elemental carbon as reported with PM<sub>2.5</sub> data; and crustal includes Al, Si, Ca, Fe, Ti, each adjusted by a factor to account for oxides. The “other” category includes primarily other metallic elements not included in the crustal category. This calculation procedure generally over-predicts (but sometimes under-predicts) total mass slightly, so values were then normalized to total PM<sub>2.5</sub> mass.

Figures 3.3 to 3.5 show the results of this analysis for Blair St. for 2004 through 2006. Figures 3.6 to 3.8 and 3.9 to 3.11 show the results for Arnold and Bonne Terre. Six speciation categories are listed in these charts, including ammonium sulfate, ammonium nitrate, organics, elemental carbon, crustal, and other. Ammonium sulfate and ammonium nitrate result from chemical reactions in the ambient air with the PM<sub>2.5</sub> precursors SO<sub>2</sub> and NO<sub>x</sub>. Organics include all carbon containing compounds. These three categories account for over 85 percent of the total PM<sub>2.5</sub> collected at these monitors over the three years in which this analysis was performed. General trends at all three monitors show that ammonium sulfates and organics are typically higher during the warmer months of the year, while ammonium nitrates are higher during the winter months of the year.

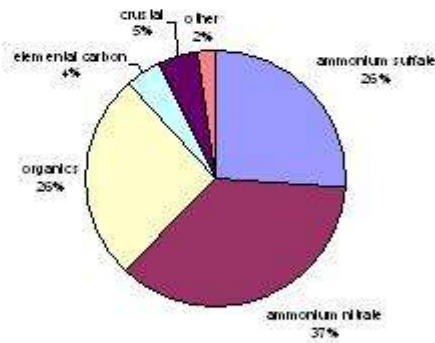
Comparing the species of PM<sub>2.5</sub> at each monitor, the ammonium sulfate concentrations are significant, ranging from 30 – 60 percent of total PM<sub>2.5</sub> mass in the summer months and roughly 25 – 40 percent of total PM<sub>2.5</sub> mass in the winter. The sulfate contribution is similar at all three monitors, suggesting that the ambient PM<sub>2.5</sub> resulting from SO<sub>2</sub> emissions is not concentrated in urban or suburban areas, but rather regional in nature. Nitrates are significant in winter months, contributing roughly 20 – 35 percent of the total PM<sub>2.5</sub> mass collected at these monitors during the first and fourth quarters of each year. The nitrate ratio for Arnold to Blair St. is close to one, while the ratio for Bonne Terre to Blair St. is less than one, suggesting that some part of the nitrate particulate matter results from localized urban and/or suburban sources in contrast to sulfate, which appears to result from regional sources. Organics are also significant at all three monitors ranging from 25 – 40 percent of the total PM<sub>2.5</sub> mass. Concentrations of organic PM<sub>2.5</sub> are highest in the summer months, but do not appear to be as seasonally dependent as sulfates and nitrates. The organic ratio for Arnold to Blair St. is close to one, while the ratio for Bonne Terre to Blair St. is less than one, suggesting that some part of the organic particulate matter results from localized urban and/or suburban sources similarly to nitrates. The speciation

categories of elemental carbon, crustal, and other, are not significant percentages of the total PM<sub>2.5</sub> concentrations at these three monitors. Because the concentrations organics, nitrates, and elemental carbon are all higher in the urban and suburban areas compared to the rural site, it is believed that high concentrations of gasoline and diesel vehicles could be major contributors to these speciation categories.

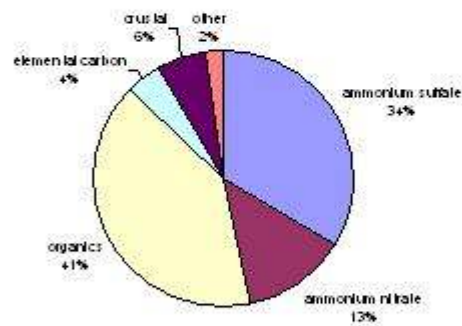
Figure 3-3 Blair Street PM<sub>2.5</sub> Speciation 2004



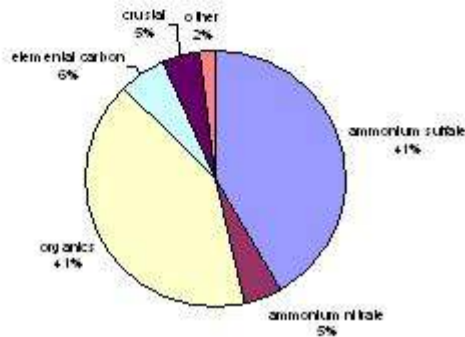
Blair St. PM<sub>2.5</sub> Speciation, 1st Quarter 2004



Blair St. PM<sub>2.5</sub> Speciation, 2nd Quarter 2004



Blair St. PM<sub>2.5</sub> Speciation, 3rd Quarter 2004



Blair St. PM<sub>2.5</sub> Speciation, 4th Quarter 2004

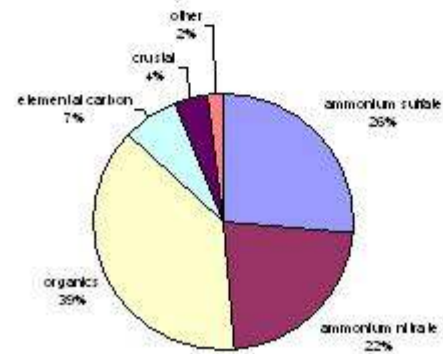
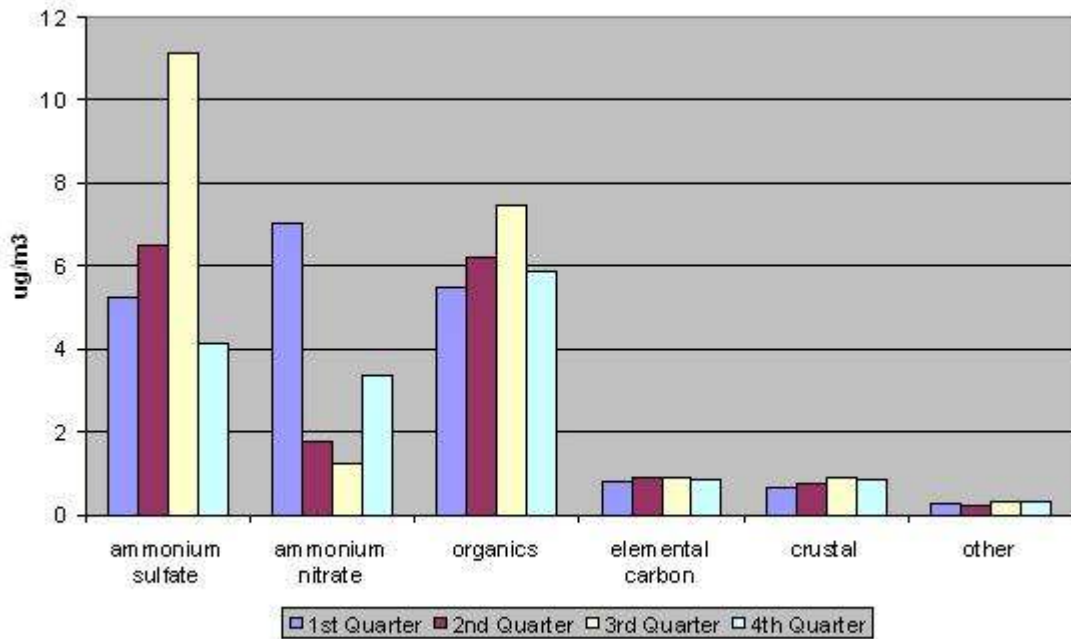
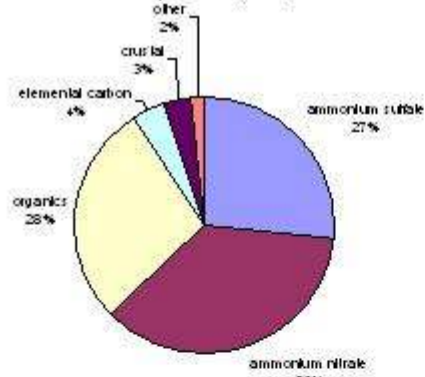


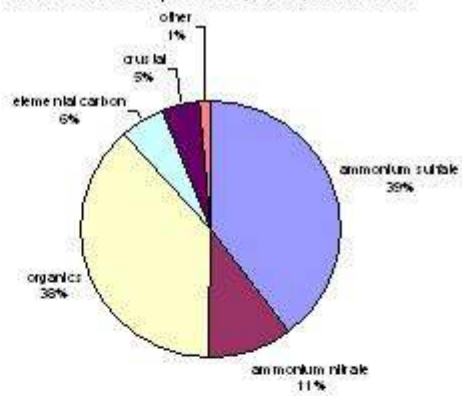
Figure 3-4 Blair Street PM<sub>2.5</sub> Speciation 2005



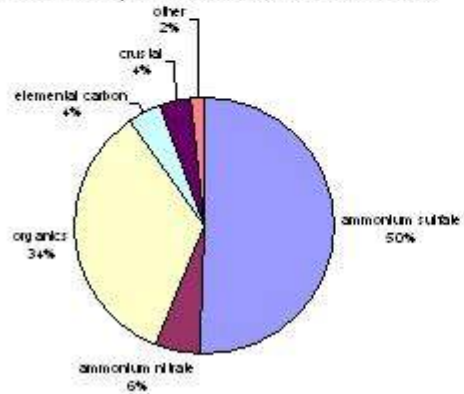
Blair St. PM<sub>2.5</sub> Speciation, 1st Quarter 2005



Blair St. PM<sub>2.5</sub> Speciation, 2nd Quarter 2005



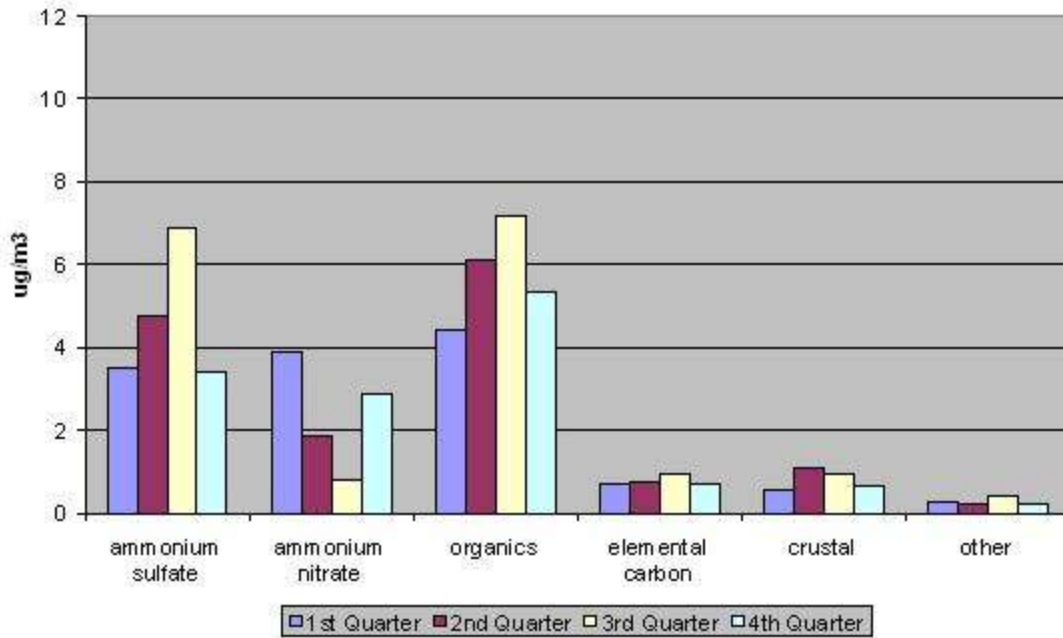
Blair St. PM<sub>2.5</sub> Speciation, 3rd Quarter 2005 Quarter



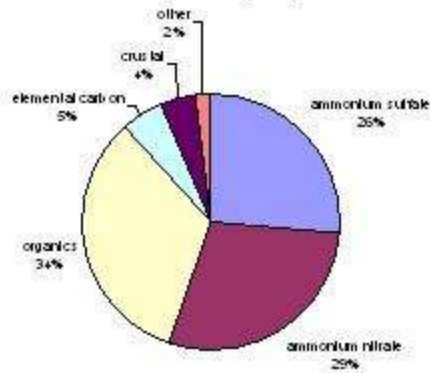
Blair St. PM<sub>2.5</sub> Speciation, 4th Quarter 2005



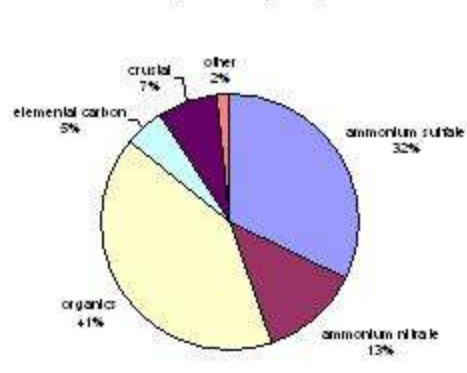
Figure 3-5 Blair Street PM<sub>2.5</sub> Speciation 2006



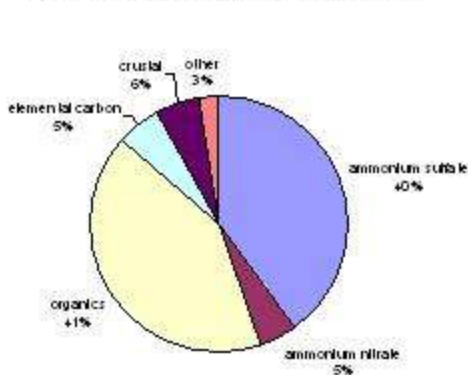
Blair St. PM<sub>2.5</sub> Speciation, 1st Quarter 2006



Blair St. PM<sub>2.5</sub> Speciation, 2nd Quarter 2006



Blair St. PM<sub>2.5</sub> Speciation, 3rd Quarter 2006



Blair St. PM<sub>2.5</sub> Speciation, 4th Quarter 2006

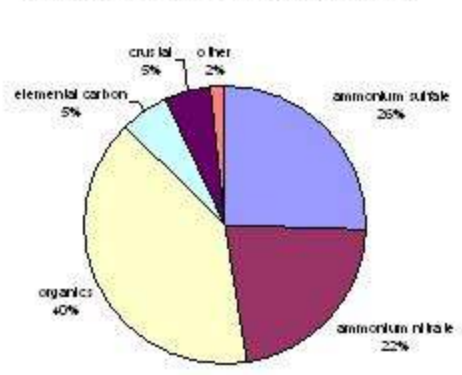
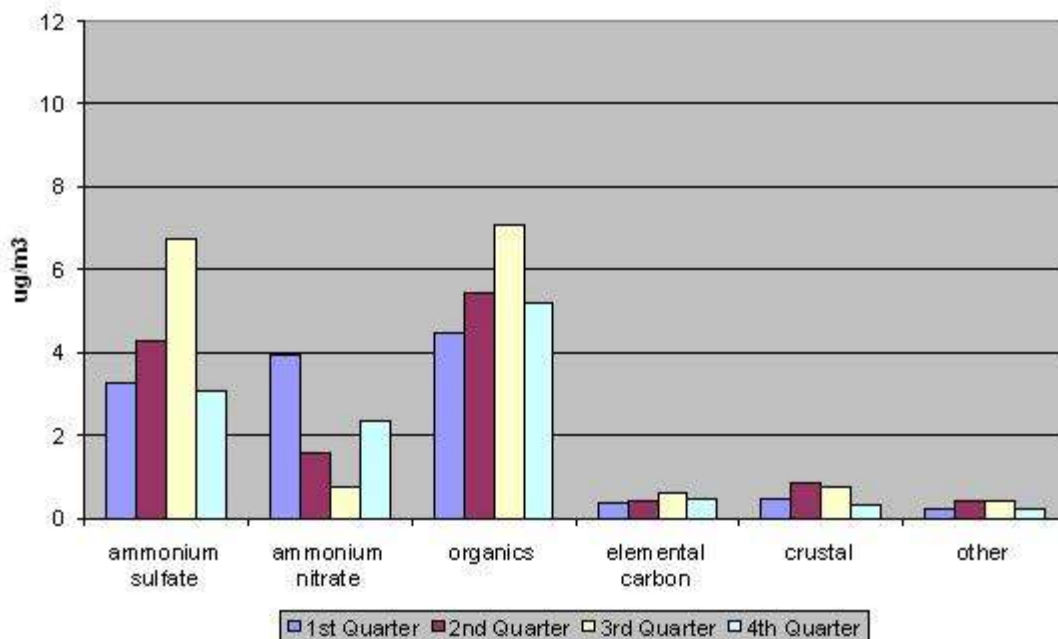
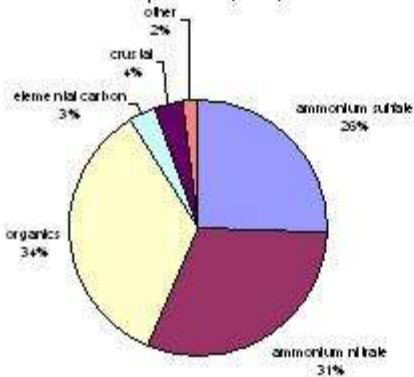


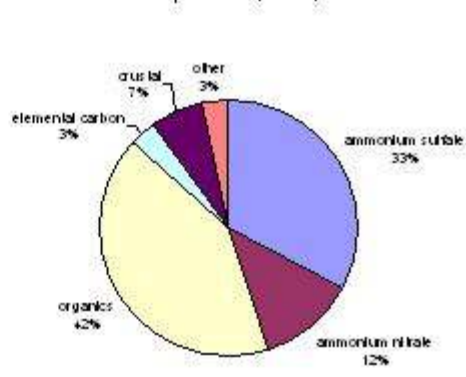
Figure 3-6 Arnold PM<sub>2.5</sub> Speciation 2004



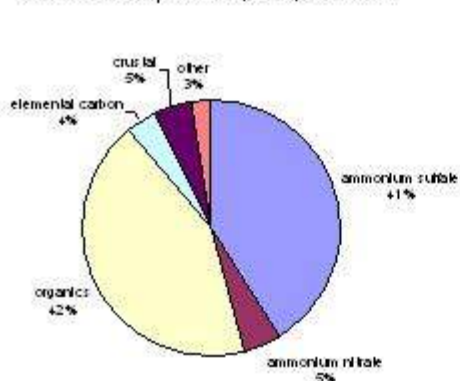
Arnold PM<sub>2.5</sub> Speciation, 1st Quarter 2004



Arnold PM<sub>2.5</sub> Speciation, 2nd Quarter 2004



Arnold PM<sub>2.5</sub> Speciation, 3rd Quarter 2004



Arnold PM<sub>2.5</sub> Speciation, 4th Quarter 2004

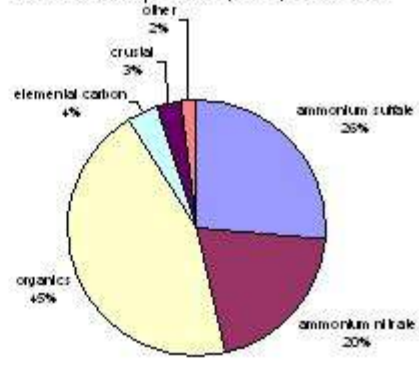
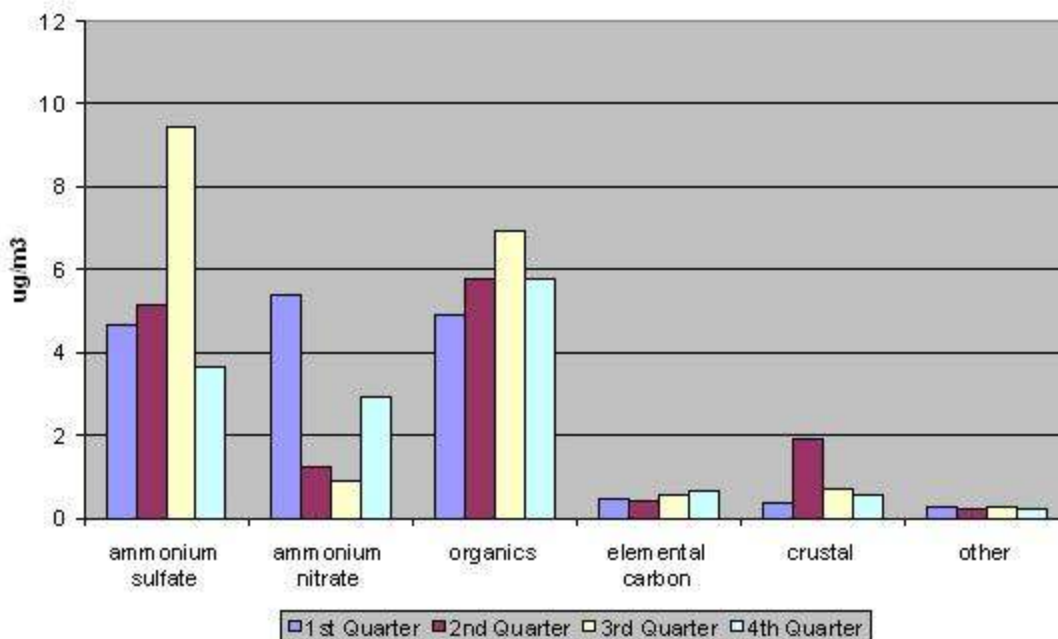
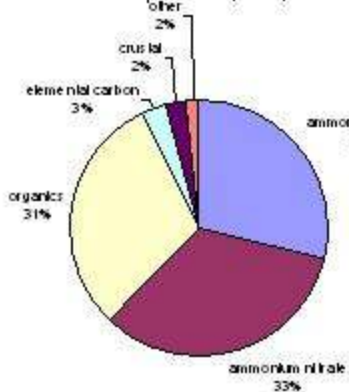


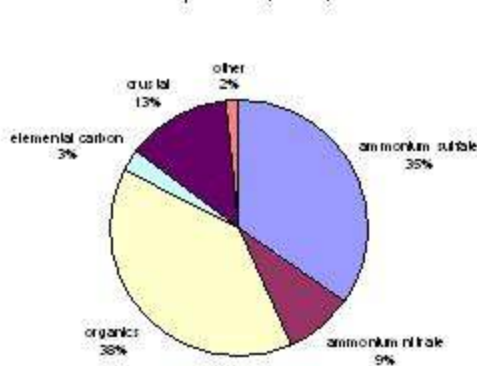
Figure 3-7 Arnold PM<sub>2.5</sub> Speciation 2005



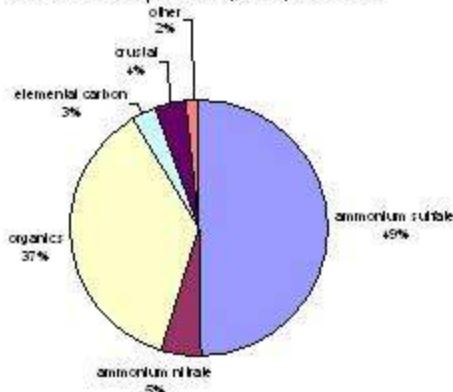
Arnold PM<sub>2.5</sub> Speciation, 1st Quarter 2005



Arnold PM<sub>2.5</sub> Speciation, 2nd Quarter 2005



Arnold PM<sub>2.5</sub> Speciation, 3rd Quarter 2005



Arnold PM<sub>2.5</sub> Speciation, 4th Quarter 2005

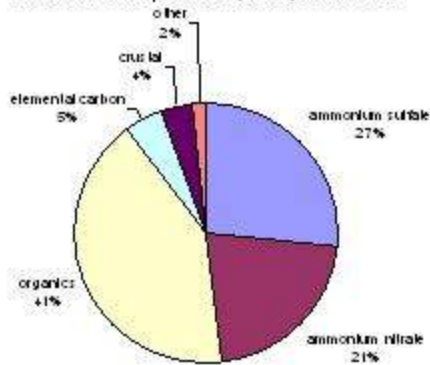
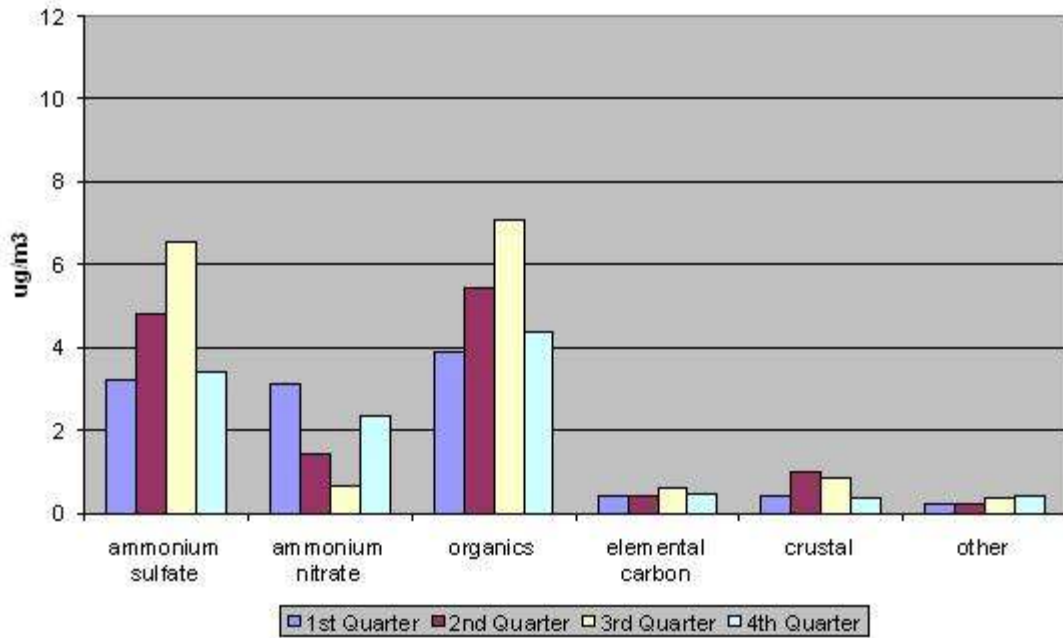
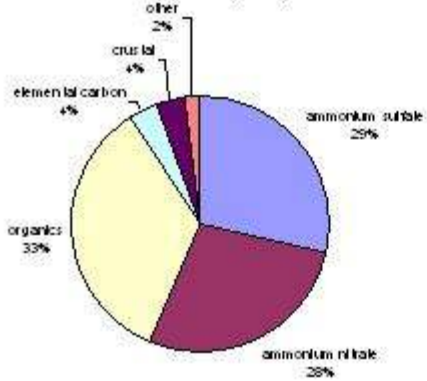


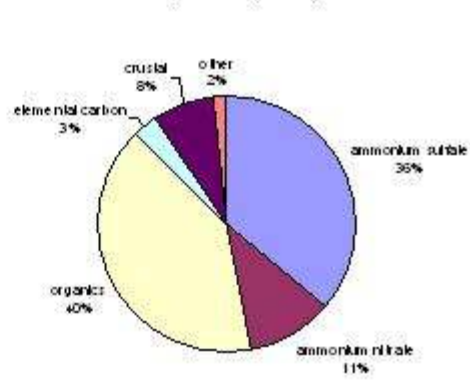
Figure 3-8 Arnold PM<sub>2.5</sub> Speciation 2006



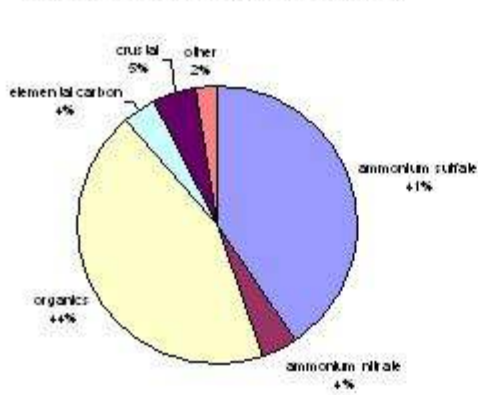
Arnold PM<sub>2.5</sub> Speciation, 1st Quarter 2006



Arnold PM<sub>2.5</sub> Speciation, 2nd Quarter 2006



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Arnold PM<sub>2.5</sub> Speciation, 4th Quarter 2006

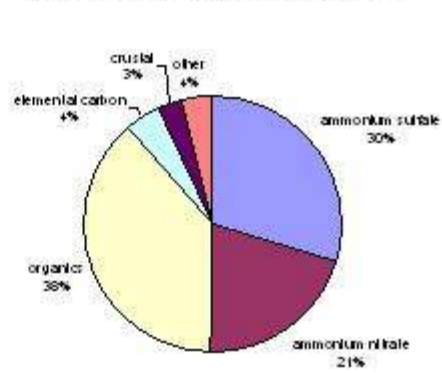
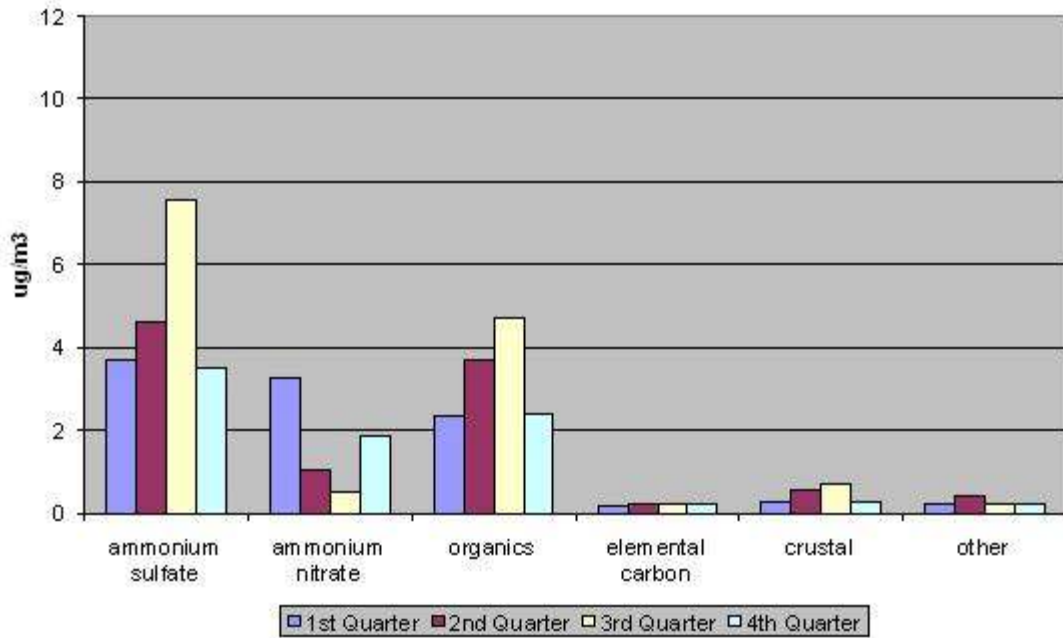
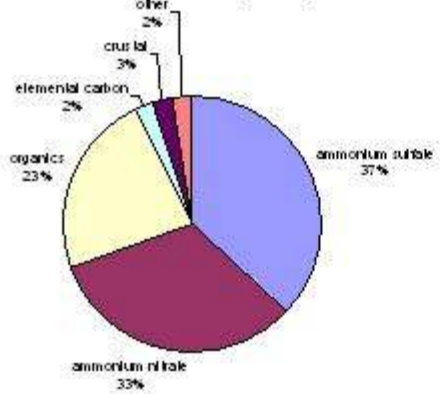


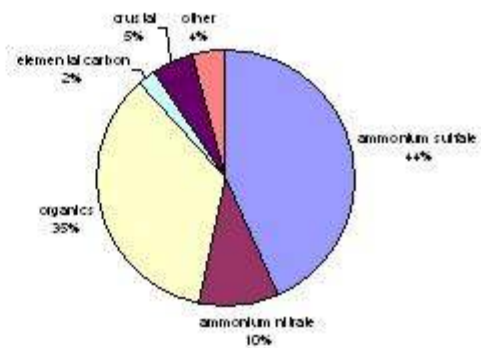
Figure 3-9 Bonne Terre PM<sub>2.5</sub> Speciation 2004



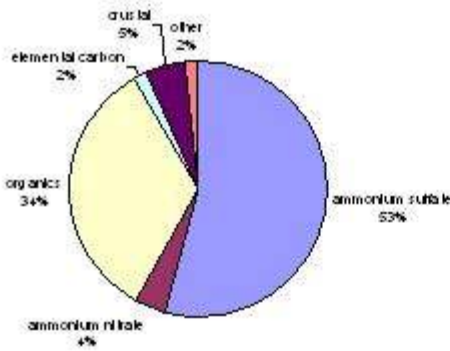
Bonne Terre PM<sub>2.5</sub> Speciation, 1st Quarter 2004



Bonne Terre PM<sub>2.5</sub> Speciation, 2nd Quarter 2004



Bonne Terre PM<sub>2.5</sub> Speciation, 3rd Quarter 2004



Bonne Terre PM<sub>2.5</sub> Speciation, 4th Quarter 2004

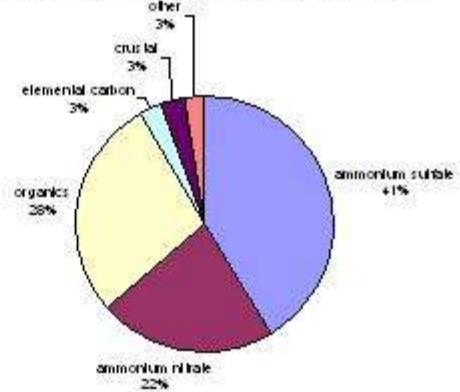
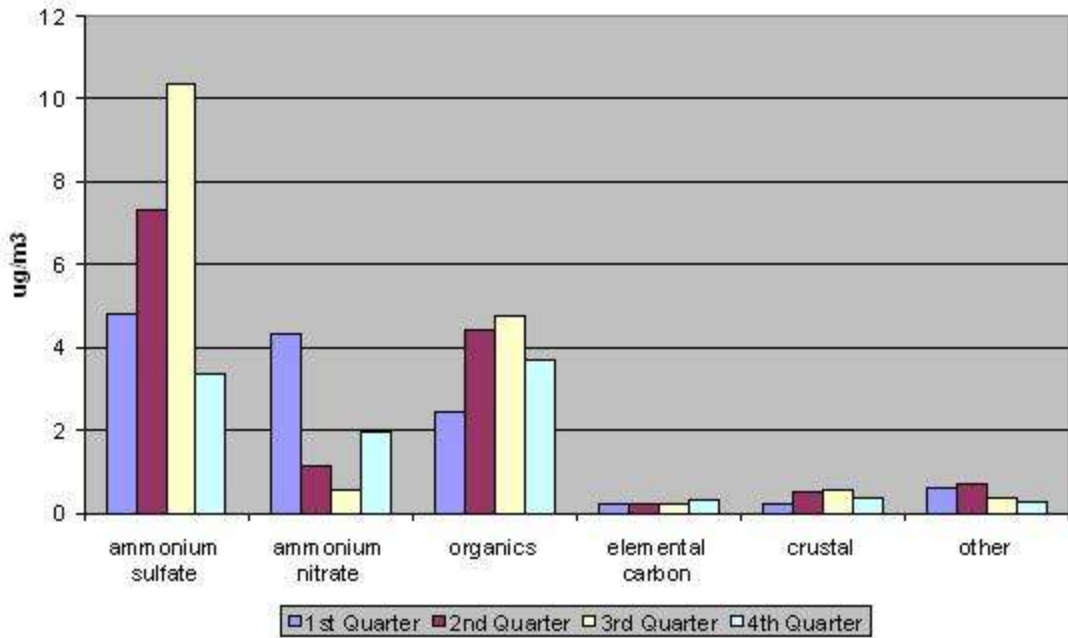
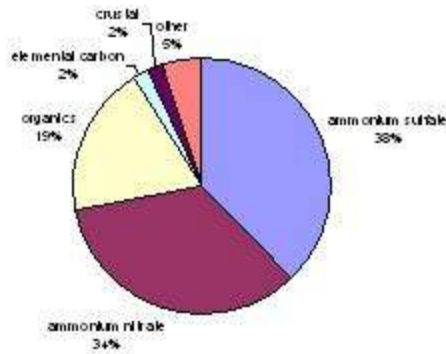


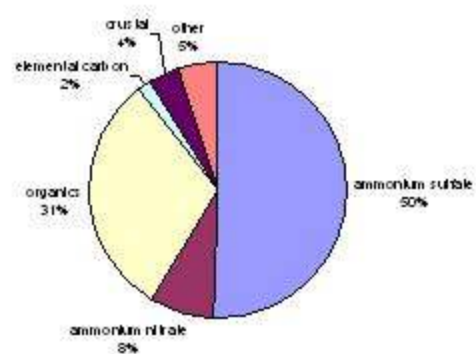
Figure 3-10 Bonne Terre PM<sub>2.5</sub> Speciation 2005



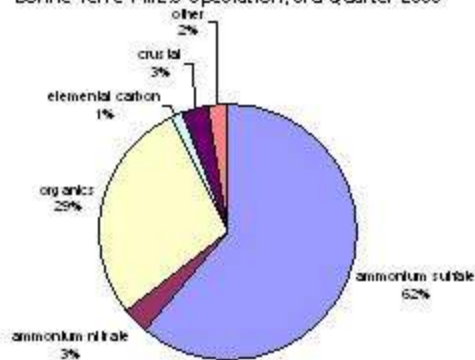
Bonne Terre PM<sub>2.5</sub> Speciation, 1st Quarter 2005



Bonne Terre PM<sub>2.5</sub> Speciation, 2nd Quarter 2005



Bonne Terre PM<sub>2.5</sub> Speciation, 3rd Quarter 2005



Bonne Terre PM<sub>2.5</sub> Speciation, 4th Quarter 2005

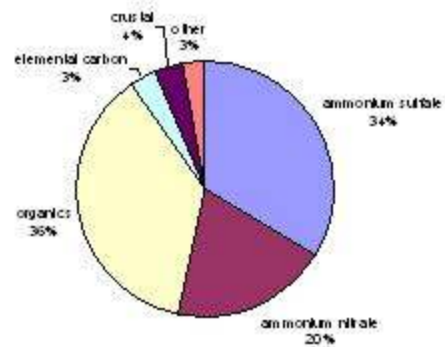
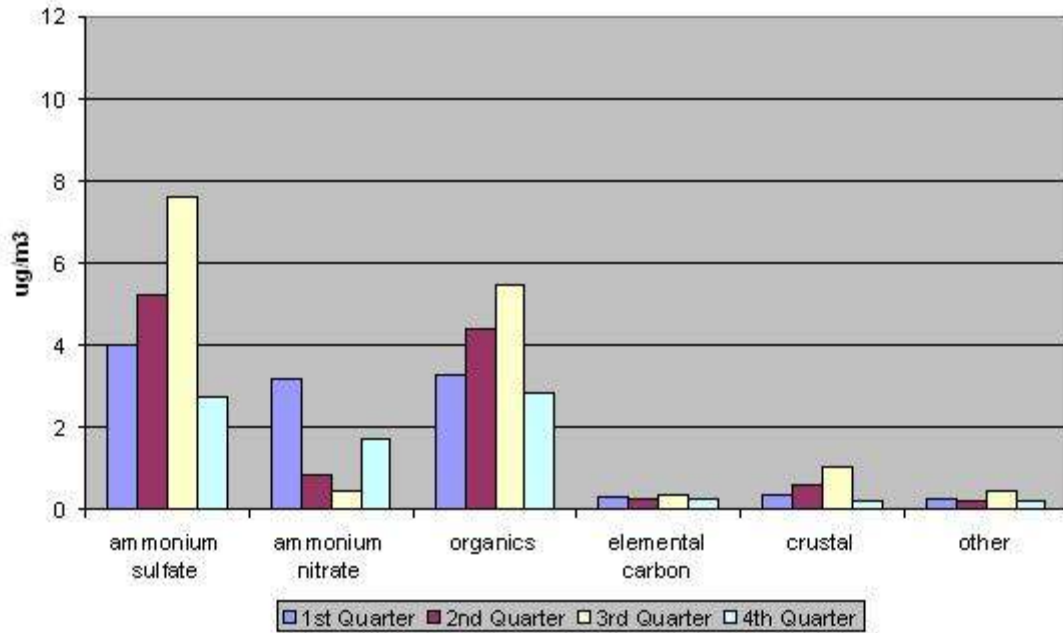
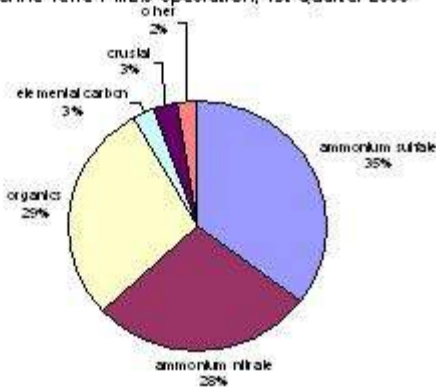


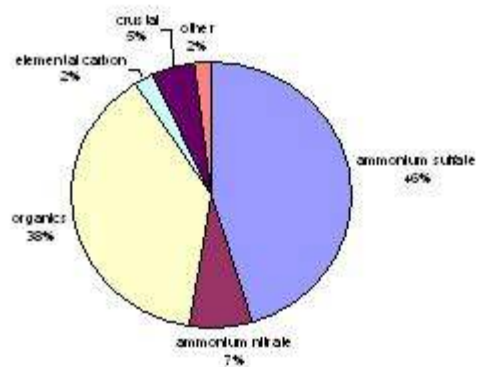
Figure 3-11 Bonne Terre PM<sub>2.5</sub> Speciation 2006



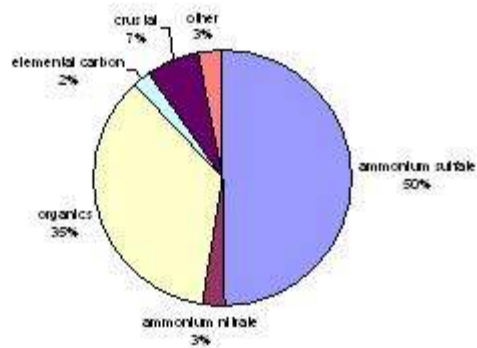
Bonne Terre PM<sub>2.5</sub> Speciation, 1st Quarter 2006



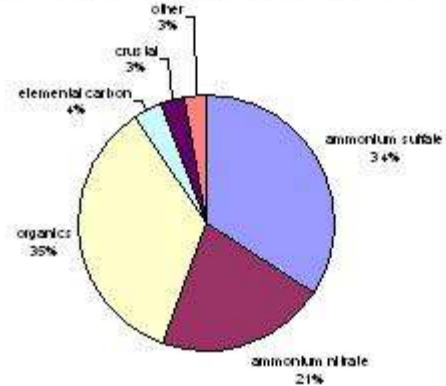
Bonne Terre PM<sub>2.5</sub> Speciation, 2nd Quarter 2006



Bonne Terre PM<sub>2.5</sub> Speciation, 3rd Quarter 2006



Bonne Terre PM<sub>2.5</sub> Speciation, 4th Quarter 2006



### 3.5 Missing Data under the 1997 Annual PM<sub>2.5</sub> Standard

Annual PM<sub>2.5</sub> attainment is determined according to federal procedures cited in Appendix N to Part 50—Interpretation of the National Ambient Air Quality Standards for PM<sub>2.5</sub>. For a single site, 3 years of valid annual means are required to produce a valid annual standard design value. A year meets data completeness requirements when at least 75 percent of the scheduled sampling days for each quarter have valid data. Quarterly data capture rates (expressed as a percentage) are specifically calculated as the number of creditable samples for the quarter divided by the number of scheduled samples for the quarter, the result then multiplied by 100 and rounded to the nearest integer. Years with at least 11 samples in each quarter can be considered valid, as long as the quarters meet the capture requirements and other certain requirements are met. (See abovementioned CFR for further information.) If these criteria are not met, then compliance with the annual PM<sub>2.5</sub> standard cannot be established. To date, acceptable monitoring has been maintained and exceeded in the Missouri portion of the St. Louis nonattainment area for the annual PM<sub>2.5</sub> standard.

### 3.6 Quality Assurance

The Missouri ambient air monitoring data used in the above analysis has been quality assured in accordance with 40 CFR Part 58 and the Missouri Quality Assurance Project Plan (QAPP). The Missouri QAPP outlines standard operating procedures for operating the monitoring network and validating the data. Illinois EPA has a similar quality assurance system. In addition, the network is reviewed annually through the Annual Monitoring Plans, according to 40 CFR Part 58.10. A site can be discontinued or relocated based on the annual review and with approval from the EPA Regional Administrator. Both Missouri and Illinois EPA quality assured ambient air monitoring data is submitted into the AQS database and available to the public.

### 3.7 Continued Monitoring Commitment

The Air Program is committed to continue monitoring PM<sub>2.5</sub> concentrations in the St. Louis area and throughout the state in accordance with 40 CFR Part 58 and EPA approved Annual Monitoring Plans. Missouri will continue to quality assure the ambient air monitoring data in accordance with 40 CFR 58 and submit the data into the AQS in a timely fashion.

While the St. Louis metropolitan statistical area (MSA) meets and goes beyond the minimum monitoring requirement for PM<sub>2.5</sub> (40 CFR 58 Appendix D, Table D-5), revisions to the Ambient Air Monitoring Regulations (71 Federal Register 61240, October 17, 2006) note “While the final rule of regulations requires fewer monitors than are now operating for O<sub>3</sub> and PM<sub>2.5</sub>, as did the pre-existing monitoring rule, EPA does not intend to encourage net reductions in the number of O<sub>3</sub> and PM<sub>2.5</sub> monitoring sites in the U.S. as a whole. The surplus in the existing networks relative to minimum requirements gives States more flexibility to choose where to apply monitoring resources for O<sub>3</sub> and PM<sub>2.5</sub>”. The Air Program’s commitment is to continue working with the EPA to ensure that the PM<sub>2.5</sub> monitoring network is sufficiently meeting the monitoring requirement of 40 CFR 58 and its monitoring objectives.

### 3.8 Clean Data Determination

On March 17, 2010, Missouri submitted a letter to the EPA advising them of the St. Louis nonattainment area's 2007-2009 PM<sub>2.5</sub> air quality monitoring data and requesting the determination of attainment, also called a Clean Data Determination. On May 23, 2011, EPA published a final rule in the Federal Register stating that the St. Louis PM<sub>2.5</sub> nonattainment area covering both Missouri and Illinois has attained the 1997 annual PM<sub>2.5</sub> standard based on three years of quality assured ambient air quality data (76 FR 29652, May 23, 2011).

#### 4. Redesignation Request: Emission Inventory and Controls from 2002 – 2008

A redesignation request must contain a demonstration that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emissions reductions. As described previously in Section 3, a 3-year monitoring period is used to evaluate whether actual air quality attainment has been achieved. In this section, the “attainment year” refers to the mid-point year (2008) of the three-year period (2007-2009) used to demonstrate attainment, and the base year refers to the mid-point year (2002) of the three year period used to determine the designation of the nonattainment area. The inventories detailed in this section for 2002 and 2008 include data categories for point, area, and mobile emissions. Additional details for the base and attainment year inventories for 2002 and 2008 are found in Appendices A and B, respectively.

In the Clean Air Fine Particle Implementation Rule, EPA did not make a finding that all precursors and pollutants should be evaluated in each nonattainment area. Fine particulate matter, SO<sub>2</sub>, and NO<sub>x</sub> were required to be evaluated; however ammonia and volatile organic compounds were not. EPA considers SO<sub>2</sub> to be an important precursor to PM<sub>2.5</sub> formation in all areas and has a strong regional impact on PM<sub>2.5</sub> concentration. EPA also considers NO<sub>x</sub> to be a presumptive precursor unless demonstrated otherwise. For these reasons, this section includes SO<sub>2</sub>, NO<sub>x</sub>, and direct PM<sub>2.5</sub> emissions only.

##### 4.1 Base Year and Attainment Year Inventories

Table 4.1 is a comprehensive emissions inventory for the St. Louis PM<sub>2.5</sub> nonattainment area, including point, area, on-road mobile, and off-road mobile sources for primary PM<sub>2.5</sub> as well as precursors of PM<sub>2.5</sub> (NO<sub>x</sub> and SO<sub>2</sub>) for the base year, 2002. Table 4.2 is a comprehensive emissions inventory for the St. Louis PM<sub>2.5</sub> nonattainment area for direct PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> for the attainment year, 2008. The Air Program selected 2008 emissions data to represent the “attainment year” since it is the middle year of the 3-year period (2007-2009) which demonstrates monitored attainment. Both the 2002 and 2008 inventories are based on actual activity levels.

The U.S. EPA’s PM<sub>2.5</sub> Emissions Inventory Guidance requires that states with PM<sub>2.5</sub> nonattainment areas prepare and submit a 2002 base year inventory of anthropogenic sources of direct PM<sub>2.5</sub> and precursors of secondary PM<sub>2.5</sub> emissions, namely NO<sub>x</sub> and SO<sub>2</sub>. This base year inventory included emissions from point, area, on-road mobile and off-road mobile emissions. Table 4.2 summarizes 2002 emissions by major source category and by pollutant for the St. Louis nonattainment area and comes from EPA’s 2002 National Emissions Inventory (NEI) database. The supporting documentation and sources of information used to develop this inventory can be found in the above mentioned document, and for convenience, summary tables of emissions from each source category are listed in Appendix A of this document.

For the 2008 “attainment year” emissions inventory, emissions for point and area categories were submitted to EPA as required by the Consolidated Emissions Reporting Rule (CERR) in May 2010. This emissions data was submitted by the Air Program to EPA, to be used in EPA’s 2008

NEI database. Point source annual emissions for the pollutants of concern were compiled from Missouri's Air Emissions Database as submitted to EPA. Area source emissions were calculated using the most recently available methodologies and emissions factors from U.S. EPA along with activity data (typically population, employment, fuel use, etc.) specific to 2008. Biogenic emissions were not included in these summaries.

For Section 4 of this document, the 2008 mobile emissions were created using Mobile6.2 via the National Mobile Inventory Model (NMIM) with 2008 vehicle miles traveled (VMT) data provided by the East West Gateway Council of Governments in coordination with the Interagency Council of Governments. The 2008 VMT data was generated from East-West Gateway's Traffic Demand Model and then compared to Highway Performance Monitoring System (HPMS) data. Through this comparison, calibration factors were developed and then applied to the VMT data from the Traffic Demand Model in order to estimate the actual 2008 VMT for the St. Louis nonattainment area. The NMIM National County Database (NCD) was updated with Missouri specific data. Please see Appendix B-3 for additional details regarding the 2008 on-road mobile emissions calculated using Mobile 6.2 via NMIM.

The EPA's Mobile6.2 emissions model was used to generate the mobile source emissions in this section in order to allow for a useful comparison between 2002 and 2008 mobile emissions. The mobile emissions generated for the 2002 emissions inventory used Mobile6.2, and it was necessary to use the same mobile emission model to compare the base and attainment year mobile source emissions. However, in Section 5 of this document, the 2008 and 2022 mobile source emissions were generated using EPA's Motor Vehicle Emissions Simulator (MOVES) 2010a. More information about the use of these two different emission models can be found in Section 5 and Appendix B of this document.

Tables 4-1 and 4-2 summarize the 2002 and 2008 emissions estimates for the St. Louis PM<sub>2.5</sub> nonattainment area, respectively. Table 4.3 shows the differences in inventories between these two years for each source category and pollutant of concern. As seen in Table 4-3, emissions of direct PM<sub>2.5</sub> decreased by 4,171 tons/year, NO<sub>x</sub> emissions decreased by 56,082 tons/year, and SO<sub>2</sub> emissions increased by 36,204 tons/year. However, as noted below, a large percentage of the apparent SO<sub>2</sub> emissions increase is due to differences in emission factors used to calculate emissions in 2002 and 2008, not to an actual increase in SO<sub>2</sub> emissions. The substantial reductions in PM<sub>2.5</sub> and NO<sub>x</sub> emissions have resulted in the improved monitored PM<sub>2.5</sub> concentrations in the St. Louis nonattainment area.

Also, as seen Figures 3-3 through 3-11 in subsection 3.4 of this document, organic compounds make up a large percentage of the total PM<sub>2.5</sub> mass that is collected at the monitors in the St. Louis area, particularly in urban and suburban areas. On-road mobile sources are believed to be major contributors to this speciation category of PM<sub>2.5</sub>. Due to the phase in of federal motor vehicle standards, and the retirement of older higher polluting and less efficient vehicles, it is believed that this has contributed not only to reductions in direct PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> emissions, but also organic compounds that have a significant impact on the monitors in the St. Louis area.

**Table 4-1. 2002 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Emissions for the Missouri Side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area (tons per year)**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources	4,607	44,198	156,999
Area Sources	14,833	9,929	17,232
On-Road Mobile Sources	1,302	68,899	1,809
Off-Road Mobile Sources	1,587	27,437	2,075
<b>Total</b>	<b>22,329</b>	<b>150,463</b>	<b>178,115</b>

**Table 4-2. 2008 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Emissions for the Missouri Side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area (tons per year)**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources	3,493	31,103	201,701
Area Sources	12,695	4,426	11,538
On-Road Mobile Sources	670	37,396	356
Off-Road Mobile Sources	1,300	21,456	724
<b>Total</b>	<b>18,159</b>	<b>94,381</b>	<b>214,319</b>

**Table 4-3. Comparing 2002 and 2008 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Emissions for the Missouri Side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources*	- 1,114	- 13,095	+ 44,702
Area Sources*	- 2,138	- 5,503	- 5,694
On-Road Mobile Sources*	- 632	- 31,503	- 1,453
Off-Road Mobile Sources*	- 287	- 5,981	- 1,351
<b>Total*</b>	<b>- 4,171</b>	<b>-56,082</b>	<b>+ 36,204</b>

\*Note: A negative value indicates a decrease in emissions from 2002 to 2008.  
A positive value indicates an increase in emissions from 2002 to 2008.

The increase in SO<sub>2</sub> emissions from point sources between the emission inventories from 2002 to 2008 is the result of two different factors. Over half of the increase in SO<sub>2</sub> emissions from point sources can be attributed to the Doe Run Primary Lead Smelter in Herculaneum, MO. From 2002 to 2008, the emission factor used to calculate SO<sub>2</sub> emissions at the facility increased by more than a factor of two. The 2002 emissions were based on an assumption of the percentage of lead sulfide in the ore converted to SO<sub>2</sub> air emissions, but later stack test analysis performed by Doe Run determined a higher lead sulfide conversion. The addition of a Continuous Emission Rate Monitoring System in 2009 confirms the higher emissions reported in 2008. Therefore, the increase in SO<sub>2</sub> emissions at Herculaneum between 2002 and 2008 is an artifact of an assumed rate versus a tested emissions factor.

The other half of the increase in SO<sub>2</sub> emissions from point sources in the nonattainment area is attributed to electricity production. According to the Clean Air Market Division's (CAMD's) Website (<http://camddataandmaps.epa.gov/gdm/>), heat input, a surrogate for electricity demand, for the four major electric generating units located in the nonattainment area, all of which are owned by Ameren UE, has increased by over 10% from 2002 to 2008. This increase in electricity demand has increased the amount of coal burned and the corresponding SO<sub>2</sub> emissions at these facilities. However, as exhibited by the monitoring data, the NO<sub>x</sub> and direct PM<sub>2.5</sub> emissions reductions in the St. Louis nonattainment area that occurred from 2002 to 2008 have more than compensated for the increase in SO<sub>2</sub> emissions, resulting in a downward trend of ambient air PM<sub>2.5</sub> concentrations.

## 4.2 Controls Used to Attain the Standard

The St. Louis area was designated as nonattainment of the 1997 PM<sub>2.5</sub> NAAQS in 2004. Since that time, the implementation of permanent and enforceable reductions of primary PM<sub>2.5</sub> and secondary PM<sub>2.5</sub> precursor emissions have contributed to improvements in PM<sub>2.5</sub> air quality and to the attainment of the PM<sub>2.5</sub> NAAQS. The significant reductions in NO<sub>x</sub> emissions from 2002 to 2008 were relied upon to bring the area into attainment. The primary control measures used to attain the 1997 annual PM<sub>2.5</sub> standard include:

- NO<sub>x</sub> SIP Call
- Clean Air Interstate Rule (CAIR)
- Heavy-Duty Diesel Engine Standards and Low-Sulfur Diesel
- Tier 2 Rule-Vehicle Standards
- Tier 4 Rule-Off Road Mobile Engine Standards
- Reformulated Gasoline (RFG)
- Gateway Vehicle Inspection Program
- State Regulations: *10 CSR 10-6.360 Controlling NO<sub>x</sub> Emissions From Electric Generating Units and Non-Electric Generating Boilers, 10 CSR 10-6.362 Clean Air Interstate Rule Annual NO<sub>x</sub> Trading Program, 10 CSR 10-6.364 Clean Air Interstate Rule Seasonal NO<sub>x</sub> Trading Program, 10 CSR 10-6.380 Control of NO<sub>x</sub> Emissions From Portland Cement Kilns, and 10 CSR 10-6.390 Control of NO<sub>x</sub> Emissions From Large Stationary Internal Combustion Engines.*

### 4.2.1 Federal Emission Trading Programs

The NO<sub>x</sub> SIP Call and CAIR are federal emission trading programs that were designed to reduce the transport of emissions that have significant impacts on downwind nonattainment and maintenance areas. The first year in which sources were required to comply with the NO<sub>x</sub> SIP Call was 2003. In Missouri, the NO<sub>x</sub> SIP Call only affected the eastern third of the state. The NO<sub>x</sub> SIP Call greatly reduced ozone season NO<sub>x</sub> emissions from large sources such as Electric Generating units (EGUs). According to data from CAMD's Website, the annual NO<sub>x</sub> emissions from EGUs located in the St. Louis nonattainment area have reduced by 9,295 tons from 2002 to 2008. These reductions are almost exclusively attributed to the NO<sub>x</sub> SIP Call. Additionally, the

NO<sub>x</sub> SIP Call limited NO<sub>x</sub> emissions from non-EGU boilers including those located at Anheuser Busch and Trigen Ashley Street Station. The total NO<sub>x</sub> emission reductions from point sources in the St. Louis nonattainment area from 2002 to 2008 total 13,095 tons.

CAIR replaced the NO<sub>x</sub> SIP Call and first became effective in 2009. CAIR limited the amount of annual and ozone season NO<sub>x</sub> emissions from EGUs in the entire state of Missouri. In regards to the EGUs located in the St. Louis nonattainment area, the requirements in CAIR were no more stringent than the requirements under the NO<sub>x</sub> SIP Call other than the fact that the annual NO<sub>x</sub> emissions had to be controlled in addition to ozone season NO<sub>x</sub> emissions. However, CAIR had a significant impact on the EGUs located in the western two-thirds of the state, who were now required to significantly reduce their annual and ozone season NO<sub>x</sub> emissions. Some of the facilities in the western two-thirds of the state installed controls earlier than 2009 in anticipation of CAIR. While the NO<sub>x</sub> controls added in the western two-thirds of the state do not affect the NO<sub>x</sub> emissions inventory for the St. Louis nonattainment area, they did have a positive impact in reducing the regional contribution of NO<sub>x</sub> emissions to the PM<sub>2.5</sub> monitors located in the nonattainment area. The requirements for the control of SO<sub>2</sub> under CAIR did not take effect until January 2010, so while these newer requirements are anticipated to result in improved PM<sub>2.5</sub> concentrations in the St. Louis area, they did not contribute to attainment of the annual PM<sub>2.5</sub> NAAQS for the years 2007-2009.

#### *4.2.2 Federal Mobile Source Emission Controls*

Federal and state regulations for mobile sources have been phased in since 2002 have had a positive impact on the emissions inventory by resulting in reductions in all three pollutant categories for both on-road and off-road mobile sources. Mobile source regulations including Heavy-Duty Diesel Engine Standards and Low-Sulfur Diesel, Tier 2 Rule-Vehicle Standards, Tier 4 Rule-Off Road Mobile Engine Standards, Reformulated Gasoline (RFG), and the Gateway Vehicle Inspection Program have reduced the emissions of direct PM<sub>2.5</sub> and its precursors from the mobile sector in the St. Louis nonattainment area.

Overall, the retirement of older higher polluting vehicles and the phasing in of federal mobile source standards from 2002 to 2008 have contributed to a decrease of 602 tons of direct PM<sub>2.5</sub> emissions, 37,010 tons of NO<sub>x</sub> emissions, and 2,590 tons of SO<sub>2</sub> emissions. Mobile source emissions also include organic compounds such as hydrocarbons and volatile organic compounds (VOCs). Standards for these pollutants have also been strengthened since 2002. As seen in subsection 3.4, organic compounds are a large contributor to overall PM<sub>2.5</sub>; therefore these reductions in mobile sources have a significant impact on monitors in the St. Louis area beyond the reductions in direct PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub>. The reductions in mobile source emissions are the largest contributors to attainment of the PM<sub>2.5</sub> NAAQS in the St. Louis area.

#### *4.2.3 State Regulations*

Several new state regulations that have been adopted since 2002 have had positive impacts on ambient PM<sub>2.5</sub> concentrations. These include the control of NO<sub>x</sub> emissions from cement kilns and stationary internal combustion engines. All of these rules were put in place primarily as ozone controls, but they also have co-benefits for PM<sub>2.5</sub>. The Federal NO<sub>x</sub> SIP Call Rule and the

associated emission reductions are discussed in detail in Subsection 4.2.1. State Regulation 10 CSR 10-6.360 was the rule written to address the NO<sub>x</sub> SIP Call requirements, which has had a significant effect on NO<sub>x</sub> emissions from EGUs in the nonattainment area. State Regulations 10 CSR 10-6.362 and 10 CSR 10-6.364 were written to comply with CAIR for annual and ozone season NO<sub>x</sub>. CAIR replaced the NO<sub>x</sub> SIP call and implementation for CAIR began in 2009. These five rules are listed below along with the dates they became effective.

*10 CSR 10-6.360 Controlling NO<sub>x</sub> Emissions From Electric Generating Units and Non-Electric Generating Boilers,*  
Original Effective Date: 10/30/05,

*10 CSR 10-6.362 Clean Air Interstate Rule Annual NO<sub>x</sub> Trading program,*  
Original Effective Date: 5/30/07,

*10 CSR 10-6.364 Clean Air Interstate Rule Seasonal NO<sub>x</sub> Trading program,*  
Original Effective Date: 5/30/07,

*10 CSR 10-6.380 Control of NO<sub>x</sub> Emissions From Portland Cement Kilns,*  
Original Effective Date: 10/30/05, and

*10 CSR 10-6.390 Control of NO<sub>x</sub> Emissions From Large Stationary Internal Combustion Engines*  
Original Effective Date: 10/30/05

#### 4.3 Permanent and Enforceable Controls

The Air Program provides assurance that all of the control measures adopted by state rules and listed in this document that have been used to attain the annual PM<sub>2.5</sub> standard are permanent and enforceable. Any revisions to the control measures included in this document will be submitted as a SIP revision to EPA for approval.

The NO<sub>x</sub> SIP Call included rules for the control of NO<sub>x</sub> emissions from four different source groups including electric generating units, non-electric generating boilers, Portland cement kilns, and stationary internal combustion engines. The rule written to comply with the NO<sub>x</sub> SIP Call requirements for EGUs and was *10 CSR 10-6.360 Controlling NO<sub>x</sub> Emissions From Electric Generating Units and Non-Electric Generating Boilers*, however this rule was replaced when implementation of the Clean Air Interstate Rule (CAIR) began in 2009 and CAIR will be replaced by the federal Cross-State Air Pollution Rule (CSAPR) in 2012 as discussed in the following paragraph. CSAPR, does not include regulations for non-EGU boilers, specifically Trigen Units 5 and 6 and Anheuser Busch Unit 6, however these three units have all been retired, and received retired unit exemptions that prohibit these units from operating. The signed EPA retired unit exemption forms for these three units are included in this document as Appendix G. The rules written to comply with the NO<sub>x</sub> SIP Call requirements for Portland cement kilns, and stationary internal combustion engines are *10 CSR 10-6.380 Control of NO<sub>x</sub> Emissions From Portland Cement Kilns*, *10 CSR 10-6.390 Control of NO<sub>x</sub> Emissions From Large Stationary*

*Internal Combustion Engines*, both of which currently remain permanent and enforceable in Missouri's SIP.

EPA's CSAPR will replace the 2005 CAIR beginning January 1, 2012. EPA issued CAIR on May 12, 2005 and the CAIR federal implementation plans on April 26, 2006. CSAPR establishes SO<sub>2</sub> and NO<sub>x</sub> annual emissions caps for large electric utilities in Missouri and other Eastern states. In 2008, the US Court of Appeals for the DC Circuit remanded CAIR to the agency. CSAPR, finalized on July 6, 2011, will replace CAIR using new approaches consistent with the court's opinion. The CAIR requirements for SO<sub>2</sub> and NO<sub>x</sub> pollution reductions currently remain in effect and the CAIR regional control programs will continue operating until January 1, 2012 when CSAPR replaces them. CSAPR will ensure that SO<sub>2</sub> and NO<sub>x</sub> emission reductions established by CAIR are permanent and enforceable.

Federal regulations for the control of mobile sources are expected to be tightened in the future. The mobile source control measures have resulted in the most significant amounts of PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emission reductions. The continued tightening of federal mobile source standards and phase out of older higher polluting vehicles will ensure that the emission reductions resulting from federal mobile source regulations from 2002 to 2008 will remain permanent and enforceable.

Finally, there are numerous state regulations that apply to the St. Louis area, which became effective prior to 2002, that provide permanent and enforceable controls for PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emissions. These controls include open burning restrictions, PM emission standards for industrial processes, PM emission standards for indirect heating, emission standards for incinerators, SO<sub>2</sub> emission standards, controls for emissions of fugitive dust, and Phase II of the Acid Rain Program. The following existing rules ensure that controls for PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> have been in place since before 2002 will continue to control emissions in the St. Louis area thus preventing elevated ambient concentrations of PM<sub>2.5</sub> in the area: *10 CSR 10-5.030 Maximum Allowable Emission of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating* (this rule is currently being rescinded, but will be replaced by a statewide rule, and the emission limits will remain the same for the St. Louis area), *10 CSR 10-5.040 Use of Fuel in Hand-Fired Equipment Prohibited*, *10 CSR 10-5.070 Open Burning Restrictions* (this rule was rescinded, and was replaced by statewide rule, *10 CSR 10-6.045 Open Burning Requirements*, but this change has not yet been adopted into the SIP), *10 CSR 10-6.170 Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, *10 CSR 10-6.200 Hospital, Medical, Infectious Waste Incinerators*, *10 CSR 10-6.220 Restriction of Emission of Visible Air Contaminants*, *10 CSR 10-6.260 Restriction of Emission of Sulfur Compounds*, *10 CSR 10-6.330 Restriction of Emissions from Batch-Type Charcoal Kilns*, and *10 CSR 10-6.400 Restriction of Emission of Particulate Matter From Industrial Processes*.

## 5. Maintenance Plan Demonstration: Emission Inventory and Controls from 2008 - 2022

This section provides a detailed emissions inventory for 2008 and a projected emission inventory for 2022. This section also includes a discussion of regulations that have become effective since 2008, and a list of expected future regulations that will help to continue to control PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emissions in the St. Louis area. The Air Program commits to keeping all previously adopted control measures in effect after redesignation. In addition, Prevention of Significant Deterioration (PSD) requirements will apply to construction of new major sources and to significant modifications of existing sources. Future transportation plans will also be required to conform to the conformity plan budgets. These existing and future control measures identified in the maintenance plan are relied upon to maintain the 1997 annual PM<sub>2.5</sub> NAAQS.

### 5.1 Base/Attainment Year Inventory and Future Year Emission Projections

A Maintenance Plan must contain a demonstration that the levels of emissions projected for the ten-year period following redesignation are sufficient to maintain the NAAQS. Accordingly, the Air Program has projected PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> emissions for the St. Louis nonattainment area for 2022. Emissions for this projection year are compared to emissions levels in 2008 to determine if emissions levels are sufficient to maintain the NAAQS during this period.

For the purposes of this section, a modified 2008 emission inventory was developed. The 2008 inventory in this section will act as the base year compared to the 2022 inventory detailed in this section. The base year 2008 inventory includes point, area, on-road mobile, and off-road mobile source categories. The emissions from point, area, and off-road mobile source categories are identical to the 2008 attainment year inventory listed in the previous section. However, the on-road mobile source inventory is dramatically different. This is due to the fact that a different mobile emission model was used to develop the inventory in this section of the document. The Air Program posted the base year 2008 inventory for the St. Louis PM<sub>2.5</sub> nonattainment area on a 30 day public notice beginning July 13, 2011, and no public hearing was requested. This inventory is included as Appendix E to this document.

For this Section of the document, on-road motor vehicle emissions were estimated using U.S. EPA's MOVES 2010A motor vehicle emissions model and VMT data from East-West Gateway Council of Government in coordination with the St. Louis Transportation Conformity Interagency Consultation Group. MOVES 2010A is a completely redesigned model, not just an updated version of the previous mobile model. The way MOVES calculates emissions has changed to reflect EPA's most up-to-date understanding of the emissions produced by vehicles and the various factors that affect these emissions. NO<sub>x</sub> emissions were found to be higher because of the larger portion that extended idling of heavy duty vehicles contributes to the emissions total. PM<sub>2.5</sub> emissions were also higher because of a better understanding of the effect of stop and go traffic, which has a significant impact on emissions in highly urban areas, such as the St. Louis nonattainment area. As a result of these changes to the model, MOVES produced higher emissions estimates for both 2008 and 2022 than were originally created with Mobile 6.2 via NMIM. Therefore, in addition to running a projected emissions budget for 2022 for on-road emissions, 2008 base year emissions were also run using MOVES. This allows for a meaningful

comparison in emissions from 2008 to 2022. By using MOVES to calculate the 2008 and 2022 mobile emission inventories, a smooth transition will occur to new the mobile model that must be used in future SIPs and transportation conformity determinations. Additional details about the development of the 2008 and 2022 on-road mobile emissions inventories are located in Appendices B and D of this document, respectively.

The projected point and area source emissions in the St. Louis area for 2022 were estimated using the 2008 base year inventory and growth factors appropriate for each source category. The 2008 and 2022 emissions from point, area, on-road mobile, and off-road mobile source categories are listed in Tables 5-1 and 5-2. Growth factors were created from the EGAS model (<http://www.epa.gov/ttnecas1/egas5.htm>) using economic growth projections from the Policy Insight® Model for Regional Economic Model, Inc (REMI). An adjustment was made for a consent agreement between the Air Program and MEMC Electronics Materials Incorporated for the company to continue to operate their scrubbers for the control of NO<sub>x</sub> from their acid bath/etching process. This consent agreement has previously been through Missouri's public hearing and MACC adoption process and is included as Appendix F of this document.

State regulation *10 CSR 10-5.570 Control of Sulfur Emissions from Stationary Boilers*, became effective September 30, 2009 and will continue to be permanent and enforceable. This new rule limits SO<sub>2</sub> emissions from stationary boilers in the St. Louis area. Five sources are subject to this rule including Chrysler, General Motors, Mallinckrodt, Trigen, and Anheuser Busch. Rule amendment, *10 CSR 10-6.260, Restriction of Emission of Sulfur Compounds*, limits SO<sub>2</sub> emissions from a primary lead smelter in the St. Louis Nonattainment Area. Following the adoption of 10 CSR 10-6.260, the Doe Run Resources Corporation agreed to a proposed federal Consent Decree that establishes stringent enforceable SO<sub>2</sub> emission limits and an accelerated time table for control and shutdown of the Herculaneum smelter by December 31, 2013, which will result in the elimination of virtually all SO<sub>2</sub> emissions at the facility. Finally, through review of the Federal CSAPR and consultation with Ameren UE, the owner of the four largest point source emitters of SO<sub>2</sub> and NO<sub>x</sub> in the nonattainment area, future projections of SO<sub>2</sub> and NO<sub>x</sub> from these sources were determined by using the allowance levels listed in CSAPR, along with an 18% variability factor, which was included in CSAPR for the annual SO<sub>2</sub> and NO<sub>x</sub> trading programs. CSAPR was finalized July 6, 2011. Using an 18% variability factor is very conservative and not expected to be reached in any year by these four facilities combined. Detailed information about the development of the point and area source inventories for future year, 2022, can be found in Appendix D of this document.

Off-road emissions projections for 2022 were developed using the growth factors contained in U.S. EPA's NONROAD model. The NONROAD model also includes control factors for federal controls that have been promulgated. The on-road mobile source emissions listed in Tables 5-1 and 5-2 were calculated using MOVES 2010A. The VMT data was provided by East-West Gateway Council of Government in coordination with the St. Louis Transportation Conformity Interagency Consultation Group. The figures assume the continued use of reformulated gasoline, the continued phase-in of the Tier 2 motor vehicle emissions standards, and the continuing operation of a basic vehicle inspection and maintenance program. Total VMT for 2022 were assumed to increase at a rate of 1.5 percent per year from 2008, as provided by East West Gateway Council of Governments in coordination with the St. Louis Transportation Conformity

Interagency Consultation Group. Detailed information about the development of the on-road and off-road mobile source inventories for future year, 2022, can be found in Appendix D of this document.

**Table 5-1. 2008 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Emissions for the Missouri Side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area (tons per year)**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources	3,493	31,103	201,701
Area Sources	12,695	4,426	11,538
On-Road Mobile Sources	1,987	58,509	427
Off-Road Mobile Sources	1,300	21,456	724
<b>Total</b>	<b>19,475</b>	<b>115,494</b>	<b>214,390</b>

**Table 5-2. 2022 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Projected Emissions for the Missouri Side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area (tons per year)**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources	4,109	32,641	109,323
Area Sources	13,915	4,542	11,586
On-Road Mobile Sources	533	16,493	189
Off-Road Mobile Sources	1,128	16,567	805
<b>Total</b>	<b>19,685</b>	<b>70,243</b>	<b>121,903</b>

Table 5-3 provides a comparison of emissions for the years 2008 and 2022, using the 2008 on-road mobile source emissions listed in Table 5-1 to reflect the MOVES values for consistent comparison purposes. Table 5-3 shows the differences by source category along with the total changes in emissions for each pollutant listed. As shown in the table, both SO<sub>2</sub> and NO<sub>x</sub> emissions within the nonattainment area are expected to decrease significantly between 2008 and 2022 with direct PM<sub>2.5</sub> increasing slightly. Based on these emissions trends of PM<sub>2.5</sub> and PM<sub>2.5</sub> precursors it is expected that air quality will continue to meet the PM<sub>2.5</sub> NAAQS throughout the maintenance period.

**Table 5-3. Comparison of 2008 and 2022 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Emissions for the Missouri side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area (tons per year)**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources*	+ 616	+1,538	- 92,378
Area Sources*	+ 1,220	+ 116	+ 48
On-Road Mobile Sources*	- 1,454	- 42,016	- 238
Off-Road Mobile Sources*	- 172	- 4,889	+ 81
<b>Total*</b>	<b>+ 210</b>	<b>- 45,251</b>	<b>- 92,487</b>

\*Note: A negative value indicates a projected decrease in emissions from 2008 to 2022. A positive value indicates a projected increase in emissions from 2008 to 2022.

It should be noted that the projected increase in emissions in all three pollutant categories for area sources are based on (EGAS) growth factors. Due to the use of these growth factors, emissions of NO<sub>x</sub> and PM<sub>2.5</sub> from area sources are projected to increase significantly by 2022. However, these projected increases are likely overstated and actual area source emissions of NO<sub>x</sub> and PM<sub>2.5</sub> are not expected to increase as much as the growth factors suggest. EPA's Regulatory Impact Analysis (RIA) for the 2006 PM NAAQS rule, Appendix D (<http://www.epa.gov/ttn/ecas/regdata/RIAs/Appendix%20D--Inventory.pdf>), notes on pages D-29 to D-36 that though REMI data was used in their emission forecasting method, the oversimplification of emissions growth based on economic factors likely overestimates projected emissions. EPA's recognition of the downward trend in emissions during times of economic growth supports the conclusion that the PM<sub>2.5</sub> and NO<sub>x</sub> increases for area sources are likely an artifact of the growth methodology. From page D-36:

*-While it is not clear that all of the factors that have served to produce this historical decline will continue to operate in the future, it appears unreasonable to assume that we currently have arrived at an 'inflection point' past which the trend will stop or reverse itself. Indeed, because the available data show that a number of large sources in the sectors of interest have no or limited pollution controls, it is reasonable to expect emissions rates will be steady or decline. Continuing to ignore this factor in future-year emission projections may increasingly skew the predicted emissions increase, and the farther into the future the forecast the more dramatic the impact. The preceding and other explanations suggested that we need to reevaluate our emission forecasting approaches for stationary non-EGU sources to incorporate factors not adequately considered in past methodologies.*

The projected decrease in NO<sub>x</sub> from 2008 to 2022 is primarily due to decreases in the mobile source category. Total annual NO<sub>x</sub> emissions in the St. Louis area from on-road and off-road mobile sources are projected to decrease nearly 47,000 tons (nearly 60%), while point and area source NO<sub>x</sub> is expected to increase slightly. Decreases in SO<sub>2</sub> are due to point source emission controls. A consent decree shutdown at Doe Run Herculaneum and CSAPR are projected to decrease point source SO<sub>2</sub> emissions by over 92,000 tons in the St. Louis area (over 45%). As described in subsection 3.4 of this document, nitrates, sulfates, and organics comprise approximately 85% of the total PM<sub>2.5</sub> concentrations at monitors in the St. Louis area. Therefore, the reductions in NO<sub>x</sub> and SO<sub>2</sub> emissions described in Table 5.3 are expected to have significantly positive impacts on the monitored PM<sub>2.5</sub> concentrations through 2022. The continued tightening of federal mobile source standards, are expected not only to reduce direct PM<sub>2.5</sub> and NO<sub>x</sub>, but also organic compounds such as hydrocarbons and VOCs. As organic compounds also account for a significant percentage of the speciation of ambient PM<sub>2.5</sub> mass in the St. Louis area, the federal mobile source controls and continued retirement of older vehicles are anticipated to result in continued downward trends of ambient PM<sub>2.5</sub> concentrations in the St. Louis area.

Additional details about the 2008 and 2022 emission inventories can be found in Appendices B and D, respectively. It should also be noted that the emissions projections included here do not reflect the reductions expected from a range of measures being implemented to reduce diesel

emissions in the St. Louis nonattainment area. These measures have been funded through sources such as the:

- U.S. EPA’s Midwest Clean Diesel Initiative
- Congestion Mitigation and Air Quality Improvement (CMAQ) Program
- Diesel Emissions Reduction Act (DERA)
- American Recovery and Reinvestment Act of 2009
- Heavy Duty Diesel Idling Rule, *10 CSR 10-5.385*
- Various supplemental environmental projects

These projects include the installation of particulate filters, diesel oxidation catalysts, closed-crankcase ventilation systems, and direct-fired heaters on school and transit buses, and municipally-owned utility vehicles, upgrading diesel construction engines with engines meeting more stringent emissions standards, and installing idle reduction technology on heavy duty diesel engines to reduce idling. It is anticipated that DERA and CMAQ funding will continue to support additional diesel emissions reduction projects in the near future.

## 5.2 Interim Year Emission Inventory: 2017

The Air Program has developed an Interim Emission inventory for the Missouri portion of the St. Louis nonattainment area. Interim year 2017 was decided to be used as it is the midway point between 2012, the year in which this plan is expected to be approved, and 2022, the last year in the ten year maintenance plan period. All assumptions and controls used in developing the project 2022 emission inventory in Section 5.1 of this document were also used to project the 2017 inventory. Table 5.4 summarizes the emissions for point, area, on-road mobile, and off-road mobile sources that are projected for 2017 for the Missouri side of the St. Louis nonattainment area. As can be seen in Table 5-4, this interim year emissions analysis shows that emissions levels in the area will remain below the 2008 base year, thus demonstrating that the area will continue to maintain the standard throughout the 10-year maintenance period. The Air Program commits to analyzing actual 2017 emissions for the Missouri side of the St. Louis nonattainment area and comparing the actual 2017 emissions to the projected 2017 emissions listed in Table 5.4 to ensure the area keeps pace with the reductions expected throughout the maintenance period. Additional details about the development of the 2017 interim year emission inventory can be found in Appendix C of this document.

**Table 5-4. 2017 PM<sub>2.5</sub>, NO<sub>x</sub>, and SO<sub>2</sub> Projected Emissions for the Missouri Side of the 1997 St. Louis PM<sub>2.5</sub> Nonattainment Area (tons per year)**

<b>Source Category</b>	<b>PM<sub>2.5</sub></b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>
Point Sources	3,664	32,621	108,798
Area Sources	14,043	4,491	11,562
On-Road Mobile Sources	694	22,816	191
Off-Road Mobile Sources	1,174	17,507	775
<b>Total</b>	<b>19,575</b>	<b>77,435</b>	<b>121,326</b>

### 5.3 Controls to Remain in Effect

The Air Program provides assurance that all of the control measures adopted by state rules and listed in this document that have been used to attain the annual PM<sub>2.5</sub> standard are permanent and enforceable. Any revisions to the control measures included in this document will be submitted as a SIP revision to EPA for approval. Additional information with respect to the ongoing control of PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor sources in the St. Louis area can be found in subsection 4.3 of this document.

### 5.4 Future Federal Control Measures

There are currently several federal control measures that have recently been proposed or promulgated that are expected to greatly reduce the amount of PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emissions in the St. Louis area. The control measures expected to have the greatest effect on PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emissions in the St. Louis area include the federal CSAPR, the National Emissions Standards for Fossil-Fuel Fired Electric Utility Steam Generating Units (Utility MACT), National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters (Boiler MACT), improved motor vehicle fuel efficiency standards, the phase in of tier 4 emission standards for nonroad engines, and the federal consent decree between EPA and Doe Run.

CSAPR, the EPA Consent Decree between EPA and Doe Run, and the improved federal mobile source regulations were all considered when developing the future emissions inventory in order to demonstrate continued maintenance with the 1997 PM<sub>2.5</sub> standard. EPA projects that under CSAPR, annual SO<sub>2</sub> emissions from EGUs will be 4.0 million tons lower and annual NO<sub>x</sub> emissions will be 100,000 tons lower nationwide in 2012, compared to baseline 2012 projections. In 2008, the Doe Run Primary Lead Smelter at Herculaneum emitted over 35,000 tons of SO<sub>2</sub>, and according to the federal consent decree, virtually all SO<sub>2</sub> emissions will be eliminated by 2013. As stated earlier, federal motor vehicle and nonroad engine standards are only expected to be tightened in the future which will also contribute to PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emission reductions. These recent and anticipated future federal control measures are expected to result in continued decreases in PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emissions both nationwide and in the St. Louis area. These measures will greatly assist current and ongoing efforts in the St. Louis area to maintain compliance with the annual PM<sub>2.5</sub> NAAQS.

The Utility MACT is projected to reduce annual PM<sub>2.5</sub> and SO<sub>2</sub> emissions nationwide by 84,000 tons and over 2 million tons, respectively by 2016 (76 FR 25085, May 3, 2011). The Boiler MACT is projected to reduce annual filterable PM and SO<sub>2</sub> emissions by 47,400 tons and 442,000 tons, respectively for existing units subject to the rule (76 FR 15649, March 31, 2011). The Air program did not rely on the Utility MACT or the Boiler MACT when developing the future year emissions inventory or to determine that the St. Louis area would remain in attainment of the 1997 PM<sub>2.5</sub> NAAQS; however the anticipated reductions from these new rules may also contribute to the future attainment of the 1997 PM<sub>2.5</sub> NAAQS in the St. Louis area.

## 5.5 Provisions for Permitting New or Modified Emissions Sources

In accordance with the Clean Air Act, Missouri has a long-standing and fully implemented New Source Review (NSR) permitting program for new major sources and significant modifications of existing sources. This NSR program in any attainment area is referred to as a Prevention of Significant Deterioration (PSD) permitting program. One of the major components of the PSD program is the implementation of Best Available Control Technology (BACT) on new major sources or significant modification of existing major sources. Missouri has been delegated full authority to implement the PSD program by the EPA.

## 6. Transportation Conformity

Transportation conformity is required under CAA section 176(c) (42 U.S.C. 7506(c)) to ensure that transportation plans, transportation improvement programs and federally supported highway transit project activities are consistent with (“conform to”) the purpose of the SIP. Conform to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS or any interim milestones. These requirements are found in Clean Air Act section 176(c)(B)(i), (ii), and (iii): “That such activities will not cause or contribute to any new violation of any standard in any area; increase the frequency or severity of any existing violation of any standard in any area; or delay timely attainment of any standard or any required interim emissions reductions or other milestones in any area.” Transportation conformity applies to areas that are designated nonattainment, and those areas redesignated to attainment after 1990 (“maintenance areas”) for transportation-related criteria pollutants: Carbon monoxide (CO), ozone, nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>).

As stated in 40 CFR 93.102, for PM<sub>2.5</sub> nonattainment and maintenance areas, transportation conformity applies to directly emitted PM<sub>2.5</sub>. In addition, it applies to NO<sub>x</sub> in these areas, unless both the EPA Regional Administrator and the director of the state air agency have made a finding that transportation-related emissions of NO<sub>x</sub> within the nonattainment area are not a significant contributor to the PM<sub>2.5</sub> nonattainment problem. Such a finding has not been made for the St. Louis annual PM<sub>2.5</sub> nonattainment area. Therefore, mobile source emission budgets for the Missouri portion of the St. Louis annual PM<sub>2.5</sub> nonattainment area for both PM<sub>2.5</sub> and NO<sub>x</sub> are proposed in this maintenance plan.

40 CFR 93.102 further specifies that in PM<sub>2.5</sub> areas, transportation conformity applies to VOC, SO<sub>2</sub>, and/or ammonia as PM<sub>2.5</sub> precursors, as well as re-entrained road dust, if the EPA Regional Administrator or the director of the state air agency has made a finding that transportation-related emissions of any of these precursors or re-entrained road dust within the nonattainment area are a significant contributor to the PM<sub>2.5</sub> nonattainment area. Such a finding has not been made for any of these precursors or for re-entrained road dust for the St. Louis PM<sub>2.5</sub> nonattainment area. For this reason, VOC, SO<sub>2</sub>, ammonia and re-entrained road dust are not addressed in this maintenance plan for transportation conformity purposes.

This section describes and establishes the Missouri portion of the St. Louis nonattainment area motor vehicle emissions budget associated with the annual PM<sub>2.5</sub> maintenance plan. EPA requires motor vehicle emission budgets be established for the last year of the maintenance plan, 2022. The mobile source emissions budgets were calculated consistent with EPA’s *Guidance for Creating Annual On-Road Mobile Source Emission Inventories for PM<sub>2.5</sub> Nonattainment Areas for Use in SIPs and Conformity*. In addition, the calculations incorporate the latest planning assumptions established by the Inter Agency Consultation Group coordinated by the East West Gateway Council of Governments.

The budgets reflect an emissions level determined using 2008 VMT provided by East West Gateway. The 2008 VMT data was generated from East-West Gateway's Traffic Demand Model and then compared to Highway Performance Monitoring System (HPMS) data. Through this

comparison, calibration factors were developed and then applied to the VMT data from the Traffic Demand Model in order to estimate the actual 2008 VMT for the St. Louis nonattainment area. The budgets also reflect a VMT growth at an annual rate of 1.5 percent from year 2008 levels to 2022. The 1.5 percent growth rate for use in projecting 2008 VMT to 2022 was developed through a coordinated effort with MoDOT, Illinois Environmental Protection Agency, the Federal Highway Administration, Illinois Department of Transportation, and East-West Gateway. Table 6-1 shows the actual historical annual VMT on state owned roads for the Missouri Portion of the St. Louis nonattainment area. In the past twenty-five years, VMT growth has varied considerably for the Missouri side of the St. Louis nonattainment area ranging as high as 6.7 percent in 1988 and as low as negative 1.8 percent in 1991. The average annual growth rate over the past twenty-five years is 1.9 percent. However, the traffic demand model used by East-west Gateway projects approximately 1 percent annual VMT growth for the next 10 years. The traffic demand model used by East-West Gateway uses current economic trends as a factor to calculate projected growth rates. With such extreme variations in a relatively short amount of time, it is not reasonable to project VMT for conformity budget setting purposes to a future year solely considering current economic trends. In addition, emission plans for maintenance must be based on permanent and enforceable reductions, such as federal emission standards. Due to the worst economic downturn since the Great Depression, the economy has been struggling in the past few years, which has resulted in lower projected VMT growth rates from the traffic demand model. For the purposes of this maintenance plan, the 1.5 percent VMT growth rate was selected and agreed to by both states for consistency and to account for the expected economic rebound, which would result in higher VMT than projected by the traffic demand model. On February 22, 2011, the Air Program discussed the use of the 1.5 percent growth rate to be used in this Maintenance Plan with the Interagency Council of Governments (IACG) group responsible for transportation conformity in the St. Louis nonattainment area. Illinois EPA stated that they too planned to use a 1.5 percent growth rate in their maintenance plans for the St. Louis area for both PM and Ozone, and the members of the IACG agreed that a 1.5 percent growth rate was reasonable to use for the purposes of this plan. Table 6-2 summarizes the estimated 2008 and projected 2022 annual VMT used for each county in the Missouri Portion of the St. Louis nonattainment area.

**Table 6-1. Historical VMT in the Missouri Portion of the St. Louis Nonattainment Area (State Owned Roads Only)**

<b>Year</b>	<b>Annual VMT</b>	<b>Annual Growth Rate</b>
1985	8,308,235,850	
1986	8,838,007,070	6.4%
1987	9,168,965,710	3.7%
1988	9,779,349,735	6.7%
1989	10,279,500,110	5.1%
1990	10,535,025,660	2.5%
1991	10,342,044,685	-1.8%
1992	10,745,357,640	3.9%
1993	11,013,078,205	2.5%
1994	11,670,927,195	6.0%
1995	11,960,972,985	2.5%

<b>Year</b>	<b>Annual VMT</b>	<b>Annual Growth Rate</b>
1996	12,112,134,815	1.3%
1997	12,463,661,570	2.9%
1998	12,593,954,160	1.0%
1999	12,562,808,345	-0.2%
2000	12,584,108,650	0.2%
2001	12,816,788,850	1.8%
2002	12,998,755,585	1.4%
2003	13,057,922,815	0.5%
2004	13,121,705,470	0.5%
2005	13,102,295,865	-0.1%
2006	13,114,079,525	0.1%
2007	13,473,086,955	2.7%
2008	13,334,059,915	-1.0%
2009	13,349,210,335	0.1%
2010	13,236,646,160	-0.8%

**Table 6-2. 2008 and 2022 Annual VMT by County**

<b>County</b>	<b>2008 Annual VMT</b>	<b>2022 Annual VMT</b>
Franklin	1,636,760,381	2,016,088,979
Jefferson	1,884,745,023	2,321,545,483
St. Charles	2,728,058,895	3,360,302,178
St. Louis	11,924,864,323	14,688,519,968
St. Louis City	3,450,450,085	4,250,111,666
<b>Totals</b>	<b>21,624,878,706</b>	<b>26,636,568,272</b>

In the Missouri portion of the St. Louis nonattainment area, transportation conformity for the annual PM<sub>2.5</sub> standard will be based on these submitted motor vehicle budgets after EPA determines that the budgets meet the adequacy criteria of the transportation conformity rule. This conformity budget replaces any and all previous budgets used for PM<sub>2.5</sub> conformity demonstrations in the Missouri portion of the St. Louis PM<sub>2.5</sub> nonattainment area. Table 6-3 identifies the 2022 motor vehicle emissions budgets for the St. Louis annual PM<sub>2.5</sub> nonattainment area for use in transportation conformity analyses. The emissions budgets were created using MOVES 2010A. All inputs used to create these budgets can be found in Appendix D-3.

**Table 6-3. Motor Vehicle Emissions Budgets for the Missouri Portion of the St. Louis Annual PM<sub>2.5</sub> Nonattainment Area in Tons per Year**

<b>Pollutants</b>	<b>2022 Mobile Source Budgets (tons/year)</b>
<b>NO<sub>x</sub></b>	16,493.43
<b>PM<sub>2.5</sub></b>	533.34

## 7. Contingency Measures

Section 175(A) of the Clean Air Act specifies the requirements for maintenance plans. In addition to providing a plan for the maintenance of the NAAQS for at least ten (10) years after the redesignation, the plan shall also include a list of contingency measures to correct any violation of the fine particulate matter NAAQS after redesignation to attainment.

Contingency measures are to be used to further reduce emissions if a violation of the annual  $PM_{2.5}$  NAAQS occurs after redesignation to attainment. While these measures do not need to be fully adopted by the Missouri Air Conservation Commission prior to the occurrence of a NAAQS violation, the contingency measures are expected to be implemented as expeditiously as possible once a triggering event occurs. The maintenance plan must identify the triggers that determine when contingency measures will be adopted, and the measures that the Air Program will consider.

The Air Program has developed a contingency plan for the Missouri portion of the St. Louis  $PM_{2.5}$  maintenance area. The contingency plan which details the Level I and Level II triggers and corresponding actions to be taken is summarized in Table 7-1. The potential contingency measures, to be evaluated after a triggering event, are listed in Table 7-2. Consistent with this contingency plan, the Air Program agrees to adopt and implement, as expeditiously as is practicable, the necessary corrective actions in the event that violations of the annual  $PM_{2.5}$  NAAQS occur anywhere within the St. Louis maintenance area after redesignation to attainment. The implementation of contingency measures under Level I or Level II triggers will take place as expeditiously as practicable, but in no event later than twenty-four (24) months after the Air Program makes a determination, based on quality-assured ambient data, that a violation of the appropriate trigger has occurred.

The contingency plan provides for different levels of corrective responses should the annual  $PM_{2.5}$  level exceed the NAAQS in any year. A Level I trigger occurs when the annual average monitored  $PM_{2.5}$  concentration exceeds  $15.0 \mu\text{g}/\text{m}^3$  in any year at any monitoring station in the St. Louis maintenance area. The Air Program will evaluate the air quality and determine if adverse emission trends are likely to continue. If so, the Air Program will determine what and where controls may be required, as well as the level of emissions reductions needed to avoid a violation of the NAAQS. If controls are required, the potential contingency measures listed in Table 7-2 will be evaluated in addition to other measures that may be identified through the evaluation or that become available through future advances in control technology and methods. It should be noted that the EPA does not require a state to implement contingency measures when occasional exceedances are recorded. The Air Program's voluntary commitment to initiate a Level I response is intended to prevent future violations of the NAAQS from ever occurring.

A Level II trigger occurs when a violation of the NAAQS at any monitoring station in the St. Louis maintenance area is recorded after it has been redesignated to attainment. The Air Program will conduct a thorough analysis to determine appropriate measures to address the cause of the violation. Contingency measures will be selected from those listed in Table 7.2 or from any other measured identified and deemed appropriate and effective at the time the selection is

made. Level II triggers are more serious than Level I triggers and cost effectiveness thresholds could be increased when determinations for additional controls are made.

The Air Program commits to compiling PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor emissions inventories for the St. Louis maintenance area every three years for the duration of the Maintenance Plan to facilitate the emissions trends analysis included in the contingency plan under Levels I and II. Since St. Louis is a bi-state nonattainment area, the Air Program commits to work with Illinois EPA to evaluate emissions trends and the causes of Level I and Level II triggers to determine appropriate control measures needed to assure continued attainment of annual PM<sub>2.5</sub> NAAQS.

Adoption of additional control measures is subject to necessary administrative and legal processes. The Air Program will solicit input from all interested and affected persons in the area prior to selecting appropriate control measures. No contingency measures will be implemented without providing the opportunity for full public participation. This process will include publication of notices, an opportunity for public hearing, and other measures required by Missouri law.

Table 7-1. Contingency Plan for the Missouri Portion of the St. Louis PM<sub>2.5</sub> Maintenance Area

<b>Contingency Measure Trigger</b>	<b>Action to be Taken</b>
<p><u>Level I Trigger</u></p> <p>A monitored PM<sub>2.5</sub> annual average concentration exceeding 15.0 ug/m<sup>3</sup> in any year at any monitoring station in the St. Louis, MO-IL maintenance area.</p>	<p>The Air Program will evaluate the air quality and determine if adverse emission trends are likely to continue. If so, Air Program will determine what and where controls may be required, as well as the level of emissions reductions needed to avoid a violation of the NAAQS. The evaluation shall be completed as expeditiously as possible and, if necessary, control measures shall be adopted and implemented as expeditiously as practicable, taking into consideration the ease of implementation and the technical and economic feasibility of the selected measures. This action will be taken no later than 24 months after the Air Program has determined that a Level I trigger has occurred.</p>
<p><u>Level II Trigger</u></p> <p>A monitored violation of the NAAQS at any monitoring station in the St. Louis, MO-IL maintenance area.</p>	<p>The Air Program will conduct a thorough analysis to determine appropriate measures to address the cause of the violation. Analysis shall be completed within 6 months. Selected measures shall be implemented as expeditiously as practicable, taking into consideration the ease of implementation and the technical and economic feasibility of the selected measures. This action will be taken no later than 24 months after the Air Program has determined that a Level II trigger has occurred.</p>

Table 7-2. Potential Contingency Measures for the Missouri Portion of the St. Louis PM<sub>2.5</sub> Maintenance Area

<b>Contingency Measure Method</b>	<b>List of Potential Contingency Measures to be Considered</b>
Implement controls for local individual sources with significant effects on the monitored violation	<ul style="list-style-type: none"> <li>• Identify specific target areas and implement simple fugitive dust suppression methods such as water spraying, planting vegetative buffer zones, and paving roads, driveways and parking lots</li> <li>• Identify local sources with significant impacts on PM<sub>2.5</sub> concentrations and develop controls through consent agreements</li> </ul>
Revise rules that control PM <sub>2.5</sub> and PM <sub>2.5</sub> precursor emissions	<ul style="list-style-type: none"> <li>• Lower the applicability thresholds in existing rules that control PM, NO<sub>x</sub>, and SO<sub>2</sub></li> <li>• Lower the limits in existing rules</li> <li>• Broaden the geographical area of existing rules</li> <li>• Include new source categories under the applicability of existing rules</li> </ul>
New rules that control PM <sub>2.5</sub> and PM <sub>2.5</sub> precursor emissions	<ul style="list-style-type: none"> <li>• Enhanced Heavy-Duty Diesel Anti-Idling Program (i.e. mandated rest periods and locomotives)</li> <li>• New Alternative Control Techniques (ACTs) for NO<sub>x</sub> sources</li> <li>• New rules for direct PM<sub>2.5</sub> controls</li> <li>• New rules for SO<sub>2</sub> controls</li> </ul>
Potential Future Federal Measures *	<ul style="list-style-type: none"> <li>• New and phased in on-road vehicle standards</li> <li>• New and phased in nonroad engine standards for marine engines and locomotives</li> <li>• Federal CSAPR Phase II **</li> <li>• Utility MACT</li> <li>• Industrial-Commercial-Institutional Boiler MACT</li> </ul>

\*Note: The potential future federal measures will not be promulgated by the Air Program; however, they will be evaluated after a triggering event to determine if their implementation will be sufficient to keep/return the St. Louis area to compliance with the annual PM<sub>2.5</sub> NAAQS.

\*\*Note: Federal CSAPR Phase II is intended to mean the planned rule that EPA is expected to write to address interstate transport of emissions for the 2011 reconsidered ozone standard, not the 2014 phase of the existing CSAPR that was finalized July 6, 2011.

## 8. Conclusion

The St. Louis PM<sub>2.5</sub> nonattainment area has attained the 1997 annual PM<sub>2.5</sub> NAAQS and has complied with the applicable provisions of the CAA requirements. Missouri has supported, with appropriate submittals, all of EPA's redesignation obligations under Section 107 of the CAA and has addressed all the applicable maintenance plan requirements. This submittal represents Missouri's formal Redesignation Request as well as the applicable Maintenance Plan.

The Air Program has prepared this maintenance plan to meet the requirement of the Clean Air Act. This Maintenance Plan provides for the continued attainment of the 1997 annual PM<sub>2.5</sub> NAAQS for a period of ten years after U.S. EPA has formally redesignated the area to attainment and also supplies adequate contingency measures for potential, additional emissions reductions in the event that future violations of the 1997 annual PM<sub>2.5</sub> NAAQS are monitored in the area.

The Air Program has prepared a comprehensive emissions inventory of primary PM<sub>2.5</sub> and PM<sub>2.5</sub> precursor (NO<sub>x</sub> and SO<sub>2</sub>) emissions for the attainment year 2008, and has prepared projections of the emissions inventory to 2022. These emissions projections indicate that SO<sub>2</sub> and NO<sub>x</sub> emissions levels will continue to decrease from attainment year, 2008, levels. Furthermore, the development of the interim year (2017) emissions inventory shows that the emissions levels will remain below 2008 levels throughout the entire 10-year maintenance period. As shown by the speciation data analysis from 2004 – 2006, SO<sub>2</sub> and NO<sub>x</sub> reductions are expected to reduce the most significant portion of PM<sub>2.5</sub> mass at the monitors in the St. Louis area, thereby maintaining the 1997 annual PM<sub>2.5</sub> NAAQS in future years. The Air Program commits to continue to operate an appropriate air quality monitoring network to verify the maintenance of the attainment status once the area has been redesignated. The Missouri Department of Natural Resources' Air Pollution Control Program has the legal authority to implement and enforce all control measures.

Finally, this maintenance plan includes year 2008 and 2022 on-road motor vehicle emissions budgets for use in transportation conformity determinations to assure that any increases in emissions from this sector do not jeopardize continued attainment of the annual PM<sub>2.5</sub> standard during the ten-year maintenance period. This maintenance plan has been prepared in accordance with the requirements of the CAA and in conjunction with the guidance provided by EPA documents and staff.

Pursuant to 643.055 RSMo, the Missouri Air Conservation Commission has determined that this action is needed to have a U.S. Environmental Protection Agency approved State Implementation Plan.

The Redesignation Demonstration and Maintenance Plan for the Missouri Portion of the St. Louis Nonattainment Area for the 1997 Annual Fine Particulate Matter National Ambient Air Quality Standard is hereby adopted by the Missouri Air Conservation Commission this 25th day of August, 2011.

Mal G, Chairman

Ann C Zimmerman, Vice Chairman

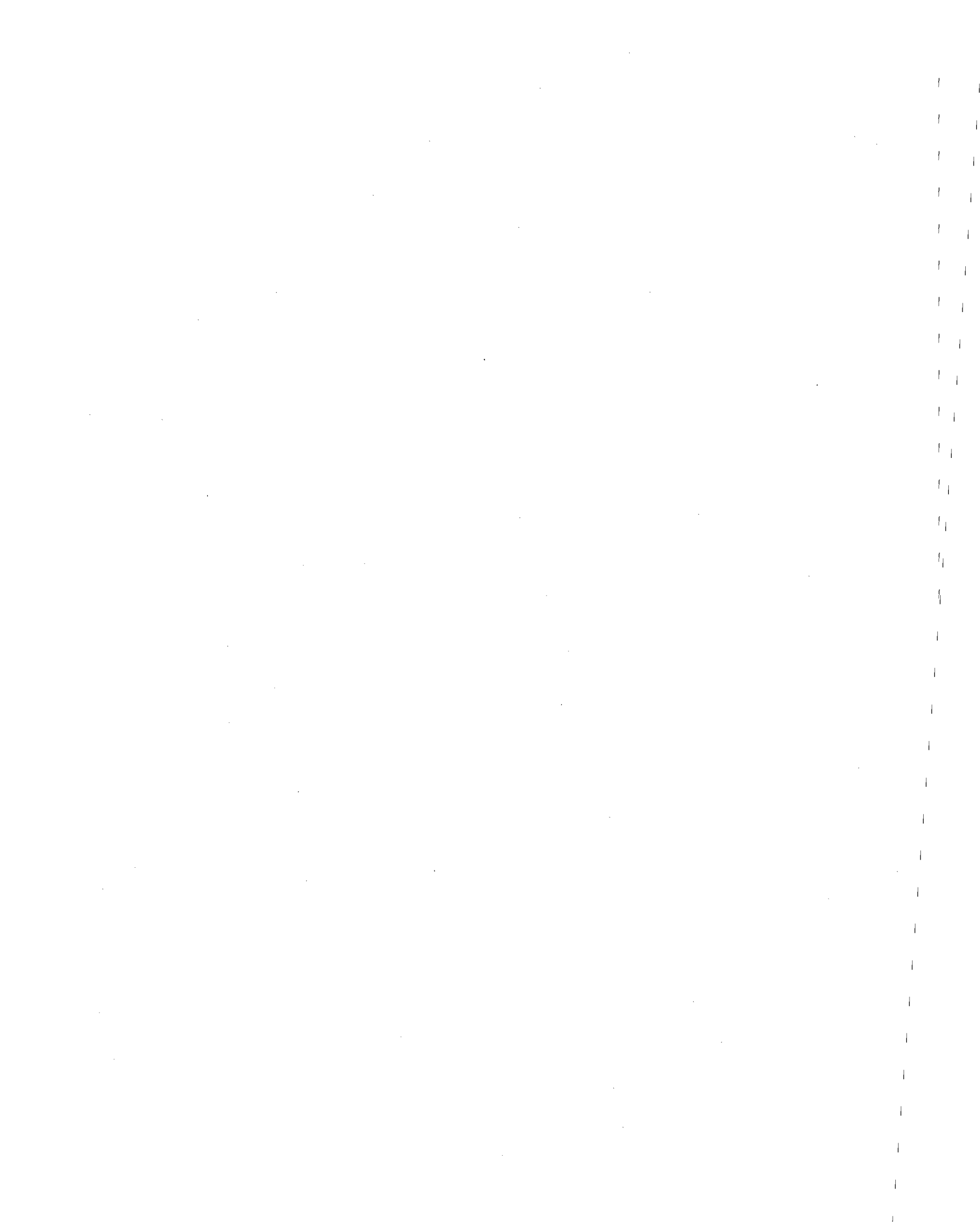
Jack C Baker, Member

Ronald Boyer, Member

Sue Pa, Member

\_\_\_\_\_, Member

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sources, Air Pollution Control Program, 1659 Elm Street, Jefferson City, (573) 751-4817 and in the Public Notices section of the program web site [www.dnr.mo.gov/env/apcp/index.html](http://www.dnr.mo.gov/env/apcp/index.html). This information will be available at least 30 days prior to the public hearing date. Persons with disabilities requiring special services or accommodations to attend the meeting can make arrangements by calling the Department directly at (573) 526-4679, the Department's toll free number at (800) 334-6946, or by writing two weeks in advance of the meeting to: Missouri Department of Natural Resources, Air Conservation Commission Secretary, P.O. Box 176, Jefferson City, MO 65102. Hearing impaired persons may contact the program through Relay Missouri, (800) 735-2966.

The commission holds public hearings under the provisions of chapter 643, RSMo. Citizens wishing to speak at the public hearing should notify the secretary to the Missouri Air Conservation Commission, Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, Missouri 65102-0176, or telephone (573) 526-4679. The Department requests persons intending to give verbal presentations also provide a written copy of their testimony to the commission secretary at the time of the public hearing. The Department also will accept written or email comments for the record until 5 p.m. on May 5, 2011; please send written comments to Chief, Air Quality Planning Section, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176. Email comments regarding rule actions shall be sent to [apcprulespn@dnr.mo.gov](mailto:apcprulespn@dnr.mo.gov) and email comments regarding plan actions shall be sent to [apcpsppn@dnr.mo.gov](mailto:apcpsppn@dnr.mo.gov). All written and email comments and public hearing testimony will be equally considered.

Public hearing items may be adopted by the Missouri Air Conservation Commission as provided for under authority of 643.050, RSMo. For more information or a complete meeting agenda, including items being presented for adoption, contact the Missouri Department of Natural Resources' Air Pollution Control Program at (573) 751-4817.  
N.T. March 29, 2011

1 revision is adopted by the Commission, the parties have  
2 agreed to sign this amendment to the 2007 Consent  
3 Judgment, thereby modifying it accordingly, as provided  
4 for in the original document and it will be the  
5 department's intention to submit this revision to the  
6 United States Environmental Protection Agency for  
7 inclusion in the Missouri State Implementation Plan.

8 This concludes my testimony. Commissioners, I'll  
9 be happy to answer any questions.

10 MR. GARNETT: Thank you, Joe. Paul Myers

11 PAUL MYERS,

12 of lawful age, having been produced and sworn, testified  
13 as follows:

14 MR. MYERS: Good morning, Commissioners. My name  
15 is Paul Myers. I work as an Environmental Specialist  
16 with the Air Pollution Control Program located at 1659  
17 East Elm Street, in Jefferson City, Missouri. I'm here  
18 today, to present testimony on a Redesignation  
19 Demonstration and Maintenance Plan for the Missouri  
20 Portion of the St. Louis Nonattainment Area for the 1997  
21 Annual Fine Particulate Matter, PM2.5, National Ambient  
22 Air Quality Standard. An executive summary of the plan  
23 can be found on page 121 of your briefing document. The  
24 PowerPoint presentation can be found on page 125 of your  
25 briefing document. The complete maintenance plan can be

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**COMMENTS AND RESPONSES  
AND  
RECOMMENDATION FOR ADOPTION**

**PROPOSED REVISION TO  
THE MISSOURI STATE IMPLEMENTATION PLAN –  
REDESIGNATION DEMONSTRATION AND MAINTENANCE PLAN FOR THE  
MISSOURI PORTION OF THE ST. LOUIS NONATTAINMENT AREA FOR  
THE 1997 ANNUAL FINE PARTICULATE MATTER (PM<sub>2.5</sub>) NATIONAL  
AMBIENT AIR QUALITY STANDARD**

On April 28<sup>th</sup>, 2011, the Missouri Air Conservation Commission held a public hearing concerning the proposed revision to the Missouri State Implementation Plan (SIP) for the Redesignation Demonstration and Maintenance Plan for the Missouri Portion of the St. Louis Nonattainment Area for the 1997 Annual PM<sub>2.5</sub> National Ambient Air Quality Standard (NAAQS). The following is a summary of comments received and the Missouri Department of Natural Resources' corresponding responses. Any changes to the proposed state implementation plan are identified in the responses to the comments.

The Missouri Department of Natural Resources' Air Pollution Control Program recommends the commission adopt the plan action as amended. If the commission adopts this plan action, it will be the department's intention to submit this plan to the U.S. Environmental Protection Agency for inclusion in the Missouri State Implementation Plan.

**SUMMARY OF COMMENTS:** The Department received two comments from the U.S. Environmental Protection Agency (EPA).

**COMMENT #1:** The EPA commented that the document should be organized so that there is a clear distinction between the redesignation request and the maintenance plan. This includes making clear which control measures were relied on to reach attainment (i.e., the redesignation request) and which control measures will ensure continued attainment of the standard through 2022 (i.e., the maintenance demonstration). Additionally, they requested that the emissions reductions from control measures and expected future control measures be quantified to the extent possible.

**RESPONSE AND EXPLANATION OF CHANGE:** The department appreciates the EPA's cooperation in commenting on this redesignation request and maintenance plan. As a result of this comment, reorganizational changes have been made throughout the document to clarify the distinction between the redesignation request and the maintenance plan. Section 2 of this document has been revised to clearly summarize how the state has met the requirements for both redesignation and maintenance. Section 4 of this document now specifically addresses the control measures implemented and emissions inventories used for 2002 through 2008, which will serve to address certain requirements for the redesignation request. Section 5 of this document now specifically

addresses the control measures and emissions inventories used for 2008 through 2022, which will serve to address certain requirements for the maintenance plan.

Additionally, the department performed a more thorough review of the emission inventories included in the Plan in order to analyze the emission reductions that have resulted or that are expected to result from specific control measures mentioned throughout the document. As a result of this review, corrections have been made to the inventories used throughout the document, and updated appendices for all emission inventories referenced in the document have been included in the appendix section.

In order to provide further clarification throughout the Plan and ensure that all requirements have been satisfied, references to control measures identified in previous plan documents submitted to EPA have been deleted; the document now specifies individual control measures that have been implemented or that will be implemented in the future. The quantification of emission reductions as a result of certain control measures adopted or expected to be adopted were also added throughout the document wherever feasible. Other minor clarification, reorganizational, and reference changes were also made to ensure consistency throughout the document.

COMMENT #2: The EPA commented that the menu of contingency measures should be further refined, and the commitment to implement contingency measures within a 24-month time period should be clarified.

RESPONSE AND EXPLANATION OF CHANGE: The Department appreciates EPA's thorough review of the contingency plan and contingency measures included in the maintenance plan portion of this SIP revision. As a result of this comment, Section 7 of this document has been revised to refine the menu of contingency measures to be evaluated following a Level 1 (monitored exceedance of the annual PM<sub>2.5</sub> NAAQS in any year) or Level 2 (monitored violation of the annual PM<sub>2.5</sub> NAAQS over a 3-year period) trigger after the area is redesignated to attainment. The commitment to implement contingency measures within a 24-month time period after a Level 1 or Level 2 trigger has also been clarified in Section 7 of this document.

# AFFIDAVIT

STATE OF MISSOURI, }  
COUNTY OF COLE }

I, Kyra Moore, Director of the Air Pollution Control Program in the Missouri Department of Natural Resources, first being duly sworn on my oath, state that the document referred to as the 2008 Base Year Emissions Inventory for the Missouri Portion of the St. Louis PM<sub>2.5</sub> Nonattainment Area, was made publicly available via the internet for thirty days at the following web address: <http://dnr.mo.gov/env/apcp/stateplanrevisions.htm>. It was posted on this web address on the 13<sup>th</sup> day of July, 2011 until the close of business on the 12<sup>th</sup> day of August, 2011.

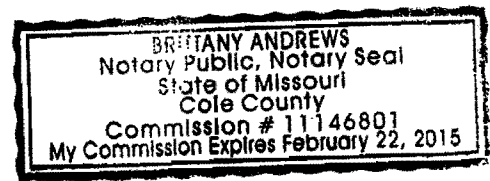
Kyra A Moore  
Name

INTERIM DIRECTOR  
Title

Air Pollution Control Program  
Program

Subscribed and sworn to before me on this 23<sup>th</sup> day of August,  
2011. I am commissioned as a notary public within the County of Cole,  
State of Missouri, and my commission expires on February 22, 2015.

Brittany Andrews  
NOTARY PUBLIC





Jay Nixon, Governor  
Sara Parker Pauley, Director

## Air Pollution Control Program

### State Plan Actions

On Public Notice | Proposed for Adoption

#### On Public Notice

The following proposed state plan actions are on public notice and comments are being accepted through the closing dates listed below.

2008 Base Year Emissions Inventory for the Missouri Portion of the St. Louis Fine Particulate Matter (PM2.5) Nonattainment Area

Appendix A - Point Source Emissions by Facility

Appendix B - Onroad Emissions for Franklin and Jefferson Counties

Appendix C - Onroad Emissions for St. Charles and St. Louis Counties and St. Louis City

Appendix D - Nonroad Inventory Documentation

Appendix E - Nonroad Emissions

Appendix F - Nonpoint Industrial and Commercial/Institutional Fuel Combustion Methodology

In accordance with Section 172(c)(3) of the Clean Air Act, the Missouri Department of Natural Resources Air Pollution Control Program has developed a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutants in the Missouri Portion of the St. Louis fine particulate matter (PM2.5) Nonattainment Area for the 1997 annual PM2.5 standard. In order to make this 2008 Base Year Emissions Inventory potentially applicable for other future needs, it includes emissions per year for all of the following pollutants: carbon monoxide, ammonia, oxides of nitrogen, PM10, PM2.5, sulfur dioxide and volatile organic compounds.

This information will be on Public Notice for 30 days beginning on July 13, 2011 and ending at the close of business on Aug. 12, 2011. Written comments on this inventory should be sent to the attention of Wendy Vit, Air Quality Planning Section Chief at P.O. Box 176, Jefferson City, MO 65102-0176 or emailed to [apcpsip@dnr.mo.gov](mailto:apcpsip@dnr.mo.gov).

A public hearing will be set at the request of any interested party. Any requests for a public hearing should be sent to the attention of Wendy Vit, at the above address or by fax to 573-751-2706 and must be received by noon, Aug. 2, 2011.

