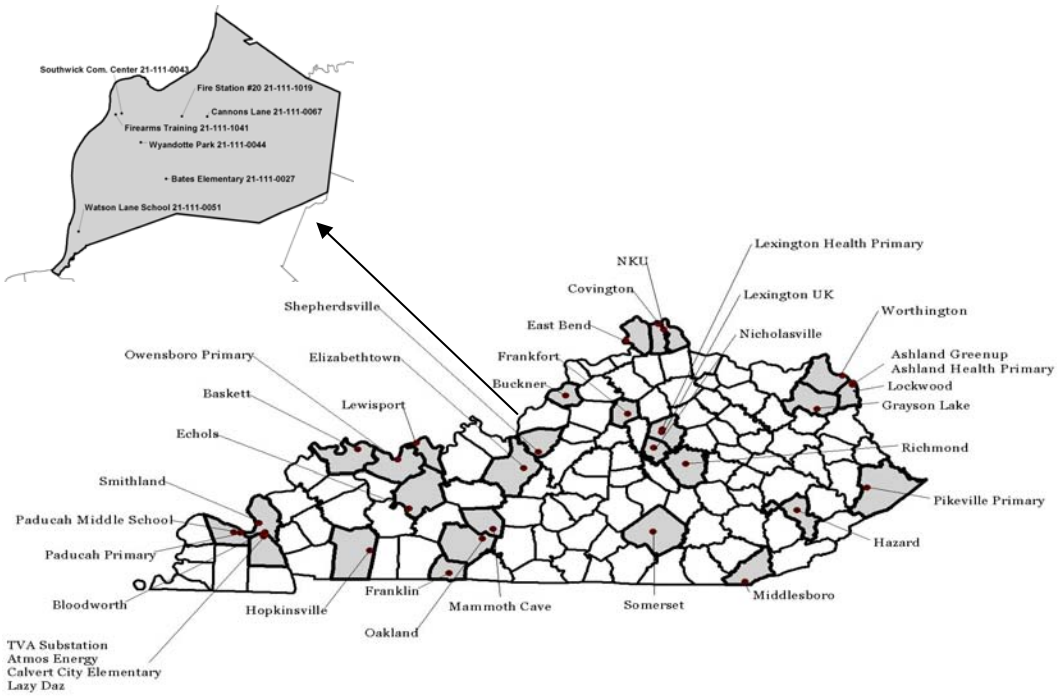
Kentucky Annual Ambient Air Monitoring Network Plan 2009



Commonwealth of Kentucky Energy & Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor,
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CERTIFICATION

By the signatures below, the Kentucky Division for Air Quality certifies that the information contained in this Surveillance Network document for sampling year 2009 is complete and accurate at the time of submittal to EPA Region 4. However, due to circumstances that may arise during the sampling year, some network information may change. A notification of change and a request for approval will be submitted to EPA Region 4 at that time.

Print Name: Andrea P. Keatley — Signature: [signature] — Date: 6/30/09
Environmental Scientist II

Print Name: Stephanie McCarthy — Signature: Stephanie McCarthy — Date: 6/30/09
Technical Services Branch Manager

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Division Director

PUBLIC NOTIFICATION AND COMMENT PERIOD

In accordance with 40 C.F.R. 58.10(a)(1), the Kentucky Energy and Environment Cabinet shall make the annual monitoring network plan available for public inspection for at least 30 days prior to submission to the U.S. EPA. The annual monitoring network plan details the operation and location of ambient air monitors operated by the Kentucky Division for Air Quality (KYDAQ), Louisville Metro Air Pollution Control District (LMAPCD), and the National Park Service (NPS).

TABLE OF CONTENTS

ACRONYMS

AEM – Automated Equivalent Method

AQI – Air Quality Index

AQS – Air Quality System

ARM – Automated Reference Method

CBSA – Core-Based Statistical Area

CSA – Combined Statistical Area

FAM – Federal Alternate Method

FEM – Federal Equivalent Method

FRM – Federal Reference Method

KYDAQ – Kentucky Division for Air Quality

LMAPCD – Louisville Metro Air Pollution Control District

MSA – Metropolitan Statistical Area

NAAQS – National Ambient Air Quality Standards

NAMS – National Air Monitoring Stations

SAMWG – Standing Air Monitoring Working Group

SLAMS – State and Local Air Monitoring Stations

SPM – Special Purpose Monitors

U.S.EPA – United States Environmental Protection Agency

UV – Ultra Violet

VOC – Volatile Organic Compounds

INTRODUCTION

In October 1975, the United States Environmental Protection Agency (U.S.EPA) established a work group to critically review and evaluate current air monitoring activities at that time. This group was named the Standing Air Monitoring Working Group (SAMWG). The review by the SAMWG indicated several areas where deficiencies existed which needed correction. The principal areas needing correction were: an excess of monitoring sites in some areas to assess air quality; existing regulations did not allow for flexibility to conduct special purpose monitoring studies; data reporting was untimely and incomplete, caused by a lack of uniformity in station location and probe siting, sampling methodology, quality assurance practices, and data handling procedures.

In August 1978, recommendations developed by SAMWG, to remedy the deficiencies in the existing monitoring activities, were combined with the new requirements of Section 319 of the Clean Air Act. Section 319 provided for the development of uniform air quality monitoring criteria and methodology; reporting of a uniform air quality index in major urban areas; and the establishment of an air quality monitoring system nationwide which utilizes uniform monitoring criteria and provides for monitoring stations in major urban areas that supplement State monitoring. The combination of the recommendations and requirements were included in a proposed revision to the air monitoring regulations.

In May 1979, air monitoring regulations were finalized by the U.S.EPA requiring certain modifications and additions to be included in the State Implementation Plan for air quality surveillance. These regulations require each state to operate a network of monitoring stations designated as State and Local Air Monitoring Stations (SLAMS) that measure ambient concentrations of air pollutants for which standards have been established. The SLAMS designation contains provisions concerning the conformity to specific siting and monitoring criteria not previously required. The regulations also provide for an annual review of the monitoring network to insure objectives are being met and to identify needed modification.

The Kentucky Division for Air Quality (KYDAQ) has operated an air quality monitoring network in the Commonwealth since July 1967. The Louisville Metro Air Pollution Control District (LMAPCD), a local agency, has maintained a sub-network in its area of jurisdiction since January 1956. Since that time, the networks have been expanded in accordance with the U.S.EPA's regulations to consist of a current overall network of 44 stations, operated by KYDAQ, LMAPCD and the National Park Service. The Commonwealth's SLAMS air monitoring network monitors criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) have been issued. In addition to a SLAMS network, KYDAQ's air monitoring network includes special purpose monitors (SPM) for air toxics, mercury, wet deposition and meteorological stations.

The annual monitoring network description, as provided for in 40 CFR Part 58.10, *Annual monitoring network plan and periodic network assessment*, must contain the following information for each monitoring station in the network:

1. The Air Quality System (AQS) site identification number for existing stations.

2. The location, including the street address and geographical coordinates, for each monitoring station.

3. The sampling and analysis method used for each measured parameter.

4. The operating schedule for each monitor.

5. Any proposal to remove or move a monitoring station within a period of eighteen months following the plan submittal.

6. The monitoring objective and spatial scale of representativeness for each monitor.

7. The identification of any site that is suitable for comparison against the PM2.5 NAAQS.

8. The Metropolitan Statistical Area (MSA), Core-Based Statistical Area (CBSA), Combined Statistical Area (CSA) or other area represented by the monitor.

The following document constitutes the Kentucky ambient air monitoring network description and is organized into three main parts:

(1) Station Description Format: An outline of the designations, parameters, monitoring methods, and the basis for site selection.

(2) Network Summaries: Presenting the total number of sites and monitors in each region and for the state. Also included is a listing of all proposed changes to the current network.

(3) Air Monitoring Station Description: Each air monitor station is described in detail as per the outline in (1) above.

Modification to the network as determined by an annual review process will be made each year to maintain a current up-to-date network description document.

STATION DESCRIPTION FORMAT

AQS Site Identification Information

Pertinent, specific siting information for each site and monitor is stored in the U.S. EPA's AQS data system. This information includes the exact location of the site, local and regional population, description of the site location, monitor types, and monitoring objectives. This site and monitor information is routinely updated whenever there is a change in site characteristics or pollutants monitored.

Network Station Description

The network station descriptions contained in this document include the following information:

1. Site Description

Specific information is provided to show the location of the monitoring equipment at the site, if the site is located in a CSA/MSA, the AQS identification number, the GPS coordinates, and that monitors and monitor probes conform to the siting criteria.

2. Date Established

The date when each existing monitoring station was established is shown in the description. For those stations, which are proposed, a date is provided when it is expected for the station to be in operation.

3. Site Approval Status

Each monitoring station in the existing network has been reviewed with the purpose of determining whether it meets all design criteria for inclusion in the SLAMS network. Stations that do not meet the criteria will either be relocated in the immediate area or when possible, re-sited at the present location.

4. Monitoring Objectives

The monitoring network was designed to provide information to be used as a basis for the following actions:

(a) To determine compliance with ambient air quality standards and to plan measures to attain these standards.

(b) To activate emergency control procedures in the event of an impending air pollution episode.

(c) To observe pollution trends throughout a region including rural areas and report progress made toward meeting ambient air quality standards.

(d) To provide a database for the evaluation of the effects of air quality on population, land use, and transportation planning; to provide a database for the development and evaluation of air dispersion models.

5. Monitoring Stations' Designations

Most stations described in the air quality surveillance network are designated as "SLAMS". In addition, some of these stations fulfill other requirements, which must be identified. In this description of the network, designations are also made for Special Purpose Monitors (SPM), Emergency Episode Monitoring sites and Air Quality Index sites (AQI). The following is the criteria used for each of these designations.

SLAMS: Requirements for air quality surveillance systems provide for the establishment of a network of monitoring stations designated as State and Local Air Monitoring Stations (SLAMS) that measure ambient concentrations of pollutants for which standards have been established. These stations must meet requirements that relate to four major areas: quality assurance, monitoring methodology, sampling interval, siting of instruments and instrument probes.

EMERGENCY EPISODE MONITORING SITES (EPISODE): Regulations provide for the operation of at least one continuous SLAMS monitor for each major pollutant in designated locations for emergency episode monitoring. These monitors are placed in areas of worst air quality and provide continual surveillance during episode conditions.

AIR QUALITY INDEX (AQI): Certain stations in the SLAMS network provide data for daily index reporting. Index reporting is required for all urban areas with a population exceeding 200,000. However, KYDAQ is providing this service to the general public from all areas where monitoring and attending staff are available. The AQI is a method of reporting that converts concentration levels of pollution to a simple number scale of 0-500. Intervals on the AQI scale are related to potential health effects of the daily measured concentrations of the major pollutants. KYDAQ prepares the Index twice daily for release to the public from the pollutant data reported from the Field Offices.

SPM: Not all monitors and monitoring stations in the air quality surveillance network are included in the SLAMS network. In order to allow the capability of providing monitoring for complaint studies, modeling verification and compliance status, certain monitors are reserved for short-term studies and designated as Special Purpose Monitors (SPM). These monitors are not committed to any one location or for any specified time period. They may be located as separate monitoring stations or be included at SLAMS locations. Monitoring data may be reported, provided that the monitors and stations conform to all requirements of the SLAMS network.

6. Monitoring Methods

All sampling and analytical procedures used in the air-monitoring network conform to Federal reference (FRM), alternate (FAM) or equivalent (FEM) methods. In case there is no federal method, procedures are described in the Kentucky Air Quality Monitoring and Quality Assurance Manuals.

(a) Particulate Matter 10 microns in size (PM_{10})

All PM_{10} samplers operated by the Division for Air Quality are certified as either FRM or FEM samplers and are operated according to the requirements set forth in 40 CFR 50 and 40 CFR 53.

Intermittent samplers collect a 24-hour sample every sixth day on 46.2mm PTFE filters. The filter is weighed before and after the sample run. The gain in weight in relation to the volume of air sampled is calculated in micrograms per cubic meter (ug/m^3). The PTFE filters are to be equilibrated before each weighing for a minimum of 24 hours at a 20-23 degrees C mean temperature and a 30-40% mean relative humidity.

Continuous PM_{10} samplers provide 24-hour samples daily for SLAMS reporting. During sampling, ambient air passes through an inlet designed to pass only particles smaller than 10 microns in diameter. After exiting the inlet, the sample stream is sent to a mass transducer. Inside the transducer the sample stream passes through a Teflon-coated glass fiber filter. This filter is weighed every two seconds. The difference between the current filter weight and the initial or installed weight gives the total mass of the collected particulate. The mass concentration is computed by dividing the total mass by the flow rate. Data is transmitted by telemetry for entry into the automated central data acquisition system.

(b) **Particulate Matter 2.5 microns in size ($PM_{2.5}$)**

With the exception of continuous samplers, all $PM_{2.5}$ samplers operated by the Division for Air Quality are certified as either FRM or FEM samplers. All manual samplers are operated per the requirements set forth in 40 CFR 50, Appendix L. Samples are collected on 46.2mm PTFE filters over a 24-hour sampling period. Air flow through the filter is to be maintained at 16.7 liters per minute. The flow rate must not vary more than +/-5% for five minutes over a 24-hour sample period at actual ambient temperature and pressure. Samples must be retrieved within 177 hours of the end of the sample run and must be kept cool (4 degrees C or cooler) during transit to meet the thirty-day limit for re-weighing.

The PTFE filters are to be equilibrated before each weighing for a minimum of 24 hours at a controlled atmosphere of 20-23 degrees C mean temperature and 30-40% mean relative humidity. Filters must be used within thirty days of initial weighing. Filters must be re-weighed within thirty days of the end of the sample run and must be kept at 4 degrees C or cooler. The gain in weight in relation to the volume of air sampled is calculated in micrograms per cubic meter (ug/m^3).

Continuous $PM_{2.5}$ samplers provide 24-hour samples daily for AQI reporting. During sampling, ambient air passes through an inlet and very sharp cut cyclone designed to pass only particles smaller than 2.5 microns in diameter. After exiting the inlet, the sample stream is sent to a mass transducer. Inside the transducer the sample stream passes through a Teflon-coated glass fiber filter. This filter is weighed every two seconds. The difference between the current filter weight and the initial or installed weight gives the total mass of the collected particulate. The mass concentration is computed by dividing the total mass by the flow rate.

Another means of measuring $PM_{2.5}$ continuously is through beta ray attenuation. During sampling, ambient air passes through an inlet and very sharp cut cyclone designed to pass only particles smaller than 2.5 microns in diameter. The sample is collected on filter tape as the air passes through the tape. The filter tape is then placed in between a beta source and a scintillation detector causing an attenuation of the beta particle signal.

Data is transmitted by telemetry for entry into the automated central data acquisition system.

(c) **$PM_{2.5}$ Speciation sampling and analysis**

In addition to operating $PM_{2.5}$ samplers that determine only $PM_{2.5}$ mass values, KYDAQ also operates $PM_{2.5}$ speciation samplers that collect samples that are analyzed to determine the chemical makeup of $PM_{2.5}$. Samples are collected on a set of three filters over a 24-hour sampling period. The individual filters are composed of different media in order to collect specific types of toxic pollutants.

After collection, the samples are shipped in ice chests to an EPA contract laboratory for analysis. At the laboratory, the samples are analyzed using optical and electron microscopy, thermal optical analysis, ion chromatography and x-ray fluorescence to determine the presence and level of specific toxic compounds. Sample results are entered in the AQS data system.

(d) **Sulfur Dioxide**

Instruments used to continuously monitor sulfur dioxide levels in the atmosphere employ the UV fluorescence and UV open path methods. The continuous data output from the instrument is transmitted by telemetry for entry into an automated central data system.

Calibration of these instruments is done dynamically using certified gas mixtures containing a known concentration of sulfur dioxide gas. This gas is then diluted in a specially designed apparatus to give varying known concentrations of sulfur dioxide. These known concentrations are supplied to the instruments, which are adjusted so that instrument output corresponds with the specific concentrations. Calibration curves are prepared for each instrument and each data point is automatically compared to this curve before entry into the data acquisition system.

(e) **Carbon Monoxide**

Continuous monitoring for carbon monoxide is performed by use of the non-dispersive infrared correlation method. Data is transmitted by telemetry for entry in an automated central data acquisition system.

Calibration of the instrument is performed periodically by using nitrogen or zero air to establish the zero baseline and NIST or NIST traceable gas mixtures of carbon monoxide in air. The span is checked daily using a certified mixture of compressed gas containing approximately 45 parts per million carbon monoxide.

(f) **Ozone**

Ozone is monitored using the UV photometry and UV open path methods. The continuous data output from the instrument is transmitted by telemetry for entry into an automated central data acquisition system.

Monitors are calibrated routinely using an ozone generator, which is calibrated using the ultra violet photometry reference method. Calibration curves are prepared for each instrument and each data point is automatically compared to this curve before entry into the data acquisition system.

(g) **Nitrogen Dioxide**

The chemiluminescence and UV open path methods are used in monitoring the nitrogen dioxide level in the ambient air. The continuous data output from the instrument is transmitted by telemetry for entry into an automated central data acquisition system.

Calibration of these instruments is done dynamically using NIST certified gas mixtures of nitric oxide. Through the use of dilution apparatus, varying concentrations are produced and supplied to the monitors, thus producing a specific calibration curve for each instrument. Each data point is automatically compared to this curve before entry into the data acquisition system.

(h) **Lead**

Lead concentrations are determined from the analysis of suspended particulates collected by high volume particulate samplers. Particulate samples are ashed to remove organic matter and acid extracted to dissolve the metals. The lead content is determined by the atomic absorption spectroscopy method or an approved Federal Equivalent Method.

(i) **Mercury**

Cold vapor atomic fluorescence spectrometry is used to determine elemental gaseous mercury in ambient air at sub-ng/m^3 levels. The analyzer uses a dual, ultra pure gold absurbent cartridge design that allows alternating desorption and sampling. The dual cartridge design results in continuous mercury sampling of the air stream. The continuous data output from the instrument is transmitted by telemetry for entry into an automated central data acquisition system.

(j) **Air Toxics**

Air toxics pollutants are determined in three categories: metals, volatile organic compounds (VOC), and carbonyls.

Metal samples are collected on 46.2 mm PTFE filter over a 24-hour period similar to the PM_{10} monitoring method. The filter is weighed before and after the sample run. The gain in weight in relation to the volume of air sampled is used to calculate the concentration in micrograms per cubic meter (ug/m^3). The PTFE filter is to be equilibrated before each weighing for a minimum of 24 hours at a 20-23 degrees C mean temperature and a 30-40% mean relative humidity. The filter is then delivered to the Division for Environmental Program Support for inductively coupled plasma/mass spectrometer analysis to determine the concentration of metals in ug/m^3.

VOC samples are collected in a vacuum canister. Ambient air is pulled into the canister over a 24-hour sampling period. The sample is shipped to the Division for Environmental Program Support for gas chromatography/mass spectrometer analysis. VOC concentrations determined in the sample are reported in ug/m^3.

Carbonyl samples are collected on a DPNH cartridge. An ambient air stream flows through the cartridge at a (1) liter per minute flow rate for a 24-hour sampling period. The cartridge is packed on ice and shipped to the Division for Environmental Program Support for high-pressure liquid chromatography analysis. Carbonyl concentrations determined in the sample are reported in ug/m^3.

(k) **Wet Deposition**

Acid precipitation monitoring stations operate on a weekly sampling schedule. Cumulative precipitation events occurring during a seven-day period are collected in one container to represent a one-week sample. An Aerochem precipitation monitor and NCON monitors are used to collect the wet deposition samples. The principle of operation of the samplers is based on the use of a moisture sensor that activates an electrically driven movable container lid covering the "wet" container during dry periods and then is moved to uncover the "wet" container when precipitation occurs. The opening and closing of the lid for each precipitation event is indicated on a data logger providing the time and date of each event. At the end of each weekly sampling period, the sample bag/bottle in the "wet" container is removed and a new sample bag/bottle is installed. The sample is then analyzed at the Division for Environmental Program Supports' laboratory.

7. Quality Assurance Status

The Division for Air Quality has an extensive quality assurance program to ensure that all air monitoring data collected is accurate and precise. Staff members audit air monitors on a scheduled basis, including those operated by the Louisville Metro Air Pollution Control District, to ensure that each instrument is calibrated and operating properly. Data validation is performed monthly by verifying the data reported by each instrument is recorded accurately in the computerized database.

8. Area Representativeness

Each station in the monitoring network must be described in terms of the physical dimensions of the air parcel nearest the monitoring station throughout which actual pollutant concentrations are reasonably similar. Area dimensions or scales of representativeness used in the network description are:

(a) Microscale - defines the concentration in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

(b) Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.

(c) Neighborhood scale - defines the concentrations within an extended area of a city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers.

(d) Urban scale - defines an overall citywide condition with dimensions on the order of 4 to 50 kilometers.

(e) Regional Scale - defines air quality levels over areas having dimensions of 50 to hundreds of kilometers.

Closely associated with the area around the monitoring station where pollutant concentrations are reasonably similar are the basic monitoring exposures of the station. There are four basic exposures included in this description:

(a) To determine the highest concentrations expected to occur in the area covered by the network.

(b) To determine representative concentrations in areas of high population density.

(c) To determine the impact on ambient pollution levels of significant sources or source categories.

(d) To determine general background concentration levels.

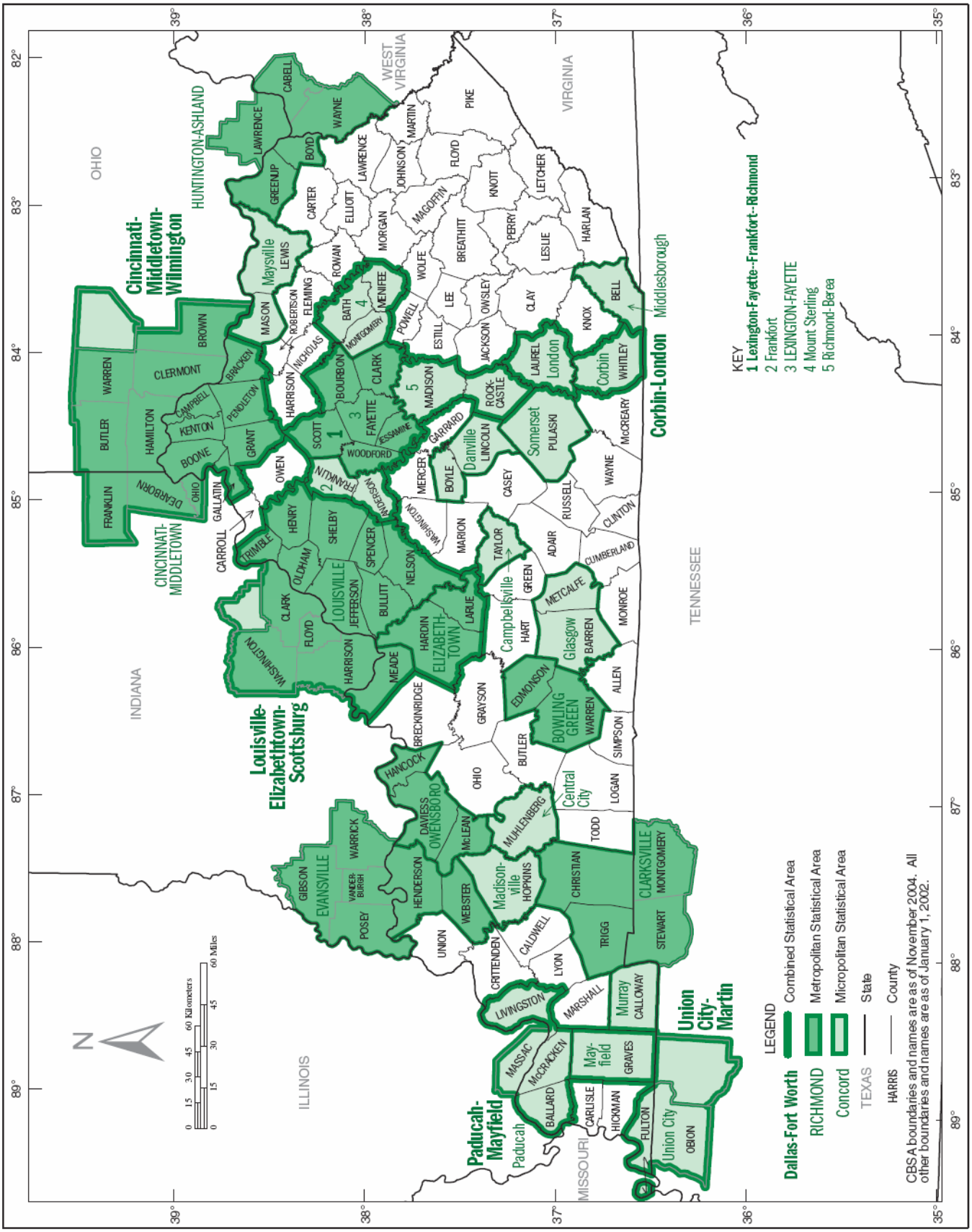
The design intent in siting stations is to correctly match the area dimensions represented by the sample of monitored air with the area dimensions most appropriate for the monitoring objective of the station. The following relationship of the four basic objectives and the area of representativeness are appropriate when siting monitoring stations:

Monitoring Exposures	**Siting Area Scale**
Highest concentration	Micro, Middle, Neighborhood
Population	Neighborhood, Urban
Source impact	Micro, Middle, Neighborhood
General/background	Neighborhood, Regional

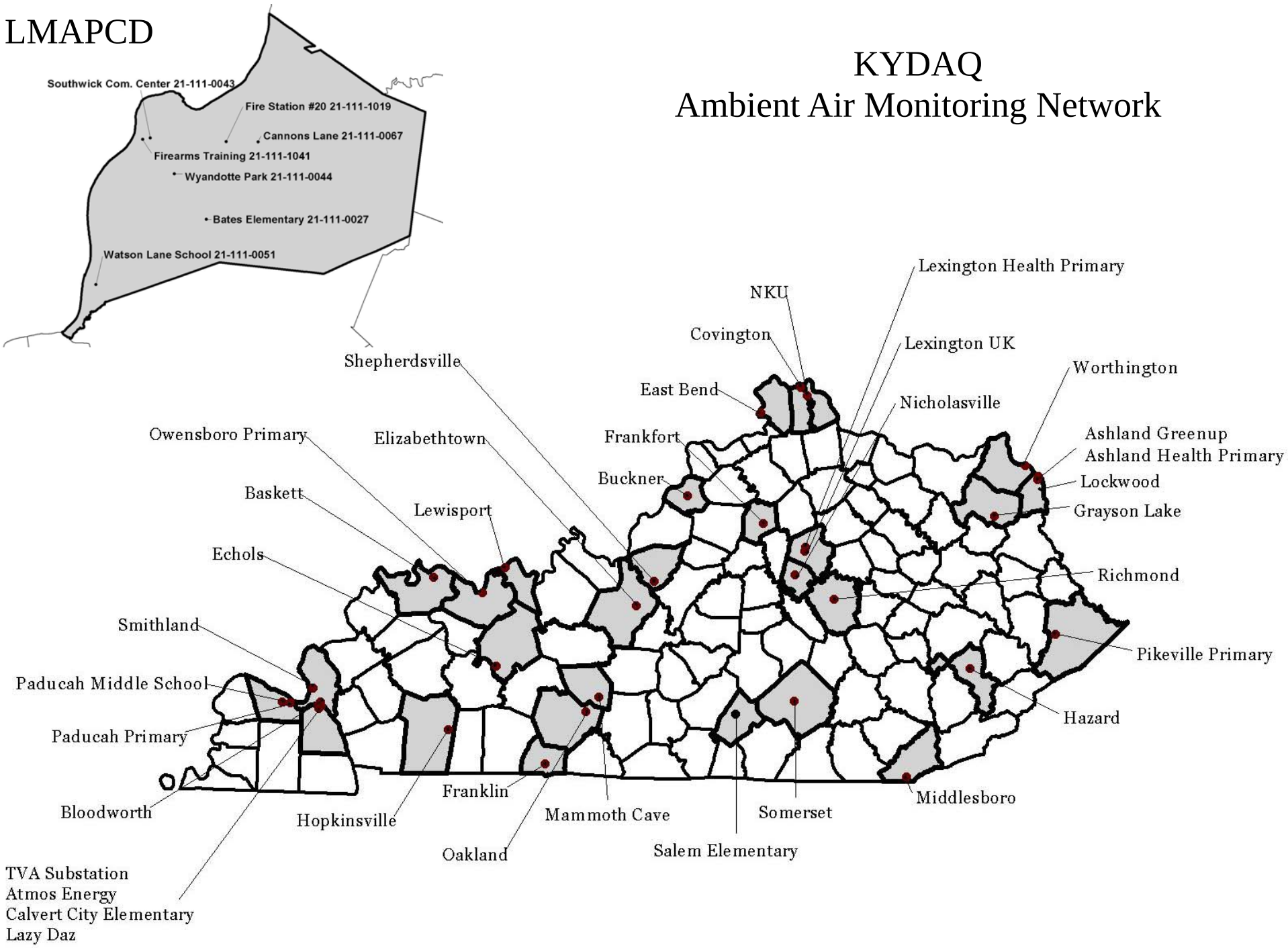
Data Processing and Reporting

All ambient air quality data are stored in a centralized server located at the 14th floor of the Capital Plaza Tower, the Energy and Environment Cabinet (EEC) headquarters in Frankfort, Kentucky. The server is backed up on tape nightly, weekly, and monthly. The backup tape of the server is stored off site of the EEC headquarters and is cycled through use on a monthly schedule. After each month of data has passed all quality assurance checks, the data is transmitted via telemetry to the U.S. EPA's national data storage system known as AQS. Statistical data summaries are generated from this database and compiled to produce the Ambient Air Quality Annual Report. This report may be accessed at the KYDAQ website:http://www.air.ky.gov. The report is located under **Public Information**.

KENTUCKY - Core Based Statistical Areas and Counties



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau


LMAPCD
Southwick Com. Center 21-111-0043
Fire Station #20 21-111-1019
Cannons Lane 21-111-0067
Firearms Training 21-111-1041
Wyandotte Park 21-111-0044
Bates Elementary 21-111-0027
Watson Lane School 21-111-0051
KYDAQ
Ambient Air Monitoring Network
Lexington Health Primary
NKU
Covington
Lexington UK
Worthington
Shepherdsville
East Bend
Nicholasville
Owensboro Primary
Elizabethtown
Frankfort
Ashland Greenup
Ashland Health Primary
Buckner
Lockwood
Baskett
Lewisport
Grayson Lake
Echols
Richmond
Smithland
Pikeville Primary
Paducah Middle School
Hazard
Paducah Primary
Franklin
Middlesboro
Bloodworth
Hopkinsville
Mammoth Cave
Somerset
Oakland
Salem Elementary
TVA Substation
Atmos Energy
Calvert City Elementary
Lazy Daz

AIR MONITORING STATIONS SUMMARY

Metropolitan Statistical Area	Number of Sites	$PM_{2.5}$	PM_{10}	PM_{coarse}	SO_2	NO_2	NO_y	CO	O_3	Pb/ Metals	Hg	Wet Dep	VOC	Carbonyl	Speciation	MET
Bowling Green, KY	2	4 CT	0	0	1	1	0	1	2	0	1	0	0	0	0	1
Cincinnati-Middletown, OH-KY-IN	3	4 T	0	0	1	1	0	0	3	0	1	1	1	1	1	2
Clarksville, TN-KY	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Elizabethtown, KY	1	3 T	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Evansville, IN-KY	1	2 T	1	0	1	0	0	0	1	0	0	0	0	0	0	0
Huntington-Ashland, WV-KY-OH	3	2 T	2 C**	0	2	1	0	0	2	3 C	0	0	1	1	1	1
Lexington-Fayette, KY	3	3 T	1 **	0	2	1	0	0	2	1	1	1	1	1	1	1
Louisville-Jefferson County, KY-IN	10	12 CT	4 C**	1	3	1	1	2	5	0	0	0	0	0	1	3
Owensboro, KY	2	2 CT	0	0	1	1	0	0	2	0	0	0	0	0	0	1
Micorpolitan Statistical Area																
Paducah, KY-IL	4	2 T	1	0	2	1	0	0	2	0	1	1	1	0	0	1
Somerset, KY	1	1 T	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Middlesborough, KY	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Richmond-Berea, KY	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Frankfort, KY	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in a MSA																
Carter County	1	1	2 C	0	0	0	0	0	1	2 C	1	2	2	2	1	1
Marshall County	4	0	1	0	0	0	0	0	0	1	0	0	5	0	0	1
Ohio County	1	2 T	1 **	0	0	0	0	0	0	1	1	1	0	0	0	1
Perry County	1	1 T	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Pike County	1	3 T	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Russell County	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Simpson County	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTALS	43	46	13	1	13	7	1	3	27	10	6	6	11	5	5	16

C=Collocated monitors; D=Duplicate monitors; T= Continuous PM2.5 monitors or continuous PM10 monitors; **=Multiple analysis: PM10 Teflon filters used for PM10 monitoring, Metals monitoring and PMcoarse)

SUMMARY OF NETWORK CHANGES 2009

MSA Summary:

Cincinnati-Middletown, OH-KY-IN - NKU (21-037-3002) add $PM_{2.5}$ beta attenuation monitor

Elizabethtown, KY MSA – Elizabethtown (21-093-0006) add $PM_{2.5}$ collocated sampler moved from the Evansville, IN-KY MSA.

Evansville, IN-KY MSA – Baskett (21-101-0014) remove the collocated $PM_{2.5}$ sampler and install a PM_{10} sampler.

Huntington-Ashland, WV-KY-OH MSA – Lockwood (21-019-0016) establish a site and add a source impact lead sampler.

Not in a MSA Summary:

Grayson, KY – Grayson Lake (21-043-0500) increase sampling frequency for the duplicate PM_{10} from every twelfth day to every sixth day.

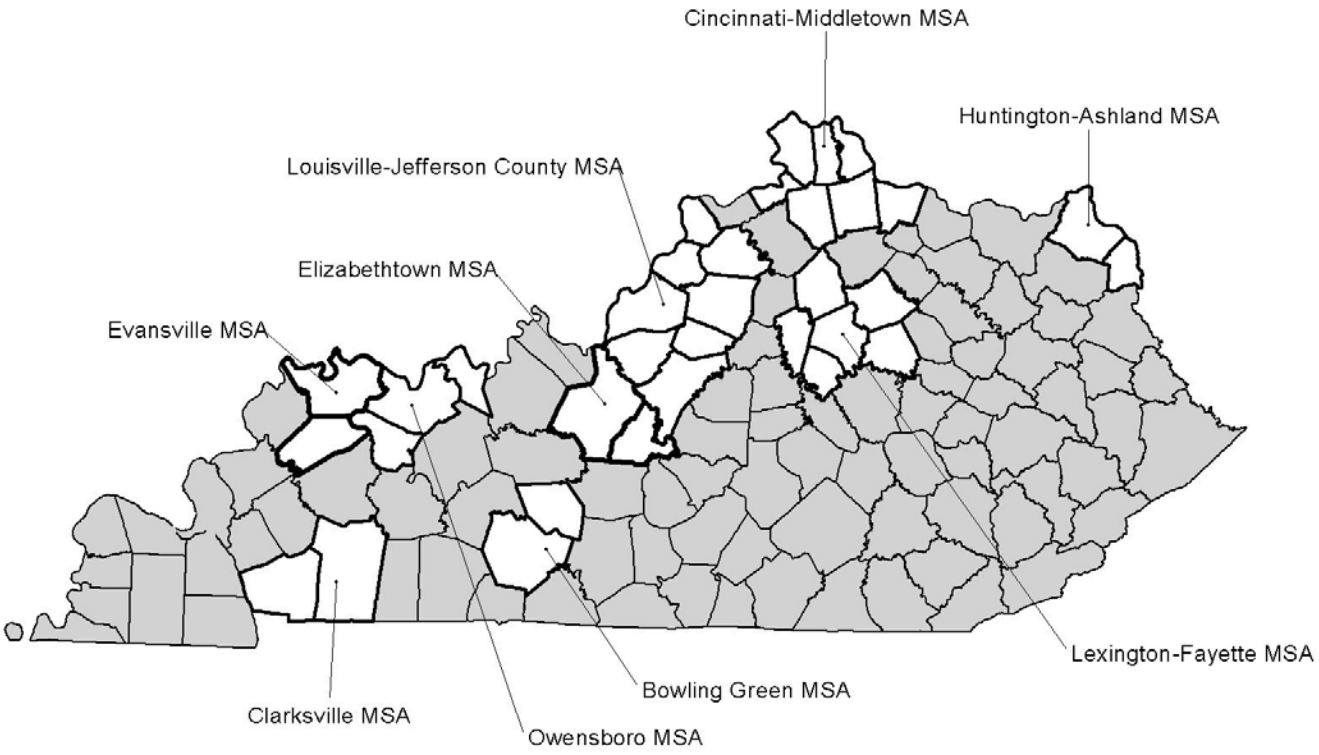
Pikeville, KY – Pikeville (21-195-0002) increase sampling frequency for the duplicate $PM_{2.5}$ from every twelfth day to every sixth day.

Richmond, KY – Richmond (21-151-0003) and add source impact lead sampler and collocated source impact lead sampler.

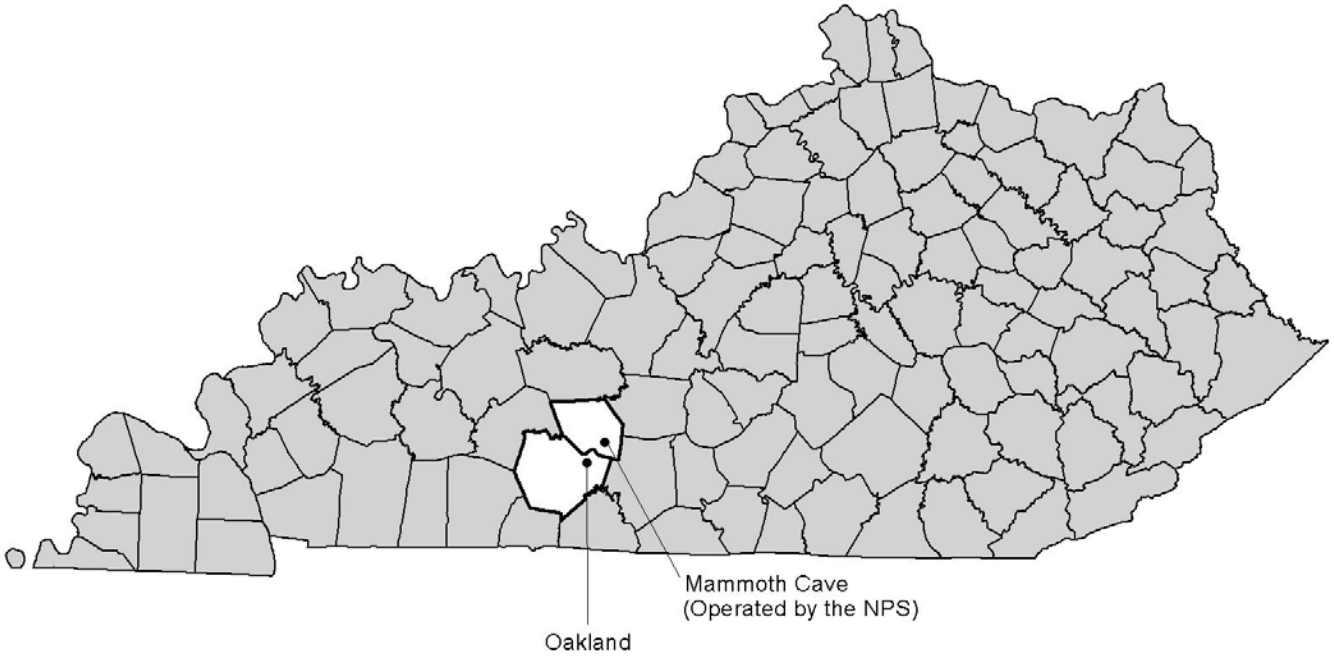
Russell Springs, KY - Salem Elementary (TBD) add source impact lead sampler.

Somerset, KY - Somerset (21-199-0003) add $PM_{2.5}$ beta attenuation monitor

Metropolitan Statistical Areas



Bowling Green, KY



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-061-0501 (NPS)	Alfred Cook Road Mammoth Cave (Edmonson)	X(t)		X	X	X	X		X	X				X
21-227-0008	Oakland School Oakland (Warren)	X(ctI)					X(sI)							
	TOTAL	4	0	1	1	1	2	0	1	1	0	0	0	1

(c) Collocated Monitor
(I) Air Quality Index Monitor
(s) Special Purpose Monitor
(t) Continuous PM Monitor

(Rev.5/23/08)

CSA/MSA: Bowling Green, KY MSA
401 KAR 50:020 Air Quality Region: South Central Kentucky Intrastate (105)
Site Name: Oakland Primary
AQS Site ID: 21-227-0008
Location: Oakland Elementary School, Oakland, KY 42159
County: Warren
GPS Coordinates: 37.036667, -86.250556
Date Established: January 1, 2000
Inspection Date: December 4, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Oakland Elementary School in Oakland, Kentucky. The sample inlets are 200 feet from the nearest road. The most recent site inspection was conducted on December 4, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

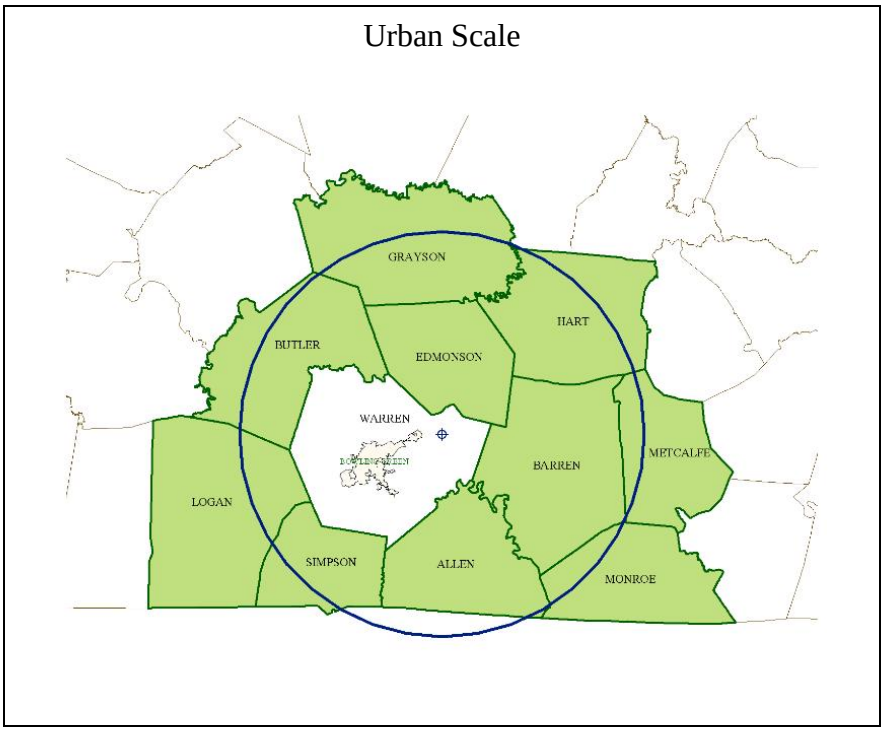
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide levels of ozone and particulate matter for daily index reporting.

Monitors:

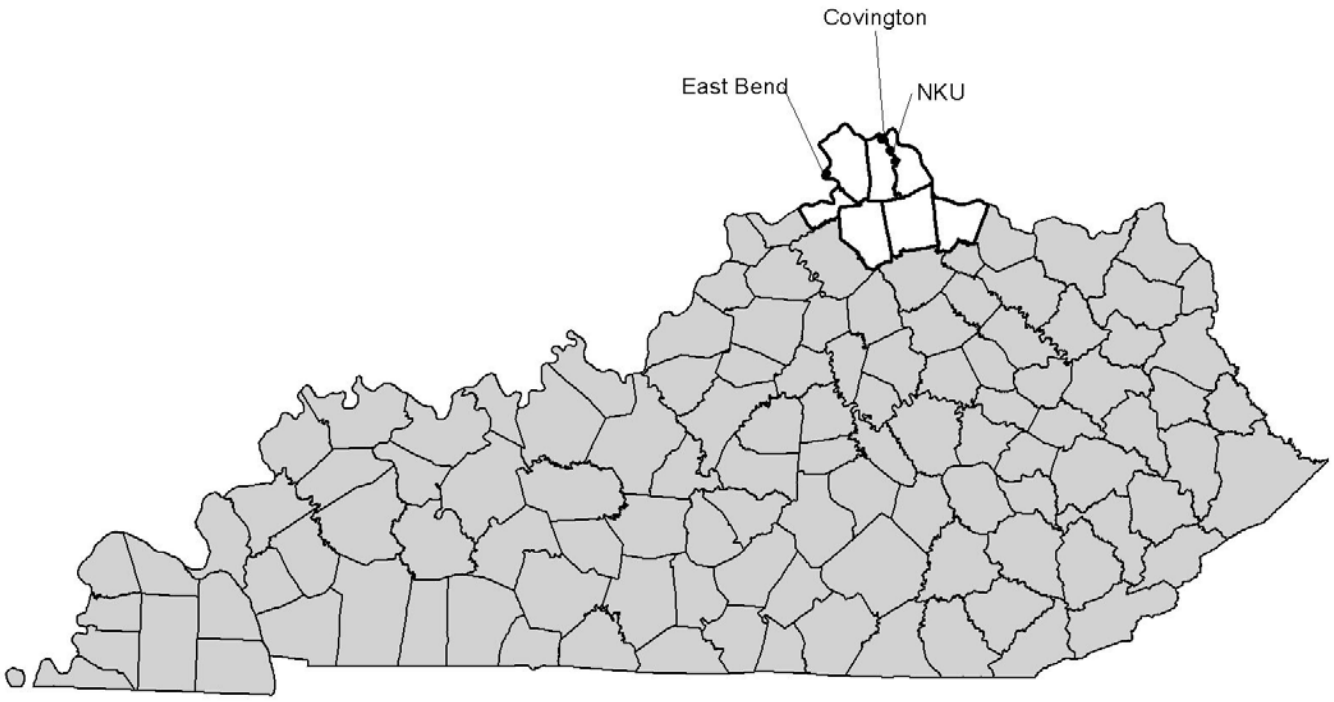
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4	SPM AQI	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ TEOM	5	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
FEM $PM_{2.5}$	5	SLAMS	Gravimetric	24-hours every third day
- Collocated FRM $PM_{2.5}$	5	SLAMS	Gravimetric	24-hours every third day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on an urban scale for particulates. This site also represents maximum concentration on and urban scale for ozone.



Cincinnati-Middletown, OH-KY-IN



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-015-0003	KY 338 & Lower River Road East Bend (Boone)						X							X
21-037-3002	524A John's Hill Road Highland Heights(Campbell)	X(It)		X(I)	X		X(Ie)		X	HG				
21-117-0007	1401 Dixie Highway Covington (Kenton)	X(tIe)					X(I)				X	X	X	X
	TOTAL	4	0	1	1	0	3	0	1	1	1	1	1	2

(e) Emergency Episode Monitor

(I) Air Quality Index Monitor

(s) Special Purpose

(t) Continuous PM Monitor

(Rev.6/30/09

CSA/MSA: Cincinnati-Middletown-Wilmington, OH-KY-IN CSA/Cincinnati-Middletown, OH-KY-IN MSA
401 KAR 50:020 Air Quality Region: Metropolitan Cincinnati (Ohio) Interstate (079)
Site Name: East Bend
AQS Site ID: 21-015-0003
Location: KY 338 and Lower River Road, East Bend, KY 41005
County: Boone
GPS Coordinates: 38.918056, -84.852778
Date Established: July 1, 1977
Inspection Date: November 4, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located at the intersection of KY 338 and Lower River Road in East Bend, Kentucky. The sample inlets are 50 feet from the nearest road. The most recent site inspection was conducted on November 4, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

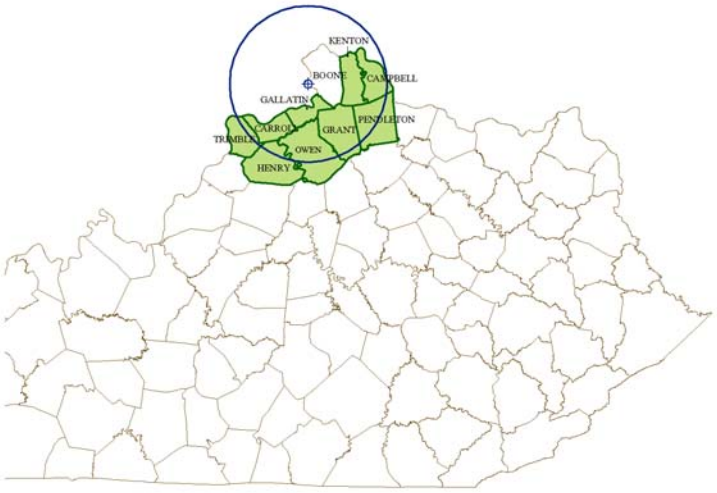
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SLAMS AQI	UV photometry	Continuously March 1 – October 31
Meteorological	5.5	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents background levels on an urban scale for ozone.

Urban Scale



CSA/MSA: Cincinnati-Middletown-Wilmington, OH-KY-IN CSA/Cincinnati-Middletown, OH-KY-IN MSA
401 KAR 50:020 Air Quality Region: Metropolitan Cincinnati (Ohio) Interstate (079)
Site Name: Covington
AQS Site ID: 21-117-0007
Location: University College, 1401 Dixie Hwy, Covington, KY 41011
County: Kenton
GPS Coordinates: 39.072500, -84.525000
Date Established: August 22, 1975
Inspection Date: November 4, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the University College in Covington, Kentucky. The sample inlets are 40 feet from the nearest road. The most recent site inspection was conducted on November 4, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to provide ozone, particulate and sulfur dioxide levels for daily index reporting; and to detect elevated pollutant levels for activation of emergency control procedures for particulates.

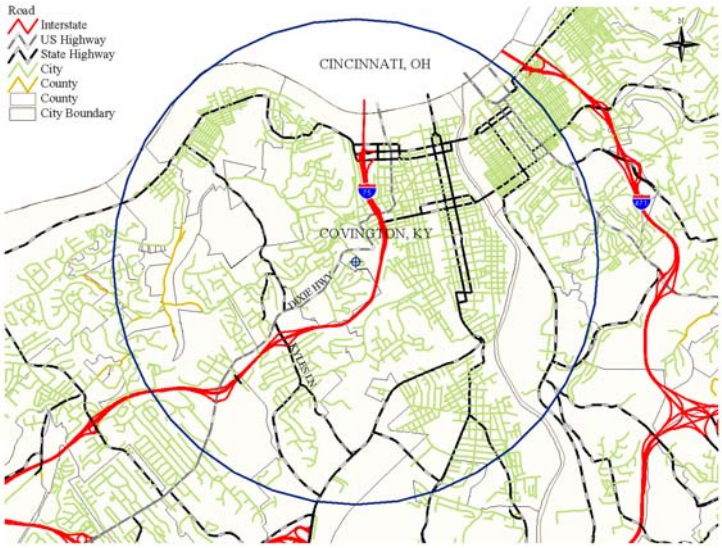
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.6	SLAMS AQI	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	4.6	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ Speciation	4.5	SLAMS	Thermal optical, ion chromatography, and X-ray fluorescence	24-hours every sixth day
$PM_{2.5}$ TEOM	4.5	SPM AQI EPISODE	Tapered element oscillating microbalance, gravimetric	Continuously
Volatile Organics Compound	4.3	SPM	EPA method TO-15	24-hours every sixth day
Carbonyls	4.3	SPM	EPA method TO-11A	24-hours every sixth day
Meteorological	7.6	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for ozone and particulates.

Neighborhood Scale



CSA/MSA: Cincinnati-Middletown-Wilmington, OH-KY-IN CSA/Cincinnati-Middletown, OH-KY-IN MSA
401 KAR 50:020 Air Quality Region: Metropolitan Cincinnati (Ohio) Interstate (079)
Site Name: Northern Kentucky University "NKU"
AQS Site ID: 21-037-3002
Location: 524A John's Hill Road, Highland Heights, KY 41076
County: Campbell
GPS Coordinates: 39.02181, -84.47445
Date Established: August 1, 2007
Inspection Date: November 4, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on farmland owned by the Northern Kentucky University in Highland Heights, Kentucky. The sample inlets are 72 feet from the nearest road, which is a dirt service drive for a radio tower. The most recent site inspection was conducted on November 4, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to provide ozone, particulate and sulfur dioxide levels for daily index reporting; and to detect elevated pollutant levels for activation of emergency control procedures for ozone.

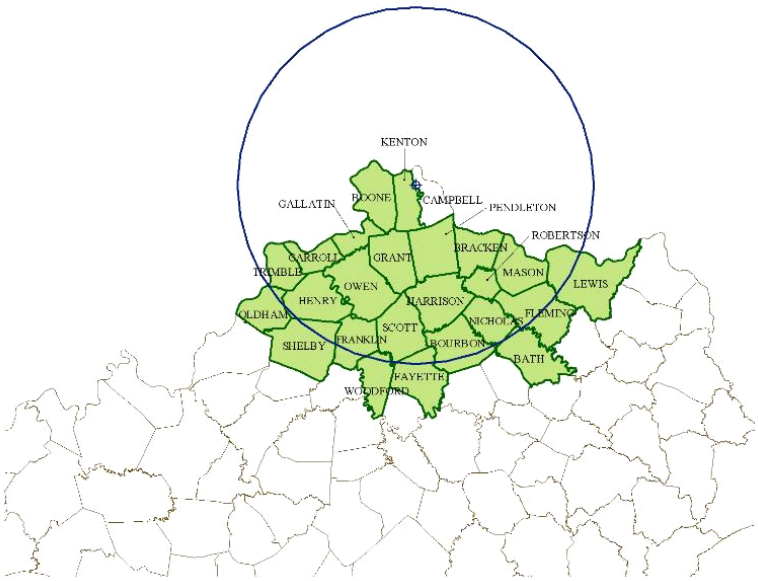
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.8	SLAMS	Chemiluminescence	Continuously
AEM Ozone	3.8	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	4.6	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ BAM	4	SPM AQI	Beta Attenuation Mass Monitor	Continuously
AEM Sulfur Dioxide	3.9	SLAMS AQI	UV fluorescence	Continuously
Mercury - ambient	3.7	SPM	Cold vapour atomic fluorescence spectrometry	Continuously
Mercury – Wet Deposition	1.5	SPM	Wet deposition collected, analysis of sample by the Environmental Services laboratory	Weekly
Meteorological	1.5	Other	Rain gauge	Continuously

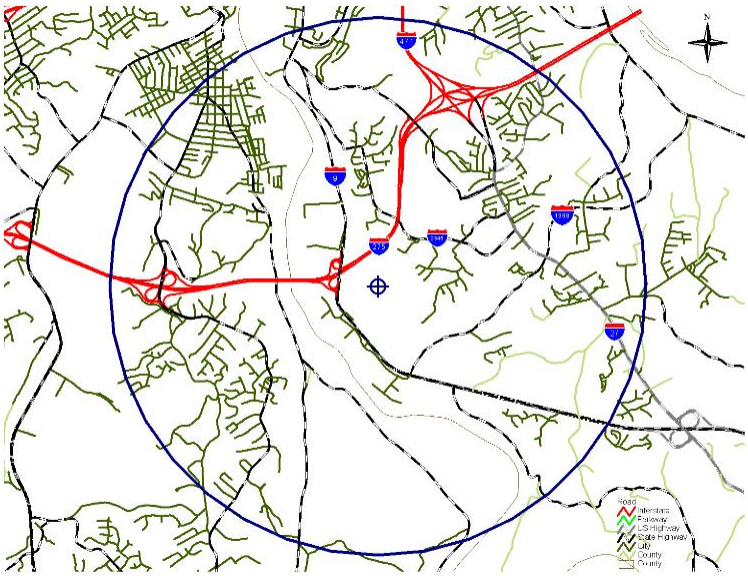
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure for nitrogen dioxide, ozone, sulfur dioxide and mercury on an urban scale. This site also represents population exposure on a neighborhood scale for particulate matter.

Urban Scale



Neighborhood Scale



Clarksville, TN-KY

AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-047-0006	10800 Pilot Rock Road Hopkinsville (Christian)	X					X							
	TOTAL	1	0	0	0	0	1	0	0	0	0	0	0	0

(Rev.5/23/08)

CSA/MSA: Clarksville, TN- KY MSA
401 KAR 50:020 Air Quality Region: Paducah - Cairo Interstate (072)
Site Name: Hopkinsville
AQS Site ID: 21-047-0006
Location: 10800 Pilot Rock Road, Hopkinsville, KY 42240
County: Christian
GPS Coordinates: 36.911667, -87.323611
Date Established: January 1, 1999
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is on a platform in a field and a stationary equipment shelter adjacent to a residence located at 10800 Pilot Rock Road in Hopkinsville, Kentucky. The sample inlet is 300 feet from the nearest road. The most recent site inspection was conducted on December 17, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

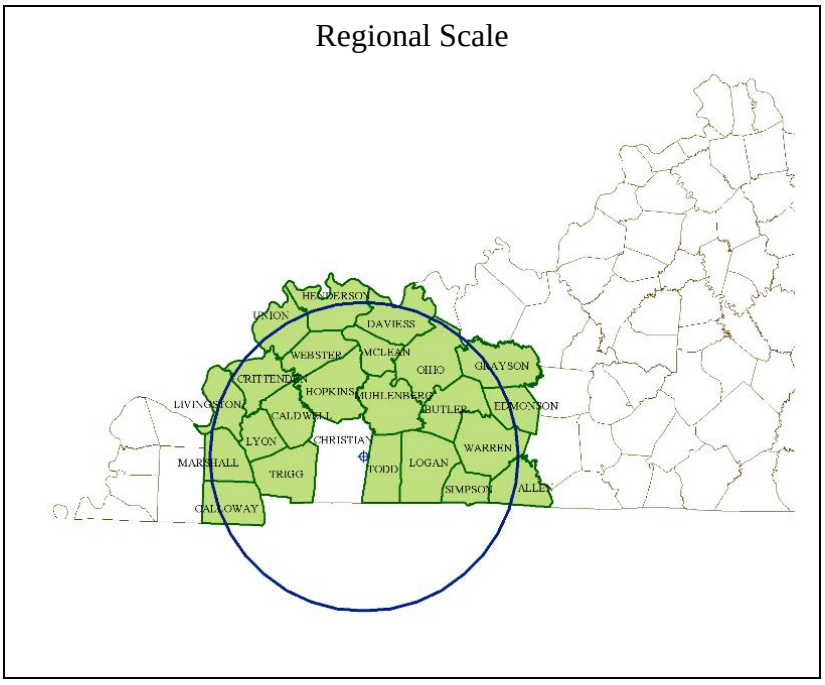
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality standards and to determine levels of interstate transport of fine particulate matter.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.8	SLAMS AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	3	SLAMS	Gravimetric	24-hours every third day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a regional scale.



Elizabethtown, KY

AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-093-0006	801 N Miles St, Am Legion Park Elizabethtown (Hardin)	X(ct)					X(s)							
	TOTAL	3	0	0	0	0	1	0	0	0	0	0	0	0

(c) Continuous Monitor

(s) Special Purpose Monitor

(t) Continuous PM Monitor

(Rev.5/20/09)

CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Elizabethtown, KY MSA
401 KAR 50:020 Air Quality Region: North Central Kentucky Intrastate (104)
Site Name: Elizabethtown
AQS Site ID: 21-093-0006
Location: American Legion Park, 801 North Miles Street, Elizabethtown, KY 42701
County: Hardin
GPS Coordinates: 37.706389, -85.851667
Date Established: February 24, 2000
Inspection Date: December 17, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located near the tennis courts on the grounds of the American Legion Park in Elizabethtown, Kentucky. The sample inlets are 800 feet from the nearest road. The most recent site inspection was conducted on December 17, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide ozone and particulate levels for daily index reporting.

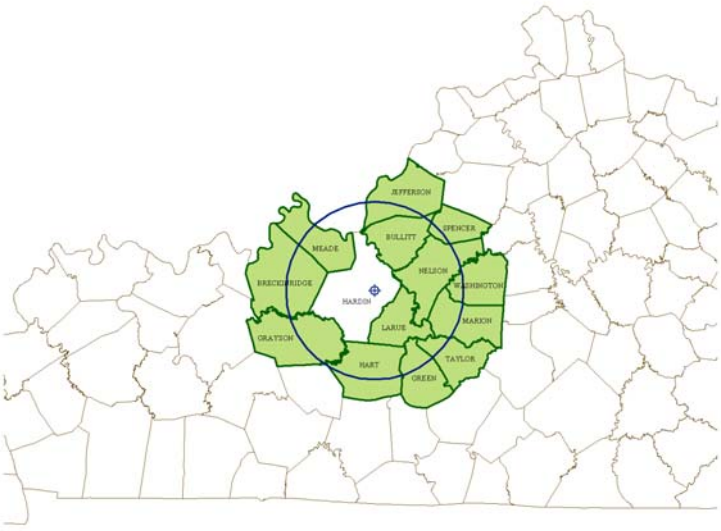
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	4.5	SLAMS	Gravimetric	24-hours every third day
- Collocated FEM $PM_{2.5}$	4.5	SLAMS	Gravimetric	24-hours every sixth day
$PM_{2.5}$ TEOM	4.2	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

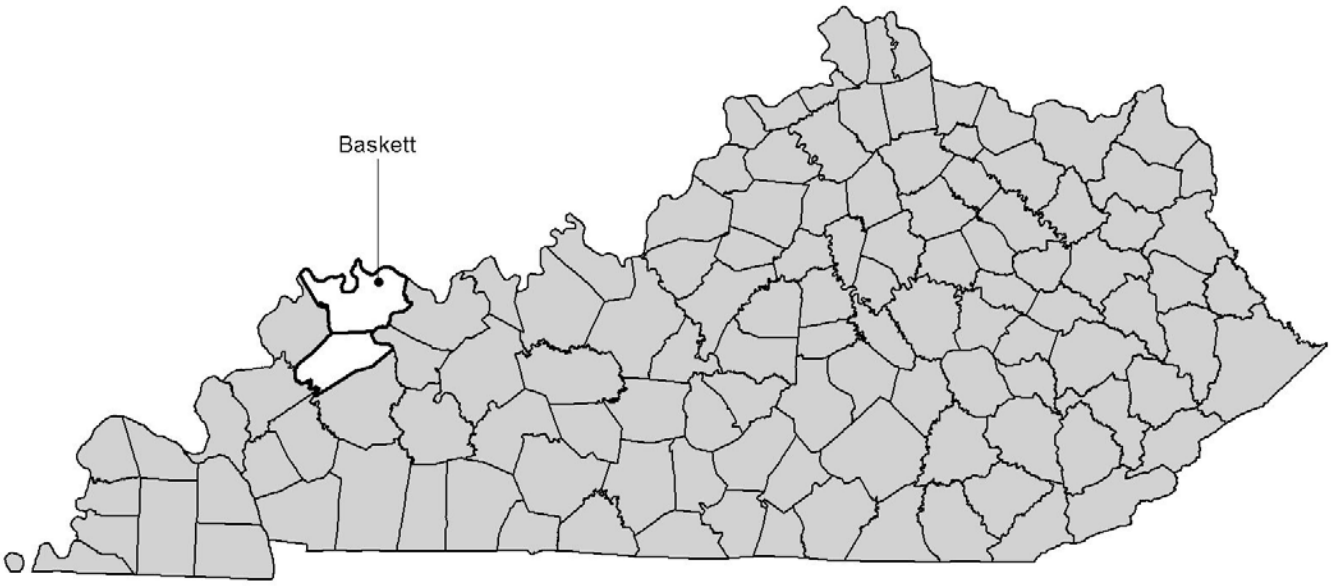
Area Representativeness:
This site represents population exposure on a neighborhood scale for particulates and population exposure on an urban scale for ozone.

Ozone Urban Scale



Particulates Neighborhood Scale

Evansville, IN-KY



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-101-0014	Baskett Fire Department Baskett (Henderson)	X(t)	X	X			X(s)							
	TOTAL	2	1	1	0	0	1	0	0	0	0	0	0	0

(s) Special Purpose Monitor

(t) Continuous PM Monitor

(Rev.5/20/09)

CSA/MSA: Evansville, IN-KY MSA
401 KAR 50:020 Air Quality Region: Evansville-Owensboro-Henderson Interstate (077)
Site Name: Baskett
AQS Site ID: 21-101-0014
Location: Baskett Fire Department, Baskett, KY 42402
County: Henderson
GPS Coordinates: 37.871389, -87.463333
Date Established: February 27, 1992
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Baskett Fire Department in Baskett, Kentucky. The sample inlets are 25 feet from the nearest road. The most recent site inspection was conducted on December 18, 2008 Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide ozone, particulate and sulfur dioxide levels for daily index reporting.

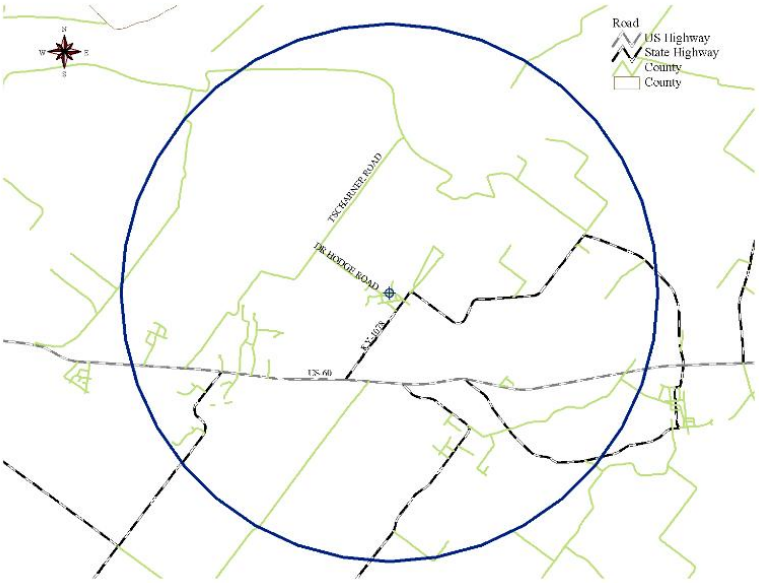
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	4.5	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ TEOM	4.5	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
FRM PM_{10}	4.5	SLAMS	Gravimetric	24-hours every sixth day
AEM Sulfur Dioxide	4	SLAMS AQI	UV fluorescence	Continuously

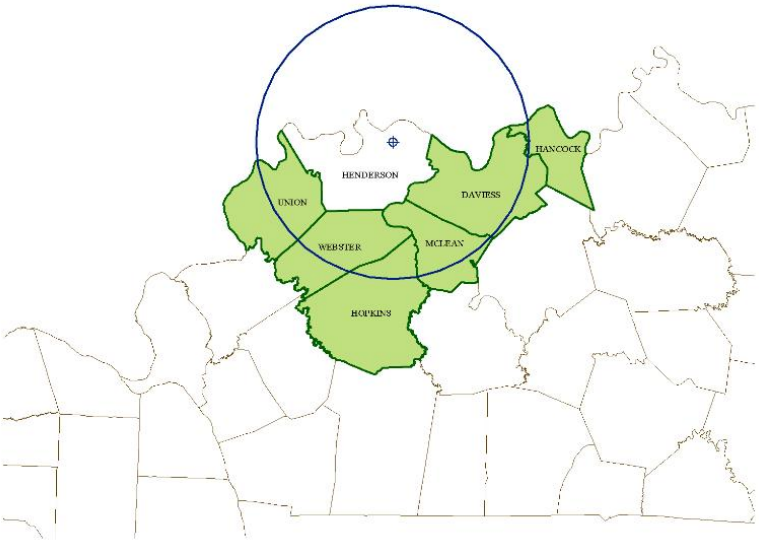
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents maximum concentration on an urban scale for ozone. This site also represents population exposure on a neighborhood scale for particulates and sulfur dioxide.

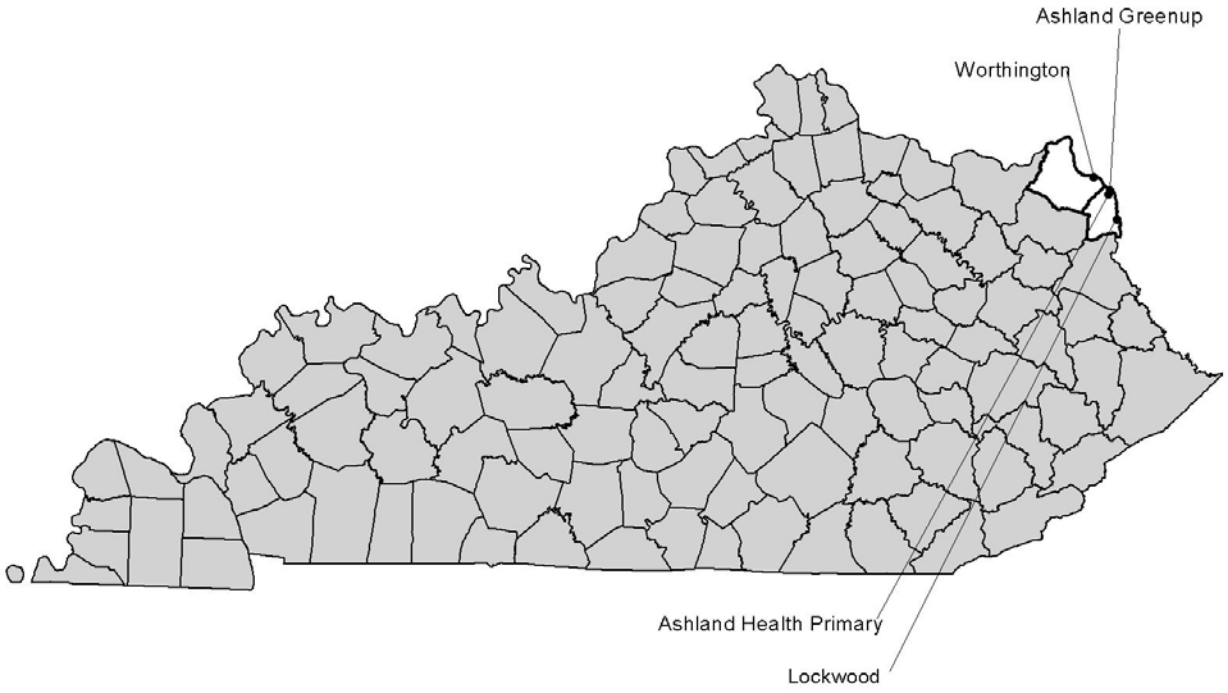
Neighborhood Scale



Ozone Urban Scale



Huntington-Ashland, WV-KY-OH



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Pb/ Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-019-0002	21st & Greenup Ashland (Boyd)		X(c)					X(c)						
21-019-0016	18138 Cherry Wood Catlettsburg (Boyd)							X						
21-019-0017	2924 Holt St, FIVCO Health Dept Ashland (Boyd)	X(It)		X(eI)	X(e)		X(eI)				X(s)	X(s)	X(s)	X
21-089-0007	Water Tower, Scott & Center Sts. Worthington (Greenup)			X(s)			X							
	TOTAL	2	2	2	1	0	2	3	0	0	1	1	1	1

(c) Collocated Monitor
(e) Emergency Episode Monitor
(I) Air Quality Index Monitor
(s) Special Purpose Monitor
(t) Continuous PM Monitor

(Rev.5/20/09)

CSA/MSA: Huntington-Ashland, WV-KY-OH MSA
401 KAR 50:020 Air Quality Region: Huntington (WV)-Ashland (KY)-Portsmouth-Ironton (OH) Interstate (103)
Site Name: Ashland - Greenup
AQS Site ID: 21-019-0002
Location: 122 22nd Street, Ashland, KY 41101
County: Boyd
GPS Coordinates: 38.478611, -82.631944
Date Established: April 2, 1978
Inspection Date: October 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is located on the west end of the roof of the Ashland Valvoline Oil complex building in Ashland, Kentucky. The building is one story tall. The sample inlets are 100 feet from the nearest road. The most recent site inspection was conducted on October 24, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to measure concentrations of a sub-group of air toxics.

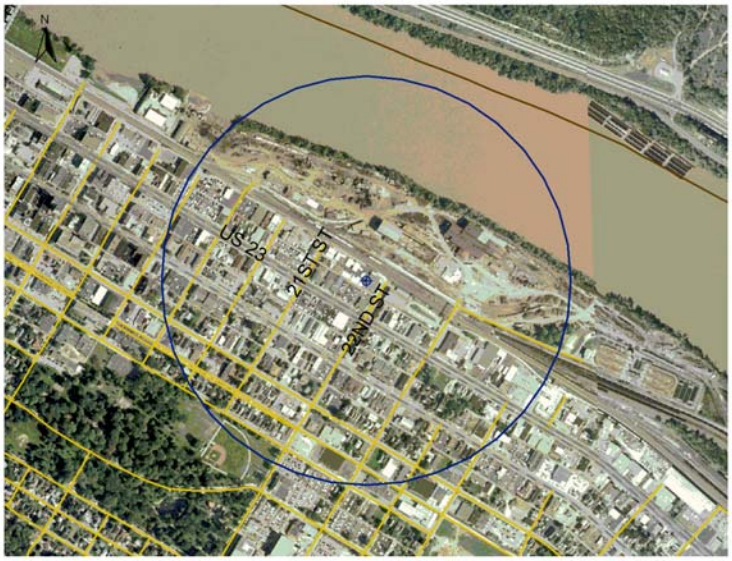
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM_{10}	6.6	SLAMS	Gravimetric	24-hours every sixth day
- Collocated FRM PM_{10}	6.6	SPM	Gravimetric	24-hours every sixth day
- Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.4	Same as PM_{10}

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

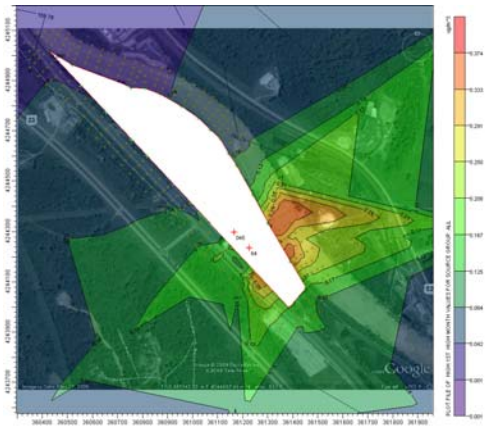
Area Representativeness:
The site represents maximum concentrations on a middle scale for particulates. This site also represents population exposure on a neighborhood scale for air toxics.

Particulate Middle Scale



Air Toxics Neighborhood Scale

CSA/MSA: Huntington-Ashland, WV-KY-OH MSA
401 KAR 50:020 Air Quality Region: Huntington (WV)-Ashland (KY)-Portsmouth-Ironton (OH) Interstate (103)
Site Name: Lockwood
AQS Site ID: 21-019-0016
Location: Catlettsburg, KY
County: Boyd
GPS Coordinates: To be determined
Date Established: January 1, 2010
Inspection Date: Not Applicable
Inspection By:
Site Approval Status:



Calgon Carbon, located in Catlettsburg, Kentucky, was identified as a lead source emitting over 6 tons per year of actual reported emissions in 2007. In accordance with 40 CFR Part 58 Appendix D, a lead source monitoring site will be located in the Lockwood Estates off U.S. 23 in Catlettsburg, Kentucky. The location of this source-oriented lead monitor was determined through the use of AERMOD modeling analysis. The model indicated that majority of the source impact would be in West Virginia. However, the model indicated that Lockwood Estates was within the deposition boundary.

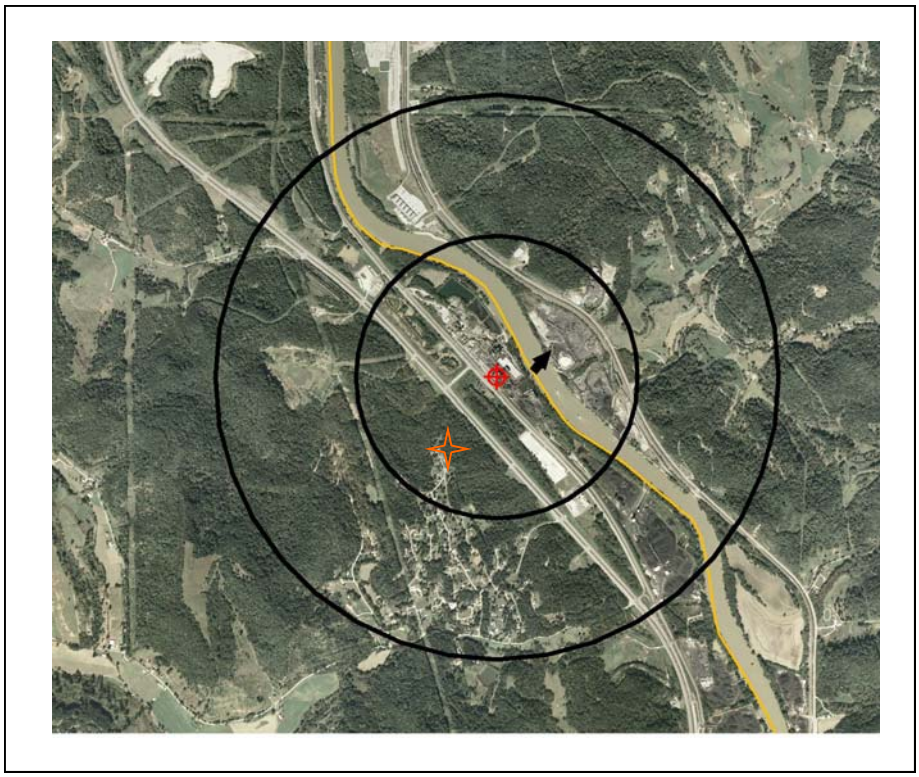
Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM Lead		SLAMS	Gravimetric	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures will be implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents maximum concentrations, from a source, on a middle scale for lead.



CSA/MSA: Huntington-Ashland, WV-KY-OH MSA
401 KAR 50:020 Air Quality Region: Huntington (WV)-Ashland (KY)-Portsmouth-Ironton (OH) Interstate (103)
Site Name: Ashland Primary (FIVCO)
AQS Site ID: 21-019-0017
Location: FIVCO Health Department, 2924 Holt Street, Ashland, KY 41101
County: Boyd
GPS Coordinates: 38.459167, -82.640556
Date Established: January 1, 1999
Inspection Date: October 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the health department building in Ashland, Kentucky. The sample inlets are 240 feet from the nearest road. The most recent site inspection was conducted on October 24, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect elevated pollutant levels for activation of emergency control procedures for nitrogen dioxide, ozone and sulfur dioxide; and to provide pollutant levels for daily air quality index reporting.

Monitors:

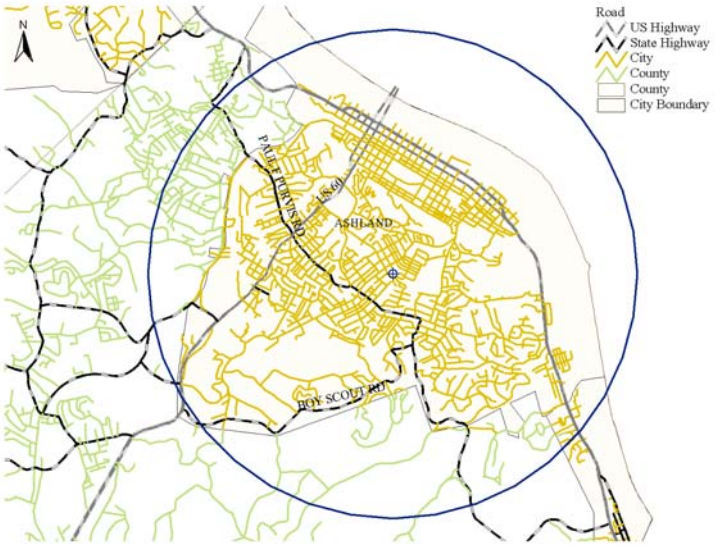
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	4.3	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	4.3	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	4.7	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ Speciation	4.6	SLAMS	Thermal optical, ion chromatography, and X-ray fluorescence	24-hours every sixth day
$PM_{2.5}$ TEOM	4.7	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
AEM Sulfur Dioxide	4.3	SLAMS AQI EPISODE	UV fluorescence	Continuously
Volatile Organics Compound	4	SPM	EPA method TO-15	24-hours every sixth day

Carbonyls	3.8	SPM	EPA method TO-11A	24-hours every sixth day
Meteorological	7.7	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

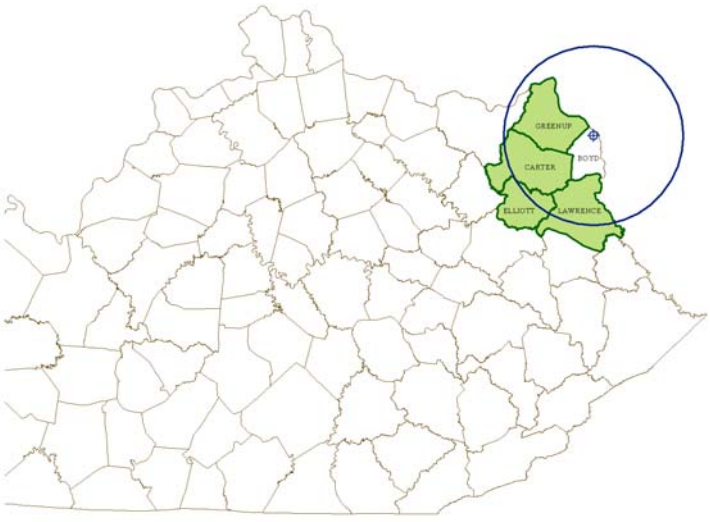
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents maximum concentrations on a middle scale for particulates. This site also represents population exposure on a neighborhood scale for air toxics.

Criteria and Air Toxics Neighborhood Scale



Nitrogen Dioxide Urban Scale



CSA/MSA: Huntington-Ashland, WV-KY-OH MSA
401 KAR 50:020 Air Quality Region: Huntington (WV)-Ashland (KY)-Portsmouth-Ironton (OH) Interstate (103)
Site Name: Worthington
AQS Site ID: 21-089-0007
Location: Scott Street and Center Avenue, Worthington, KY 41183
County: Greenup
GPS Coordinates: 38.548333, -82.731667
Date Established: October 12, 1980
Inspection Date: October 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of a water tower near the intersection of Scott Street and Center Avenue in Worthington, Kentucky. The sample inlets are 57 feet from the nearest road. The most recent site inspection was conducted on October 24, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect elevated pollutant levels for activation of emergency control procedures for nitrogen dioxide, ozone and sulfur dioxide; and to provide pollutant levels for daily air quality index reporting.

Monitors:

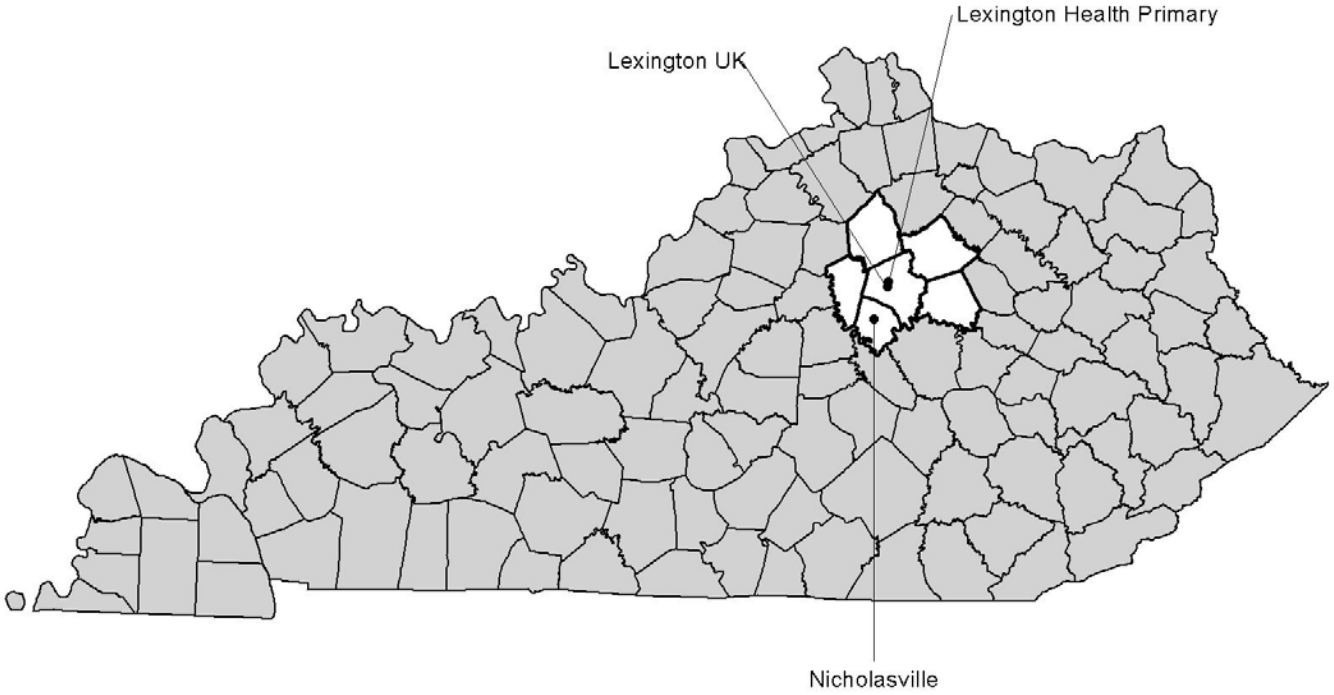
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.2	SLAMS AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	4.2	SPM	UV fluorescence	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for ozone and sulfur dioxide.

Criteria Neighborhood Scale

Lexington-Fayette, KY



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-067-0012	650 Newtown Pike Lexington (Fayette)	X(t)		X(eI)	X(e)		X (I e)				X(s)	X(s)	X(s)	
21-067-0014	533 South Limestone Lexington (Fayette)	X	X					X(s)						
21-113-0001	KY DOT Garage, US 27 Bypass Nicholasville (Jessamine)			X(s)			X		X	HG				X
	TOTAL	3	1	2	1	0	2	1	1	1	1	1	1	1

(e) Emergency Episode Monitor

(I) Air Quality Index Monitor

(s) Special Purpose Monitor

(t) Continuous PM Monitor

(Rev.6/30/09)

CSA/MSA: Lexington-Fayette-Frankfort-Richmond, KY CSA / Lexington-Fayette, KY MSA
401 KAR 50:020 Air Quality Region: Bluegrass Intrastate (102)
Site Name: Lexington Primary
AQS Site ID: 21-067-0012
Location: Fayette County Health Department, 650 Newtown Pike, Lexington, KY 40508
County: Fayette
GPS Coordinates: 38.065000, -84.500000
Date Established: November 8, 1979
Inspection Date: December 5, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Fayette County health department building in Lexington, Kentucky. The sample inlets are 385 feet from the nearest road. The most recent site inspection was conducted on December 5, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect elevated pollutant levels for activation of emergency control procedures for nitrogen dioxide, ozone and sulfur dioxide; and to provide pollutant levels for daily air quality index reporting.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
ARM Nitrogen Dioxide	4	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.8	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	4.6	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ Speciation	4.5	SLAMS	Thermal optical, ion chromatography, and X-ray fluorescence	24-hours every sixth day
$PM_{2.5}$ TEOM	4.6	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
AEM Sulfur Dioxide	3.6	SLAMS AQI EPISODE	UV fluorescence	Continuously
Volatile Organics Compound	3.5	SPM	EPA method TO-15	24-hours every sixth day
Carbonyls	3.5	SPM	EPA method TO-11A	24-hours every sixth day

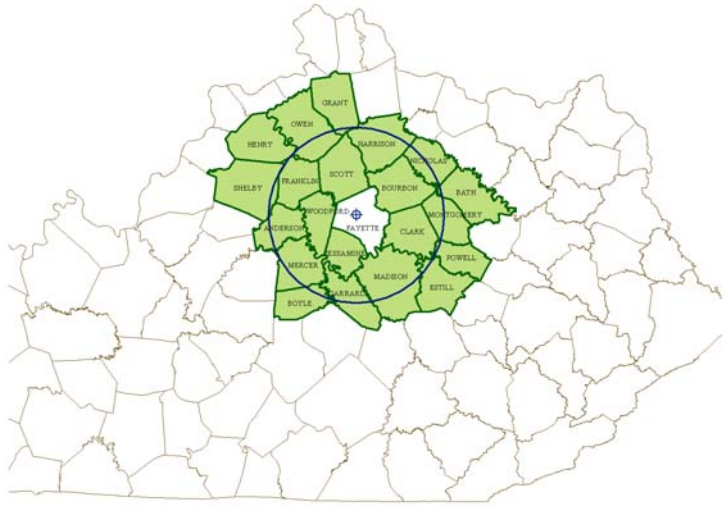
Radiation	4	RadNet	RadNet fixed stationary monitor, manual and automated methods	Continuously & 2 weekly filters

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for particulates, sulfur dioxide and ozone. This site also represents population exposure on an urban scale for nitrogen dioxide and air toxics.

Criteria Neighborhood Scale

Nitrogen Dioxide and Air Toxics Urban Scale



CSA/MSA: Lexington-Fayette-Frankfort-Richmond, KY CSA / Lexington-Fayette, KY MSA
401 KAR 50:020 Air Quality Region: Bluegrass Intrastate (102)
Site Name: U.K. Lexington
AQS Site ID: 21-067-0014
Location: 533 South Limestone, Lexington, KY 40508
County: Fayette
GPS Coordinates: 38.038889, -84.507500
Date Established: October 2, 1982
Inspection Date: December 5, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is located on the roof of the Whalen Transportation Research Building on the University of Kentucky campus in Lexington, Kentucky. The sample inlets are 60 feet from the nearest road. The most recent site inspection was conducted on December 5, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM $PM_{2.5}$	11.2	SLAMS	Gravimetric	24-hourd every third day
FRM PM_{10}	11	SLAMS	Gravimetric	24-hourd every sixth day
- Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.4	Same as PM_{10}

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on a neighborhood scale.

Criteria Neighborhood Scale

CSA/MSA: Lexington-Fayette-Frankfort-Richmond, KY CSA / Lexington-Fayette, KY MSA
401 KAR 50:020 Air Quality Region: Bluegrass Intrastate (102)
Site Name: Nicholasville
AQS Site ID: 21-113-0001
Location: DOT Garage, US 27 Bypass, Nicholasville, KY 40356
County: Jessamine
GPS Coordinates: 37.893333, -84.589167
Date Established: August 1, 1991
Inspection Date: December 5, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Kentucky DOT Garage in Nicholasville, Kentucky. The sample inlets are 372 feet from the nearest road. The most recent site inspection was conducted on December 5, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to provide ozone data upwind of the Lexington area; and to provide pollutant levels for daily air quality index reporting.

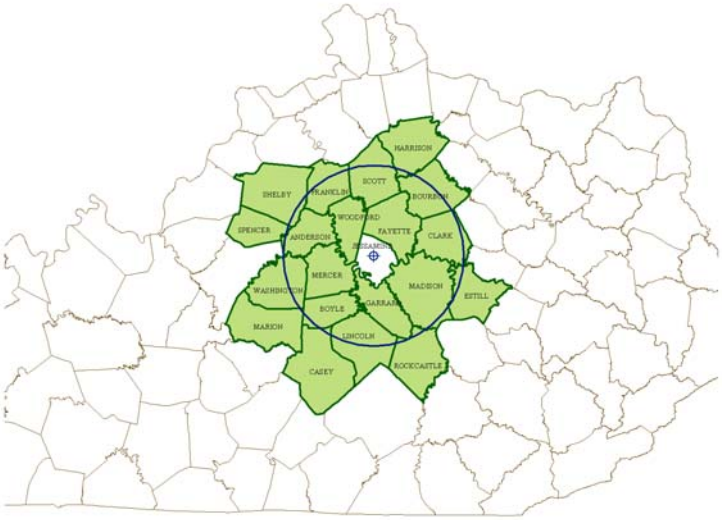
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.9	SLAMS AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	3.9	SPM AQI	UV fluorescence	Continuously
Mercury - ambient	3.8	SPM	Cold vapour atomic fluorescence spectrometry	Continuously
Mercury – Wet Deposition	1.5	SPM	Wet deposition collected, analysis of sample by the Environmental Services laboratory	Weekly
Meteorological	1.25	Other	Rain gauge	Continuously

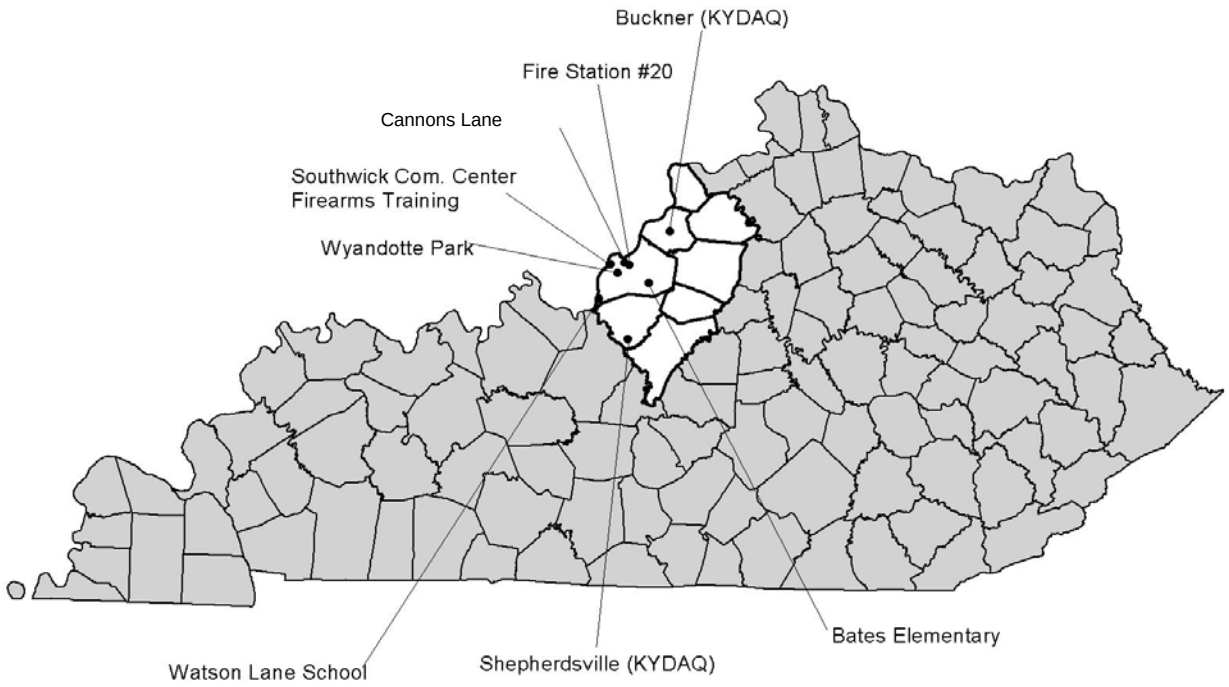
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on an urban scale.

Criteria and Air Toxics Urban Scale



Louisville-Jefferson County, KY-IN



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-029-0006	2nd & Carpenter Streets Shepherdsville (Bullitt)	X					X(I)							X
21-185-0004	DOT Garage, 3995 Morgan Rd Buckner (Oldham)						X(I)							
21-111-0027	7601 Bardstown Road Louisville (Jefferson)	Xt(sI)					X(I)							
21-111-0043	3621 Southern Avenue Louisville (Jefferson)	X(ctI)	X(c)											X
21-111-0044	1032 Beecher Avenue Louisville (Jefferson)	X(I)	X(tI)											
21-111-0051	7201 Watson Lane Louisville (Jefferson)	X(tsI)		X(I)			X(I)							
21-111-0067	2730 Cannons Lane Louisville (Jefferson)	X(tI)	X	X(I)	X(I)	X(I)	X(I)				X		X	X
21-111-1019	1735 Bardstown Road Louisville (Jefferson)					X(I)								
21-111-1041	4201 Algonquin Parkway Louisville (Jefferson)			X(Ie)										
	TOTAL	11	4	3	1	2	5	0	0	0	1	0	1	3

(c) Collocated Monitor
(e) Emergency Episode Monitor
(I) Air Quality Index Monitor
(s) Special Purpose Monitor
(t) Continuous PM Monitor

(Rev. 5/21/09)

CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: North Central Kentucky Intrastate (104)
Site Name: Shepherdsville
AQS Site ID: 21-029-0006
Location: Second and Carpenter Streets, Shepherdsville, KY 40165
County: Bullitt
GPS Coordinates: 37.98556, -85.713056
Date Established: January 30, 1992
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located in a fenced in area near the intersection of Second and Carpenter Streets in Shepherdsville, Kentucky. The sample inlets are 70 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide ozone levels for daily index reporting.

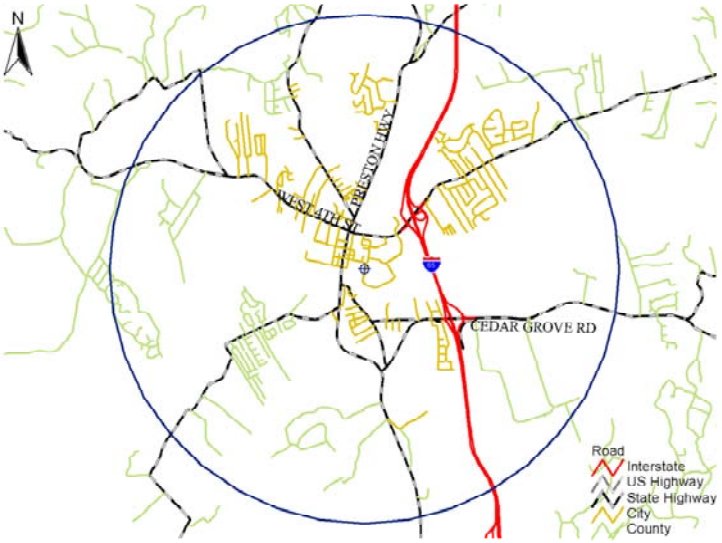
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	4.5	SLAMS	Gravimetric	24-hourd every third day
Meteorological	7.6	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

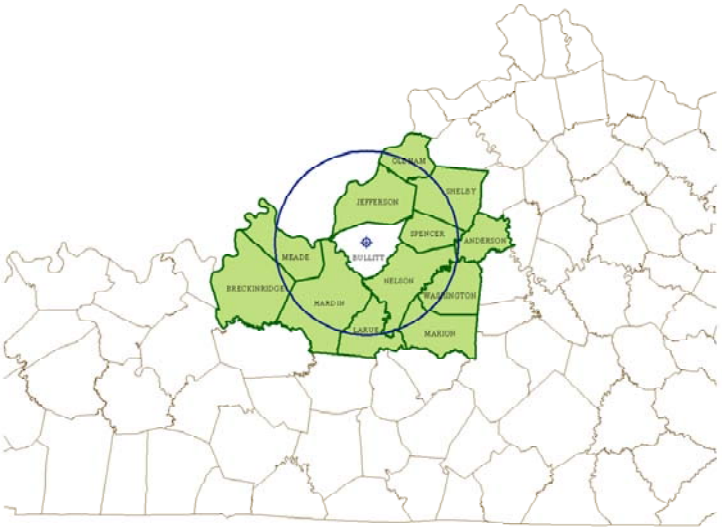
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for particulates and population exposure on an urban scale for ozone.

Particulates Neighborhood Scale



Ozone Urban Scale



CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: North Central Kentucky Intrastate (104)
Site Name: Buckner
AQS Site ID: 21-185-0004
Location: DOT Garage, 3995 Morgan Road, Buckner, KY 40010
County: Oldham
GPS Coordinates: 38.398611, -85.443333
Date Established: May 1, 1981
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Kentucky DOT Highway Garage in Buckner, Kentucky. The sample inlet is 250 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. Upon inspection, the sample line and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide ozone levels for daily index reporting.

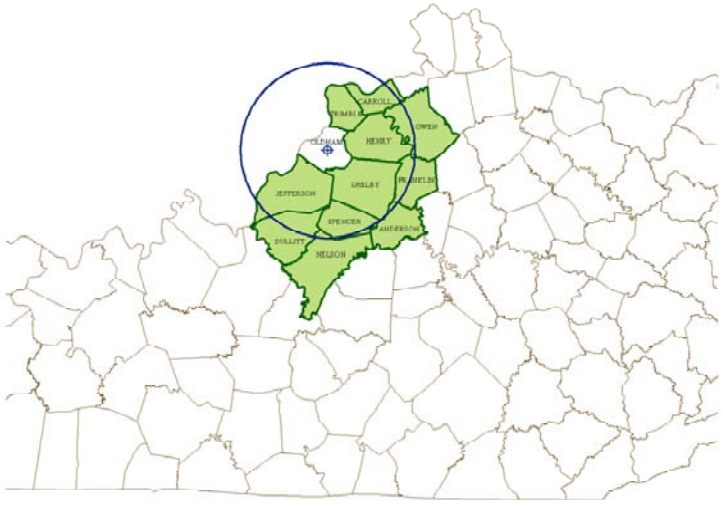
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SPM AQI	UV photometry	Continuously March 1 – October 31

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents maximum concentrations on an urban scale.

Ozone Urban Scale



CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Bates Elementary
AQS Site ID: 21-111-0027
Location: Bates Elementary, 7601 Bardstown Road, Louisville, KY 40291
County: Jefferson
GPS Coordinates: 38.13784, -85.57648
Date Established: January 4, 1973
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Bates Elementary School in Louisville, Kentucky. The sample inlets are 13 feet above ground level and 1000 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide pollution levels for daily index reporting.

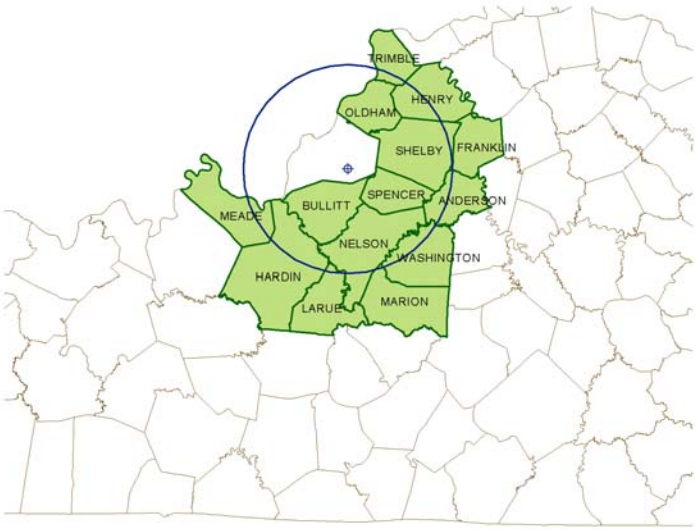
Monitors:

Monitor Type	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	SLAMS AQI	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ TEOM	Other AQI	Tapered element oscillating microbalance, gravimetric	Continuously

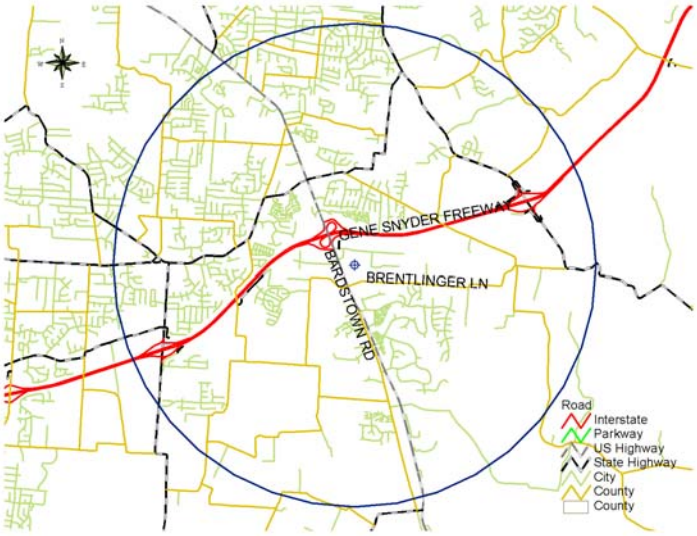
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on an urban scale for ozone. This site also represents population exposure on a neighborhood scale for fine particulates.

Ozone Urban Scale



Particulates Neighborhood Scale



CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Southwick Community Center
AQS Site ID: 21-111-0043
Location: Southwick Community Center, 3621 Southern Avenue, Louisville, KY 40211
County: Jefferson
GPS Coordinates: 38.23319, -85.81566
Date Established: July 1, 1983
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is located on the roof of the Southwick Community Center in Louisville, Kentucky. The sample inlets are 16 feet above ground level and 200 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide pollution levels for daily index reporting.

Monitors:

Monitor Type	Designation	Analysis Method	Frequency of Sampling
PM_{10} TEOM	AQI	Tapered element oscillating microbal-ance, gravimetric	Continuously
- Collocated PM_{10} TEOM	AQI	Tapered element oscillating microbal-ance, gravimetric	Continuously
FRM $PM_{2.5}$	SLAMS	Gravimetric	24-hours everyday
- Collocated FRM $PM_{2.5}$	Other	Gravimetric	24-hours every sixth day
$PM_{2.5}$ TEOM	Other AQI	Tapered element oscillating microbal-ance, gravimetric	Continuously
Meteorological	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure, rainfall and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for particulates.

Neighborhood Scale

CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Wyandotte Park
AQS Site ID: 21-111-0044
Location: Wyandotte Park, 1032 Beecher Avenue, Louisville, KY 40215
County: Jefferson
GPS Coordinates: 38.19113, -85.77935
Date Established: September 1, 1983
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is located on the roof of the recreation building at Wyandotte Park in Louisville, Kentucky. The sample inlets are 16 feet above ground level and 150 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide pollution levels for daily index reporting.

Monitors:

Monitor Type	Designation	Analysis Method	Frequency of Sampling
PM_{10} TEOM	AQI	Tapered element oscillating microbalance, gravimetric	Continuously
FRM $PM_{2.5}$	SLAMS	Gravimetric	24-hours everyday

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on a neighborhood scale.

Neighborhood Scale

CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Watson Lane
AQS Site ID: 21-111-0051
Location: Watson Lane School, 7201 Watson Lane, Louisville, KY 40272
County: Jefferson
GPS Coordinates: 38.06091, -85.89804
Date Established: July 16, 1992
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Watson Lane Elementary School in Louisville, Kentucky. The sample inlets are 13 feet above ground level and 125 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices C, D, E and G.

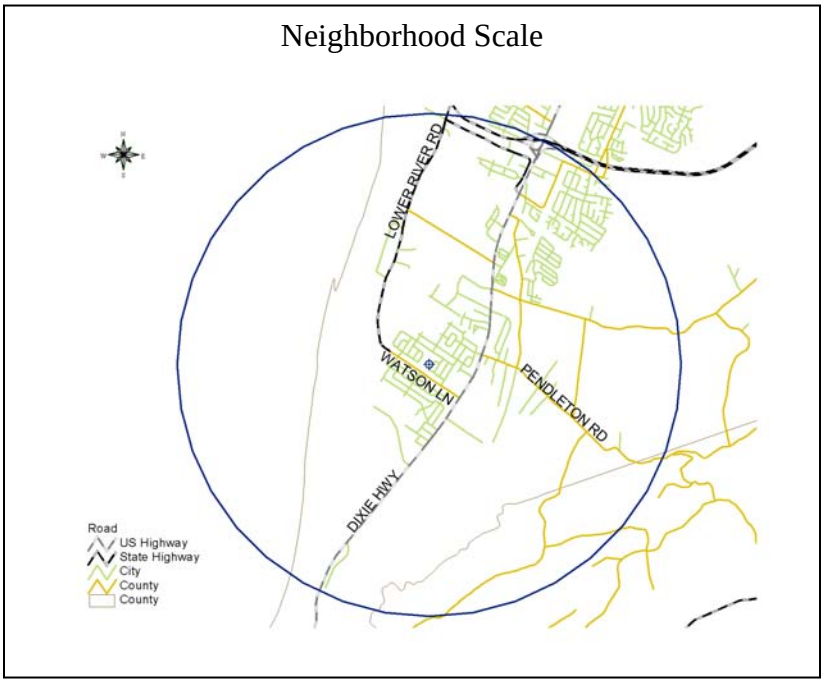
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide pollution levels for daily index reporting.

Monitors:

Monitor Type	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	SLAMS AQI	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	Other	Gravimetric	24-hours every sixth day
$PM_{2.5}$ TEOM	Other AQI	Tapered element oscillating microbal-ance, gravimetric	Continuously
AEM Sulfur Dioxide	SLAMS AQI	UV fluorescence	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale.



CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Cannons Lane
AQS Site ID: 21-111-0067
Location: 2730 Cannons Lane, Louisville, KY 40204
County: Jefferson
GPS Coordinates: 38.22883, -85.6544
Date Established: January 1, 2009
Inspection Date: April 17, 2008 (KYDAQ), December 9, 2008 (US EPA)
Inspection By: Andrea P. Keatley (KYDAQ), Richard Guillot and Jerry Burger (US EPA)
Site Approval Status: EPA SLAMS approval on December 22, 2008, NCORE approval is pending

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The station is located on property leased by LMAPCD. The property was used as a Vehicle Emissions Testing (VET) center but is now used primarily for storage. The location is in the NE quadrant of Jefferson County and is approximately 9 km from the urban core of Metro Louisville.

Monitoring Objective:

The NCore Network addresses the following monitoring objectives:

- timely reporting of data to the public through AIRNow, air quality forecasting, and other public reporting mechanisms
- support development of emission strategies through air quality model evaluation and other observational methods
- accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors
- support long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards (NAAQS)
- compliance through establishing nonattainment/attainment areas by comparison with the NAAQS
- support multiple disciplines of scientific research, including public health, atmospheric and ecological

Monitors:

Monitor Type	Designations	Analysis Method	Frequency of Sampling	Startup Date
Carbon Monoxide (CO)	NCore AQI	Automated Reference Method* utilizing trace level non-dispersive infrared analysis.	Continuously	01/01/2010
Nitrogen Oxide (NO_x)	NCore AQI	Automated Reference Method utilizing chemiluminescence analysis.	Continuously	01/01/2010
Ozone (O_3)	NCore AQI	Automated Equivalent Method utilizing UV photometry analysis.	Continuously	01/01/2010
Sulfur Dioxide (SO_2)	NCore AQI	Automated Equivalent Method utilizing trace level UV fluorescence analysis	Continuously	01/01/2010
Total Reactive Nitrogen (NO/ NO_y)	NCore	Automated method utilizing trace level chemiluminescence analysis.	Continuously	01/01/2011
$PM_{2.5}$ Filter	NCore	Manual Reference Method utilizing gravimetric analysis.	1/3 days	01/01/2009
$PM_{2.5}$ Continuous	NCore AQI	Automated Equivalent Method* utilizing Tapered Element Oscillating Microbalance/gravimetric analysis	Continuously	01/01/2009
$PM_{2.5}$ Speciation	NCore	Multi-species manual collection method utilizing thermal optical, ion chromatography, gravimetric, and X-ray fluorescence analyses.	1/6 days 1/3 days	01/01/2009 01/01/2011
PM_{10c} Filter	NCore	Manual Reference Method* PM_{10c} utilizing differential gravimetric analysis.	1/3 days	01/01/2009
$PM_{10-2.5}$ Speciation	NCore	Method pending	1/3 days	Requirement under review
Meteorological	NCore	Air Quality Measurements approved instrumentation for wind speed, wind direction, humidity, temperature, rainfall, and solar radiation	Continuously	07/01/2009
Lead	SLAMS	Manual Reference Method TSP Sampler, Analytical method to be determined.	1/6	01/01/2011
Radiation	RadNet	RadNet fixed station air monitor, manual and automated methods	Continuously + 2 weekly filters	01/01/2009
Volatile Organic Compounds	SPM	EPA Compendium Method TO-15 utilizing Summa® passivated canisters	1/12	02/10/2009

* Pending EPA designation

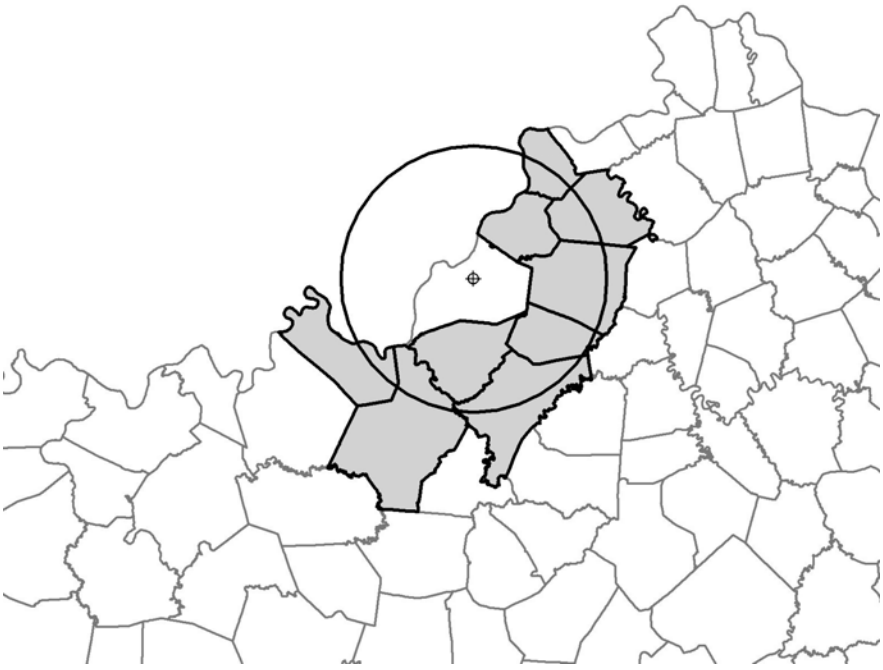
Quality Assurance Status:

All Quality Assurance procedures shall be implemented in accordance with 40 CFR 58, Appendix A. The District's current Quality Assurance Project Plan covers $PM_{2.5}$, Ozone, NOx, SO_2, CO, $PM_{2.5}$ Speciation, and meteorological measurements. The Quality Assurance Project Plan will be revised to include trace level measurements and lead. Standard operating procedures manuals will be adopted or developed for new instrumentation.

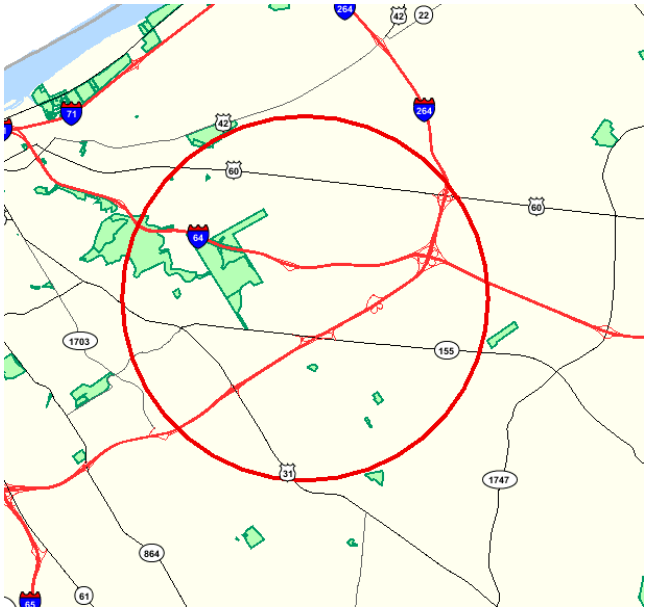
Area Representativeness:

Pollutant	Spatial Scale	Comments
Ozone	Neighborhood and Urban Scale	Use 10 km
NO_x /NO_y	Neighborhood and Urban Scale	Use 10 km
Carbon Monoxide	Neighborhood Scale	There is no Urban scale for CO
SO_2	Neighborhood Scale	There is no Urban scale for SO_2
PM_{10}/$PM_{2.5}$/Lead	Urban	
Radiation	Urban	
VOCs	Neighborhood	

Ozone, $PM_{2.5}$, PM_{10}, and NO_x urban scale (50 km)



CO neighborhood scale (4 km)



CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Fire Station 20
AQS Site ID: 21-111-1019
Location: Fire Station 20, 1735 Bardstown Road, Louisville, KY 40205
County: Jefferson
GPS Coordinates: 38.229, -85.7018
Date Established: January 1, 1973
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is located at Fire Station Number 20 on Bardstown Road in Louisville, Kentucky. The sample inlet is 10 feet above ground level and 13 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide pollution levels for daily index reporting.

Monitors:

Monitor Type	Designation	Analysis Method	Frequency of Sampling
ARM Carbon Monoxide	SLAMS AQI	Non-dispersive infrared	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents maximum concentration on a micro scale.

Micro Scale

CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Firearms Training
AQS Site ID: 21-111-1041
Location: Firearms Training, 4201 Algonquin Parkway, Louisville, KY 40211
County: Jefferson
GPS Coordinates: 38.23158, -85.82678
Date Established: April 13, 1978
Inspection Date: November 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Firearms Training Center in Louisville, Kentucky. The sample inlet is 15 feet above ground level and 100 feet from the nearest road. The most recent site inspection was conducted on November 24, 2008. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect episode levels for the activation of emergency control procedures; and to provide pollution levels for daily index reporting.

Monitors:

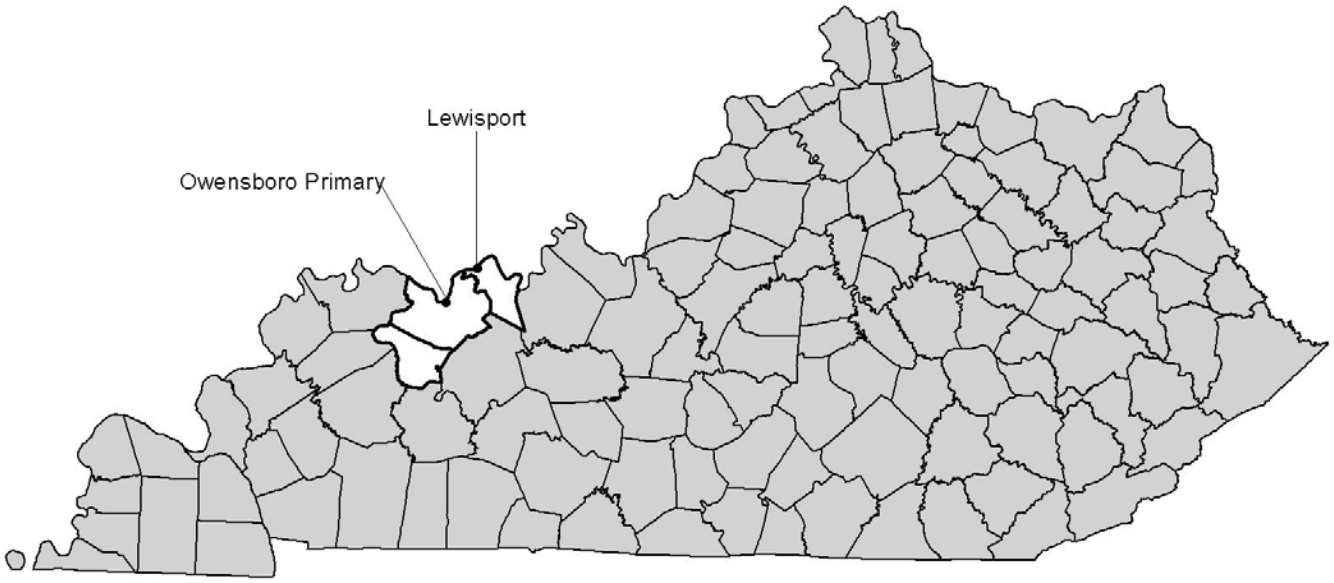
Monitor Type	Designation	Analysis Method	Frequency of Sampling
AEM Sulfur Dioxide	SLAMS EPISODE AQI	UV fluorescence	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale.

Neighborhood Scale

Owensboro, KY



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Metals	Hg	Wet Dep.	VOC	Carb -onyl	Specia- tion	MET
21-059-0005	716 Pleasant Valley Road Owensboro (Daviess)	X(tIe)		X(eI)	X(e)		X(eI)							X
21-091-0012	Lewisport Elementary School Lewisport (Hancock)						X							
	TOTAL	2	0	1	1	0	2	0	0	0	0	0	0	1

(e) Emergency Episode Monitor
(I) Air Quality Index Monitor
(t) Continuous PM Monitor

(Rev.5/23/08)

CSA/MSA: Owensboro, KY MSA
401 KAR 50:020 Air Quality Region: Evansville-Owensboro-Henderson Interstate (077)
Site Name: Owensboro Primary
AQS Site ID: 21-059-0005
Location: 716 Pleasant Valley Road, Owensboro, KY 42303
County: Daviess
GPS Coordinates: 37.780833, -87.075556
Date Established: December 1, 1970
Inspection Date: December 17, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds behind the Wyndall's Shopping Center in Owensboro, Kentucky. The sample inlets are 200 feet from the nearest road. The most recent site inspection was conducted on December 17, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect emergency pollution levels of criteria pollutants for activation of emergency control procedures; and to provide levels of pollutants for daily index reporting.

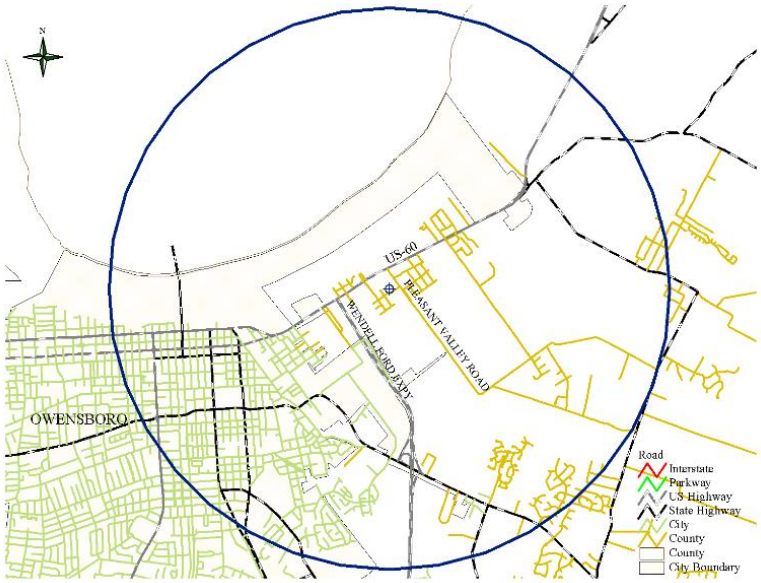
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.5	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.5	SLAMS EPISODE AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	4.5	SLAMS EPISODE AQI	Gravimetric	24-hours every third day
$PM_{2.5}$ TEOM	4.5	SPM	Tapered element oscillating microbalance, gravimetric	Continuously
AEM Sulfur Dioxide	3.5	SLAMS EPISODE AQI	UV fluorescence	Continuously
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

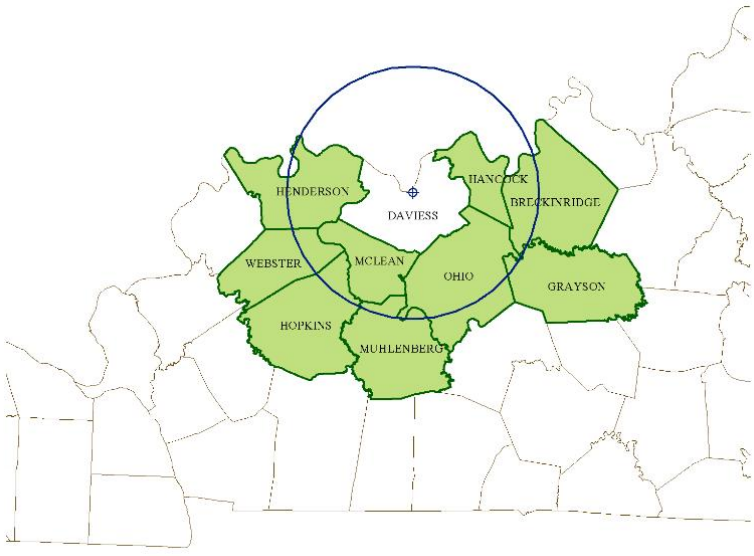
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for particulates, ozone and sulfur dioxide. This site also represents population exposure on an urban scale for nitrogen dioxide.

Criteria Neighborhood Scale



Nitrogen Dioxide Urban Scale



CSA/MSA: Owensboro, KY MSA
401 KAR 50:020 Air Quality Region: Evansville-Owensboro-Henderson Interstate (077)
Site Name: Lewisport
AQS Site ID: 21-091-0012
Location: Second and Caroline Streets, Lewisport Elementary School, Lewisport, KY 42351
County: Hancock
GPS Coordinates: 37.938889, -86.896944
Date Established: September 5, 1980
Inspection Date: December 17, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Lewisport Elementary School in Lewisport, Kentucky. The sample inlet is 175 feet from the nearest road. The most recent site inspection was conducted on December 17, 2008. Upon inspection, the sample line and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

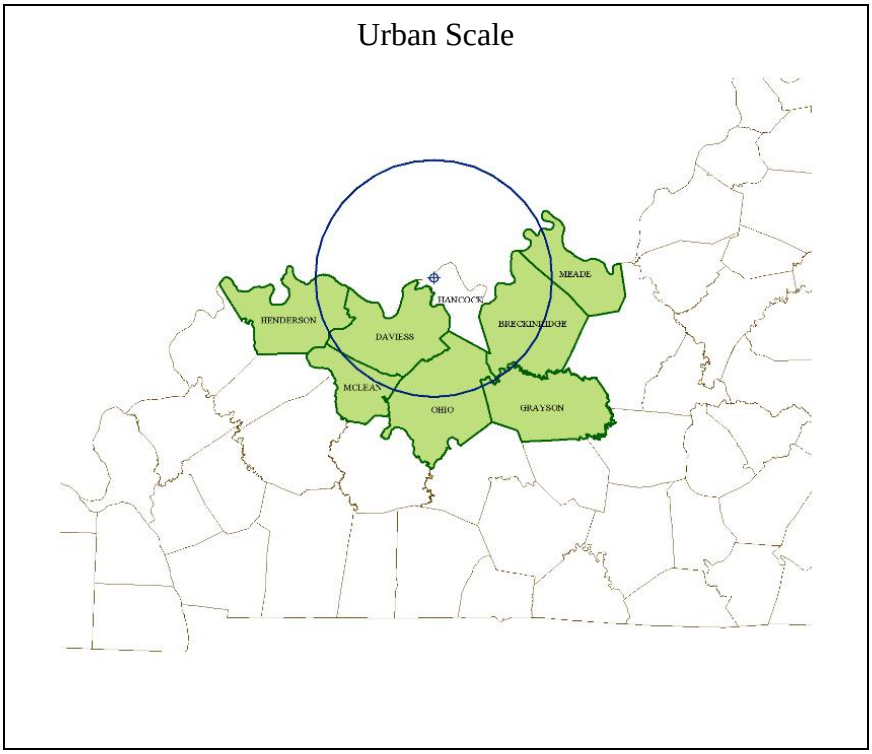
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide levels of ozone for daily index reporting.

Monitors:

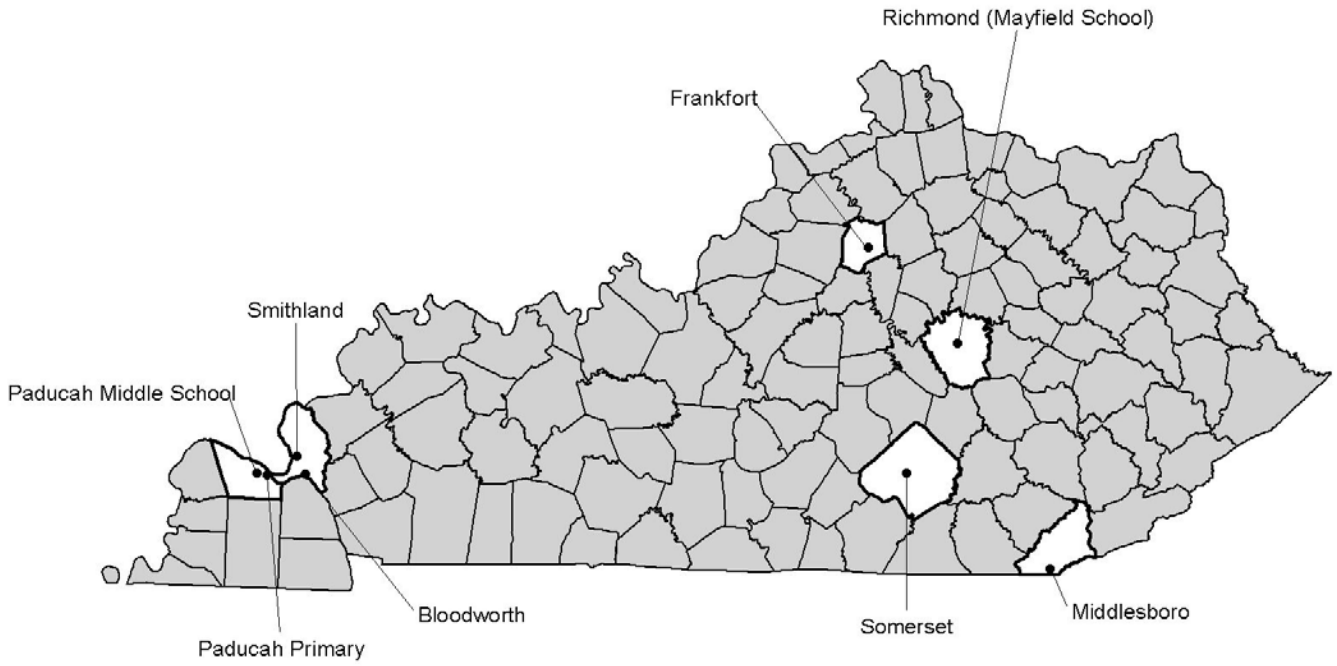
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.5	SLAMS AQI	UV photometry	Continuously March 1 – October 31

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents maximum concentration on an urban scale.



Micropolitan Statistical Areas



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Pb/ Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-013-0002	Airport, 34th & Dorchester Middlesboro (Bell)	X(s)					X(s)							X
21-073-0006	803 Schenkel Lane Frankfort (Franklin)	X												
21-139-0003	DOT Garage, 811 Hwy 60 East Smithland (Livingston)			X			X		X	HG				
21-139-0004	763 Bloodworth Road Livingston County										X			X
21-145-1004	Paducah Middle School, 342 Lone Oak Rd Paducah (McCracken)	X	X											
21-145-1024	J-P RECC, 2901 Powell Street Paducah (McCracken)	Xt(Ie)		X(eI)	X(e)		X(eI)							
21-151-0003	Mayfield Elementary, Bond St. Richmond (Madison)	X						X(c)						
21-199-0003	Somerset Gas Co., Clifty Street Somerset (Pulaski)						X(s)							
	TOTAL	5	1	2	1	0	4	1	1	1	1	0	0	2

(c) Collocated Monitor

(e) Emergency Episode Monitor

(I) Air Quality Index Monitor

(t) Continuous PM Monitor

(Rev.5/22/09)

CSA/MSA: Middlesborough, KY Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Appalachian Intrastate (101)
Site Name: Middlesboro
AQS Site ID: 21-013-0002
Location: Middlesboro Airport, Middlesboro, KY 40965
County: Bell
GPS Coordinates: 36.608056, -83.736944
Date Established: February 14, 1992
Inspection Date: November 27, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Middlesboro Airport in Middlesboro, Kentucky. The sample inlets are 55 feet from the nearest road. The most recent site inspection was conducted on November 27, 2008. Upon inspection the sample lines and monitors were found to be in good condition. Even though this site is for special purpose monitoring, the site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to provide pollutant levels for daily index reporting; and to provide information on the transport of ozone into the region.

Monitors:

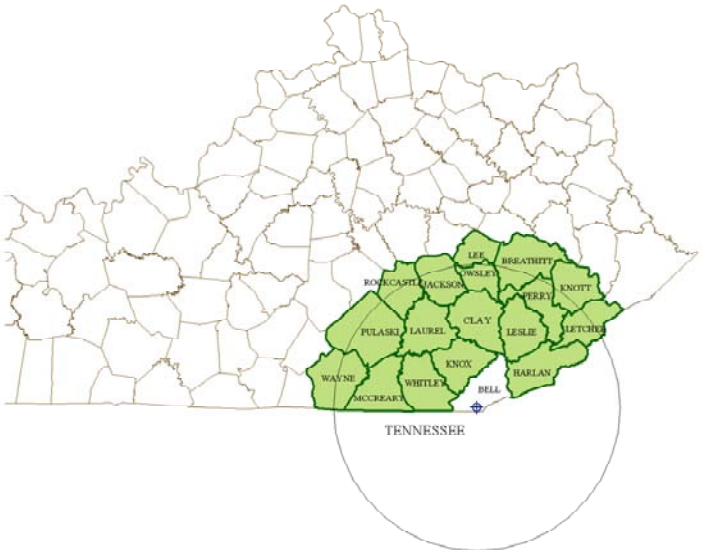
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4	SPM AQI	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	4.5	SPM	Gravimetric	24-hours every third day
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on a neighborhood scale for particulates. This site also represents transport on a regional scale for ozone.

Particulate Neighborhood Scale

Ozone Regional Scale



CSA/MSA: Lexington-Fayette-Frankfort-Richmond, KY CSA / Frankfort, KY Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Bluegrass Intrastate (102)
Site Name: Frankfort
AQS Site ID: 21-073-0006
Location: 803 Schenkel Lane, Frankfort, KY 40601
County: Franklin
GPS Coordinates: 38.219361, -84.838500
Date Established: January 1, 1999
Inspection Date: December 5, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is located on the roof of the Ragland Building in Frankfort, Kentucky. The sample inlet is 250 feet from the nearest road. The most recent site inspection was conducted on December 5, 2008. Upon inspection, the sample inlet and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FEM $PM_{2.5}$	5.5	SLAMS	Gravimetric	24-hours every third day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on a neighborhood scale.

Criteria Neighborhood Scale

CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Smithland
AQS Site ID: 21-139-0003
Location: KY DOT Garage, 811 HWY 60 East, Smithland, KY 42081
County: Livingston
GPS Coordinates: 37.155556, -88.393056
Date Established: April 1, 1988
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the KY DOT Highway Garage in Smithland, Kentucky. The sample inlets are 1200 feet from the nearest road. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

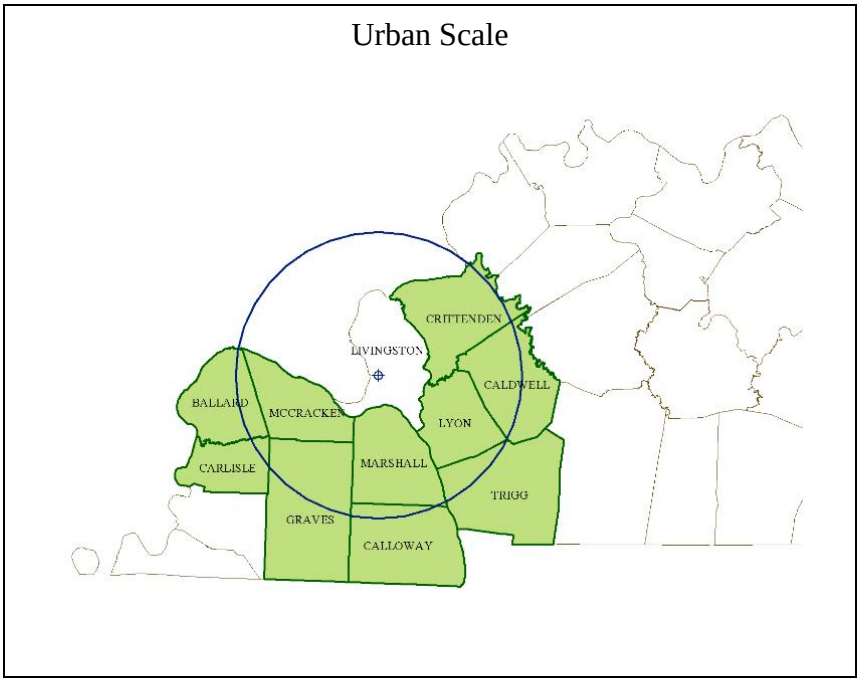
Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.8	SLAMS AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	3.9	SPM	UV fluorescence	Continuously
Mercury – ambient	3.9	SPM	Cold vapour fluorescence spectrometry	Continuously
Mercury – Wet Deposition		SPM	Wet deposition collected, analysis of sample by the Environmental Services Laboratory	Weekly

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents maximum concentration on an urban scale.



CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Bloodworth
AQS Site ID: 21-139-0004
Location: 763 Bloodworth Road, Smithland, KY 42081
County: Livingston
GPS Coordinates: 37.070833, -88.334167
Date Established: September 15, 1986
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located at the residence of 763 Bloodworth Road in Livingston County, Kentucky. The sample inlets are 1200 feet from the nearest road. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample lines and samplers were found to be in good condition.

Monitoring Objective:
The monitoring objectives are to determine if air toxics are present in the ambient air and to quantify them.

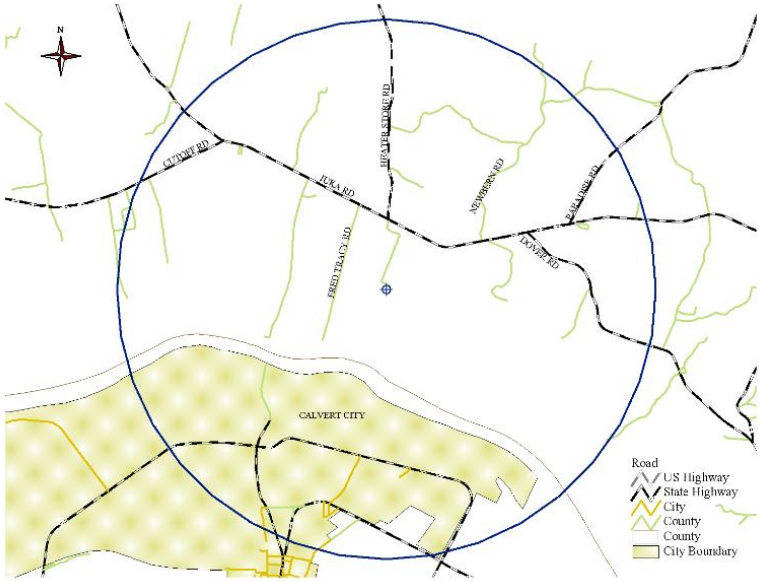
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	4.3	SPM	EPA method TO-15	24-hours every sixth day
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents source impact on a neighborhood scale.

Neighborhood Scale



CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Paducah Middle School
AQS Site ID: 21-145-1004
Location: Paducah Middle School, 342 Lone Oak, Paducah, KY 42001
County: McCracken
GPS Coordinates: 37.065556, -88.637778
Date Established: July 1, 1969
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is located on the roof of the Paducah Middle School in Paducah, Kentucky. The sample inlets are 110 feet from the nearest road. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FEM $PM_{2.5}$	11	SLAMS	Gravimetric	24-hours every third day
FRM PM_{10}	11	SLAMS	Gravimetric	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale.

Neighborhood Scale

CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Jackson Purchase Paducah Primary
AQS Site ID: 21-145-1024
Location: Jackson Purchase RECC, 2901 Powell Street, Paducah, KY 42003
County: McCracken
GPS Coordinates: 37.058056, -88.572500
Date Established: August 15, 1980
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Jackson Purchase RECC in Paducah, Kentucky. The sample inlets are 31 feet from the nearest road. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect elevated pollutant levels for activation of emergency control procedures for nitrogen dioxide, ozone and sulfur dioxide; and to provide pollutant levels for daily air quality index reporting.

Monitors:

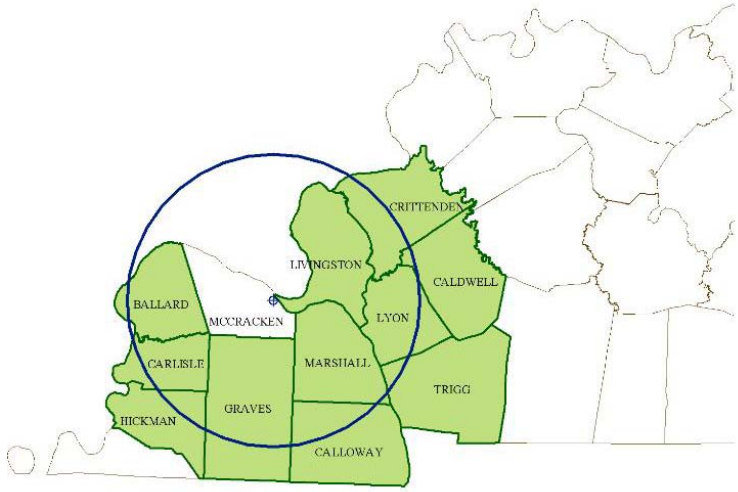
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.7	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.7	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ TEOM	4.7	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
AEM Sulfur Dioxide	3.7	SLAMS AQI EPISODE	UV fluorescence	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for ozone, particulates and sulfur dioxide. This site also represents population exposure on an urban scale for nitrogen dioxide.

Neighborhood Scale

Nitrogen Dioxide Urban Scale



CSA/MSA: Lexington-Fayette-Frankfort-Richmond, KY CSA / Richmond-Berea, KY Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Bluegrass Intrastate (102)
Site Name: Richmond
AQS Site ID: 21-151-0003
Location: Mayfield School, Bond Street, Richmond, KY 40475
County: Madison
GPS Coordinates: 37.738056, -84.285556
Date Established: January 1, 1999
Inspection Date: December 5, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is located on the roof of the Mayfield Elementary School in Richmond, Kentucky. The sample inlet is 200 feet from the nearest road. The most recent site inspection was conducted on December 5, 2008. Upon inspection, the sample inlet and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E. This site will also be the location for a source-oriented lead monitor in January 2010.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM $PM_{2.5}$	6.6	SLAMS	Gravimetric	24-hours every third day
FRM Lead		SLAMS	40 CFR Part 50 Appendix G	24-hours every sixth day
-Collocated FRM Lead		SLAMS	40 CFR Part 50 Appendix G	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale for particulates. This site also represents source impact on a neighborhood scale for lead.

Criteria Neighborhood Scale

Lead Neighborhood Scale at 1 km

CSA/MSA: Somerset, KY Micropolitan Statistical Area
401 KAR 50:020 Air Quality Control Region: South Central Kentucky Intrastate (105)
Site Name: Somerset
AQS Site ID: 21-199-0003
Location: Somerset Gas Company, Clifty Street, Somerset, KY 42501
County: Pulaski
GPS Coordinates: 37.097500, -84.611667
Date Established: February 14, 1992
Inspection Date: November 26, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Somerset Gas Company Warehouse on Clifty Street in Somerset, KY. The sample inlets are 35 feet from the nearest road. The most recent site inspection was conducted on November 26, 2008. Upon inspection the sample line and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide levels of ozone and particulate matter for daily index reporting.

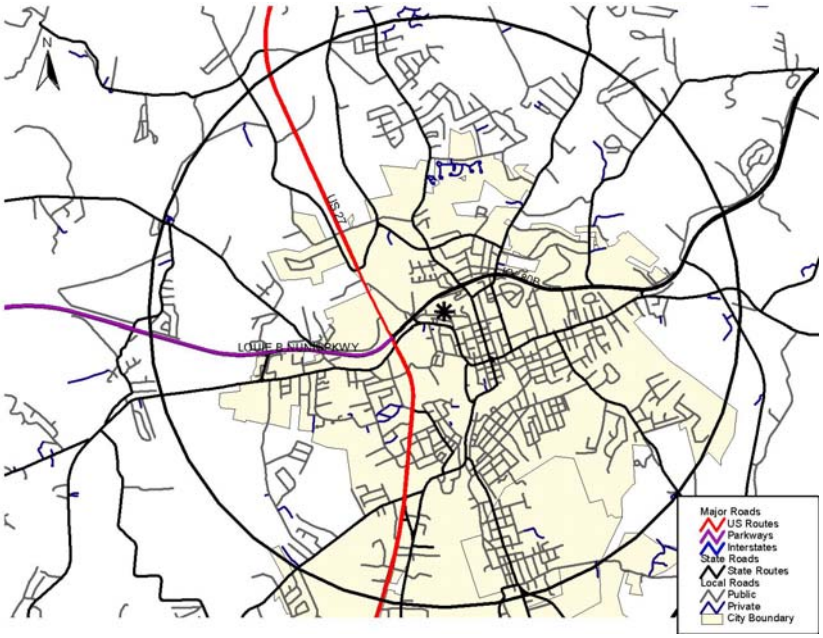
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4	SPM AQI	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ BAM		SPM AQI	Beta Attenuation Mass Monitor	Continuously

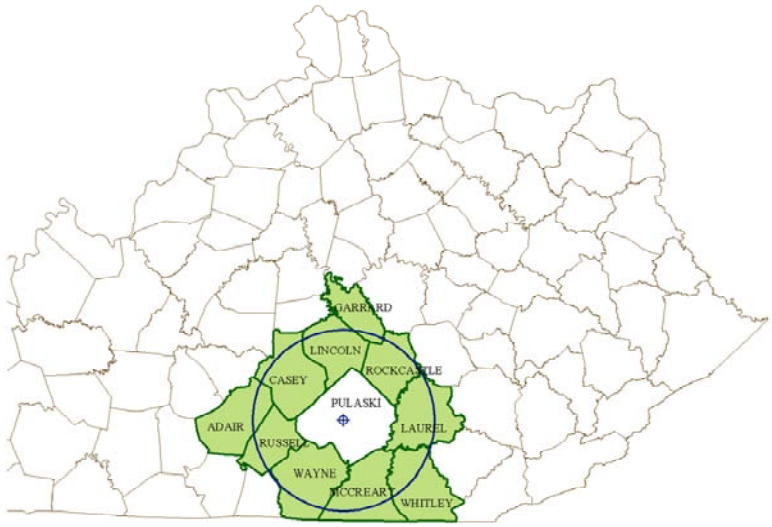
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on an urban scale for ozone. This site also represents population exposure on a neighborhood scale for particulates.

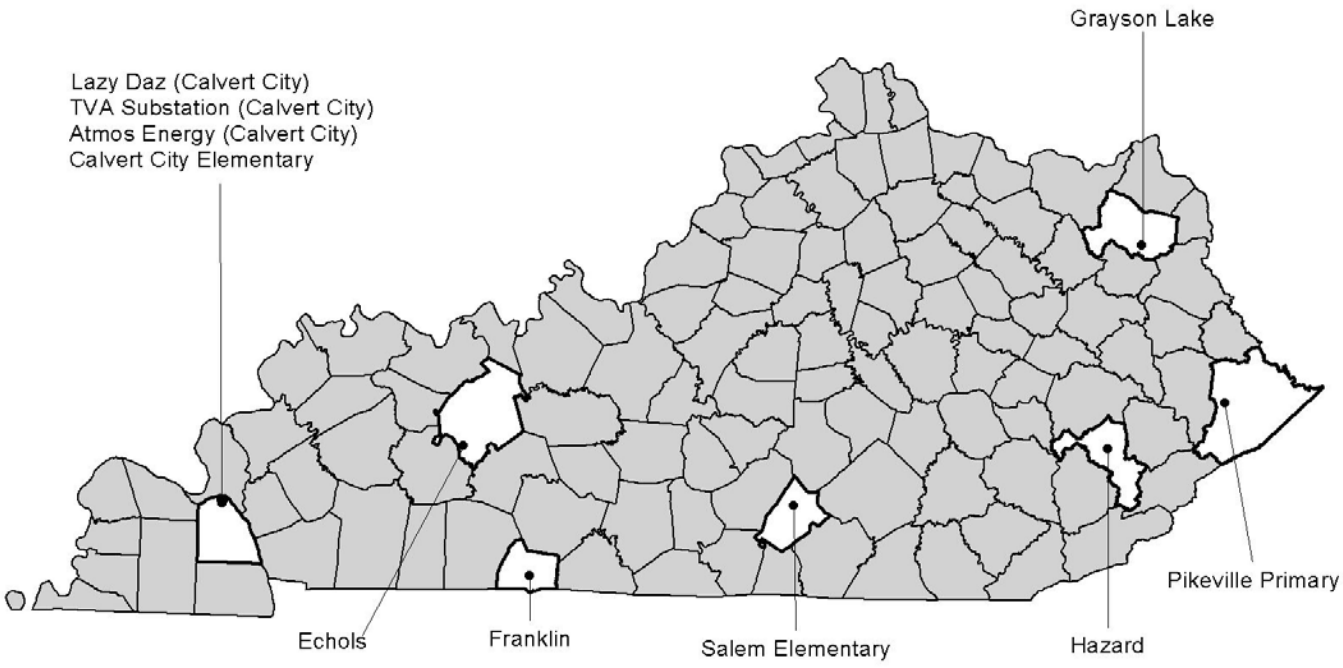
Neighborhood Scale



Ozone Urban Scale



Not in a MSA



AIRS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Pb/ Metals	Hg	Wet Dep.	VOC	Carb-onyl	Specia-tion	MET
21-043-0500	Camp Webb, Grayson Lake Grayson (Carter)	X	X(c)				X(s)	X(c)	X	X HG	X	X	X	X
21-157-0014	TVA Substation Calvert City (Marshall)										X(c)			
21-157-0016	Atmos Energy Calvert City (Marshall)										X			
21-157-0018	Calvert City Elementary Calvert City (Marshall)		X(s)					X			X			
21-157-0019	4237 Gilbertsville Hwy Calvert City (Marshall)										X			
21-183-0032	Keytown Road Echols (Ohio)	X(st)	X(s)					X	X	HG				X
21-193-0003	Perry County Horse Park Hazard (Perry)	Xt					X(s)							X
21-195-0002	101 N. Mayo Trail, DOT Office Pikeville (Pike)	X(ct)					X(s)							
21-213-0004	KY DOT Garage, KY 1008 Franklin (Simpson)						X(s)							
TBA	Salem Elementary Russell Springs (Russell)							X						
	TOTAL	7	4	0	0	0	4	5	2	2	6	1	1	3

(c) Collocated Monitor
(s) Special Purpose Monitor
(t) Continuous PM Monitor

(Rev.6/30/09)

CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Region: Huntington (WV)-Ashland (KY)-Portsmouth-Ironton (OH) Interstate (103)
Site Name: Grayson Lake
AQS Site ID: 21-043-0500
Location: Camp Webb at Grayson Lake Grayson Lake, KY 41143
County: Carter
GPS Coordinates: 38.238333, -82.988333
Date Established: May 13, 1981
Inspection Date: October 24, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter in a fenced area located in a remote section of Camp Webb in Grayson, Kentucky. The nearest road is a service road to the site. The most recent site inspection was conducted on October 24, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to determine background levels of $PM_{2.5}$; to provide ozone data upwind of the Ashland area; to measure background levels of Mercury in ambient air and in precipitation; and to measure rural concentrations of a sub-group of air toxics for use in national assessment.

Monitors:

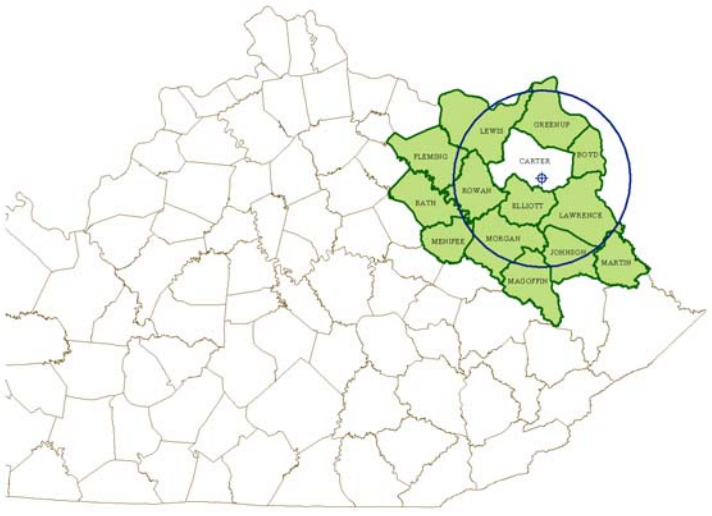
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	3.2	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ Speciation	4.5	SLAMS	Thermal optical, ion chromatography, and X-ray fluorescence	24-hours every sixth day
FRM PM_{10}	3	SLAMS	Gravimetric	24-hours every sixth day
-Collocated PM_{10}	3	SLAMS	Gravimetric	24-hours every sixth day
-Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.5	Same as PM_{10}
Mercury - ambient	4.2	SPM	Cold vapour atomic fluorescence spectrometry	Continuously

Mercury - Wet deposition	1.5	SPM	Wet deposition collected, analysis of sample by the Environmental Services Laboratory using EPA method 1631, Revision E	Weekly
Wet deposition	1.3	SPM	Wet deposition collected, analysis of sample by the Environmental Services Laboratory	Weekly
Volatile Organics Compound	4	NATTS	EPA method TO-15	24-hours every sixth day
Polycyclic Aromatic Hydrocarbons		NATTS	EPA method TO-13A	24-hours every sixth day
Carbonyls	3.5	NATTS	EPA method TO-11A	24-hours every sixth day
$Chrome_{VI}$	3.5	NATTS	SOP for the Determination of Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography (IC)	24-hours every sixth day
-Collocated $Chrome_{VI}$	3.5	NATTS	SOP for the Determination of Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography (IC)	24-hours every twelfth day
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, relative humidity, temperature, solar radiation and rain gauge	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents background levels on an urban scale for particulates and mercury. This site also represents upwind/background levels on an urban scale for ozone and population exposure on an urban scale for wet deposition.

Urban Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Paducah – Cairo Interstate (072)
Site Name: TVA Calvert City
AQS Site ID: 21-157-0014
Location: Ballpark Road, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.024200, -88.195100
Date Established: January 1, 2005
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is an air toxics monitor location off Ballpark Road in Calvert City, Kentucky. The sample inlet is 2 meters above ground level. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition.

Monitoring Objective:
The monitoring objectives are to determine if toxic air pollutants are present and to quantify them.

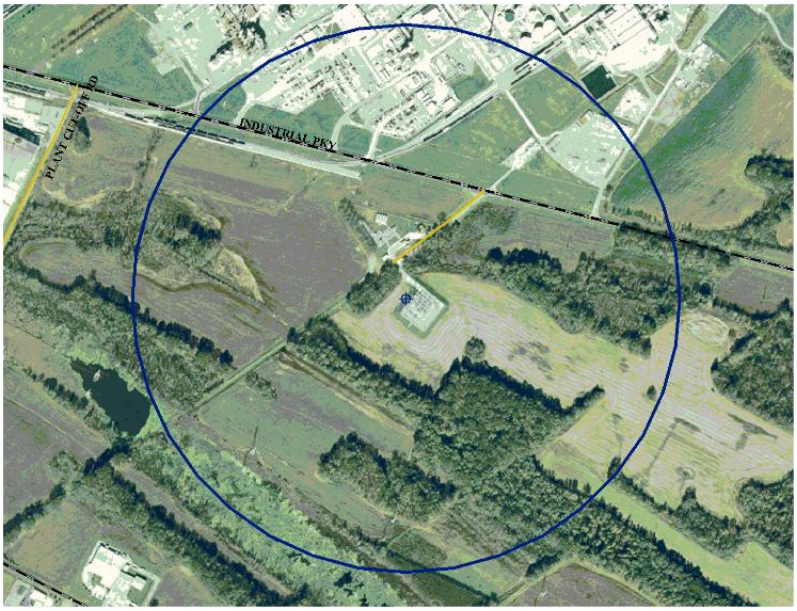
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	2	SPM	EPA method TO-15	24-hours every sixth day
- Collocated Volatile Organic Compounds	2	SPM	EPA method TO-15	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents source oriented exposure on a middle scale.

Middle Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Paducah – Cairo Interstate (072)
Site Name: Atmos Calvert City
AQS Site ID: 21-157-0016
Location: KY95, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.023100, -88.211500
Date Established: January 1, 2005
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is an air toxics monitor location off KY95 in Calvert City, Kentucky. The sample inlet is 2 meters above ground level. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample inlet and monitor were found to be in good condition.

Monitoring Objective:
The monitoring objectives are to determine if toxic air pollutants are present and to quantify them.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	1.9	SPM	EPA method TO-15	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents source oriented exposure on a neighborhood scale.

Neighborhood Scale

CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Paducah – Cairo Interstate (072)
Site Name: Calvert City Elementary
AQS Site ID: 21-157-0018
Location: Calvert City Elementary, 623 5th Avenue, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.026916, -88.343944
Date Established: May 1, 2005
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Calvert City Elementary in Calvert City, Kentucky. The sample inlets are 80 feet from the nearest road. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objectives are to determine if toxic air pollutants are present and to quantify them; and to provide meteorological data for air toxics analysis.

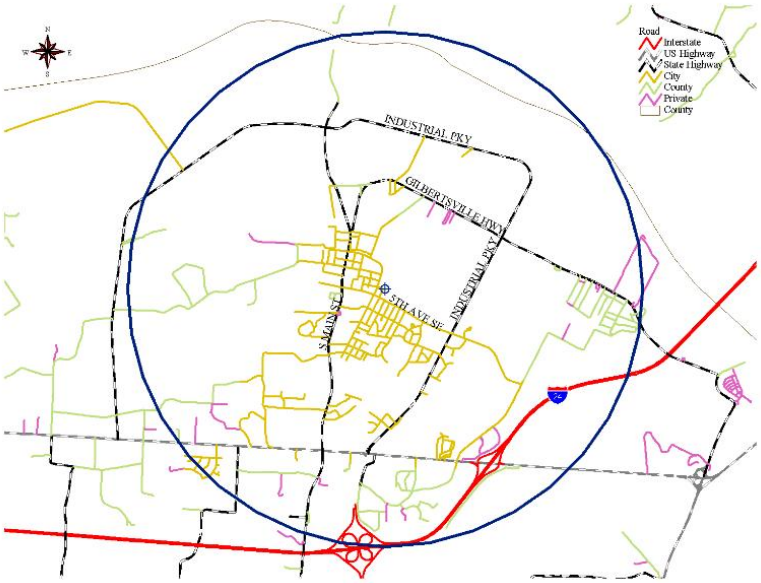
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM_{10}	4.5	SPM	Gravimetric	24-hours every sixth day
- Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.5	Same as PM_{10}
Volatile Organic Compounds	4.4	SPM	EPA method TO-15	24-hours every sixth day
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents population exposure on a neighborhood scale.

Neighborhood Scale



Calvert City Air Toxics Network

CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Paducah – Cairo Interstate (072)
Site Name: Lazy Daz
AQS Site ID: 21-157-0019
Location: 4237 Gilbertsville Highway, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.03718, -88.33411
Date Established: September 15, 2007
Inspection Date: December 18, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is solar powered, battery charged, air toxics monitor located on the Brady property of the Lazy Daz mobile home park, in Calvert City, Kentucky. The sample inlet is 154 meters from the nearest road. The most recent site inspection was conducted on December 18, 2008. Upon inspection, the sample inlet and monitor were found to be in good condition.

Monitoring Objective:
The monitoring objectives are to determine if toxic air pollutants are present and to quantify them.

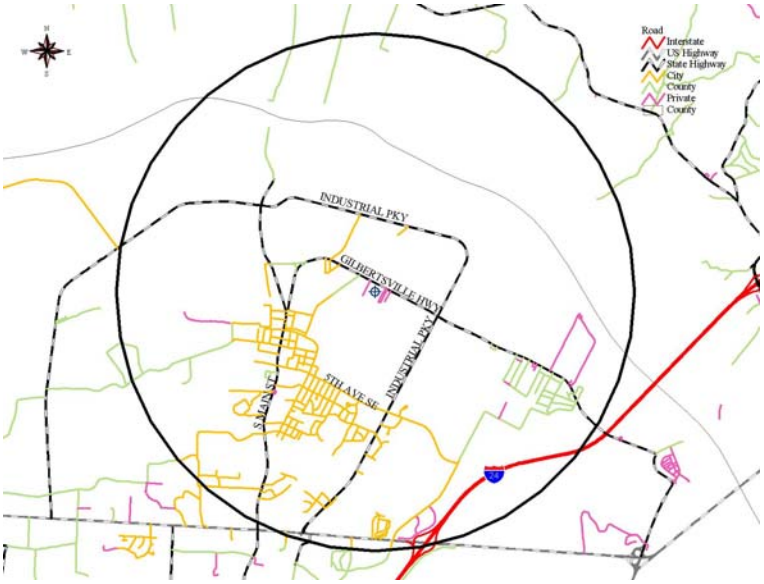
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	2	SPM	EPA method TO-15	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents source oriented exposure on a neighborhood scale.

Neighborhood Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Region: Evansville-Owensboro-Henderson Interstate (077)
Site Name: Echols
AQS Site ID: 21-183-0032
Location: Keytown Road, Echols, KY 42320
County: Ohio
GPS Coordinates: 37.319725, -86.956097
Date Established: February 1, 2005
Inspection Date: December 17, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on farmland off Keytown Road near the intersection with Pond Church Road in Echols, Kentucky. The sample inlets are 100 feet from the nearest road. The most recent site inspection was conducted on December 17, 2008. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

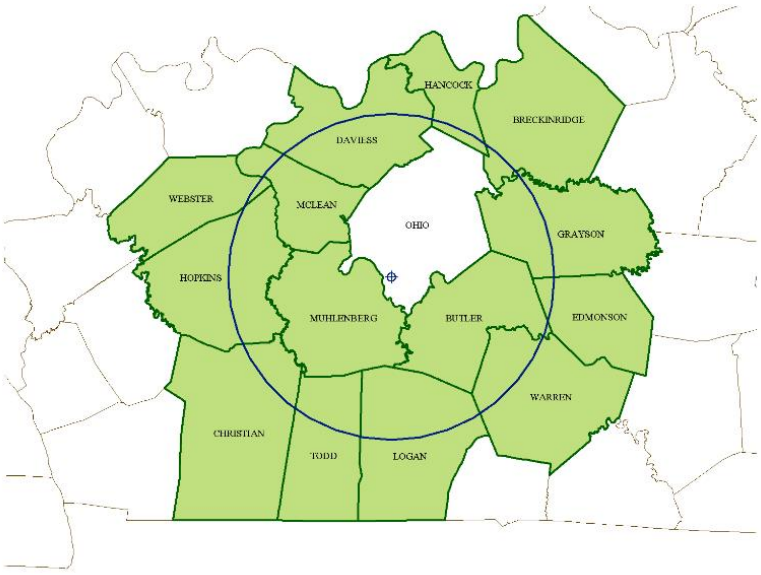
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM_{10}	2.2	SPM	Gravimetric	24-hours every sixth day
-Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.5	Same as PM_{10}
FEM $PM_{2.5}$	2.2	SPM	Gravimetric	24-hours every third day
PM2.5 TEOM	2.7	SPM	Tapered element oscillating microbalance, gravimetric	Continuously
Mercury - ambient	2.5	SPM	Cold vapour atomic fluorescence spectrometry	Continuously
Mercury - Wet deposition	1.3	SPM	Wet deposition collected, analysis of sample by the Environmental Services Laboratory	Weekly
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, relative humidity, temperature and rain gauge	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site represents source oriented exposure on an urban scale.

Urban Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Appalachian Intrastate (101)
Site Name: Hazard
AQS Site ID: 21-193-0003
Location: Perry County Horse Park, Hazard, KY 41701
County: Perry
GPS Coordinates: 37.283056, -83.220278
Date Established: April 1, 2000
Inspection Date: November 26, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the Perry County Horse Park in Hazard, Kentucky. The sample inlets are 65 feet from the nearest road. The most recent site inspection was conducted on November 26, 2008. Upon inspection the sample lines and monitors were found to be in good condition. This site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect elevated pollutant levels for activation of emergency control procedures for ozone; and to provide pollutant levels for daily index reporting.

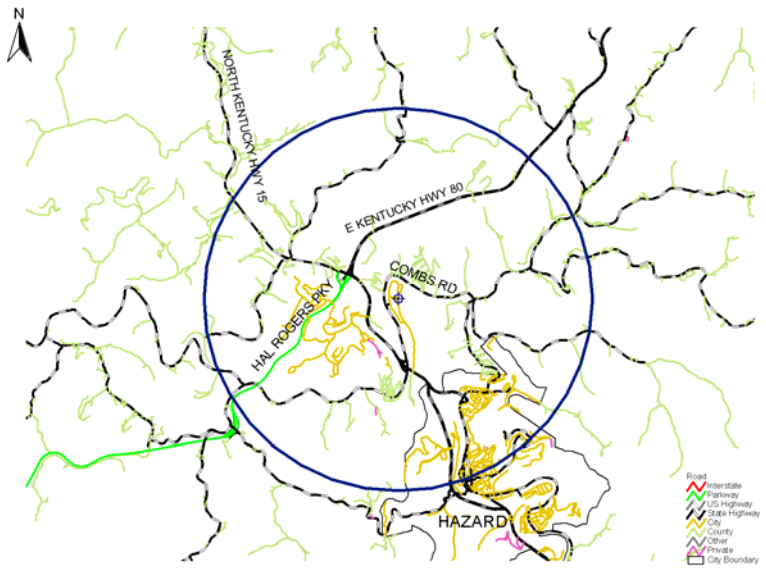
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.5	SPM EPISODE AQI	UV photometry	Continuously March 1 – October 31
PM2.5 TEOM	5.2	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, relative humidity, barometric pressure, and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on a neighborhood scale.

Neighborhood Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Appalachian Intrastate (101)
Site Name: Pikeville Primary
AQS Site ID: 21-195-0002
Location: DOT District Office, 101 North Mayo Trail, Pikeville, KY 41501
County: Pike
GPS Coordinates: 37.482778, -82.535278
Date Established: May 1, 1994
Inspection Date: November 26, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located behind the DOT District Office building at 101 North Mayo Trail in Pikeville, KY. The sample inlets are 116 feet from the nearest road. The most recent site inspection was conducted on November 26, 2008. Upon inspection the sample lines and monitors were found to be in good condition. This site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards, and to provide pollutant levels for daily index reporting.

Monitors:

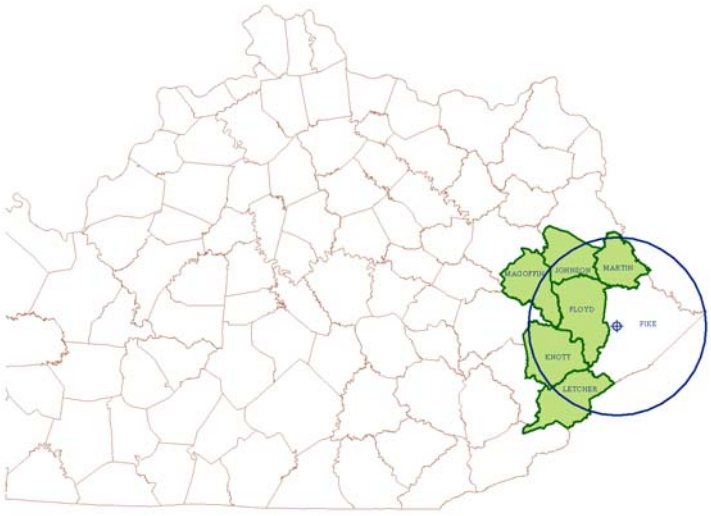
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.6	SPM AQI	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	4.9	SLAMS	Gravimetric	24-hours every sixth day
- Collocated FRM $PM_{2.5}$	4.9	SLAMS	Gravimetric	24-hours every sixth day
PM2.5 TEOM	4.9	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on a neighborhood scale for particulates. This site also represents population exposure on an urban scale for ozone.

Particulate Neighborhood Scale

Ozone Urban Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: South Central Kentucky Intrastate (105)
Site Name: Franklin
AQS Site ID: 21-213-0004
Location: DOT Garage, KY 1008, Franklin, KY 42134
County: Simpson
GPS Coordinates: 38.219361, -84.838500
Date Established: June 19, 1991
Inspection Date: December 4, 2008
Inspection By: Andrea P. Keatley
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

The monitoring site is a stationary equipment shelter located on the grounds of the DOT Garage on KY1008 in Franklin, Kentucky. The sample inlet is 200 feet from the nearest road. The most recent site inspection was conducted on December 4, 2008. Upon inspection, the sample line and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D, E and G.

Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to measure ozone levels upwind of Bowling Green; and to provide data on interstate ozone transport.

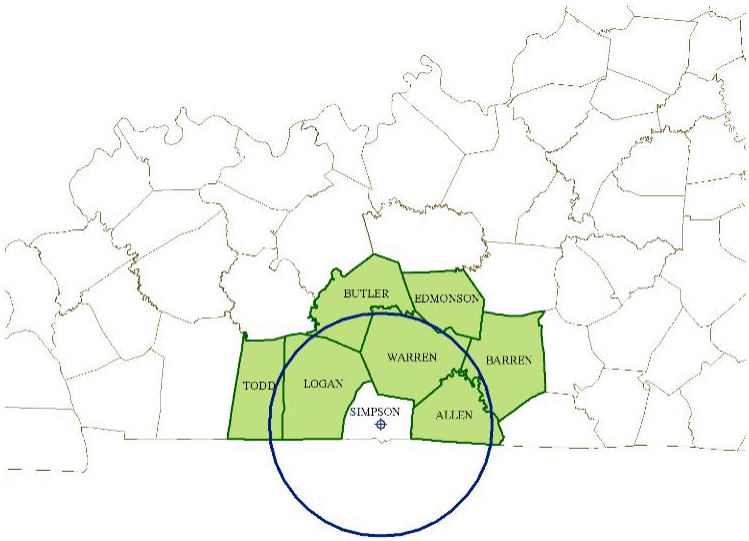
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.3	SPM AQI	UV photometry	Continuously March 1 – October 31
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, relative humidity, barometric pressure, and temperature	Continuously

Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents population exposure on an urban scale.

Urban Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: South Central Kentucky Intrastate (105)
Site Name: Salem Elementary
AQS Site ID: TBA
Location: TBA
County: Russell
GPS Coordinates:
Date Established: January 1, 2010
Inspection Date:
Inspection By:
Site Approval Status:

Superior Battery, located in Russell Springs, Kentucky, was identified as a lead source emitting over 1 tons per year of actual reported emissions in 2006. In accordance with 40 CFR Part 58 Appendix D, a lead source monitoring site will be located at the Salem Elementary School in Russell Springs, Kentucky. The location of this source-oriented lead monitor was determined through the use of AERMOD modeling analysis.

Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM Lead		SLAMS	Gravimetric	24-hours every sixth day

Quality Assurance Status:
All Quality Assurance procedures will be implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
The site represents maximum concentrations, from a source, on a middle scale for lead.

APPENDIX A
West Jefferson County Air Toxics Monitoring Stations
Volatile Organics

AIRS ID	Established	Method	Location	Purpose
21-111-1041	1999	TO-15	4201 Algonquin Parkway	Maximum Impact
21-111-0054	1999	TO-15	4211 Campground Road	Maximum Impact
21-111-0058	1999	TO-15	Farnsley Middle School 3400 Lees Lane	Neighborhood Exposure
21-111-0060	1999	TO-15	Chickasaw Park	Neighborhood Exposure
21-111-0062	1999	TO-15	Cane Run Elementary	Neighborhood Exposure
21-111-0067	2009	TO-15	Cannons Lane	Neighborhood Exposure

APPENDIX B

Louisville Metro Air Pollution Control District's

Ambient Air Monitoring Work Plan
For
National Core (NCore) Monitoring Station

Ambient Air Monitoring Work Plan
For
National Core (NCore) Monitoring Station

CBSA
Louisville-Jefferson County
KY-IN MSA

Louisville Metro Air Pollution Control District
850 Barret Avenue
Louisville, KY 40204

National Core (NCore) Multi-pollutant Monitoring Stations:

In October 2006 the United States Environmental Protection Agency (EPA) issued final amendments to the ambient air monitoring regulations for criteria pollutants. These amendments are codified in 40 CFR parts 53 and 58. The purpose of the amendments was to enhance ambient air quality monitoring to better serve current and future air quality needs. One of the most significant changes in the regulations was the requirement to establish National Core (NCore) multi-pollutant monitoring stations. These stations will provide data on several pollutants at lower detection limits and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. The final network plan must be submitted to EPA by July 1, 2009, and the stations must be operational by January 1, 2011.

In 2007, EPA provided funding to the Louisville Metro Air Pollution Control District (LMAPCD) to begin the process of establishing an NCore station in Jefferson County. In January 2008, the Kentucky Division for Air Quality delegated the responsibility for establishing and operating an NCore station to the District. Upon evaluating the existing network, historical data, census data, meteorology, and topography the District recommends that the SLAMS site located at 2730 Cannons Lane be designated as the NCore site for the Louisville-Jefferson County CBSA.

Monitoring Objectives:

The NCore Network addresses the following monitoring objectives:

- timely reporting of data to the public through AIRNow, air quality forecasting, and other public reporting mechanisms
- support development of emission strategies through air quality model evaluation and other observational methods
- accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors
- support long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards (NAAQS)
- compliance through establishing nonattainment/attainment areas by comparison with the NAAQS
- support multiple disciplines of scientific research, including public health, atmospheric and ecological

Site Configuration:

The NCore sites must measure at a minimum $PM_{2.5}$ particle mass using continuous and integrated/filter based samplers, speciated $PM_{2.5}$, $PM_{10-2.5}$ (PM_{10c}) particle mass, speciated $PM_{10-2.5}$ particle mass, O_3, SO_2, CO, NO/NO_y, wind speed, wind direction, relative humidity, and ambient temperature. Table 1 provides a list of the sampling equipment and methodology currently used and proposed for the Cannons Lane NCore site

Table 1: Monitors/Samplers

Monitor Type	Designations	Analysis Method	Frequency of Sampling	Startup Date
Carbon Monoxide (CO)	NCore AQI	Automated Reference Method* utilizing trace level non-dispersive infrared analysis.	Continuously	01/01/2010
Nitrogen Oxide (NO_x)	NCore AQI	Automated Reference Method utilizing chemiluminescence analysis.	Continuously	01/01/2010
Ozone (O_3)	NCore AQI	Automated Equivalent Method utilizing UV photometry analysis.	Continuously	01/01/2010
Sulfur Dioxide (SO_2)	NCore AQI	Automated Equivalent Method utilizing trace level UV fluorescence analysis	Continuously	01/01/2010
Total Reactive Nitrogen (NO/NO_y)	NCore	Automated method utilizing trace level chemiluminescence analysis.	Continuously	01/01/2011
$PM_{2.5}$ Filter	NCore	Manual Reference Method utilizing gravimetric analysis.	1/3 days	01/01/2009
$PM_{2.5}$ Continuous	NCore AQI	Automated Equivalent Method* utilizing Tapered Element Oscillating Microbalance/gravimetric analysis	Continuously	01/01/2009
$PM_{2.5}$ Speciation	NCore	Multi-species manual collection method utilizing thermal optical, ion chromatography, gravimetric, and X-ray fluorescence analyses.	1/6 days 1/3 days	01/01/2009 01/01/2011
PM_{10c} Filter	NCore	Manual Reference Method* PM_{10c} utilizing differential gravimetric analysis.	1/3 days	01/01/2009
$PM_{10-2.5}$ Speciation	NCore	Method pending	1/3 days	Requirement under review
Meteorological	NCore	Air Quality Measurements approved instrumentation for wind speed, wind direction, humidity, temperature, rainfall, and solar radiation	Continuously	07/01/2009
Lead	SLAMS	Manual Reference Method TSP Sampler, Analytical method to be determined.	1/6	01/01/2011
Radiation	RadNet	RadNet fixed station air monitor, manual and automated methods	Continuously + 2 weekly filters	01/01/2009
Volatile Organic Compounds	SPM	EPA Compendium Method TO-15 utilizing Summa® passivated canisters	1/12	02/10/2009

* Pending EPA designation

Quality Assurance Status:

All Quality Assurance procedures shall be implemented in accordance with 40 CFR 58, Appendix A. The District's current Quality Assurance Project Plan covers $PM_{2.5}$, Ozone, NOx, SO_2, CO, $PM_{2.5}$ Speciation, and meteorological measurements. The Quality Assurance Project Plan will be revised to include trace level measurements and lead. Standard operating procedures manuals will be adopted or developed for new instrumentation.

Area of Representativeness:

40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. The monitoring objective for the NCore site is to produce data that represents a fairly large area and therefore the spatial scale of the site is important. The spatial scale defines the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. It is determined by the characteristics of the area surrounding the air monitoring site and the site's distance from nearby air pollution sources such as roadways, factories, etc. In the case of urban NCore the spatial scales to be used are neighborhood and urban. Table 2 shows the area of representativeness for each pollutant for the Cannons Lane site.

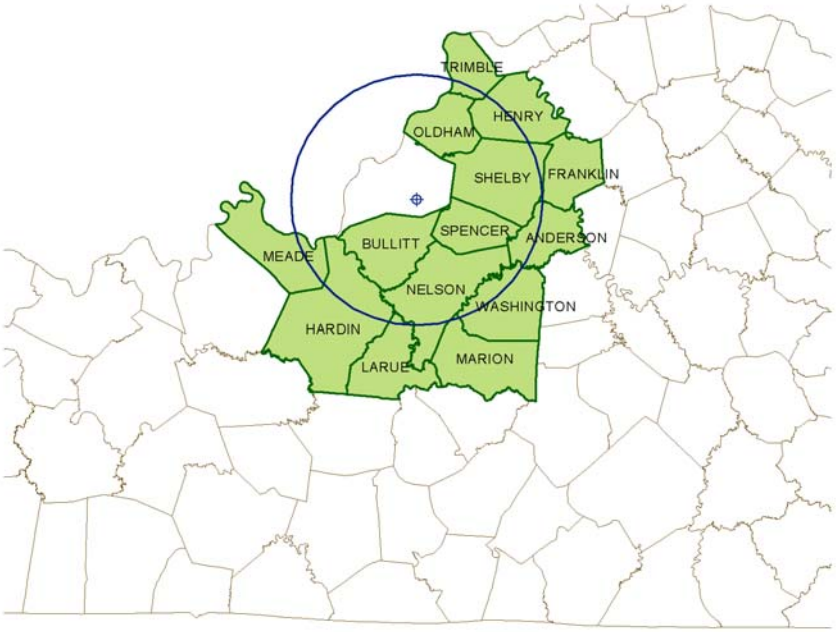
Table 2: Spatial Scales for Each Pollutant

Pollutant	Spatial Scale	Comments
Ozone	Neighborhood and Urban Scale	Use 10 km
NO_x /NO_y	Neighborhood and Urban Scale	Use 10 km
Carbon Monoxide	Neighborhood Scale	There is no Urban scale for CO
SO_2	Neighborhood Scale	There is no Urban scale for SO_2
PM_{10}/$PM_{2.5}$/Lead	Urban	
Radiation	Urban	
VOCs	Neighborhood	

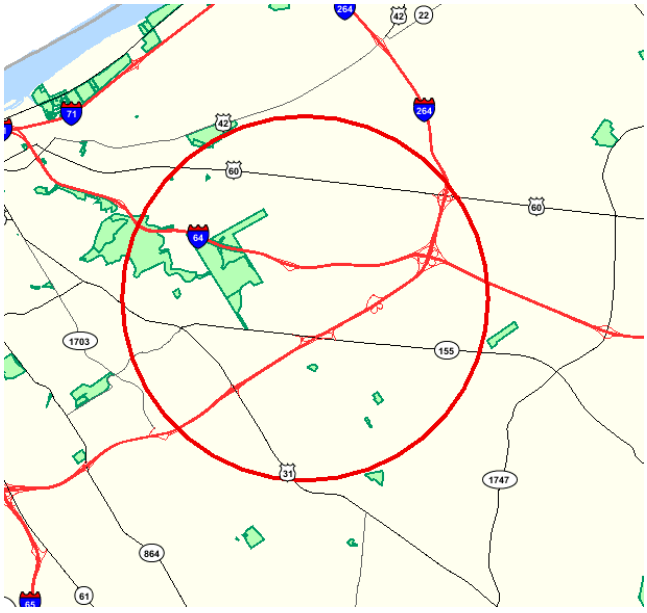
For neighborhood scale the area covered is up to a 4 km radius around the air monitoring site. This area is a mix of commercial, light industrial, and residential. Approximately 20% of the total population for Jefferson County lives within a 4 km radius of the site. This scale also includes 36 schools, 3 hospitals, 6 parks and 3 large shopping venues.

Urban scale is 4 km up to 50 km. 50 km would cover the entire MSA and overlap the current monitoring network. Dropping the scale down to 10 km covers most of the urban core and a portion of the MSA currently not covered by air monitoring. On a 10 km scale the land use varies from light to heavy industrial, commercial and dense residential. Approximately 50% of the total population for Jefferson County lives within 10 km of the site.

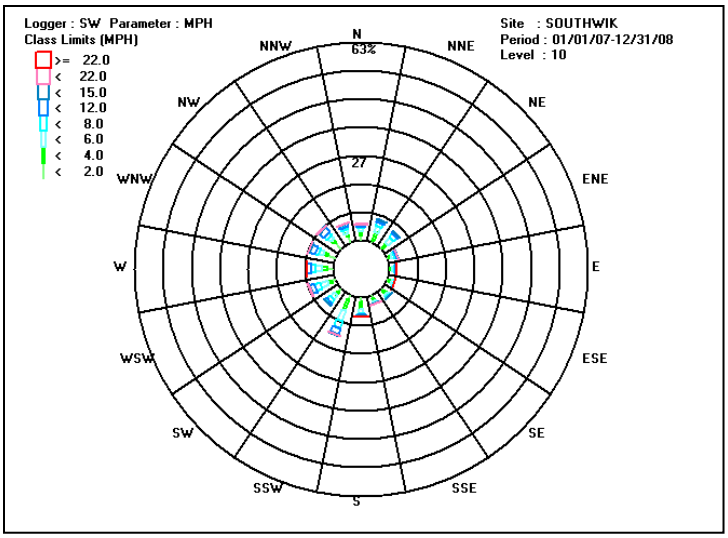
Ozone, $PM_{2.5}$, PM_{10}, and NO_x urban scale (50 km)

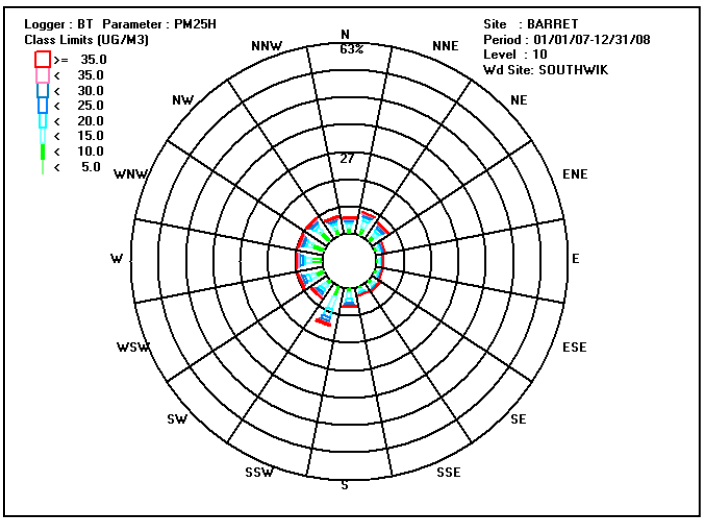


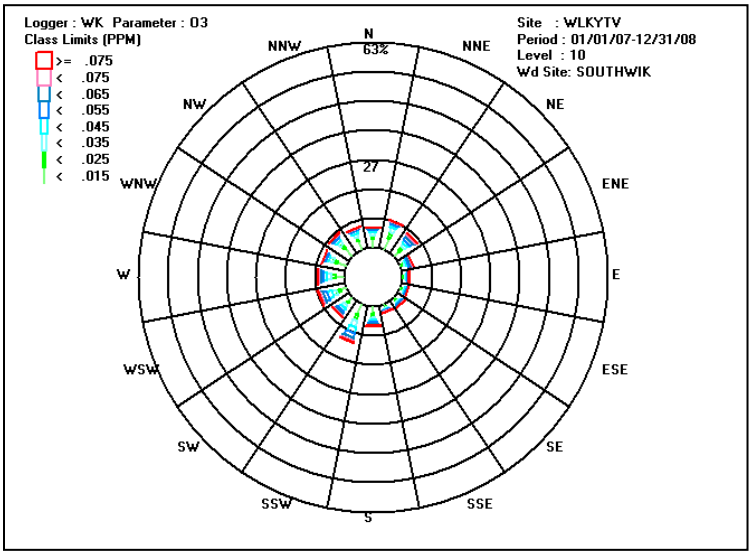
CO neighborhood scale (4 km)



The proposed NCore site is located east of the urban core and north east of the heavier industrialized areas of the metro area. The wind rose (Parameter MPH) indicates the prevailing wind directions while the pollution roses show the distributions of $PM_{2.5}$ and ozone readings within the 16 quadrants. The placement of the NCore site east of the urban core provides the best location for measuring transport and secondary pollutant formation from that area. The placement of the NCore site downwind of the more industrialized areas compliments the existing network which, is primarily designed to measure maximum concentration on a neighborhood scale. An added bonus would be measurement of transport from the NNE and NE quadrants which although monitored by sites in Southern Indiana, are not effectively addressed by sites located in Kentucky.

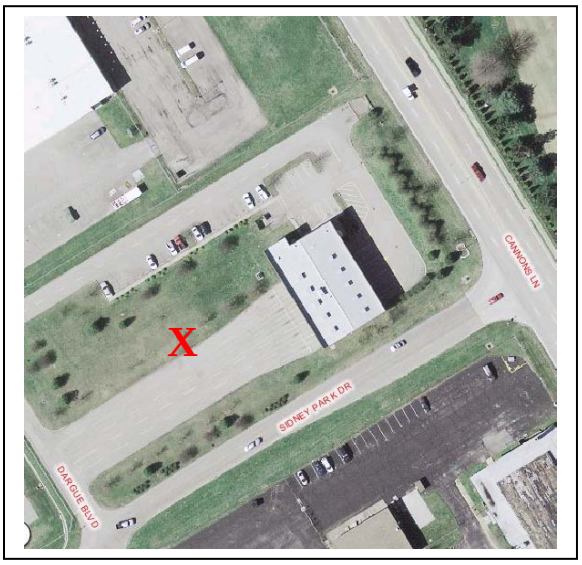






Site Description and Spacing:

401 KAR 50:20 Air Quality Control Region: Louisville Interstate (078)
CBSA: Louisville-Jefferson County, KY-IN MSA
Site Name: Cannons Lane
AQS ID: 21-111-0067
Location: 2730 Cannons Lane
County: Jefferson
GPS Coordinates: 38.228833, -85.654403
Date Established: January 1, 2009
Inspection Dates: Initial site inspection by KyDAQ April 17, 2008
Site inspection by EPA December 9, 2008
Inspections By: Andrea P. Keatley, Kentucky Division for Air Quality
Richard Guillot and Jerry Burger, EPA Region 4 SESD
Site Approval Status: EPA approval as SLAMS December 22, 2008
NCore approval pending



The station is located on property leased by LMAPCD. The property was used as a Vehicle Emissions Testing (VET) center but is now used primarily for storage. The location is in the NE quadrant of Jefferson County and is approximately 9 km from the urban core of Metro Louisville.

NCore and $PM_{2.5}$ SLAMS Siting Criteria

Appendix E to 40 CFR Part 58-*Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring* contains specific location criteria applicable to NCore and SLAMS siting. The following measurements and data were obtained for evaluation of compliance with the criteria.

1. Horizontal Placement of Sampling Probes:
The gaseous instruments will be placed in a 10'w x 16'l x 8'h air monitoring shelter to be located approximately 45 meters behind the (VET) building. The

sample inlet(s) for CO, SO_2, NO_x, and O_3 will be approximately 2 meters above the roof of the shelter and 4.5 meters above ground level. The sample inlet probe for the NOy sampler will be placed on a 10 meter nested tower.

The manual particulate samplers are on a wooden deck near the sampling shelter. The height of the inlets of the particulate samplers varies between 2-3 meters. Separation of the samplers on the deck varies from 1-2 meters depending on the flow rate of the samplers.

The continuous particulate sampler is currently on the deck but will be moved to the roof of the air monitoring shelter once it is installed. The inlet will be 2 meters above the roof and 4.5 meters above ground. The control unit will be located inside the temperature controlled shelter.

2. Spacing from Obstructions:

VET Office/garage (h=7.5 meters): 45 meters
Large Pine to the North West (estimated h=8 meters): from drip line 20 meters
Small Pine to the North West (estimated h=5 meters): from drip line 14 meters
Deciduous tree to the West (estimated h=5 meters): from drip line 30 meters
Deciduous tree to the East (estimated h=7 meters): from drip line 16 meters
Sampling platform from air monitoring shelter (h=2.5 meters): 5.0 meters
T-Hanger (estimated h=10 meters): 67 meters
Army Reserve Center (estimated h=10 meters): 68 meters
National Guard Complex (estimated h= 10 meters): 76 meters

3. Spacing from Roadways:

Tables E-1, E-2, and Figure E-1 of 40 CFR Part 58 Appendix E list the minimum distances from roadways a monitoring probe needs to be based on the average daily traffic (ADT) counts. Table 3 summarizes the findings and includes the minimum separation distance from roadways for each pollutant. ADT counts were obtained from a traffic count map generated from the Kentucky Transportation Cabinet's website.

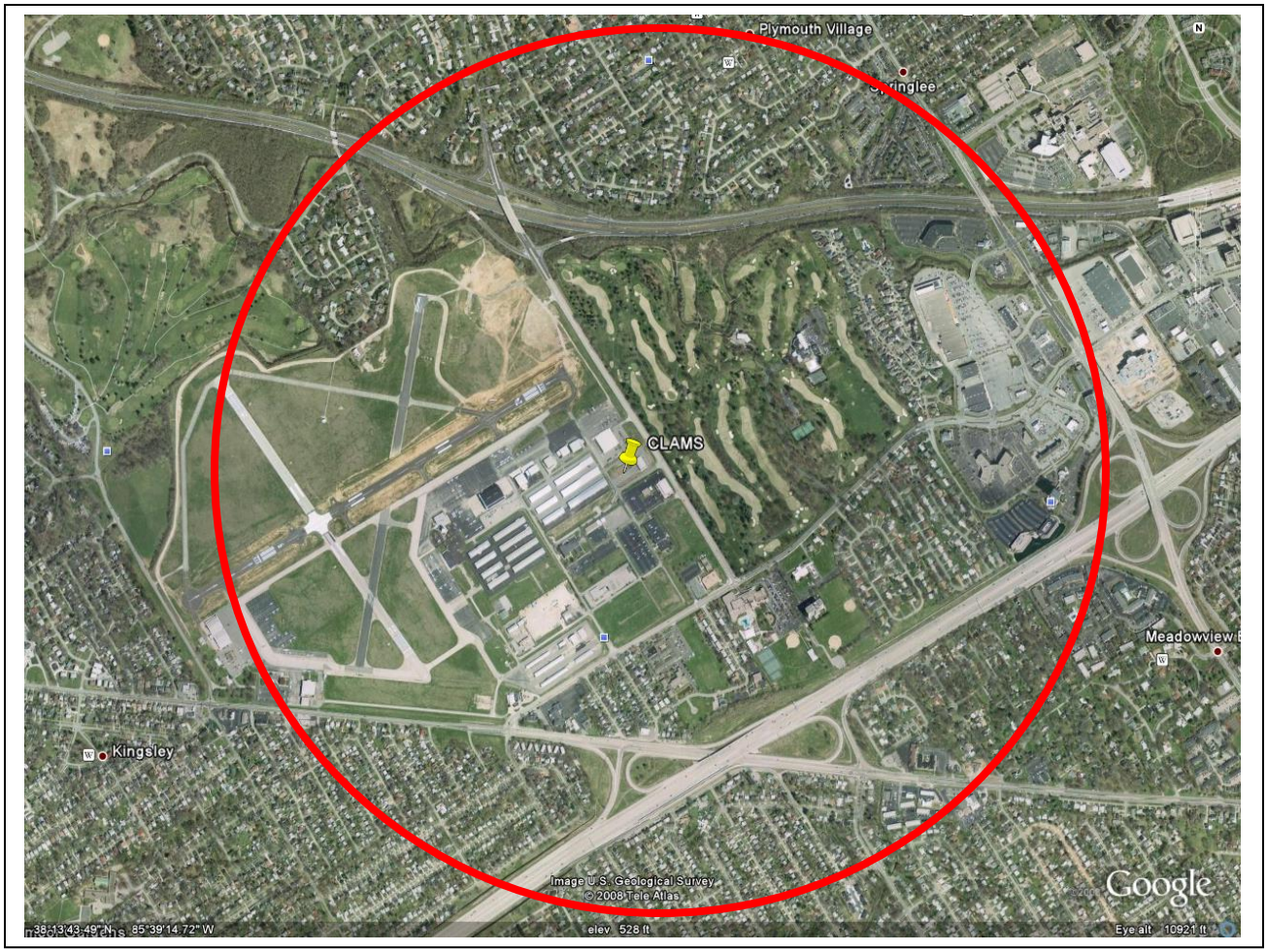
Table 3
Spacing from Roadways Analysis

Roadway	ADT	Distance from site (meters)	Minimum Distance Required (meters)			
			Ozone Table E-1	NO/NO_y Table E-1	CO Table E-2	PM Figure E-1
Cannons Lane	18,709 (2006)	104	40	30	45	80
Dutchmans Lane	16,605 (2007)	441	40	30	45	80
I-64	79,332 (2008)	732	100	100	150	160
I-264	153,890 (2007)	833	250	250	150	160
Sidney Park Drive	<1000 (estimated)	32	10	10	10	10
Dargue Blvd	<1000 (estimated)	45	10	10	10	10

4. Spacing from Minor Sources:

The closest source to the site is the Bowman Field Airport. The airport is a general aviation field with the majority of the air traffic being privately owned piston engine small aircraft. For FY 2008 the average take off and landings were reported as 52,712 or approximately 145 per day.

The main runway is approximately 854 meters from the site.
The main terminal is approximately 1372 meters from the site.



Cannons Lane (CLAMS) 1 km radius

N

W E

S

Direction	Description	Distance from Site
North	Army Reserve Center (offices, storage, hangers)	68 meters
North East	Parking lot for VET center (25 spaces)	20 meters
East	Cannons Lane VET center (office and storage)	45 meters
South East	National Guard Complex & Sidney Park Drive	76 meters
South	Intersection of Sydney Park Drive and Dargue Blvd	76 meters
South west	View toward Dargue Blvd (paved area was VET stacking lane)	45 meters
West	Airport rental T-Hangers	67 meters
North West	Airport rental T-Hangers	72 meters

Cannons Lane Ambient Air Monitoring Station

Site Details:

The photograph above was taken looking toward the NE and shows the sampling platform which is 8'w x 14'l and 18"h. The sample inlets are between 2-3 meters above the ground. The platform supports the $PM_{2.5}$ FRM, the PM_{10c}, $PM_{2.5}$ Speciation, URG Carbon, and the RadNet sampler. It also has room for lead sampling if needed and room for the PEP audit equipment. Electrical service to the platform is 100 amps with 5 (20 amp GFCI) outlets strategically placed on the platform to provide power to the instruments.

The air monitoring shelter will be located on the concrete pad in front of the site and approximately 6 meters from the sampling platform. The shelter will be 10'w x 16'l x 8'h. The roof of the shelter will be flat to support the sample inlets for the continuous particulate sampler(s) and has additional room for other samplers if the need arises. The 10 meter meteorological tower will be next to the shelter and will be of the "nested" type to insure that the NOy convertor is kept vertical and to ease servicing and calibration of the meteorological instruments. The shelter will be wired for 200 amp service and have internet and telephone connections. To maintain temperatures between 30-40 º C the shelter will have a 24,000 BTU heat pump with a digital programmable thermostat. The shelter insulation will be a minimum R-18. Once the shelter has been installed the chain link fence will be extended to enclose the entire site.

APPENDIX C

Source Impact Lead Monitoring
Waiver Requests
For
Kentucky Division for Air Quality (C-2)
And
Louisville Metro Air Pollution Control District (C-75)

AERMOD Modeling Analysis in Support of the Lead NAAQS Waiver Requests for the State of Kentucky

Introduction

On November 12, 2008, the United States Environmental Protection Agency (EPA) strengthened the National Ambient Air Quality Standard (NAAQS) for lead. The revised standard is now set at 0.15 µg/m^3 for the primary (health-based) and secondary (welfare-based) standards. In conjunction with the revision of the lead NAAQS, the EPA promulgated new network design criteria, which can be found in 40 CFR Part 58, Appendix D, paragraph 4.5. Source-oriented monitoring is required for those facilities which emit 1.0 ton per year (tpy) or more of lead in the air.

The Kentucky Division for Air Quality (Division) received formal notification from EPA Region 4 in April 2009 of the sources within the Commonwealth that were subject to lead monitoring per the revised regulations. Those seven facilities are listed in this document as ***Appendix A: Kentucky Facilities with Lead Emissions over 1.0 TPY***. The facilities include: American Electric Power – Big Sandy Plant (Big Sandy), in Louisa, KY; Calgon Carbon in Catlettsburg, KY; Enersys in Richmond, KY; Newpage in Wickliffe, KY; North American Stainless (NAS) in Ghent, KY; Superior Battery in Russell Springs, KY; and Tennessee Valley Authority (TVA) Shawnee Fossil Plant in West Paducah, KY.

Section 4.5(ii) of Appendix D to 40 CFR 58 contains waiver provision for source-oriented lead monitoring, if a state or local agency can demonstrate that the lead source will not contribute to a maximum lead concentration in ambient air in excess of one-half of the Pb NAAQS (i.e., 0.075 µg/m^3). Consequently, the Division has modeled the facilities to determine whether or not to pursue waivers. Additionally, recent Kentucky Emissions Inventory data has been reviewed for this purpose.

Emissions Inventory Data

The Division's Emissions Inventory Section (EIS) has compiled calculations for 2006-2008 data for those seven facilities listed in the aforementioned ***Appendix A: Kentucky Facilities with Lead Emissions over 1.0 TPY.***

Emissions Inventory Reports for all seven facilities are included with this document on a compact disc (CD) for review. The CD (labeled KY DAQ EIS Data) also contains Kentucky Emissions Inventory data files for 2006, 2007, and 2008, as well as permits for the facilities in question. Table 1 shows the results of the recent EIS calculations.

Table 1. Kentucky Emissions Inventory Data

Facility Name	Location	2006 Actual Emissions (tpy)	2007 Actual Emissions (tpy)	2008 Actual Emissions (tpy)
Big Sandy	Louisa	2.37	0.61	Not complete
Calgon Carbon	Catlettsburg	6.01	6.06	6.29
Enersys	Richmond	0.11	2.16	1.45
Newpage	Wickliffe	7.39	6.28	Not complete
North American Stainless	Ghent	0.98	0.59	0.65
Superior Battery	Russell Springs	1.35	0.67	0.61
TVA Shawnee	West Paducah	8.33	8.42	8.57

Selection Criteria for the Modeled Facilities

Pursuant to 40 CFR Part 58, Appendix D, paragraph 4.5(a), monitoring agencies must use the most recent National Emissions Inventory (NEI) or other scientifically justifiable data to determine if a facility emits more than 1 tpy of lead. The Division, at the direction of EPA Region 4, chose to use both state emissions inventory data and Toxic Release Inventory (TRI) data from 2006 and 2007. 40 CFR Part 58 Appendix D 4.5 (ii) states: "The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near lead (Pb) sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air *in excess of* 50% of the NAAQS (based on historical monitoring data, modeling, or other means)." The lead NAAQS is based on a 3-month rolling average.

Model Parameters

Urban versus Rural Determination

The facilities modeled in this analysis were all modeled as rural. The rural setting was chosen based on the population density procedure as stated in Section 7.2.3(d) of 40 CFR 51, Appendix W. In addition, none of the facilities modeled fall into a highly industrialized category as mentioned subsequently in Section 7.2.3(e) of Appendix W.

Meteorological Data

In compliance with the EPA air quality modeling guideline found in Section 8.3 of 40 CFR Part 51, Appendix W, the modeling performed for each facility relied on five years of consecutive meteorological data taken from the most representative surface and upper air meteorological stations. A summary of general meteorological modeling data can be found in Table 2. The meteorological data

years were chosen in part due to their availability and the completeness of the data. Unfortunately, the funding for more recent data for this particular project, which is in excess of $3,150, was not available. Therefore, the facilities were modeled with meteorological data ranging from 1988 to 1992, or 1989 to 1993, which is free to the public. Data sets deemed complete for the respective five years were chosen.

Table 2. Meteorological Modeling Data

Facility	Met Years	Surface Air Station	Upper Air Station
Big Sandy	1988-1992	Huntington/Tri-State Airport	Huntington/Tri-State Airport
Calgon Carbon	1988-1992	Huntington/Tri-State Airport	Huntington/Tri-State Airport
Enersys	1988-1992	Lexington/Blue-grass Field	Huntington/Tri-State Airport
Newpage	1989-1993	Paducah/WSO Airport	Paducah/WSO Airport
North American Stainless	1988-1992	Covington/ Greater Cincinnati	Dayton/Wright Patterson AFB
Superior Battery	1988-1992	Lexington/Blue-grass Field	Nashville/Int'l Airport
TVA Shawnee Fossil Plant	1989-1993	Paducah/WSO Airport	Paducah/WSO Airport

Representativeness/Surface Characteristics

According to the AERMOD Implementation Modeling Guidelines, the meteorological stations should be representative of the facility. The National Weather Service (NWS) meteorological stations chosen for each facility depended on the facility's location, topography, land use, and surface characteristics in reference to each facility. The surface roughness values at each facility were compared against the surface roughness values of the respective meteorological surface station and modeled separately to determine the difference in surface characteristics between them. In the interest of being conservative towards human health, the surface characteristics which yielded the highest monthly concentration were used in calculating the 3-month rolling average. The surface roughness data (albedo, bowen ratio, and surface roughness values) for each of these facilities and meteorological stations can be found in ***Appendix B: AERSURFACE Tables***. Surface roughness parameters are tabulated in Table 3. In AERSURFACE, the default 1 km radius was chosen, temporal resolution was set to "monthly", 12-30º averaged sectors were used throughout the analysis, and the application site coordinates were set to the facility.

Table 3. AERSURFACE defaults for the Meteorological Stations/Sites Used

Facility	Surface Roughness Radius (km)	Surface Moisture	Temporal Resolution	Number of 30° Sectors
Big Sandy	1.0	Average	Monthly	12
Calgon Carbon	1.0	Average	Monthly	12
Enersys	1.0	Average	Monthly	12
Newpage	1.0	Average	Monthly	12
NAS	1.0	Average	Monthly	12
Superior Battery	1.0	Average	Monthly	12
TVA Shawnee	1.0	Average	Monthly	12

The land use was classified based on the 1992 National Land Cover Data (NLCD 92) which is available from the USGS. The NLCD 92 contains a 21-category land cover classification, which is based on Landsat imagery.

Pollutant Averaging

The pollutant averaging time was set to 1-month. The 1-month average was converted to a 3-month rolling average using the lead post processor, which is available from EPA at http://www.epa.gov/ttn/amtic/pb-monitoring.html.

Building Downwash

Building downwash was not deemed necessary for facilities with very tall stacks, such as those found at coal-fired power plants. The stack heights for both AEP Big Sandy and TVA Shawnee exceed the Good Engineering Practices (GEP) stack heights. In addition, any facility significantly over or under the 0.075 $\mu g/m^3$ lead concentration on a 3-month rolling average did not have the building downwash (BPIP) algorithm applied in the model. Therefore, building downwash was only applied to the modeling for Superior Battery based on preliminary modeling showing a 3-month rolling average concentration at one-half the lead NAAQS.

Lead Emission Sources

The lead sources for each facility are tabulated in ***Appendix C*** of this document. The emission sources are based on the emissions data of the year that triggered the analysis as found in Appendix A.

AEP Big Sandy and TVA Shawnee are both electric utilities. AEP Big Sandy uses 2 pulverized coal (pc) combustors. In the case of TVA Shawnee, 9 pc's and 1 bubbling fluidized bed combustor are used. In addition, both facilities have smaller auxiliary units. Hence, their lead emissions primarily stem from the combustion of coal. Enersys and Superior Battery are both battery manufacturers. Their lead emissions are related to battery plating and manufacture. Calgon Carbon produces activated carbon and carbon-based media. Their primary feedstock is bituminous coal, which is also the source material for their lead emissions. Newpage is a paper producer whose primary lead emission point is their combination boiler. North American Stainless produces stainless steel and their primary lead emissions are from a furnace.

Receptors/Terrain

As stated in Section 8.2.2 of Appendix A to Appendix W of 40 CFR 51, "Receptor sites for refined modeling should be utilized in sufficient detail to estimate the highest concentration and possible violations of a NAAQS or PSD increment. In designing a receptor network, the emphasis should be placed on receptor resolution and location, not total number of receptors. The selection of receptor sites should be a case-by-case determination taking into consideration the topography, the climatology, monitor sites, and the results of the initial screening procedure."

The receptor grid parameters (spacing and number of receptors) were chosen in a way to encompass a majority of the plume as well as the significant impact area (SIA) in which the maximum impact occurs. The receptor grids are optimized to have the maximum concentration occur within a 100x100 meter grid. This is achieved by either expanding a tiered receptor grid or including a separate (uniform Cartesian) grid to cover the maximum impact area.

Digital Elevation Maps (DEM) or National Elevation Data (NED) maps available from the USGS were used for the AERMAP processor for each facility.

Table 4 provides a summary of parameters used in AERMOD, which includes the number and distance between receptors, whether building downwash was used, whether plant boundaries were defined, and what type of terrain data was chosen for the facilities.

Table 4. AERMOD General Summary

Facility	Model	Total Receptors	Receptor Grid Parameters	Building Downwash	Plant Boundaries	Terrain DEM or NED Data
Big Sandy	Airport Model	1604	Distance from Center/Tier Spacing 1000m/100m 5000m/500m 10000m/1000m Plus uniform Cartesian grid 100m x 100m to encompass SIA	No	Yes	NED
	Site Model	1163	Distance from Center/Tier Spacing 1000m/100m 5000m/500m 10000m/1000m	No	Yes	NED
Calgon Carbon	Airport Model	1507	Distance from Center/Tier Spacing 1500m/100m 3500m/500m 8000m/1000m	No	No	NED

	Site Model	1507	Distance from Center/Tier Spacing 1500m/100m 3500m/500m 8000m/1000m	No	No	NED
Enersys	Airport Model	1039	Distance from Center/Tier Spacing 100m/100m 3000m/500m	No	Yes	NED
	Site Model	1039	Distance from Center/Tier Spacing 100m/100m 3000m/500m	No	Yes	NED
NAS	Airport Model	3281	Distance from Center/Tier Spacing 2000m/100m 10000m/500m 15000m/1000m	No	Yes	NED
	Site Model	3281	Distance from Center/Tier Spacing 2000m/100m 10000m/500m 15000m/1000m	No	Yes	NED
NewPage	Airport Model	1594	Distance from Center/Tier Spacing 1000m/100m 5000m/500m 15000m/1000m Plus uniform Cartesian grid 100m x 100m to encompass SIA	No	Yes	NED
	Site Model	1602	Distance from Center/Tier Spacing 1000m/100m 5000m/500m 15000m/1000m Plus uniform Cartesian grid 100m x 100m to encompass SIA	No	Yes	NED
Superior Battery	Airport Model	1410	Distance from Center/Tier Spacing 1500m/100m 3500m/500m 8000m/1000m	Yes	No	NED
	Site Model	1410	Distance from Center/Tier Spacing 1500m/100m 3500m/500m 8000m/1000m	Yes	No	NED
TVA Shawnee	Airport Model	2949	3000m x 3000m Plus uniform Cartesian grid 100m x 100m to encompass SIA	No	Yes	DEM

	Site Model	3556	3000m x 3000m Plus three uniform Cartesian grids: 100m x 100m to encompass SIA 750m x 500m 500m x 1000m	No	Yes	DEM

Non-Default Parameters

The Division used a non-default option in the control pathway. The toxics non-default option was chosen to access the total deposition output. In the source pathway, particulate was selected for gas and particle deposition. Method 2 was selected for handling particle deposition by total particulate mass. Particle inputs for Method 2 consisted of the fine particle fraction equaling 0.75 and the mass mean particle diameter equaling 0.5 microns. These values were selected from Appendix B of the AERMOD Deposition Algorithms - Science Document (Revised Draft) found on EPA's Support Center for Regulatory Air Models (SCRAM) website at http://www.epa.gov/scram001/7thconf/aermod/aer_scid.pdf.

Results

Using the parameters given in this document, the models were run. The results for each facility are tabulated Table 5.

Table 5. 3-Month Rolling Average Concentrations

Facility	Surface Characteristics	One-half Lead NAAQS ($\mu g/m^3$)	3-Month Rolling Average Concentration ($\mu g/m^3$)
Big Sandy Plant	Airport	0.075	0.034
	Site	0.075	0.050
Calgon Carbon	Airport	0.075	0.289
	Site	0.075	0.286
Enersys	Airport	0.075	0.244
	Site	0.075	0.407
Newpage	Airport	0.075	0.004
	Site	0.075	0.015
North American Stainless	Airport	0.075	0.001
	Site	0.075	0.001
Superior Battery	Airport	0.075	0.982
	Site	0.075	1.341
TVA Shawnee Fossil Plant	Airport	0.075	0.001
	Site	0.075	0.000

Upon review, the output concentrations from the models show that Calgon Carbon, Enersys, and Superior Battery substantially surpass the modeled ambient concentration required to receive a waiver and indicate a modeled exceedance of the new lead NAAQS. Data in Table 5 also illustrate that the 3-month rolling averages for AEP Big Sandy, Newpage, TVA Shawnee, and North American Stainless are substantially below one-half the lead NAAQS.

Modeled Plots

Plots of the modeled high 1st high monthly impacts for the facilities can be found in ***Appendix D*** of this document. These figures are contour plots of the ambient lead concentrations as modeled. Please note, the concentration shown in the figures do not represent a 3-month rolling average but instead represent the highest monthly impact for the meteorological years chosen. Receptors are not placed within plant boundaries for the facilities that have defined fence lines. Air within the plant boundary of these facilities are represented as white areas. The facilities without defined physical barriers delineating the property line have receptors within their plant boundaries in accordance with the definition of ambient air found in 40 CFR 50.1(e). These facilities boundaries are depicted as red boundary lines.

Conclusion

As mentioned previously, modeling has demonstrated that a waiver for monitoring lead at AEP Big Sandy, Newpage, TVA Shawnee, and North American Stainless can be requested based upon a maximum 3-month rolling average at or below one-half the lead NAAQS. The Calgon Carbon, Enersys, and Superior Battery facilities emissions have been modeled and shown to exceed one-half the lead NAAQS. Therefore, Calgon Carbon, Enersys, and Superior Battery should be monitored in accordance with 40 CFR Part 58, Appendix D, paragraph 4.5(a).

Additional Information

Data has been complied for each facility and is available on the attached compact disc (CD) labeled *KY DAQ Lead Modeling Data: AERMOD*. Each facility has a designated folder which contains files specific the airport and site models. Each model has three folders: the Post Processor folder, the AERMET folder, and the AERMOD folder. The Post Processor folder contains the 3-Month Processor Output File (.out), Plot File (.plt), and a Post File (.pos). The AERMET folder contains the Profile File (.pfl) for Upper Air, Surface File (.sfc), AERMET Log File (.log), and the AERMET Output File (.out). The AERMOD folder contains the AERMOD Input File (.adi) and the AERMOD Output File (.ado).

Appendix A. Kentucky Facilities with Lead Emissions over 1.0 TPY

Facility	City	State	Lead Emissions (tpy)	Data Source
AMERICAN ELECTRIC POWER - BIG SANDY PLANT	LOUISA	KY	**2.37**	2006 S/L Data
CALGON CARBON	CATLETTSBURG	KY	**6.06**	2007 S/L Data
ENERSYS	RICHMOND	KY	**2.16**	2007 S/L Data
NEWPAGE	WICKLIFFE	KY	**6.28**	2007 S/L Data
NORTH AMERICAN STAINLESS	GHENT	KY	**1.14**	2007 TRI
SUPERIOR BATTERY	RUSSELL SPRINGS	KY	**1.35**	2006 S/L Data
TVA SHAWNEE FOSSIL PLANT	WEST PADUCAH	KY	**8.42**	2007 S/L Data

Appendix B. AERSURFACE Tables

Superior Battery Airport					Superior Battery Site				
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.17	0.79	0.067	1	1	0.17	0.79	0.065
1	2	0.17	0.79	0.035	1	2	0.17	0.79	0.079
1	3	0.17	0.79	0.034	1	3	0.17	0.79	0.051
1	4	0.17	0.79	0.036	1	4	0.17	0.79	0.041
1	5	0.17	0.79	0.062	1	5	0.17	0.79	0.05
1	6	0.17	0.79	0.043	1	6	0.17	0.79	0.052
1	7	0.17	0.79	0.042	1	7	0.17	0.79	0.068
1	8	0.17	0.79	0.038	1	8	0.17	0.79	0.103
1	9	0.17	0.79	0.076	1	9	0.17	0.79	0.095
1	10	0.17	0.79	0.08	1	10	0.17	0.79	0.034
1	11	0.17	0.79	0.057	1	11	0.17	0.79	0.073
1	12	0.17	0.79	0.045	1	12	0.17	0.79	0.055
2	1	0.17	0.79	0.067	2	1	0.17	0.79	0.065
2	2	0.17	0.79	0.035	2	2	0.17	0.79	0.079
2	3	0.17	0.79	0.034	2	3	0.17	0.79	0.051
2	4	0.17	0.79	0.036	2	4	0.17	0.79	0.041
2	5	0.17	0.79	0.062	2	5	0.17	0.79	0.05
2	6	0.17	0.79	0.043	2	6	0.17	0.79	0.052
2	7	0.17	0.79	0.042	2	7	0.17	0.79	0.068
2	8	0.17	0.79	0.038	2	8	0.17	0.79	0.103
2	9	0.17	0.79	0.076	2	9	0.17	0.79	0.095
2	10	0.17	0.79	0.08	2	10	0.17	0.79	0.034
2	11	0.17	0.79	0.057	2	11	0.17	0.79	0.073
2	12	0.17	0.79	0.045	2	12	0.17	0.79	0.055
3	1	0.15	0.41	0.075	3	1	0.15	0.43	0.096

3	2	0.15	0.41	0.046	3	2	0.15	0.43	0.116
3	3	0.15	0.41	0.047	3	3	0.15	0.43	0.076
3	4	0.15	0.41	0.05	3	4	0.15	0.43	0.061
3	5	0.15	0.41	0.089	3	5	0.15	0.43	0.074
3	6	0.15	0.41	0.06	3	6	0.15	0.43	0.073
3	7	0.15	0.41	0.057	3	7	0.15	0.43	0.101
3	8	0.15	0.41	0.048	3	8	0.15	0.43	0.154
3	9	0.15	0.41	0.097	3	9	0.15	0.43	0.144
3	10	0.15	0.41	0.1	3	10	0.15	0.43	0.05
3	11	0.15	0.41	0.068	3	11	0.15	0.43	0.102
3	12	0.15	0.41	0.051	3	12	0.15	0.43	0.084
4	1	0.15	0.41	0.075	4	1	0.15	0.43	0.096
4	2	0.15	0.41	0.046	4	2	0.15	0.43	0.116
4	3	0.15	0.41	0.047	4	3	0.15	0.43	0.076
4	4	0.15	0.41	0.05	4	4	0.15	0.43	0.061
4	5	0.15	0.41	0.089	4	5	0.15	0.43	0.074
4	6	0.15	0.41	0.06	4	6	0.15	0.43	0.073
4	7	0.15	0.41	0.057	4	7	0.15	0.43	0.101
4	8	0.15	0.41	0.048	4	8	0.15	0.43	0.154
4	9	0.15	0.41	0.097	4	9	0.15	0.43	0.144
4	10	0.15	0.41	0.1	4	10	0.15	0.43	0.05
4	11	0.15	0.41	0.068	4	11	0.15	0.43	0.102
4	12	0.15	0.41	0.051	4	12	0.15	0.43	0.084
5	1	0.15	0.41	0.075	5	1	0.15	0.43	0.096
5	2	0.15	0.41	0.046	5	2	0.15	0.43	0.116
5	3	0.15	0.41	0.047	5	3	0.15	0.43	0.076
5	4	0.15	0.41	0.05	5	4	0.15	0.43	0.061
5	5	0.15	0.41	0.089	5	5	0.15	0.43	0.074
5	6	0.15	0.41	0.06	5	6	0.15	0.43	0.073
5	7	0.15	0.41	0.057	5	7	0.15	0.43	0.101
5	8	0.15	0.41	0.048	5	8	0.15	0.43	0.154

5	9	0.15	0.41	0.097	5	9	0.15	0.43	0.144
5	10	0.15	0.41	0.1	5	10	0.15	0.43	0.05
5	11	0.15	0.41	0.068	5	11	0.15	0.43	0.102
5	12	0.15	0.41	0.051	5	12	0.15	0.43	0.084
6	1	0.18	0.5	0.094	6	1	0.18	0.4	0.302
6	2	0.18	0.5	0.117	6	2	0.18	0.4	0.341
6	3	0.18	0.5	0.138	6	3	0.18	0.4	0.269
6	4	0.18	0.5	0.16	6	4	0.18	0.4	0.238
6	5	0.18	0.5	0.242	6	5	0.18	0.4	0.257
6	6	0.18	0.5	0.193	6	6	0.18	0.4	0.257
6	7	0.18	0.5	0.107	6	7	0.18	0.4	0.327
6	8	0.18	0.5	0.077	6	8	0.18	0.4	0.411
6	9	0.18	0.5	0.152	6	9	0.18	0.4	0.403
6	10	0.18	0.5	0.127	6	10	0.18	0.4	0.203
6	11	0.18	0.5	0.076	6	11	0.18	0.4	0.31
6	12	0.18	0.5	0.06	6	12	0.18	0.4	0.288
7	1	0.18	0.5	0.094	7	1	0.18	0.4	0.302
7	2	0.18	0.5	0.117	7	2	0.18	0.4	0.341
7	3	0.18	0.5	0.138	7	3	0.18	0.4	0.269
7	4	0.18	0.5	0.16	7	4	0.18	0.4	0.238
7	5	0.18	0.5	0.242	7	5	0.18	0.4	0.257
7	6	0.18	0.5	0.193	7	6	0.18	0.4	0.257
7	7	0.18	0.5	0.107	7	7	0.18	0.4	0.327
7	8	0.18	0.5	0.077	7	8	0.18	0.4	0.411
7	9	0.18	0.5	0.152	7	9	0.18	0.4	0.403
7	10	0.18	0.5	0.127	7	10	0.18	0.4	0.203
7	11	0.18	0.5	0.076	7	11	0.18	0.4	0.31
7	12	0.18	0.5	0.06	7	12	0.18	0.4	0.288
8	1	0.18	0.5	0.094	8	1	0.18	0.4	0.302
8	2	0.18	0.5	0.117	8	2	0.18	0.4	0.341
8	3	0.18	0.5	0.138	8	3	0.18	0.4	0.269

8	4	0.18	0.5	0.16	8	4	0.18	0.4	0.238
8	5	0.18	0.5	0.242	8	5	0.18	0.4	0.257
8	6	0.18	0.5	0.193	8	6	0.18	0.4	0.257
8	7	0.18	0.5	0.107	8	7	0.18	0.4	0.327
8	8	0.18	0.5	0.077	8	8	0.18	0.4	0.411
8	9	0.18	0.5	0.152	8	9	0.18	0.4	0.403
8	10	0.18	0.5	0.127	8	10	0.18	0.4	0.203
8	11	0.18	0.5	0.076	8	11	0.18	0.4	0.31
8	12	0.18	0.5	0.06	8	12	0.18	0.4	0.288
9	1	0.18	0.79	0.091	9	1	0.18	0.79	0.302
9	2	0.18	0.79	0.114	9	2	0.18	0.79	0.341
9	3	0.18	0.79	0.134	9	3	0.18	0.79	0.269
9	4	0.18	0.79	0.158	9	4	0.18	0.79	0.238
9	5	0.18	0.79	0.239	9	5	0.18	0.79	0.257
9	6	0.18	0.79	0.188	9	6	0.18	0.79	0.257
9	7	0.18	0.79	0.097	9	7	0.18	0.79	0.327
9	8	0.18	0.79	0.069	9	8	0.18	0.79	0.411
9	9	0.18	0.79	0.144	9	9	0.18	0.79	0.403
9	10	0.18	0.79	0.118	9	10	0.18	0.79	0.203
9	11	0.18	0.79	0.071	9	11	0.18	0.79	0.31
9	12	0.18	0.79	0.055	9	12	0.18	0.79	0.288
10	1	0.18	0.79	0.091	10	1	0.18	0.79	0.302
10	2	0.18	0.79	0.114	10	2	0.18	0.79	0.341
10	3	0.18	0.79	0.134	10	3	0.18	0.79	0.269
10	4	0.18	0.79	0.158	10	4	0.18	0.79	0.238
10	5	0.18	0.79	0.239	10	5	0.18	0.79	0.257
10	6	0.18	0.79	0.188	10	6	0.18	0.79	0.257
10	7	0.18	0.79	0.097	10	7	0.18	0.79	0.327
10	8	0.18	0.79	0.069	10	8	0.18	0.79	0.411
10	9	0.18	0.79	0.144	10	9	0.18	0.79	0.403
10	10	0.18	0.79	0.118	10	10	0.18	0.79	0.203

10	11	0.18	0.79	0.071	10	11	0.18	0.79	0.31
10	12	0.18	0.79	0.055	10	12	0.18	0.79	0.288
11	1	0.18	0.79	0.091	11	1	0.18	0.79	0.302
11	2	0.18	0.79	0.114	11	2	0.18	0.79	0.341
11	3	0.18	0.79	0.134	11	3	0.18	0.79	0.269
11	4	0.18	0.79	0.158	11	4	0.18	0.79	0.238
11	5	0.18	0.79	0.239	11	5	0.18	0.79	0.257
11	6	0.18	0.79	0.188	11	6	0.18	0.79	0.257
11	7	0.18	0.79	0.097	11	7	0.18	0.79	0.327
11	8	0.18	0.79	0.069	11	8	0.18	0.79	0.411
11	9	0.18	0.79	0.144	11	9	0.18	0.79	0.403
11	10	0.18	0.79	0.118	11	10	0.18	0.79	0.203
11	11	0.18	0.79	0.071	11	11	0.18	0.79	0.31
11	12	0.18	0.79	0.055	11	12	0.18	0.79	0.288
12	1	0.17	0.79	0.067	12	1	0.17	0.79	0.065
12	2	0.17	0.79	0.035	12	2	0.17	0.79	0.079
12	3	0.17	0.79	0.034	12	3	0.17	0.79	0.051
12	4	0.17	0.79	0.036	12	4	0.17	0.79	0.041
12	5	0.17	0.79	0.062	12	5	0.17	0.79	0.05
12	6	0.17	0.79	0.043	12	6	0.17	0.79	0.052
12	7	0.17	0.79	0.042	12	7	0.17	0.79	0.068
12	8	0.17	0.79	0.038	12	8	0.17	0.79	0.103
12	9	0.17	0.79	0.076	12	9	0.17	0.79	0.095
12	10	0.17	0.79	0.08	12	10	0.17	0.79	0.034
12	11	0.17	0.79	0.057	12	11	0.17	0.79	0.073
12	12	0.17	0.79	0.045	12	12	0.17	0.79	0.055

Enersys Airport					Enersys Site				
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length

1	1	0.17	0.79	0.067	1	1	0.17	0.78	0.18
1	2	0.17	0.79	0.035	1	2	0.17	0.78	0.056
1	3	0.17	0.79	0.034	1	3	0.17	0.78	0.143
1	4	0.17	0.79	0.036	1	4	0.17	0.78	0.062
1	5	0.17	0.79	0.062	1	5	0.17	0.78	0.096
1	6	0.17	0.79	0.043	1	6	0.17	0.78	0.149
1	7	0.17	0.79	0.042	1	7	0.17	0.78	0.314
1	8	0.17	0.79	0.038	1	8	0.17	0.78	0.29
1	9	0.17	0.79	0.076	1	9	0.17	0.78	0.519
1	10	0.17	0.79	0.08	1	10	0.17	0.78	0.379
1	11	0.17	0.79	0.057	1	11	0.17	0.78	0.41
1	12	0.17	0.79	0.045	1	12	0.17	0.78	0.24
2	1	0.17	0.79	0.067	2	1	0.17	0.78	0.18
2	2	0.17	0.79	0.035	2	2	0.17	0.78	0.056
2	3	0.17	0.79	0.034	2	3	0.17	0.78	0.143
2	4	0.17	0.79	0.036	2	4	0.17	0.78	0.062
2	5	0.17	0.79	0.062	2	5	0.17	0.78	0.096
2	6	0.17	0.79	0.043	2	6	0.17	0.78	0.149
2	7	0.17	0.79	0.042	2	7	0.17	0.78	0.314
2	8	0.17	0.79	0.038	2	8	0.17	0.78	0.29
2	9	0.17	0.79	0.076	2	9	0.17	0.78	0.519
2	10	0.17	0.79	0.08	2	10	0.17	0.78	0.379
2	11	0.17	0.79	0.057	2	11	0.17	0.78	0.41
2	12	0.17	0.79	0.045	2	12	0.17	0.78	0.24
3	1	0.15	0.41	0.075	3	1	0.14	0.42	0.228
3	2	0.15	0.41	0.046	3	2	0.14	0.42	0.075
3	3	0.15	0.41	0.047	3	3	0.14	0.42	0.181
3	4	0.15	0.41	0.05	3	4	0.14	0.42	0.083
3	5	0.15	0.41	0.089	3	5	0.14	0.42	0.121
3	6	0.15	0.41	0.06	3	6	0.14	0.42	0.183
3	7	0.15	0.41	0.057	3	7	0.14	0.42	0.355

3	8	0.15	0.41	0.048	3	8	0.14	0.42	0.334
3	9	0.15	0.41	0.097	3	9	0.14	0.42	0.56
3	10	0.15	0.41	0.1	3	10	0.14	0.42	0.43
3	11	0.15	0.41	0.068	3	11	0.14	0.42	0.472
3	12	0.15	0.41	0.051	3	12	0.14	0.42	0.284
4	1	0.15	0.41	0.075	4	1	0.14	0.42	0.228
4	2	0.15	0.41	0.046	4	2	0.14	0.42	0.075
4	3	0.15	0.41	0.047	4	3	0.14	0.42	0.181
4	4	0.15	0.41	0.05	4	4	0.14	0.42	0.083
4	5	0.15	0.41	0.089	4	5	0.14	0.42	0.121
4	6	0.15	0.41	0.06	4	6	0.14	0.42	0.183
4	7	0.15	0.41	0.057	4	7	0.14	0.42	0.355
4	8	0.15	0.41	0.048	4	8	0.14	0.42	0.334
4	9	0.15	0.41	0.097	4	9	0.14	0.42	0.56
4	10	0.15	0.41	0.1	4	10	0.14	0.42	0.43
4	11	0.15	0.41	0.068	4	11	0.14	0.42	0.472
4	12	0.15	0.41	0.051	4	12	0.14	0.42	0.284
5	1	0.15	0.41	0.075	5	1	0.14	0.42	0.228
5	2	0.15	0.41	0.046	5	2	0.14	0.42	0.075
5	3	0.15	0.41	0.047	5	3	0.14	0.42	0.181
5	4	0.15	0.41	0.05	5	4	0.14	0.42	0.083
5	5	0.15	0.41	0.089	5	5	0.14	0.42	0.121
5	6	0.15	0.41	0.06	5	6	0.14	0.42	0.183
5	7	0.15	0.41	0.057	5	7	0.14	0.42	0.355
5	8	0.15	0.41	0.048	5	8	0.14	0.42	0.334
5	9	0.15	0.41	0.097	5	9	0.14	0.42	0.56
5	10	0.15	0.41	0.1	5	10	0.14	0.42	0.43
5	11	0.15	0.41	0.068	5	11	0.14	0.42	0.472
5	12	0.15	0.41	0.051	5	12	0.14	0.42	0.284
6	1	0.18	0.5	0.094	6	1	0.18	0.47	0.276
6	2	0.18	0.5	0.117	6	2	0.18	0.47	0.112

6	3	0.18	0.5	0.138	6	3	0.18	0.47	0.373
6	4	0.18	0.5	0.16	6	4	0.18	0.47	0.237
6	5	0.18	0.5	0.242	6	5	0.18	0.47	0.239
6	6	0.18	0.5	0.193	6	6	0.18	0.47	0.356
6	7	0.18	0.5	0.107	6	7	0.18	0.47	0.41
6	8	0.18	0.5	0.077	6	8	0.18	0.47	0.386
6	9	0.18	0.5	0.152	6	9	0.18	0.47	0.59
6	10	0.18	0.5	0.127	6	10	0.18	0.47	0.469
6	11	0.18	0.5	0.076	6	11	0.18	0.47	0.528
6	12	0.18	0.5	0.06	6	12	0.18	0.47	0.325
7	1	0.18	0.5	0.094	7	1	0.18	0.47	0.276
7	2	0.18	0.5	0.117	7	2	0.18	0.47	0.112
7	3	0.18	0.5	0.138	7	3	0.18	0.47	0.373
7	4	0.18	0.5	0.16	7	4	0.18	0.47	0.237
7	5	0.18	0.5	0.242	7	5	0.18	0.47	0.239
7	6	0.18	0.5	0.193	7	6	0.18	0.47	0.356
7	7	0.18	0.5	0.107	7	7	0.18	0.47	0.41
7	8	0.18	0.5	0.077	7	8	0.18	0.47	0.386
7	9	0.18	0.5	0.152	7	9	0.18	0.47	0.59
7	10	0.18	0.5	0.127	7	10	0.18	0.47	0.469
7	11	0.18	0.5	0.076	7	11	0.18	0.47	0.528
7	12	0.18	0.5	0.06	7	12	0.18	0.47	0.325
8	1	0.18	0.5	0.094	8	1	0.18	0.47	0.276
8	2	0.18	0.5	0.117	8	2	0.18	0.47	0.112
8	3	0.18	0.5	0.138	8	3	0.18	0.47	0.373
8	4	0.18	0.5	0.16	8	4	0.18	0.47	0.237
8	5	0.18	0.5	0.242	8	5	0.18	0.47	0.239
8	6	0.18	0.5	0.193	8	6	0.18	0.47	0.356
8	7	0.18	0.5	0.107	8	7	0.18	0.47	0.41
8	8	0.18	0.5	0.077	8	8	0.18	0.47	0.386
8	9	0.18	0.5	0.152	8	9	0.18	0.47	0.59

8	10	0.18	0.5	0.127	8	10	0.18	0.47	0.469
8	11	0.18	0.5	0.076	8	11	0.18	0.47	0.528
8	12	0.18	0.5	0.06	8	12	0.18	0.47	0.325
9	1	0.18	0.79	0.091	9	1	0.18	0.78	0.254
9	2	0.18	0.79	0.114	9	2	0.18	0.78	0.098
9	3	0.18	0.79	0.134	9	3	0.18	0.78	0.367
9	4	0.18	0.79	0.158	9	4	0.18	0.78	0.233
9	5	0.18	0.79	0.239	9	5	0.18	0.78	0.228
9	6	0.18	0.79	0.188	9	6	0.18	0.78	0.348
9	7	0.18	0.79	0.097	9	7	0.18	0.78	0.39
9	8	0.18	0.79	0.069	9	8	0.18	0.78	0.364
9	9	0.18	0.79	0.144	9	9	0.18	0.78	0.574
9	10	0.18	0.79	0.118	9	10	0.18	0.78	0.449
9	11	0.18	0.79	0.071	9	11	0.18	0.78	0.511
9	12	0.18	0.79	0.055	9	12	0.18	0.78	0.304
10	1	0.18	0.79	0.091	10	1	0.18	0.78	0.254
10	2	0.18	0.79	0.114	10	2	0.18	0.78	0.098
10	3	0.18	0.79	0.134	10	3	0.18	0.78	0.367
10	4	0.18	0.79	0.158	10	4	0.18	0.78	0.233
10	5	0.18	0.79	0.239	10	5	0.18	0.78	0.228
10	6	0.18	0.79	0.188	10	6	0.18	0.78	0.348
10	7	0.18	0.79	0.097	10	7	0.18	0.78	0.39
10	8	0.18	0.79	0.069	10	8	0.18	0.78	0.364
10	9	0.18	0.79	0.144	10	9	0.18	0.78	0.574
10	10	0.18	0.79	0.118	10	10	0.18	0.78	0.449
10	11	0.18	0.79	0.071	10	11	0.18	0.78	0.511
10	12	0.18	0.79	0.055	10	12	0.18	0.78	0.304
11	1	0.18	0.79	0.091	11	1	0.18	0.78	0.254
11	2	0.18	0.79	0.114	11	2	0.18	0.78	0.098
11	3	0.18	0.79	0.134	11	3	0.18	0.78	0.367
11	4	0.18	0.79	0.158	11	4	0.18	0.78	0.233

11	5	0.18	0.79	0.239	11	5	0.18	0.78	0.228
11	6	0.18	0.79	0.188	11	6	0.18	0.78	0.348
11	7	0.18	0.79	0.097	11	7	0.18	0.78	0.39
11	8	0.18	0.79	0.069	11	8	0.18	0.78	0.364
11	9	0.18	0.79	0.144	11	9	0.18	0.78	0.574
11	10	0.18	0.79	0.118	11	10	0.18	0.78	0.449
11	11	0.18	0.79	0.071	11	11	0.18	0.78	0.511
11	12	0.18	0.79	0.055	11	12	0.18	0.78	0.304
12	1	0.17	0.79	0.067	12	1	0.17	0.78	0.18
12	2	0.17	0.79	0.035	12	2	0.17	0.78	0.056
12	3	0.17	0.79	0.034	12	3	0.17	0.78	0.143
12	4	0.17	0.79	0.036	12	4	0.17	0.78	0.062
12	5	0.17	0.79	0.062	12	5	0.17	0.78	0.096
12	6	0.17	0.79	0.043	12	6	0.17	0.78	0.149
12	7	0.17	0.79	0.042	12	7	0.17	0.78	0.314
12	8	0.17	0.79	0.038	12	8	0.17	0.78	0.29
12	9	0.17	0.79	0.076	12	9	0.17	0.78	0.519
12	10	0.17	0.79	0.08	12	10	0.17	0.78	0.379
12	11	0.17	0.79	0.057	12	11	0.17	0.78	0.41
12	12	0.17	0.79	0.045	12	12	0.17	0.78	0.24

Big Sandy Airport					Big Sandy Site				
Month	**Sector**	**Albedo**	**Bowen Ratio**	**Surface Roughness Length**	**Month**	**Sector**	**Albedo**	**Bowen Ratio**	**Surface Roughness Length**
1	1	0.16	0.82	0.232	1	1	0.17	0.93	0.133
1	2	0.16	0.82	0.206	1	2	0.17	0.93	0.028
1	3	0.16	0.82	0.299	1	3	0.17	0.93	0.037
1	4	0.16	0.82	0.488	1	4	0.17	0.93	0.119
1	5	0.16	0.82	0.372	1	5	0.17	0.93	0.106
1	6	0.16	0.82	0.199	1	6	0.17	0.93	0.185

1	7	0.16	0.82	0.192	1	7	0.17	0.93	0.283
1	8	0.16	0.82	0.044	1	8	0.17	0.93	0.272
1	9	0.16	0.82	0.04	1	9	0.17	0.93	0.165
1	10	0.16	0.82	0.06	1	10	0.17	0.93	0.274
1	11	0.16	0.82	0.383	1	11	0.17	0.93	0.402
1	12	0.16	0.82	0.303	1	12	0.17	0.93	0.292
2	1	0.16	0.82	0.232	2	1	0.17	0.93	0.133
2	2	0.16	0.82	0.206	2	2	0.17	0.93	0.028
2	3	0.16	0.82	0.299	2	3	0.17	0.93	0.037
2	4	0.16	0.82	0.488	2	4	0.17	0.93	0.119
2	5	0.16	0.82	0.372	2	5	0.17	0.93	0.106
2	6	0.16	0.82	0.199	2	6	0.17	0.93	0.185
2	7	0.16	0.82	0.192	2	7	0.17	0.93	0.283
2	8	0.16	0.82	0.044	2	8	0.17	0.93	0.272
2	9	0.16	0.82	0.04	2	9	0.17	0.93	0.165
2	10	0.16	0.82	0.06	2	10	0.17	0.93	0.274
2	11	0.16	0.82	0.383	2	11	0.17	0.93	0.402
2	12	0.16	0.82	0.303	2	12	0.17	0.93	0.292
3	1	0.15	0.56	0.356	3	1	0.16	0.64	0.182
3	2	0.15	0.56	0.311	3	2	0.16	0.64	0.035
3	3	0.15	0.56	0.463	3	3	0.16	0.64	0.048
3	4	0.15	0.56	0.772	3	4	0.16	0.64	0.168
3	5	0.15	0.56	0.574	3	5	0.16	0.64	0.152
3	6	0.15	0.56	0.279	3	6	0.16	0.64	0.262
3	7	0.15	0.56	0.28	3	7	0.16	0.64	0.394
3	8	0.15	0.56	0.062	3	8	0.16	0.64	0.351
3	9	0.15	0.56	0.055	3	9	0.16	0.64	0.181
3	10	0.15	0.56	0.079	3	10	0.16	0.64	0.322
3	11	0.15	0.56	0.566	3	11	0.16	0.64	0.626
3	12	0.15	0.56	0.451	3	12	0.16	0.64	0.44
4	1	0.15	0.56	0.356	4	1	0.16	0.64	0.182

4	2	0.15	0.56	0.311	4	2	0.16	0.64	0.035
4	3	0.15	0.56	0.463	4	3	0.16	0.64	0.048
4	4	0.15	0.56	0.772	4	4	0.16	0.64	0.168
4	5	0.15	0.56	0.574	4	5	0.16	0.64	0.152
4	6	0.15	0.56	0.279	4	6	0.16	0.64	0.262
4	7	0.15	0.56	0.28	4	7	0.16	0.64	0.394
4	8	0.15	0.56	0.062	4	8	0.16	0.64	0.351
4	9	0.15	0.56	0.055	4	9	0.16	0.64	0.181
4	10	0.15	0.56	0.079	4	10	0.16	0.64	0.322
4	11	0.15	0.56	0.566	4	11	0.16	0.64	0.626
4	12	0.15	0.56	0.451	4	12	0.16	0.64	0.44
5	1	0.15	0.56	0.356	5	1	0.16	0.64	0.182
5	2	0.15	0.56	0.311	5	2	0.16	0.64	0.035
5	3	0.15	0.56	0.463	5	3	0.16	0.64	0.048
5	4	0.15	0.56	0.772	5	4	0.16	0.64	0.168
5	5	0.15	0.56	0.574	5	5	0.16	0.64	0.152
5	6	0.15	0.56	0.279	5	6	0.16	0.64	0.262
5	7	0.15	0.56	0.28	5	7	0.16	0.64	0.394
5	8	0.15	0.56	0.062	5	8	0.16	0.64	0.351
5	9	0.15	0.56	0.055	5	9	0.16	0.64	0.181
5	10	0.15	0.56	0.079	5	10	0.16	0.64	0.322
5	11	0.15	0.56	0.566	5	11	0.16	0.64	0.626
5	12	0.15	0.56	0.451	5	12	0.16	0.64	0.44
6	1	0.16	0.39	0.684	6	1	0.16	0.32	0.222
6	2	0.16	0.39	0.642	6	2	0.16	0.32	0.039
6	3	0.16	0.39	0.803	6	3	0.16	0.32	0.055
6	4	0.16	0.39	1.096	6	4	0.16	0.32	0.201
6	5	0.16	0.39	0.86	6	5	0.16	0.32	0.201
6	6	0.16	0.39	0.447	6	6	0.16	0.32	0.331
6	7	0.16	0.39	0.434	6	7	0.16	0.32	0.527
6	8	0.16	0.39	0.12	6	8	0.16	0.32	0.416

6	9	0.16	0.39	0.115	6	9	0.16	0.32	0.192
6	10	0.16	0.39	0.123	6	10	0.16	0.32	0.378
6	11	0.16	0.39	0.742	6	11	0.16	0.32	0.834
6	12	0.16	0.39	0.714	6	12	0.16	0.32	0.575
7	1	0.16	0.39	0.684	7	1	0.16	0.32	0.222
7	2	0.16	0.39	0.642	7	2	0.16	0.32	0.039
7	3	0.16	0.39	0.803	7	3	0.16	0.32	0.055
7	4	0.16	0.39	1.096	7	4	0.16	0.32	0.201
7	5	0.16	0.39	0.86	7	5	0.16	0.32	0.201
7	6	0.16	0.39	0.447	7	6	0.16	0.32	0.331
7	7	0.16	0.39	0.434	7	7	0.16	0.32	0.527
7	8	0.16	0.39	0.12	7	8	0.16	0.32	0.416
7	9	0.16	0.39	0.115	7	9	0.16	0.32	0.192
7	10	0.16	0.39	0.123	7	10	0.16	0.32	0.378
7	11	0.16	0.39	0.742	7	11	0.16	0.32	0.834
7	12	0.16	0.39	0.714	7	12	0.16	0.32	0.575
8	1	0.16	0.39	0.684	8	1	0.16	0.32	0.222
8	2	0.16	0.39	0.642	8	2	0.16	0.32	0.039
8	3	0.16	0.39	0.803	8	3	0.16	0.32	0.055
8	4	0.16	0.39	1.096	8	4	0.16	0.32	0.201
8	5	0.16	0.39	0.86	8	5	0.16	0.32	0.201
8	6	0.16	0.39	0.447	8	6	0.16	0.32	0.331
8	7	0.16	0.39	0.434	8	7	0.16	0.32	0.527
8	8	0.16	0.39	0.12	8	8	0.16	0.32	0.416
8	9	0.16	0.39	0.115	8	9	0.16	0.32	0.192
8	10	0.16	0.39	0.123	8	10	0.16	0.32	0.378
8	11	0.16	0.39	0.742	8	11	0.16	0.32	0.834
8	12	0.16	0.39	0.714	8	12	0.16	0.32	0.575
9	1	0.16	0.82	0.684	9	1	0.16	0.93	0.221
9	2	0.16	0.82	0.642	9	2	0.16	0.93	0.039
9	3	0.16	0.82	0.803	9	3	0.16	0.93	0.055

9	4	0.16	0.82	1.096	9	4	0.16	0.93	0.201
9	5	0.16	0.82	0.86	9	5	0.16	0.93	0.201
9	6	0.16	0.82	0.443	9	6	0.16	0.93	0.331
9	7	0.16	0.82	0.42	9	7	0.16	0.93	0.527
9	8	0.16	0.82	0.111	9	8	0.16	0.93	0.415
9	9	0.16	0.82	0.107	9	9	0.16	0.93	0.191
9	10	0.16	0.82	0.115	9	10	0.16	0.93	0.378
9	11	0.16	0.82	0.735	9	11	0.16	0.93	0.834
9	12	0.16	0.82	0.714	9	12	0.16	0.93	0.569
10	1	0.16	0.82	0.684	10	1	0.16	0.93	0.221
10	2	0.16	0.82	0.642	10	2	0.16	0.93	0.039
10	3	0.16	0.82	0.803	10	3	0.16	0.93	0.055
10	4	0.16	0.82	1.096	10	4	0.16	0.93	0.201
10	5	0.16	0.82	0.86	10	5	0.16	0.93	0.201
10	6	0.16	0.82	0.443	10	6	0.16	0.93	0.331
10	7	0.16	0.82	0.42	10	7	0.16	0.93	0.527
10	8	0.16	0.82	0.111	10	8	0.16	0.93	0.415
10	9	0.16	0.82	0.107	10	9	0.16	0.93	0.191
10	10	0.16	0.82	0.115	10	10	0.16	0.93	0.378
10	11	0.16	0.82	0.735	10	11	0.16	0.93	0.834
10	12	0.16	0.82	0.714	10	12	0.16	0.93	0.569
11	1	0.16	0.82	0.684	11	1	0.16	0.93	0.221
11	2	0.16	0.82	0.642	11	2	0.16	0.93	0.039
11	3	0.16	0.82	0.803	11	3	0.16	0.93	0.055
11	4	0.16	0.82	1.096	11	4	0.16	0.93	0.201
11	5	0.16	0.82	0.86	11	5	0.16	0.93	0.201
11	6	0.16	0.82	0.443	11	6	0.16	0.93	0.331
11	7	0.16	0.82	0.42	11	7	0.16	0.93	0.527
11	8	0.16	0.82	0.111	11	8	0.16	0.93	0.415
11	9	0.16	0.82	0.107	11	9	0.16	0.93	0.191
11	10	0.16	0.82	0.115	11	10	0.16	0.93	0.378

11	11	0.16	0.82	0.735	11	11	0.16	0.93	0.834
11	12	0.16	0.82	0.714	11	12	0.16	0.93	0.569
12	1	0.16	0.82	0.232	12	1	0.17	0.93	0.133
12	2	0.16	0.82	0.206	12	2	0.17	0.93	0.028
12	3	0.16	0.82	0.299	12	3	0.17	0.93	0.037
12	4	0.16	0.82	0.488	12	4	0.17	0.93	0.119
12	5	0.16	0.82	0.372	12	5	0.17	0.93	0.106
12	6	0.16	0.82	0.199	12	6	0.17	0.93	0.185
12	7	0.16	0.82	0.192	12	7	0.17	0.93	0.283
12	8	0.16	0.82	0.044	12	8	0.17	0.93	0.272
12	9	0.16	0.82	0.04	12	9	0.17	0.93	0.165
12	10	0.16	0.82	0.06	12	10	0.17	0.93	0.274
12	11	0.16	0.82	0.383	12	11	0.17	0.93	0.402
12	12	0.16	0.82	0.303	12	12	0.17	0.93	0.292

Calgon Carbon Airport					Calgon Carbon Surface				
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.16	0.82	0.23	1	1	0.17	0.91	0.166
1	2	0.16	0.82	0.208	1	2	0.17	0.91	0.189
1	3	0.16	0.82	0.293	1	3	0.17	0.91	0.097
1	4	0.16	0.82	0.488	1	4	0.17	0.91	0.017
1	5	0.16	0.82	0.373	1	5	0.17	0.91	0.058
1	6	0.16	0.82	0.198	1	6	0.17	0.91	0.689
1	7	0.16	0.82	0.195	1	7	0.17	0.91	0.204
1	8	0.16	0.82	0.041	1	8	0.17	0.91	0.557
1	9	0.16	0.82	0.043	1	9	0.17	0.91	0.279
1	10	0.16	0.82	0.055	1	10	0.17	0.91	0.489
1	11	0.16	0.82	0.383	1	11	0.17	0.91	0.048
1	12	0.16	0.82	0.294	1	12	0.17	0.91	0.146

2	1	0.16	0.82	0.23	2	1	0.17	0.91	0.166
2	2	0.16	0.82	0.208	2	2	0.17	0.91	0.189
2	3	0.16	0.82	0.293	2	3	0.17	0.91	0.097
2	4	0.16	0.82	0.488	2	4	0.17	0.91	0.017
2	5	0.16	0.82	0.373	2	5	0.17	0.91	0.058
2	6	0.16	0.82	0.198	2	6	0.17	0.91	0.689
2	7	0.16	0.82	0.195	2	7	0.17	0.91	0.204
2	8	0.16	0.82	0.041	2	8	0.17	0.91	0.557
2	9	0.16	0.82	0.043	2	9	0.17	0.91	0.279
2	10	0.16	0.82	0.055	2	10	0.17	0.91	0.489
2	11	0.16	0.82	0.383	2	11	0.17	0.91	0.048
2	12	0.16	0.82	0.294	2	12	0.17	0.91	0.146
3	1	0.15	0.56	0.352	3	1	0.15	0.61	0.216
3	2	0.15	0.56	0.317	3	2	0.15	0.61	0.262
3	3	0.15	0.56	0.452	3	3	0.15	0.61	0.126
3	4	0.15	0.56	0.773	3	4	0.15	0.61	0.019
3	5	0.15	0.56	0.575	3	5	0.15	0.61	0.062
3	6	0.15	0.56	0.278	3	6	0.15	0.61	0.877
3	7	0.15	0.56	0.284	3	7	0.15	0.61	0.276
3	8	0.15	0.56	0.058	3	8	0.15	0.61	0.855
3	9	0.15	0.56	0.06	3	9	0.15	0.61	0.407
3	10	0.15	0.56	0.071	3	10	0.15	0.61	0.736
3	11	0.15	0.56	0.565	3	11	0.15	0.61	0.063
3	12	0.15	0.56	0.436	3	12	0.15	0.61	0.178
4	1	0.15	0.56	0.352	4	1	0.15	0.61	0.216
4	2	0.15	0.56	0.317	4	2	0.15	0.61	0.262
4	3	0.15	0.56	0.452	4	3	0.15	0.61	0.126
4	4	0.15	0.56	0.773	4	4	0.15	0.61	0.019
4	5	0.15	0.56	0.575	4	5	0.15	0.61	0.062
4	6	0.15	0.56	0.278	4	6	0.15	0.61	0.877
4	7	0.15	0.56	0.284	4	7	0.15	0.61	0.276

4	8	0.15	0.56	0.058	4	8	0.15	0.61	0.855
4	9	0.15	0.56	0.06	4	9	0.15	0.61	0.407
4	10	0.15	0.56	0.071	4	10	0.15	0.61	0.736
4	11	0.15	0.56	0.565	4	11	0.15	0.61	0.063
4	12	0.15	0.56	0.436	4	12	0.15	0.61	0.178
5	1	0.15	0.56	0.352	5	1	0.15	0.61	0.216
5	2	0.15	0.56	0.317	5	2	0.15	0.61	0.262
5	3	0.15	0.56	0.452	5	3	0.15	0.61	0.126
5	4	0.15	0.56	0.773	5	4	0.15	0.61	0.019
5	5	0.15	0.56	0.575	5	5	0.15	0.61	0.062
5	6	0.15	0.56	0.278	5	6	0.15	0.61	0.877
5	7	0.15	0.56	0.284	5	7	0.15	0.61	0.276
5	8	0.15	0.56	0.058	5	8	0.15	0.61	0.855
5	9	0.15	0.56	0.06	5	9	0.15	0.61	0.407
5	10	0.15	0.56	0.071	5	10	0.15	0.61	0.736
5	11	0.15	0.56	0.565	5	11	0.15	0.61	0.063
5	12	0.15	0.56	0.436	5	12	0.15	0.61	0.178
6	1	0.16	0.39	0.68	6	1	0.16	0.35	0.261
6	2	0.16	0.39	0.65	6	2	0.16	0.35	0.312
6	3	0.16	0.39	0.791	6	3	0.16	0.35	0.159
6	4	0.16	0.39	1.096	6	4	0.16	0.35	0.023
6	5	0.16	0.39	0.857	6	5	0.16	0.35	0.065
6	6	0.16	0.39	0.447	6	6	0.16	0.35	1.003
6	7	0.16	0.39	0.44	6	7	0.16	0.35	0.327
6	8	0.16	0.39	0.116	6	8	0.16	0.35	1.123
6	9	0.16	0.39	0.12	6	9	0.16	0.35	0.618
6	10	0.16	0.39	0.115	6	10	0.16	0.35	1.042
6	11	0.16	0.39	0.738	6	11	0.16	0.35	0.076
6	12	0.16	0.39	0.695	6	12	0.16	0.35	0.247
7	1	0.16	0.39	0.68	7	1	0.16	0.35	0.261
7	2	0.16	0.39	0.65	7	2	0.16	0.35	0.312

7	3	0.16	0.39	0.791	7	3	0.16	0.35	0.159
7	4	0.16	0.39	1.096	7	4	0.16	0.35	0.023
7	5	0.16	0.39	0.857	7	5	0.16	0.35	0.065
7	6	0.16	0.39	0.447	7	6	0.16	0.35	1.003
7	7	0.16	0.39	0.44	7	7	0.16	0.35	0.327
7	8	0.16	0.39	0.116	7	8	0.16	0.35	1.123
7	9	0.16	0.39	0.12	7	9	0.16	0.35	0.618
7	10	0.16	0.39	0.115	7	10	0.16	0.35	1.042
7	11	0.16	0.39	0.738	7	11	0.16	0.35	0.076
7	12	0.16	0.39	0.695	7	12	0.16	0.35	0.247
8	1	0.16	0.39	0.68	8	1	0.16	0.35	0.261
8	2	0.16	0.39	0.65	8	2	0.16	0.35	0.312
8	3	0.16	0.39	0.791	8	3	0.16	0.35	0.159
8	4	0.16	0.39	1.096	8	4	0.16	0.35	0.023
8	5	0.16	0.39	0.857	8	5	0.16	0.35	0.065
8	6	0.16	0.39	0.447	8	6	0.16	0.35	1.003
8	7	0.16	0.39	0.44	8	7	0.16	0.35	0.327
8	8	0.16	0.39	0.116	8	8	0.16	0.35	1.123
8	9	0.16	0.39	0.12	8	9	0.16	0.35	0.618
8	10	0.16	0.39	0.115	8	10	0.16	0.35	1.042
8	11	0.16	0.39	0.738	8	11	0.16	0.35	0.076
8	12	0.16	0.39	0.695	8	12	0.16	0.35	0.247
9	1	0.16	0.82	0.68	9	1	0.16	0.91	0.261
9	2	0.16	0.82	0.65	9	2	0.16	0.91	0.312
9	3	0.16	0.82	0.791	9	3	0.16	0.91	0.159
9	4	0.16	0.82	1.096	9	4	0.16	0.91	0.023
9	5	0.16	0.82	0.857	9	5	0.16	0.91	0.065
9	6	0.16	0.82	0.443	9	6	0.16	0.91	1.003
9	7	0.16	0.82	0.427	9	7	0.16	0.91	0.327
9	8	0.16	0.82	0.107	9	8	0.16	0.91	1.123
9	9	0.16	0.82	0.112	9	9	0.16	0.91	0.618

9	10	0.16	0.82	0.107	9	10	0.16	0.91	1.042
9	11	0.16	0.82	0.731	9	11	0.16	0.91	0.076
9	12	0.16	0.82	0.695	9	12	0.16	0.91	0.247
10	1	0.16	0.82	0.68	10	1	0.16	0.91	0.261
10	2	0.16	0.82	0.65	10	2	0.16	0.91	0.312
10	3	0.16	0.82	0.791	10	3	0.16	0.91	0.159
10	4	0.16	0.82	1.096	10	4	0.16	0.91	0.023
10	5	0.16	0.82	0.857	10	5	0.16	0.91	0.065
10	6	0.16	0.82	0.443	10	6	0.16	0.91	1.003
10	7	0.16	0.82	0.427	10	7	0.16	0.91	0.327
10	8	0.16	0.82	0.107	10	8	0.16	0.91	1.123
10	9	0.16	0.82	0.112	10	9	0.16	0.91	0.618
10	10	0.16	0.82	0.107	10	10	0.16	0.91	1.042
10	11	0.16	0.82	0.731	10	11	0.16	0.91	0.076
10	12	0.16	0.82	0.695	10	12	0.16	0.91	0.247
11	1	0.16	0.82	0.68	11	1	0.16	0.91	0.261
11	2	0.16	0.82	0.65	11	2	0.16	0.91	0.312
11	3	0.16	0.82	0.791	11	3	0.16	0.91	0.159
11	4	0.16	0.82	1.096	11	4	0.16	0.91	0.023
11	5	0.16	0.82	0.857	11	5	0.16	0.91	0.065
11	6	0.16	0.82	0.443	11	6	0.16	0.91	1.003
11	7	0.16	0.82	0.427	11	7	0.16	0.91	0.327
11	8	0.16	0.82	0.107	11	8	0.16	0.91	1.123
11	9	0.16	0.82	0.112	11	9	0.16	0.91	0.618
11	10	0.16	0.82	0.107	11	10	0.16	0.91	1.042
11	11	0.16	0.82	0.731	11	11	0.16	0.91	0.076
11	12	0.16	0.82	0.695	11	12	0.16	0.91	0.247
12	1	0.16	0.82	0.23	12	1	0.17	0.91	0.166
12	2	0.16	0.82	0.208	12	2	0.17	0.91	0.189
12	3	0.16	0.82	0.293	12	3	0.17	0.91	0.097
12	4	0.16	0.82	0.488	12	4	0.17	0.91	0.017

12	5	0.16	0.82	0.373	12	5	0.17	0.91	0.058
12	6	0.16	0.82	0.198	12	6	0.17	0.91	0.689
12	7	0.16	0.82	0.195	12	7	0.17	0.91	0.204
12	8	0.16	0.82	0.041	12	8	0.17	0.91	0.557
12	9	0.16	0.82	0.043	12	9	0.17	0.91	0.279
12	10	0.16	0.82	0.055	12	10	0.17	0.91	0.489
12	11	0.16	0.82	0.383	12	11	0.17	0.91	0.048
12	12	0.16	0.82	0.294	12	12	0.17	0.91	0.146

Newpage Airport					Newpage Site				
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.17	0.72	0.04	1	1	0.16	0.49	0.492
1	2	0.17	0.72	0.054	1	2	0.16	0.49	0.507
1	3	0.17	0.72	0.037	1	3	0.16	0.49	0.624
1	4	0.17	0.72	0.026	1	4	0.16	0.49	0.422
1	5	0.17	0.72	0.022	1	5	0.16	0.49	0.211
1	6	0.17	0.72	0.022	1	6	0.16	0.49	0.342
1	7	0.17	0.72	0.02	1	7	0.16	0.49	0.385
1	8	0.17	0.72	0.014	1	8	0.16	0.49	0.115
1	9	0.17	0.72	0.017	1	9	0.16	0.49	0.285
1	10	0.17	0.72	0.021	1	10	0.16	0.49	0.536
1	11	0.17	0.72	0.024	1	11	0.16	0.49	0.475
1	12	0.17	0.72	0.028	1	12	0.16	0.49	0.354
2	1	0.17	0.72	0.04	2	1	0.16	0.49	0.492
2	2	0.17	0.72	0.054	2	2	0.16	0.49	0.507
2	3	0.17	0.72	0.037	2	3	0.16	0.49	0.624
2	4	0.17	0.72	0.026	2	4	0.16	0.49	0.422
2	5	0.17	0.72	0.022	2	5	0.16	0.49	0.211

2	6	0.17	0.72	0.022	2	6	0.16	0.49	0.342
2	7	0.17	0.72	0.02	2	7	0.16	0.49	0.385
2	8	0.17	0.72	0.014	2	8	0.16	0.49	0.115
2	9	0.17	0.72	0.017	2	9	0.16	0.49	0.285
2	10	0.17	0.72	0.021	2	10	0.16	0.49	0.536
2	11	0.17	0.72	0.024	2	11	0.16	0.49	0.475
2	12	0.17	0.72	0.028	2	12	0.16	0.49	0.354
3	1	0.14	0.36	0.057	3	1	0.14	0.29	0.684
3	2	0.14	0.36	0.076	3	2	0.14	0.29	0.691
3	3	0.14	0.36	0.053	3	3	0.14	0.29	0.791
3	4	0.14	0.36	0.038	3	4	0.14	0.29	0.446
3	5	0.14	0.36	0.032	3	5	0.14	0.29	0.255
3	6	0.14	0.36	0.03	3	6	0.14	0.29	0.403
3	7	0.14	0.36	0.027	3	7	0.14	0.29	0.442
3	8	0.14	0.36	0.021	3	8	0.14	0.29	0.141
3	9	0.14	0.36	0.025	3	9	0.14	0.29	0.322
3	10	0.14	0.36	0.031	3	10	0.14	0.29	0.62
3	11	0.14	0.36	0.036	3	11	0.14	0.29	0.622
3	12	0.14	0.36	0.042	3	12	0.14	0.29	0.471
4	1	0.14	0.36	0.057	4	1	0.14	0.29	0.684
4	2	0.14	0.36	0.076	4	2	0.14	0.29	0.691
4	3	0.14	0.36	0.053	4	3	0.14	0.29	0.791
4	4	0.14	0.36	0.038	4	4	0.14	0.29	0.446
4	5	0.14	0.36	0.032	4	5	0.14	0.29	0.255
4	6	0.14	0.36	0.03	4	6	0.14	0.29	0.403
4	7	0.14	0.36	0.027	4	7	0.14	0.29	0.442
4	8	0.14	0.36	0.021	4	8	0.14	0.29	0.141
4	9	0.14	0.36	0.025	4	9	0.14	0.29	0.322
4	10	0.14	0.36	0.031	4	10	0.14	0.29	0.62
4	11	0.14	0.36	0.036	4	11	0.14	0.29	0.622
4	12	0.14	0.36	0.042	4	12	0.14	0.29	0.471

5	1	0.14	0.36	0.057	5	1	0.14	0.29	0.684
5	2	0.14	0.36	0.076	5	2	0.14	0.29	0.691
5	3	0.14	0.36	0.053	5	3	0.14	0.29	0.791
5	4	0.14	0.36	0.038	5	4	0.14	0.29	0.446
5	5	0.14	0.36	0.032	5	5	0.14	0.29	0.255
5	6	0.14	0.36	0.03	5	6	0.14	0.29	0.403
5	7	0.14	0.36	0.027	5	7	0.14	0.29	0.442
5	8	0.14	0.36	0.021	5	8	0.14	0.29	0.141
5	9	0.14	0.36	0.025	5	9	0.14	0.29	0.322
5	10	0.14	0.36	0.031	5	10	0.14	0.29	0.62
5	11	0.14	0.36	0.036	5	11	0.14	0.29	0.622
5	12	0.14	0.36	0.042	5	12	0.14	0.29	0.471
6	1	0.19	0.45	0.239	6	1	0.17	0.32	0.929
6	2	0.19	0.45	0.234	6	2	0.17	0.32	0.923
6	3	0.19	0.45	0.189	6	3	0.17	0.32	0.925
6	4	0.19	0.45	0.168	6	4	0.17	0.32	0.475
6	5	0.19	0.45	0.118	6	5	0.17	0.32	0.448
6	6	0.19	0.45	0.059	6	6	0.17	0.32	0.572
6	7	0.19	0.45	0.033	6	7	0.17	0.32	0.574
6	8	0.19	0.45	0.028	6	8	0.17	0.32	0.221
6	9	0.19	0.45	0.041	6	9	0.17	0.32	0.5
6	10	0.19	0.45	0.098	6	10	0.17	0.32	0.739
6	11	0.19	0.45	0.18	6	11	0.17	0.32	0.836
6	12	0.19	0.45	0.163	6	12	0.17	0.32	0.734
7	1	0.19	0.45	0.239	7	1	0.17	0.32	0.929
7	2	0.19	0.45	0.234	7	2	0.17	0.32	0.923
7	3	0.19	0.45	0.189	7	3	0.17	0.32	0.925
7	4	0.19	0.45	0.168	7	4	0.17	0.32	0.475
7	5	0.19	0.45	0.118	7	5	0.17	0.32	0.448
7	6	0.19	0.45	0.059	7	6	0.17	0.32	0.572
7	7	0.19	0.45	0.033	7	7	0.17	0.32	0.574

7	8	0.19	0.45	0.028	7	8	0.17	0.32	0.221
7	9	0.19	0.45	0.041	7	9	0.17	0.32	0.5
7	10	0.19	0.45	0.098	7	10	0.17	0.32	0.739
7	11	0.19	0.45	0.18	7	11	0.17	0.32	0.836
7	12	0.19	0.45	0.163	7	12	0.17	0.32	0.734
8	1	0.19	0.45	0.239	8	1	0.17	0.32	0.929
8	2	0.19	0.45	0.234	8	2	0.17	0.32	0.923
8	3	0.19	0.45	0.189	8	3	0.17	0.32	0.925
8	4	0.19	0.45	0.168	8	4	0.17	0.32	0.475
8	5	0.19	0.45	0.118	8	5	0.17	0.32	0.448
8	6	0.19	0.45	0.059	8	6	0.17	0.32	0.572
8	7	0.19	0.45	0.033	8	7	0.17	0.32	0.574
8	8	0.19	0.45	0.028	8	8	0.17	0.32	0.221
8	9	0.19	0.45	0.041	8	9	0.17	0.32	0.5
8	10	0.19	0.45	0.098	8	10	0.17	0.32	0.739
8	11	0.19	0.45	0.18	8	11	0.17	0.32	0.836
8	12	0.19	0.45	0.163	8	12	0.17	0.32	0.734
9	1	0.19	0.71	0.239	9	1	0.17	0.46	0.929
9	2	0.19	0.71	0.231	9	2	0.17	0.46	0.923
9	3	0.19	0.71	0.187	9	3	0.17	0.46	0.925
9	4	0.19	0.71	0.166	9	4	0.17	0.46	0.475
9	5	0.19	0.71	0.111	9	5	0.17	0.46	0.448
9	6	0.19	0.71	0.052	9	6	0.17	0.46	0.572
9	7	0.19	0.71	0.027	9	7	0.17	0.46	0.57
9	8	0.19	0.71	0.022	9	8	0.17	0.46	0.211
9	9	0.19	0.71	0.034	9	9	0.17	0.46	0.494
9	10	0.19	0.71	0.091	9	10	0.17	0.46	0.738
9	11	0.19	0.71	0.18	9	11	0.17	0.46	0.836
9	12	0.19	0.71	0.157	9	12	0.17	0.46	0.734
10	1	0.19	0.71	0.239	10	1	0.17	0.46	0.929
10	2	0.19	0.71	0.231	10	2	0.17	0.46	0.923

10	3	0.19	0.71	0.187	10	3	0.17	0.46	0.925
10	4	0.19	0.71	0.166	10	4	0.17	0.46	0.475
10	5	0.19	0.71	0.111	10	5	0.17	0.46	0.448
10	6	0.19	0.71	0.052	10	6	0.17	0.46	0.572
10	7	0.19	0.71	0.027	10	7	0.17	0.46	0.57
10	8	0.19	0.71	0.022	10	8	0.17	0.46	0.211
10	9	0.19	0.71	0.034	10	9	0.17	0.46	0.494
10	10	0.19	0.71	0.091	10	10	0.17	0.46	0.738
10	11	0.19	0.71	0.18	10	11	0.17	0.46	0.836
10	12	0.19	0.71	0.157	10	12	0.17	0.46	0.734
11	1	0.19	0.71	0.239	11	1	0.17	0.46	0.929
11	2	0.19	0.71	0.231	11	2	0.17	0.46	0.923
11	3	0.19	0.71	0.187	11	3	0.17	0.46	0.925
11	4	0.19	0.71	0.166	11	4	0.17	0.46	0.475
11	5	0.19	0.71	0.111	11	5	0.17	0.46	0.448
11	6	0.19	0.71	0.052	11	6	0.17	0.46	0.572
11	7	0.19	0.71	0.027	11	7	0.17	0.46	0.57
11	8	0.19	0.71	0.022	11	8	0.17	0.46	0.211
11	9	0.19	0.71	0.034	11	9	0.17	0.46	0.494
11	10	0.19	0.71	0.091	11	10	0.17	0.46	0.738
11	11	0.19	0.71	0.18	11	11	0.17	0.46	0.836
11	12	0.19	0.71	0.157	11	12	0.17	0.46	0.734
12	1	0.17	0.72	0.04	12	1	0.16	0.49	0.492
12	2	0.17	0.72	0.054	12	2	0.16	0.49	0.507
12	3	0.17	0.72	0.037	12	3	0.16	0.49	0.624
12	4	0.17	0.72	0.026	12	4	0.16	0.49	0.422
12	5	0.17	0.72	0.022	12	5	0.16	0.49	0.211
12	6	0.17	0.72	0.022	12	6	0.16	0.49	0.342
12	7	0.17	0.72	0.02	12	7	0.16	0.49	0.385
12	8	0.17	0.72	0.014	12	8	0.16	0.49	0.115
12	9	0.17	0.72	0.017	12	9	0.16	0.49	0.285

12	10	0.17	0.72	0.021	12	10	0.16	0.49	0.536
12	11	0.17	0.72	0.024	12	11	0.16	0.49	0.475
12	12	0.17	0.72	0.028	12	12	0.16	0.49	0.354

TVA Shawnee Airport					TVA Shawnee Site				
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.17	0.72	0.04	1	1	0.16	0.53	0.048
1	2	0.17	0.72	0.054	1	2	0.16	0.53	0.009
1	3	0.17	0.72	0.037	1	3	0.16	0.53	0.036
1	4	0.17	0.72	0.026	1	4	0.16	0.53	0.109
1	5	0.17	0.72	0.022	1	5	0.16	0.53	0.18
1	6	0.17	0.72	0.022	1	6	0.16	0.53	0.123
1	7	0.17	0.72	0.02	1	7	0.16	0.53	0.18
1	8	0.17	0.72	0.014	1	8	0.16	0.53	0.16
1	9	0.17	0.72	0.017	1	9	0.16	0.53	0.045
1	10	0.17	0.72	0.021	1	10	0.16	0.53	0.009
1	11	0.17	0.72	0.024	1	11	0.16	0.53	0.054
1	12	0.17	0.72	0.028	1	12	0.16	0.53	0.085
2	1	0.17	0.72	0.04	2	1	0.16	0.53	0.048
2	2	0.17	0.72	0.054	2	2	0.16	0.53	0.009
2	3	0.17	0.72	0.037	2	3	0.16	0.53	0.036
2	4	0.17	0.72	0.026	2	4	0.16	0.53	0.109
2	5	0.17	0.72	0.022	2	5	0.16	0.53	0.18
2	6	0.17	0.72	0.022	2	6	0.16	0.53	0.123
2	7	0.17	0.72	0.02	2	7	0.16	0.53	0.18
2	8	0.17	0.72	0.014	2	8	0.16	0.53	0.16
2	9	0.17	0.72	0.017	2	9	0.16	0.53	0.045
2	10	0.17	0.72	0.021	2	10	0.16	0.53	0.009
2	11	0.17	0.72	0.024	2	11	0.16	0.53	0.054
2	12	0.17	0.72	0.028	2	12	0.16	0.53	0.085

3	1	0.14	0.36	0.057	3	1	0.14	0.31	0.056
3	2	0.14	0.36	0.076	3	2	0.14	0.31	0.01
3	3	0.14	0.36	0.053	3	3	0.14	0.31	0.041
3	4	0.14	0.36	0.038	3	4	0.14	0.31	0.129
3	5	0.14	0.36	0.032	3	5	0.14	0.31	0.242
3	6	0.14	0.36	0.03	3	6	0.14	0.31	0.148
3	7	0.14	0.36	0.027	3	7	0.14	0.31	0.199
3	8	0.14	0.36	0.021	3	8	0.14	0.31	0.186
3	9	0.14	0.36	0.025	3	9	0.14	0.31	0.048
3	10	0.14	0.36	0.031	3	10	0.14	0.31	0.009
3	11	0.14	0.36	0.036	3	11	0.14	0.31	0.059
3	12	0.14	0.36	0.042	3	12	0.14	0.31	0.097
4	1	0.14	0.36	0.057	4	1	0.14	0.31	0.056
4	2	0.14	0.36	0.076	4	2	0.14	0.31	0.01
4	3	0.14	0.36	0.053	4	3	0.14	0.31	0.041
4	4	0.14	0.36	0.038	4	4	0.14	0.31	0.129
4	5	0.14	0.36	0.032	4	5	0.14	0.31	0.242
4	6	0.14	0.36	0.03	4	6	0.14	0.31	0.148
4	7	0.14	0.36	0.027	4	7	0.14	0.31	0.199
4	8	0.14	0.36	0.021	4	8	0.14	0.31	0.186
4	9	0.14	0.36	0.025	4	9	0.14	0.31	0.048
4	10	0.14	0.36	0.031	4	10	0.14	0.31	0.009
4	11	0.14	0.36	0.036	4	11	0.14	0.31	0.059
4	12	0.14	0.36	0.042	4	12	0.14	0.31	0.097
5	1	0.14	0.36	0.057	5	1	0.14	0.31	0.056
5	2	0.14	0.36	0.076	5	2	0.14	0.31	0.01
5	3	0.14	0.36	0.053	5	3	0.14	0.31	0.041
5	4	0.14	0.36	0.038	5	4	0.14	0.31	0.129
5	5	0.14	0.36	0.032	5	5	0.14	0.31	0.242
5	6	0.14	0.36	0.03	5	6	0.14	0.31	0.148
5	7	0.14	0.36	0.027	5	7	0.14	0.31	0.199

5	8	0.14	0.36	0.021	5	8	0.14	0.31	0.186
5	9	0.14	0.36	0.025	5	9	0.14	0.31	0.048
5	10	0.14	0.36	0.031	5	10	0.14	0.31	0.009
5	11	0.14	0.36	0.036	5	11	0.14	0.31	0.059
5	12	0.14	0.36	0.042	5	12	0.14	0.31	0.097
6	1	0.19	0.45	0.239	6	1	0.17	0.35	0.062
6	2	0.19	0.45	0.234	6	2	0.17	0.35	0.011
6	3	0.19	0.45	0.189	6	3	0.17	0.35	0.054
6	4	0.19	0.45	0.168	6	4	0.17	0.35	0.172
6	5	0.19	0.45	0.118	6	5	0.17	0.35	0.382
6	6	0.19	0.45	0.059	6	6	0.17	0.35	0.275
6	7	0.19	0.45	0.033	6	7	0.17	0.35	0.281
6	8	0.19	0.45	0.028	6	8	0.17	0.35	0.277
6	9	0.19	0.45	0.041	6	9	0.17	0.35	0.059
6	10	0.19	0.45	0.098	6	10	0.17	0.35	0.009
6	11	0.19	0.45	0.18	6	11	0.17	0.35	0.069
6	12	0.19	0.45	0.163	6	12	0.17	0.35	0.108
7	1	0.19	0.45	0.239	7	1	0.17	0.35	0.062
7	2	0.19	0.45	0.234	7	2	0.17	0.35	0.011
7	3	0.19	0.45	0.189	7	3	0.17	0.35	0.054
7	4	0.19	0.45	0.168	7	4	0.17	0.35	0.172
7	5	0.19	0.45	0.118	7	5	0.17	0.35	0.382
7	6	0.19	0.45	0.059	7	6	0.17	0.35	0.275
7	7	0.19	0.45	0.033	7	7	0.17	0.35	0.281
7	8	0.19	0.45	0.028	7	8	0.17	0.35	0.277
7	9	0.19	0.45	0.041	7	9	0.17	0.35	0.059
7	10	0.19	0.45	0.098	7	10	0.17	0.35	0.009
7	11	0.19	0.45	0.18	7	11	0.17	0.35	0.069
7	12	0.19	0.45	0.163	7	12	0.17	0.35	0.108
8	1	0.19	0.45	0.239	8	1	0.17	0.35	0.062
8	2	0.19	0.45	0.234	8	2	0.17	0.35	0.011

8	3	0.19	0.45	0.189	8	3	0.17	0.35	0.054
8	4	0.19	0.45	0.168	8	4	0.17	0.35	0.172
8	5	0.19	0.45	0.118	8	5	0.17	0.35	0.382
8	6	0.19	0.45	0.059	8	6	0.17	0.35	0.275
8	7	0.19	0.45	0.033	8	7	0.17	0.35	0.281
8	8	0.19	0.45	0.028	8	8	0.17	0.35	0.277
8	9	0.19	0.45	0.041	8	9	0.17	0.35	0.059
8	10	0.19	0.45	0.098	8	10	0.17	0.35	0.009
8	11	0.19	0.45	0.18	8	11	0.17	0.35	0.069
8	12	0.19	0.45	0.163	8	12	0.17	0.35	0.108
9	1	0.19	0.71	0.239	9	1	0.17	0.52	0.062
9	2	0.19	0.71	0.231	9	2	0.17	0.52	0.011
9	3	0.19	0.71	0.187	9	3	0.17	0.52	0.054
9	4	0.19	0.71	0.166	9	4	0.17	0.52	0.172
9	5	0.19	0.71	0.111	9	5	0.17	0.52	0.376
9	6	0.19	0.71	0.052	9	6	0.17	0.52	0.269
9	7	0.19	0.71	0.027	9	7	0.17	0.52	0.278
9	8	0.19	0.71	0.022	9	8	0.17	0.52	0.271
9	9	0.19	0.71	0.034	9	9	0.17	0.52	0.059
9	10	0.19	0.71	0.091	9	10	0.17	0.52	0.009
9	11	0.19	0.71	0.18	9	11	0.17	0.52	0.069
9	12	0.19	0.71	0.157	9	12	0.17	0.52	0.108
10	1	0.19	0.71	0.239	10	1	0.17	0.52	0.062
10	2	0.19	0.71	0.231	10	2	0.17	0.52	0.011
10	3	0.19	0.71	0.187	10	3	0.17	0.52	0.054
10	4	0.19	0.71	0.166	10	4	0.17	0.52	0.172
10	5	0.19	0.71	0.111	10	5	0.17	0.52	0.376
10	6	0.19	0.71	0.052	10	6	0.17	0.52	0.269
10	7	0.19	0.71	0.027	10	7	0.17	0.52	0.278
10	8	0.19	0.71	0.022	10	8	0.17	0.52	0.271
10	9	0.19	0.71	0.034	10	9	0.17	0.52	0.059

10	10	0.19	0.71	0.091	10	10	0.17	0.52	0.009
10	11	0.19	0.71	0.18	10	11	0.17	0.52	0.069
10	12	0.19	0.71	0.157	10	12	0.17	0.52	0.108
11	1	0.19	0.71	0.239	11	1	0.17	0.52	0.062
11	2	0.19	0.71	0.231	11	2	0.17	0.52	0.011
11	3	0.19	0.71	0.187	11	3	0.17	0.52	0.054
11	4	0.19	0.71	0.166	11	4	0.17	0.52	0.172
11	5	0.19	0.71	0.111	11	5	0.17	0.52	0.376
11	6	0.19	0.71	0.052	11	6	0.17	0.52	0.269
11	7	0.19	0.71	0.027	11	7	0.17	0.52	0.278
11	8	0.19	0.71	0.022	11	8	0.17	0.52	0.271
11	9	0.19	0.71	0.034	11	9	0.17	0.52	0.059
11	10	0.19	0.71	0.091	11	10	0.17	0.52	0.009
11	11	0.19	0.71	0.18	11	11	0.17	0.52	0.069
11	12	0.19	0.71	0.157	11	12	0.17	0.52	0.108
12	1	0.17	0.72	0.04	12	1	0.16	0.53	0.048
12	2	0.17	0.72	0.054	12	2	0.16	0.53	0.009
12	3	0.17	0.72	0.037	12	3	0.16	0.53	0.036
12	4	0.17	0.72	0.026	12	4	0.16	0.53	0.109
12	5	0.17	0.72	0.022	12	5	0.16	0.53	0.18
12	6	0.17	0.72	0.022	12	6	0.16	0.53	0.123
12	7	0.17	0.72	0.02	12	7	0.16	0.53	0.18
12	8	0.17	0.72	0.014	12	8	0.16	0.53	0.16
12	9	0.17	0.72	0.017	12	9	0.16	0.53	0.045
12	10	0.17	0.72	0.021	12	10	0.16	0.53	0.009
12	11	0.17	0.72	0.024	12	11	0.16	0.53	0.054
12	12	0.17	0.72	0.028	12	12	0.16	0.53	0.085

North American Stainless Airport					North American Stainless Site				
Month	**Sector**	**Albedo**	**Bowen Ratio**	**Surface Roughness**	**Month**	**Sector**	**Albedo**	**Bowen**	**Surface Roughness**

				Length				Ratio	Length
1	1	0.17	0.79	0.047	1	1	0.16	0.75	0.036
1	2	0.17	0.79	0.061	1	2	0.16	0.75	0.023
1	3	0.17	0.79	0.05	1	3	0.16	0.75	0.05
1	4	0.17	0.79	0.044	1	4	0.16	0.75	0.15
1	5	0.17	0.79	0.053	1	5	0.16	0.75	0.209
1	6	0.17	0.79	0.06	1	6	0.16	0.75	0.167
1	7	0.17	0.79	0.056	1	7	0.16	0.75	0.051
1	8	0.17	0.79	0.034	1	8	0.16	0.75	0.023
1	9	0.17	0.79	0.019	1	9	0.16	0.75	0.026
1	10	0.17	0.79	0.055	1	10	0.16	0.75	0.036
1	11	0.17	0.79	0.04	1	11	0.16	0.75	0.017
1	12	0.17	0.79	0.035	1	12	0.16	0.75	0.022
2	1	0.17	0.79	0.047	2	1	0.16	0.75	0.036
2	2	0.17	0.79	0.061	2	2	0.16	0.75	0.023
2	3	0.17	0.79	0.05	2	3	0.16	0.75	0.05
2	4	0.17	0.79	0.044	2	4	0.16	0.75	0.15
2	5	0.17	0.79	0.053	2	5	0.16	0.75	0.209
2	6	0.17	0.79	0.06	2	6	0.16	0.75	0.167
2	7	0.17	0.79	0.056	2	7	0.16	0.75	0.051
2	8	0.17	0.79	0.034	2	8	0.16	0.75	0.023
2	9	0.17	0.79	0.019	2	9	0.16	0.75	0.026
2	10	0.17	0.79	0.055	2	10	0.16	0.75	0.036
2	11	0.17	0.79	0.04	2	11	0.16	0.75	0.017
2	12	0.17	0.79	0.035	2	12	0.16	0.75	0.022
3	1	0.15	0.49	0.055	3	1	0.15	0.48	0.051
3	2	0.15	0.49	0.067	3	2	0.15	0.48	0.034
3	3	0.15	0.49	0.056	3	3	0.15	0.48	0.076
3	4	0.15	0.49	0.051	3	4	0.15	0.48	0.235
3	5	0.15	0.49	0.062	3	5	0.15	0.48	0.316
3	6	0.15	0.49	0.069	3	6	0.15	0.48	0.265
3	7	0.15	0.49	0.067	3	7	0.15	0.48	0.078

3	8	0.15	0.49	0.043	3	8	0.15	0.48	0.035
3	9	0.15	0.49	0.027	3	9	0.15	0.48	0.039
3	10	0.15	0.49	0.077	3	10	0.15	0.48	0.053
3	11	0.15	0.49	0.052	3	11	0.15	0.48	0.023
3	12	0.15	0.49	0.045	3	12	0.15	0.48	0.029
4	1	0.15	0.49	0.055	4	1	0.15	0.48	0.051
4	2	0.15	0.49	0.067	4	2	0.15	0.48	0.034
4	3	0.15	0.49	0.056	4	3	0.15	0.48	0.076
4	4	0.15	0.49	0.051	4	4	0.15	0.48	0.235
4	5	0.15	0.49	0.062	4	5	0.15	0.48	0.316
4	6	0.15	0.49	0.069	4	6	0.15	0.48	0.265
4	7	0.15	0.49	0.067	4	7	0.15	0.48	0.078
4	8	0.15	0.49	0.043	4	8	0.15	0.48	0.035
4	9	0.15	0.49	0.027	4	9	0.15	0.48	0.039
4	10	0.15	0.49	0.077	4	10	0.15	0.48	0.053
4	11	0.15	0.49	0.052	4	11	0.15	0.48	0.023
4	12	0.15	0.49	0.045	4	12	0.15	0.48	0.029
5	1	0.15	0.49	0.055	5	1	0.15	0.48	0.051
5	2	0.15	0.49	0.067	5	2	0.15	0.48	0.034
5	3	0.15	0.49	0.056	5	3	0.15	0.48	0.076
5	4	0.15	0.49	0.051	5	4	0.15	0.48	0.235
5	5	0.15	0.49	0.062	5	5	0.15	0.48	0.316
5	6	0.15	0.49	0.069	5	6	0.15	0.48	0.265
5	7	0.15	0.49	0.067	5	7	0.15	0.48	0.078
5	8	0.15	0.49	0.043	5	8	0.15	0.48	0.035
5	9	0.15	0.49	0.027	5	9	0.15	0.48	0.039
5	10	0.15	0.49	0.077	5	10	0.15	0.48	0.053
5	11	0.15	0.49	0.052	5	11	0.15	0.48	0.023
5	12	0.15	0.49	0.045	5	12	0.15	0.48	0.029
6	1	0.17	0.44	0.061	6	1	0.16	0.34	0.231
6	2	0.17	0.44	0.071	6	2	0.16	0.34	0.212
6	3	0.17	0.44	0.062	6	3	0.16	0.34	0.325

6	4	0.17	0.44	0.057	6	4	0.16	0.34	0.595
6	5	0.17	0.44	0.069	6	5	0.16	0.34	0.69
6	6	0.17	0.44	0.075	6	6	0.16	0.34	0.638
6	7	0.17	0.44	0.076	6	7	0.16	0.34	0.33
6	8	0.17	0.44	0.051	6	8	0.16	0.34	0.217
6	9	0.17	0.44	0.034	6	9	0.16	0.34	0.226
6	10	0.17	0.44	0.109	6	10	0.16	0.34	0.217
6	11	0.17	0.44	0.079	6	11	0.16	0.34	0.07
6	12	0.17	0.44	0.053	6	12	0.16	0.34	0.09
7	1	0.17	0.44	0.061	7	1	0.16	0.34	0.231
7	2	0.17	0.44	0.071	7	2	0.16	0.34	0.212
7	3	0.17	0.44	0.062	7	3	0.16	0.34	0.325
7	4	0.17	0.44	0.057	7	4	0.16	0.34	0.595
7	5	0.17	0.44	0.069	7	5	0.16	0.34	0.69
7	6	0.17	0.44	0.075	7	6	0.16	0.34	0.638
7	7	0.17	0.44	0.076	7	7	0.16	0.34	0.33
7	8	0.17	0.44	0.051	7	8	0.16	0.34	0.217
7	9	0.17	0.44	0.034	7	9	0.16	0.34	0.226
7	10	0.17	0.44	0.109	7	10	0.16	0.34	0.217
7	11	0.17	0.44	0.079	7	11	0.16	0.34	0.07
7	12	0.17	0.44	0.053	7	12	0.16	0.34	0.09
8	1	0.17	0.44	0.061	8	1	0.16	0.34	0.231
8	2	0.17	0.44	0.071	8	2	0.16	0.34	0.212
8	3	0.17	0.44	0.062	8	3	0.16	0.34	0.325
8	4	0.17	0.44	0.057	8	4	0.16	0.34	0.595
8	5	0.17	0.44	0.069	8	5	0.16	0.34	0.69
8	6	0.17	0.44	0.075	8	6	0.16	0.34	0.638
8	7	0.17	0.44	0.076	8	7	0.16	0.34	0.33
8	8	0.17	0.44	0.051	8	8	0.16	0.34	0.217
8	9	0.17	0.44	0.034	8	9	0.16	0.34	0.226
8	10	0.17	0.44	0.109	8	10	0.16	0.34	0.217
8	11	0.17	0.44	0.079	8	11	0.16	0.34	0.07

8	12	0.17	0.44	0.053	8	12	0.16	0.34	0.09
9	1	0.17	0.78	0.055	9	1	0.16	0.75	0.231
9	2	0.17	0.78	0.067	9	2	0.16	0.75	0.212
9	3	0.17	0.78	0.057	9	3	0.16	0.75	0.325
9	4	0.17	0.78	0.051	9	4	0.16	0.75	0.595
9	5	0.17	0.78	0.063	9	5	0.16	0.75	0.69
9	6	0.17	0.78	0.07	9	6	0.16	0.75	0.638
9	7	0.17	0.78	0.069	9	7	0.16	0.75	0.33
9	8	0.17	0.78	0.044	9	8	0.16	0.75	0.217
9	9	0.17	0.78	0.027	9	9	0.16	0.75	0.226
9	10	0.17	0.78	0.096	9	10	0.16	0.75	0.217
9	11	0.17	0.78	0.07	9	11	0.16	0.75	0.07
9	12	0.17	0.78	0.045	9	12	0.16	0.75	0.09
10	1	0.17	0.78	0.055	10	1	0.16	0.75	0.231
10	2	0.17	0.78	0.067	10	2	0.16	0.75	0.212
10	3	0.17	0.78	0.057	10	3	0.16	0.75	0.325
10	4	0.17	0.78	0.051	10	4	0.16	0.75	0.595
10	5	0.17	0.78	0.063	10	5	0.16	0.75	0.69
10	6	0.17	0.78	0.07	10	6	0.16	0.75	0.638
10	7	0.17	0.78	0.069	10	7	0.16	0.75	0.33
10	8	0.17	0.78	0.044	10	8	0.16	0.75	0.217
10	9	0.17	0.78	0.027	10	9	0.16	0.75	0.226
10	10	0.17	0.78	0.096	10	10	0.16	0.75	0.217
10	11	0.17	0.78	0.07	10	11	0.16	0.75	0.07
10	12	0.17	0.78	0.045	10	12	0.16	0.75	0.09
11	1	0.17	0.78	0.055	11	1	0.16	0.75	0.231
11	2	0.17	0.78	0.067	11	2	0.16	0.75	0.212
11	3	0.17	0.78	0.057	11	3	0.16	0.75	0.325
11	4	0.17	0.78	0.051	11	4	0.16	0.75	0.595
11	5	0.17	0.78	0.063	11	5	0.16	0.75	0.69
11	6	0.17	0.78	0.07	11	6	0.16	0.75	0.638
11	7	0.17	0.78	0.069	11	7	0.16	0.75	0.33

11	8	0.17	0.78	0.044	11	8	0.16	0.75	0.217
11	9	0.17	0.78	0.027	11	9	0.16	0.75	0.226
11	10	0.17	0.78	0.096	11	10	0.16	0.75	0.217
11	11	0.17	0.78	0.07	11	11	0.16	0.75	0.07
11	12	0.17	0.78	0.045	11	12	0.16	0.75	0.09
12	1	0.17	0.79	0.047	12	1	0.16	0.75	0.036
12	2	0.17	0.79	0.061	12	2	0.16	0.75	0.023
12	3	0.17	0.79	0.05	12	3	0.16	0.75	0.05
12	4	0.17	0.79	0.044	12	4	0.16	0.75	0.15
12	5	0.17	0.79	0.053	12	5	0.16	0.75	0.209
12	6	0.17	0.79	0.06	12	6	0.16	0.75	0.167
12	7	0.17	0.79	0.056	12	7	0.16	0.75	0.051
12	8	0.17	0.79	0.034	12	8	0.16	0.75	0.023
12	9	0.17	0.79	0.019	12	9	0.16	0.75	0.026
12	10	0.17	0.79	0.055	12	10	0.16	0.75	0.036
12	11	0.17	0.79	0.04	12	11	0.16	0.75	0.017
12	12	0.17	0.79	0.035	12	12	0.16	0.75	0.022

Appendix C. Lead Emission Sources

Facility	Source ID	X Coord. [m]	Y Coord. [m]	Base Elevation [m]	Release Height [m]	Emission Rate [g/s]	Gas Exit Temperature [K]	Gas Exit Velocity [m/s]	Inside Diameter [m]	Description
Big Sandy	COMB01	358314.98	4226074.65	1.75E+02	250.85	0.126	429.82	29.87	8.595	Unit 1Boiler- Coal Use
	COMB02	358314.98	4226074.28	1.75E+02	250.85	0.126	429.82	29.87	8.595	Unit 2 Boiler-Coal Use
	COMB04	358357.69	4226142.21	1.75E+02	31.09	0.126	659.26	17.983	2.103	Aux. Unit 2 Boiler
Calgon Carbon	045	361167.00	4244297.94	168.08	29.87	0.1744	435.93	18.288	0.853	Reactivation Furnance
Enersys	001	738518	4179618	302.04	17.07	8.97E-05	322.04	17.678	1.524	Grid Casting baghouse (4 total)
	002	738627	4179511	300.6	13.41	0.0001945	299.82	20.726	1.524	Assembly Baghouse (4 total)
	003	738632	4179534	305.25	13.41	0.0001207	299.82	21.031	1.067	Plate Finishing Baghouse (2 total)
	004	738543	4179577	302.16	15.85	0.001701	299.82	25.908	0.61	Iron Clad Filling Baghouse
	005	738545	4179581	302.28	15.85	0.001189	299.82	19.507	0.61	Iron Clad Filling Baghouse
	006	738542	4179573	302.08	15.85	0.01298	299.82	19.507	0.701	Iron Clad Filling Baghouse
	011	738532	4179615	302.32	18.29	9.65E-05	355.37	11.582	0.366	Lead Oxide Mill #1 Baghouse
	021	738538	4179614	302.48	18.29	0.04423	355.37	14.326	0.366	Lead Oxide Mill #2 Baghouse
	024	738636	4179538	306.19	12.19	1.74E-05	299.82	23.774	1.006	Assembly Baghouse
	025	738508	4179616	301.75	12.19	5.54E-05	299.82	17.678	1.433	Pasting Baghouse
	031	738535	4179614	302.39	18.29	3.97E-05	355.37	26.822	0.366	Lead Oxide Mill #3 Baghouse
North American Stainless	S1	666748.47	4287588.65	147.5	64.92	1.40E-09	313.15	21.92	1.219	Natural Gas - Boiler
	S2	666776.71	4287551	147.46	64.92	0.0328	408.15	19.48	4.572	Natural Gas Boiler/Furnace
	S3	667246.62	4287783.1	148.98	29.87	9.75E-06	477.59	10.24	0.914	Furnace
	S4	667027.48	4287593.63	149.29	49.99	3.02E-06	477.59	4.02	1.999	Furnace
Newpage	COMB5009	314777.41	4090785.83	105.78	71.32	1.75E-01	449.82	17.556	2.713	Bark/Combination Boiler
	008	314893.44	4090844.76	109.01	24.38	5.75E-03	349.82	9.144	1.753	Lime Kiln

Superior Battery	PBO1	678882.78	4104156.63	309.88	15.54	6.33E-06	407.04	7.925	0.381	Oxide Mill 1
	PBO2	678888.02	4104159.91	309.75	15.54	6.12E-06	379.82	7.925	0.381	Oxide Mill 2
	C1	678849.23	4104100.07	310.38	13.41	0.0007216	317.04	14.021	1.219	Grid Casting Operation
	P1	678840.57	4104179.77	313.03	13.41	0.0001385	338.71	9.754	1.524	Pasting Operation
	3P_AB	678797	4104154	314.49	13.11	0.002087	310.93	7.01	1.829	3 Process Operation a&b Lines
	3P_C	678839.45	4104378.74	313.99	12.19	0.03577	310.93	10.668	1.067	3 Process Operation c Lines
	SP_1	678835.72	4104354.56	314.41	7.62	4.32E-08	310.93	14.021	2.53	Smalls Parts Casting
	SP_2	678851.22	4104354.37	314.47	6.1	5.75E-10	310.93	14.021	0.253	Battery Cable Manufacturing
TVA Shawnee	STCK1	342436.92	4113016.64	94.71	243.84	0.1211	429.82	29.428	8.534	Units 1-5
	STCK2	342087.82	4113168.96	95.89	243.84	0.1211	422.04	29.632	8.53	Units 6-10

Appendix D

Figure 1. Big Sandy-Airport, High 1st High Monthly Average Concentration, Entire Domain

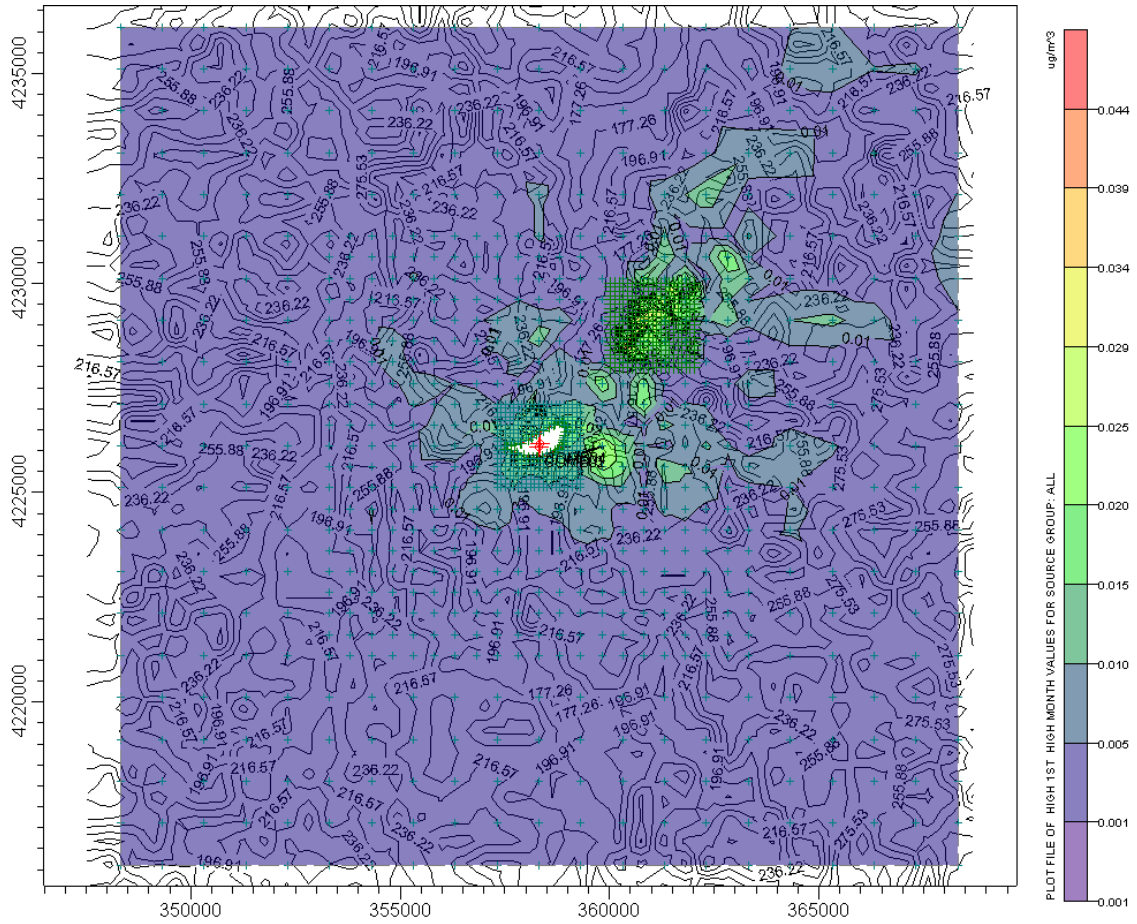


Figure 1.1 Big Sandy-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

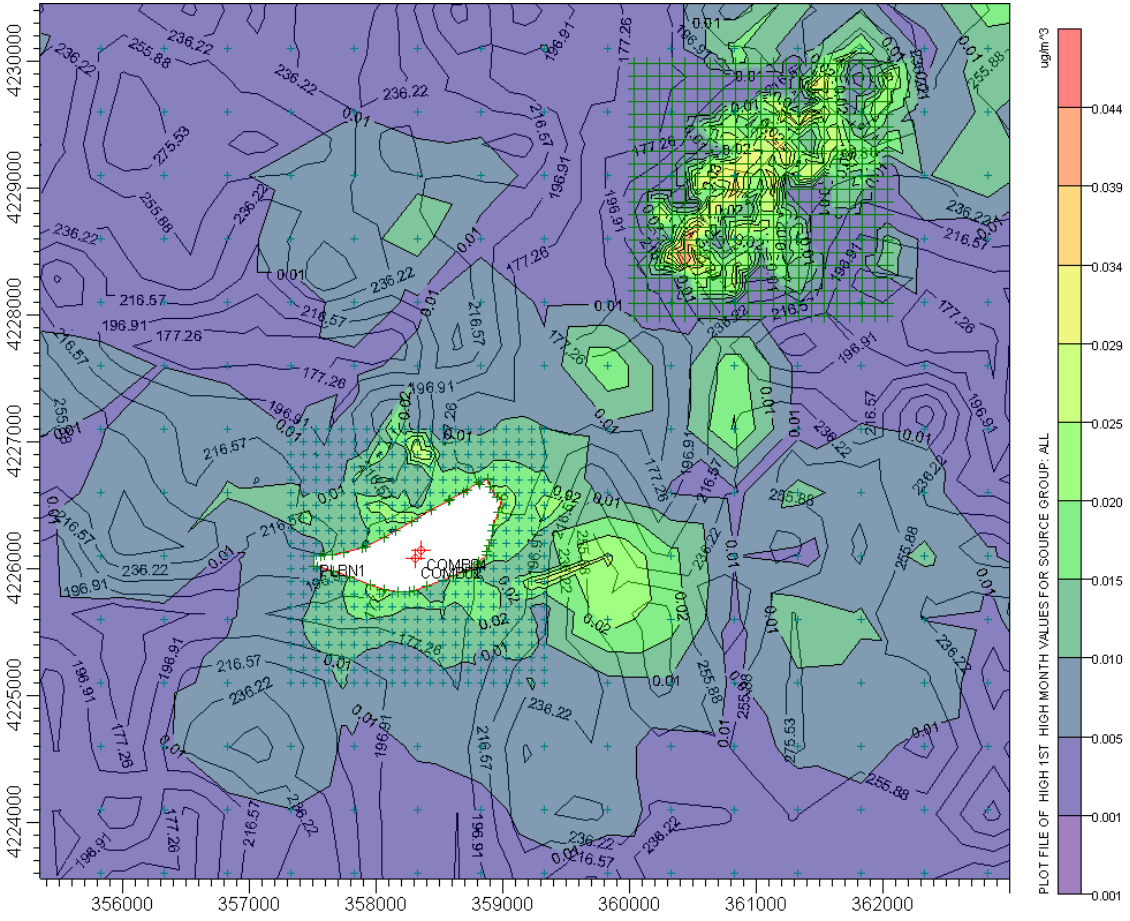


Figure 2. Big Sandy-Site, High 1st High Monthly Average Concentration, Entire Domain

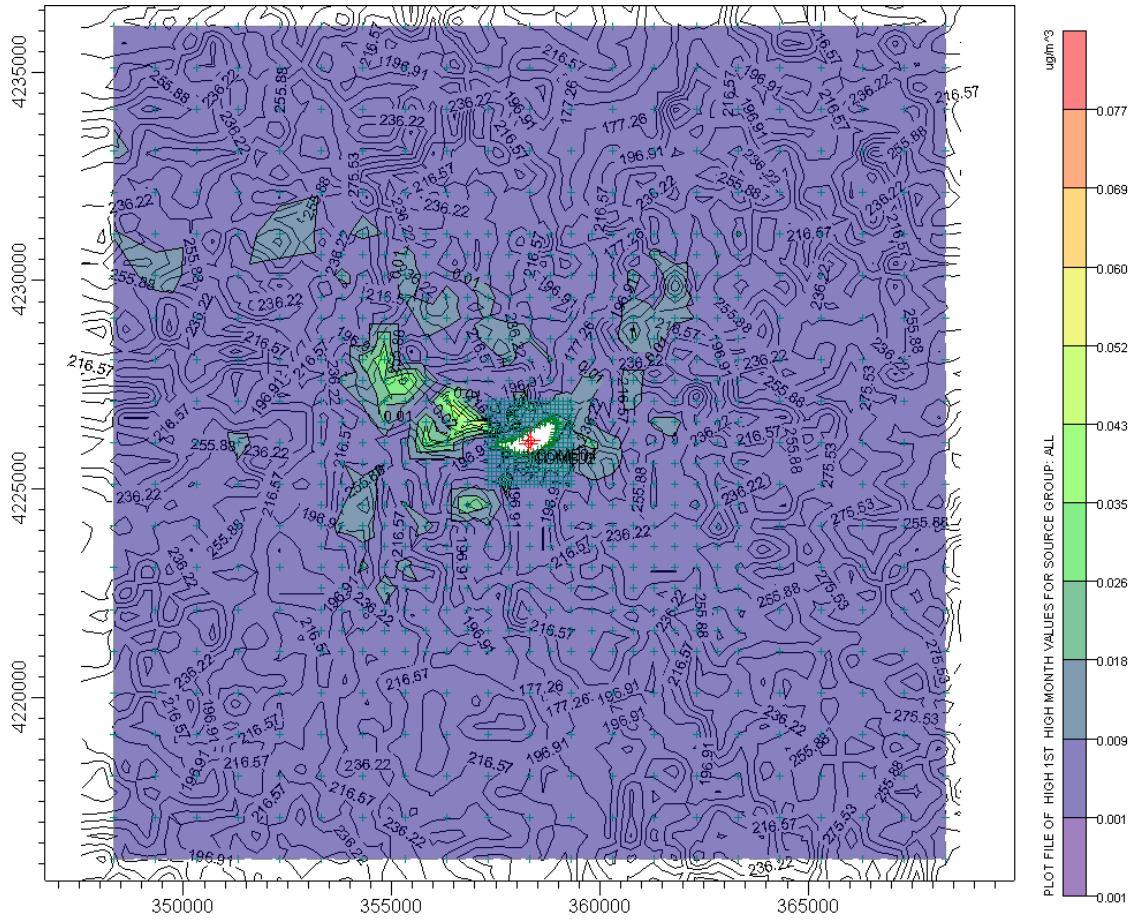


Figure 2.1 Big Sandy-Site, High 1st High Monthly Average Concentration, Controlling Concentration

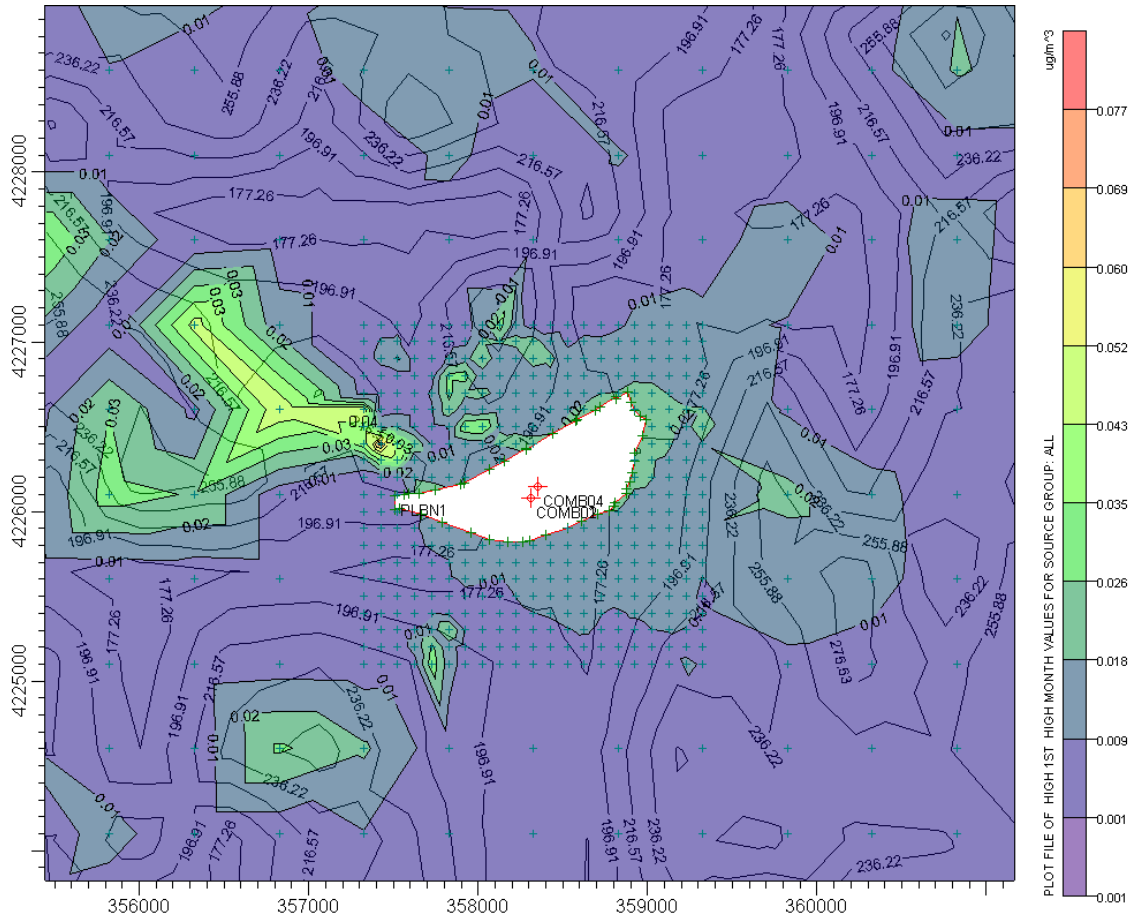


Figure 3. Calgon Carbon-Airport, High 1st High Monthly Average Concentration, Entire Domain

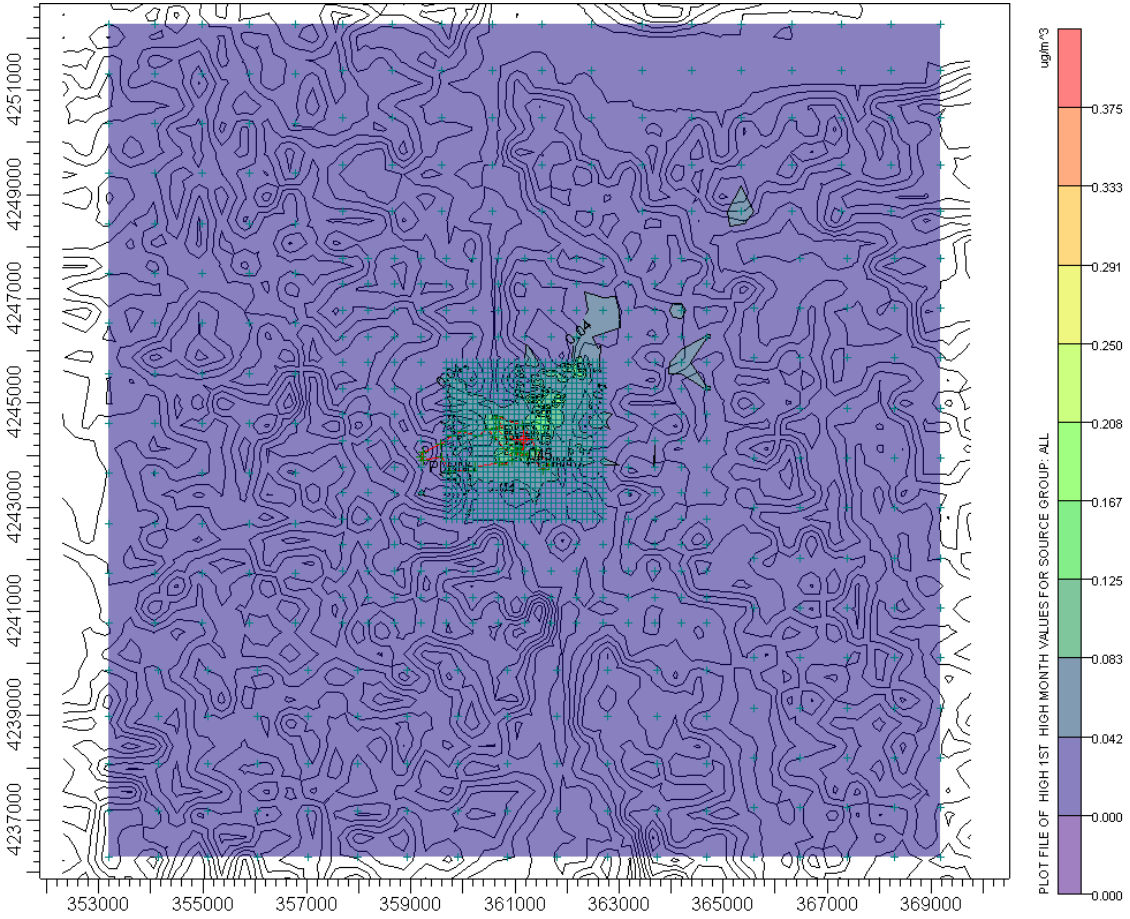


Figure 3.1 Calgon Carbon-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

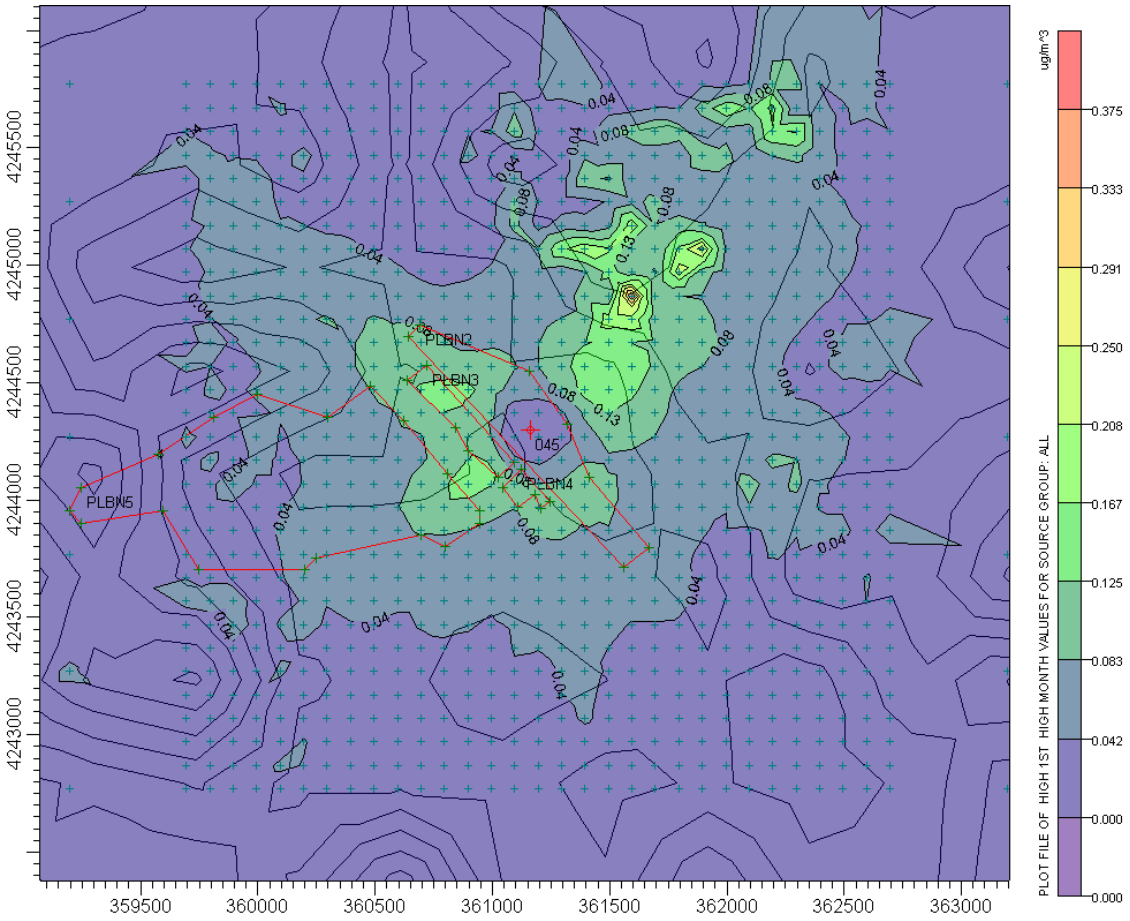


Figure 4. Calgon Carbon-Site, High 1st High Monthly Average Concentration, Entire Domain

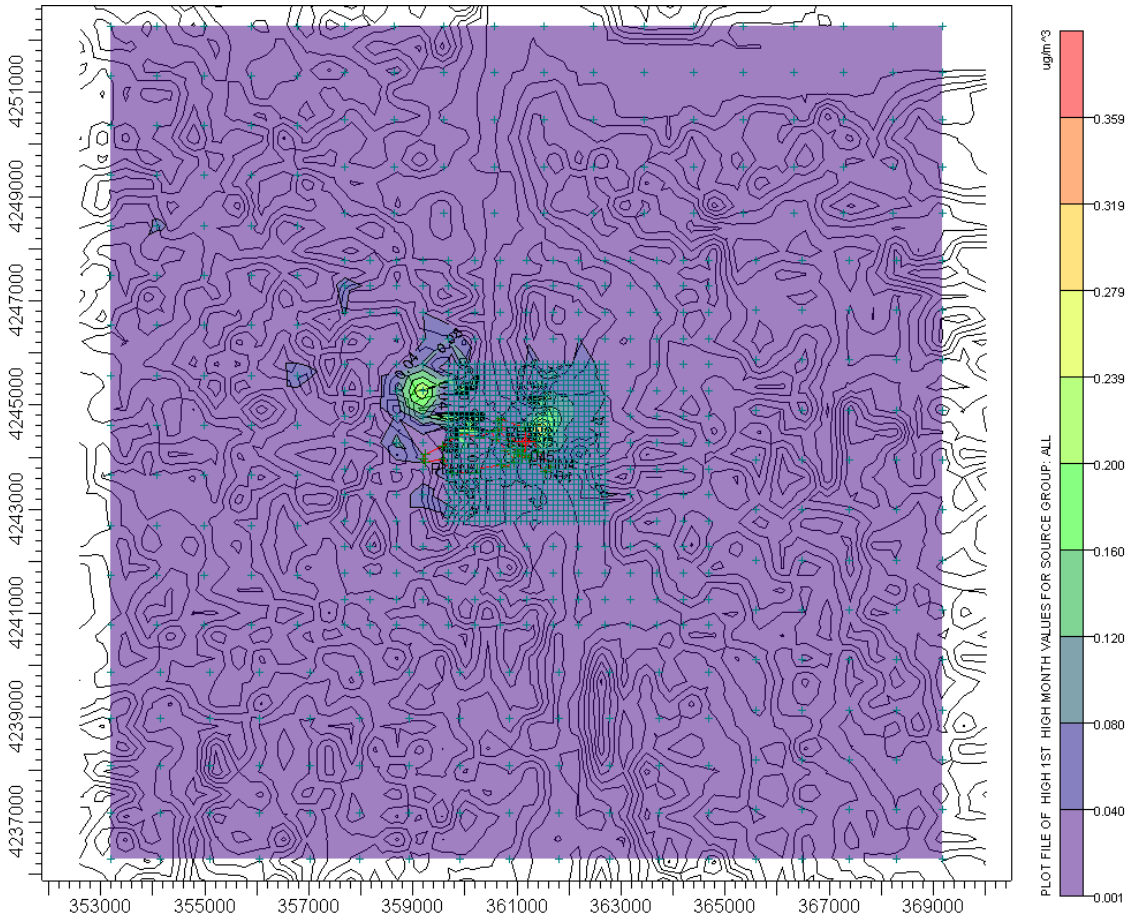


Figure 4.1 Calgon Carbon-Site, High 1st High Monthly Average Concentration, Controlling Concentration

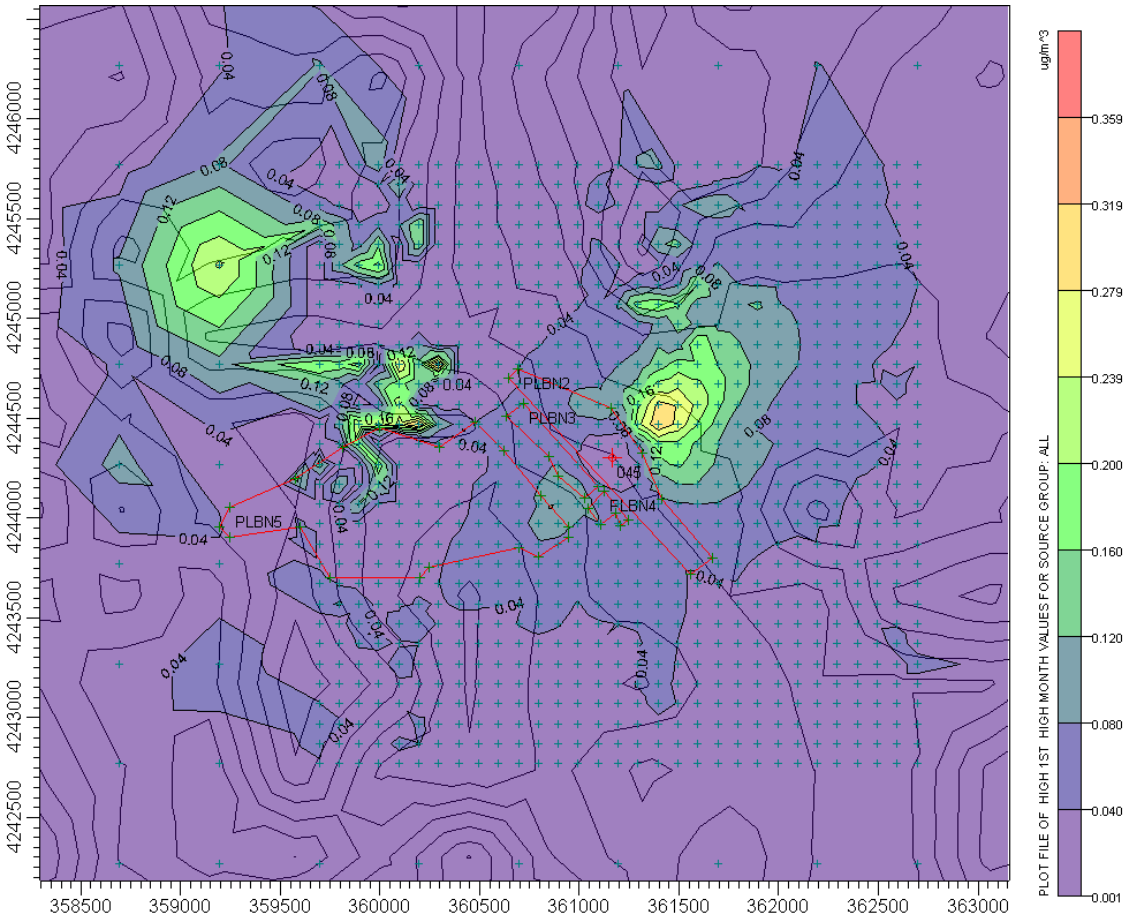


Figure 5. Enersys-Airport, High 1st High Monthly Average Concentration, Entire Domain

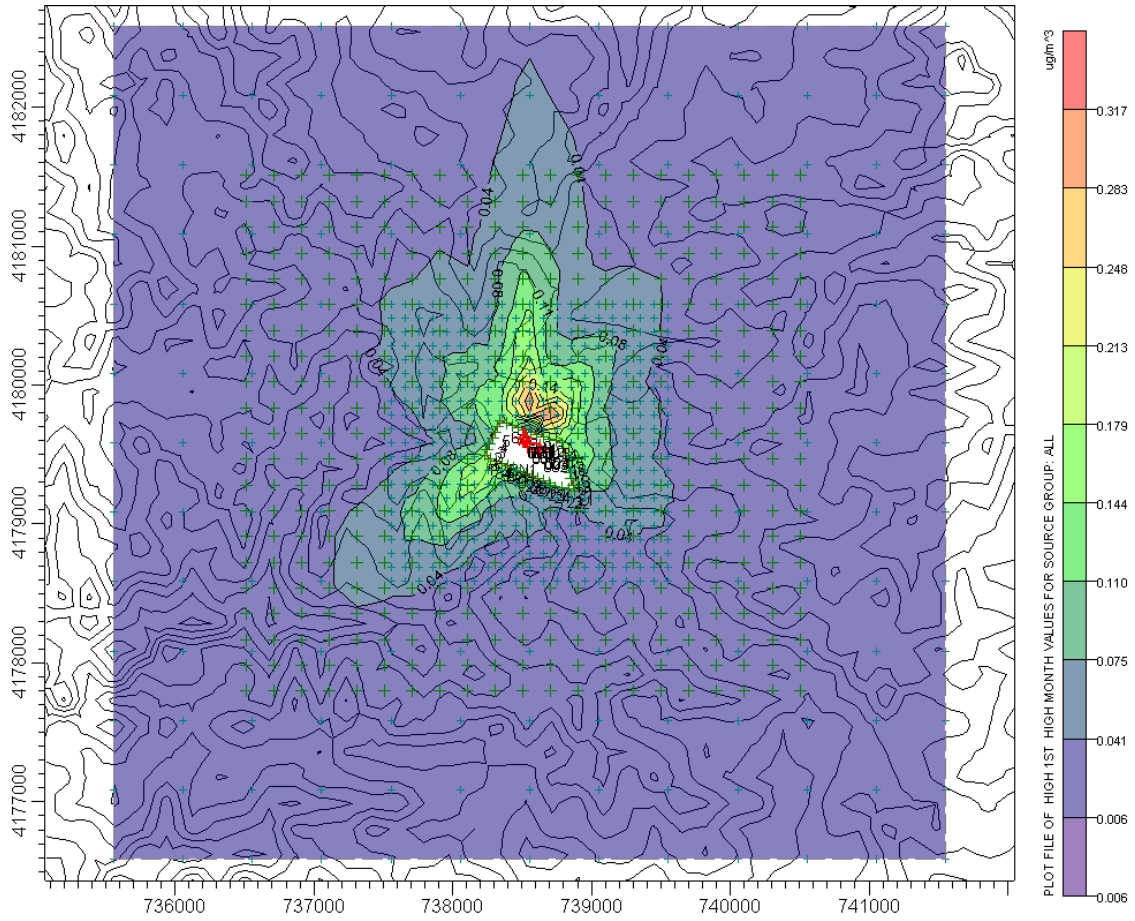


Figure 5.1 Enersys-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

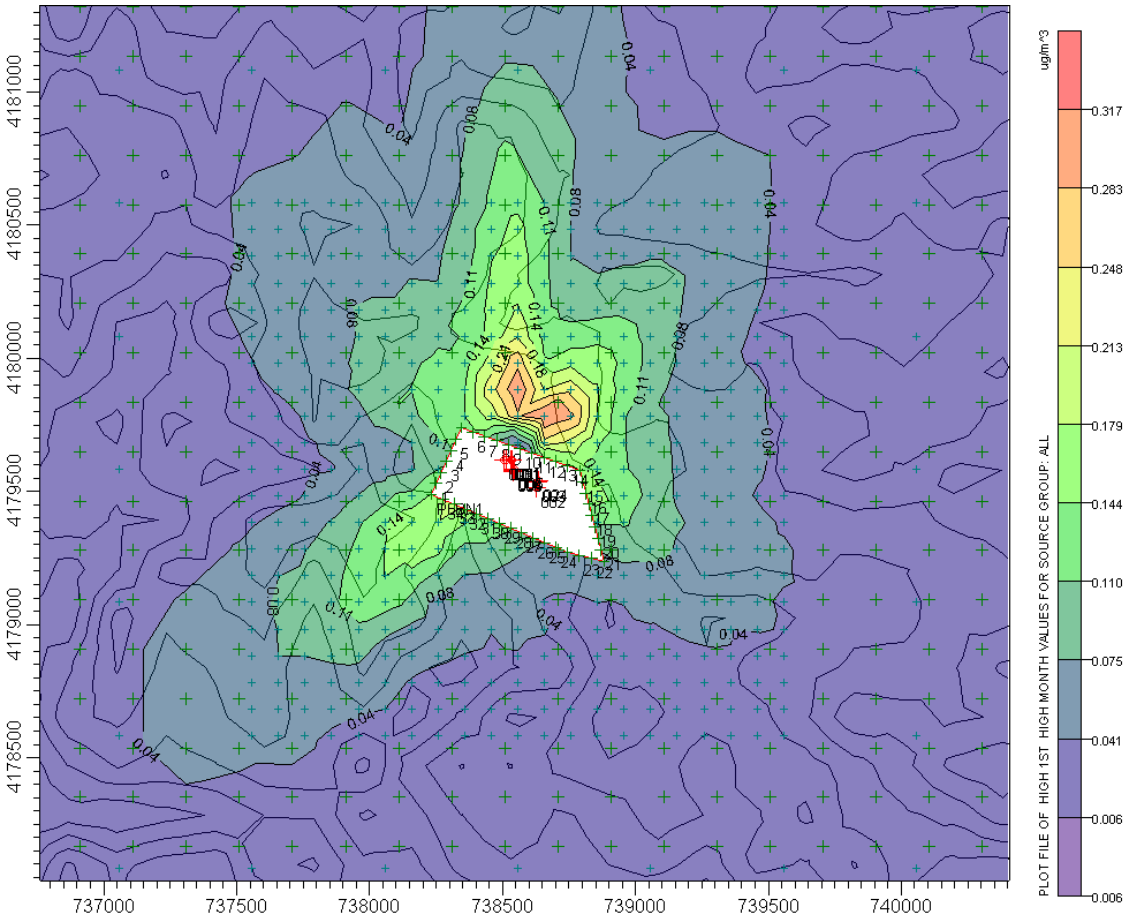


Figure 6. Enersys -Site, High 1st High Monthly Average Concentration, Entire Domain

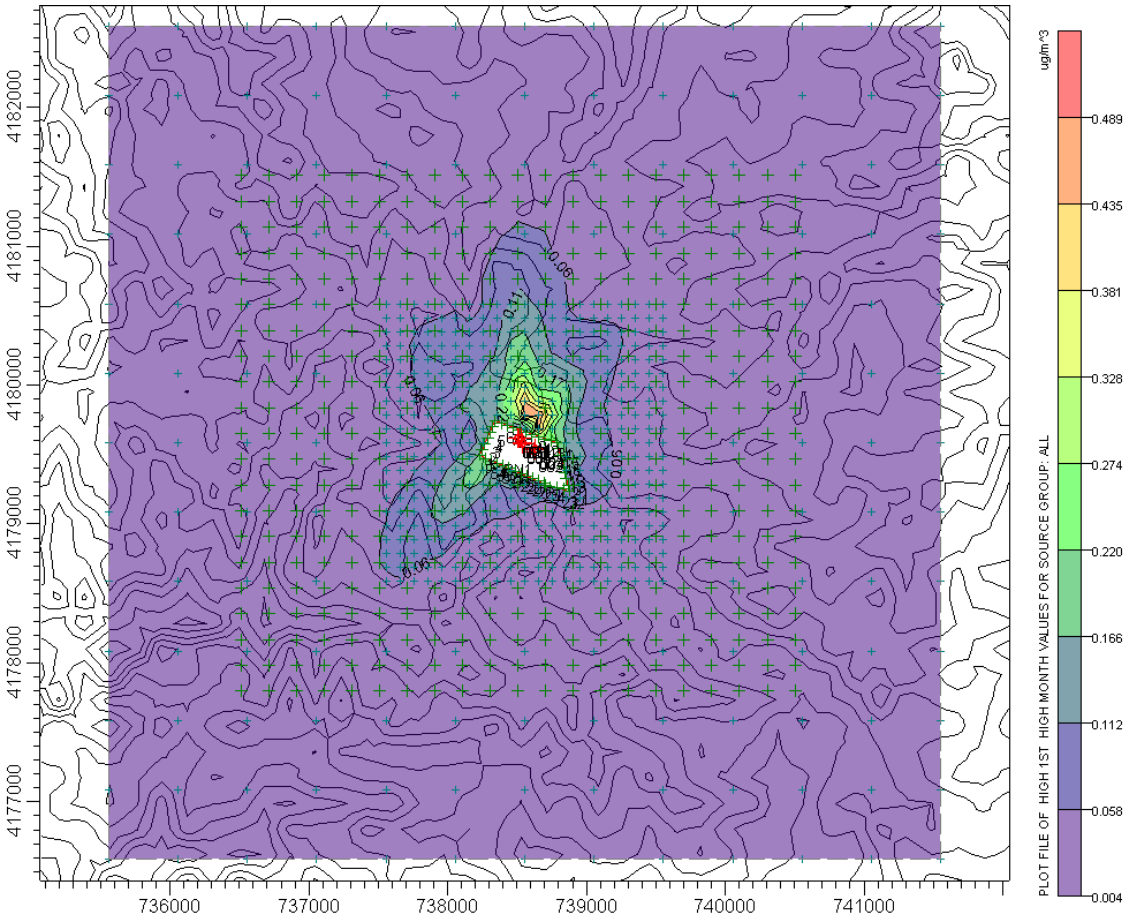


Figure 6.1 Enersys -Site, High 1st High Monthly Average Concentration, Controlling Concentration

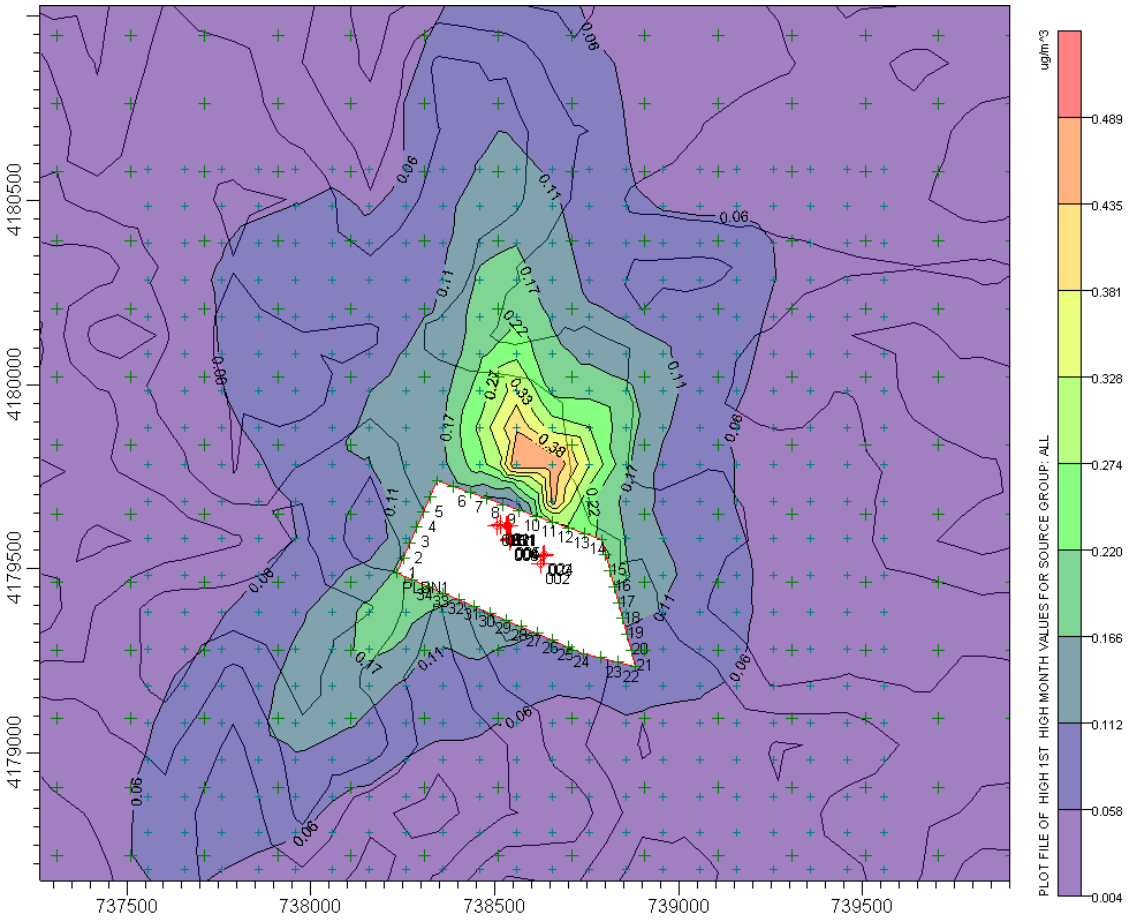


Figure 7. North American Stainless-Airport, High 1st High Monthly Average Concentration, Entire Domain

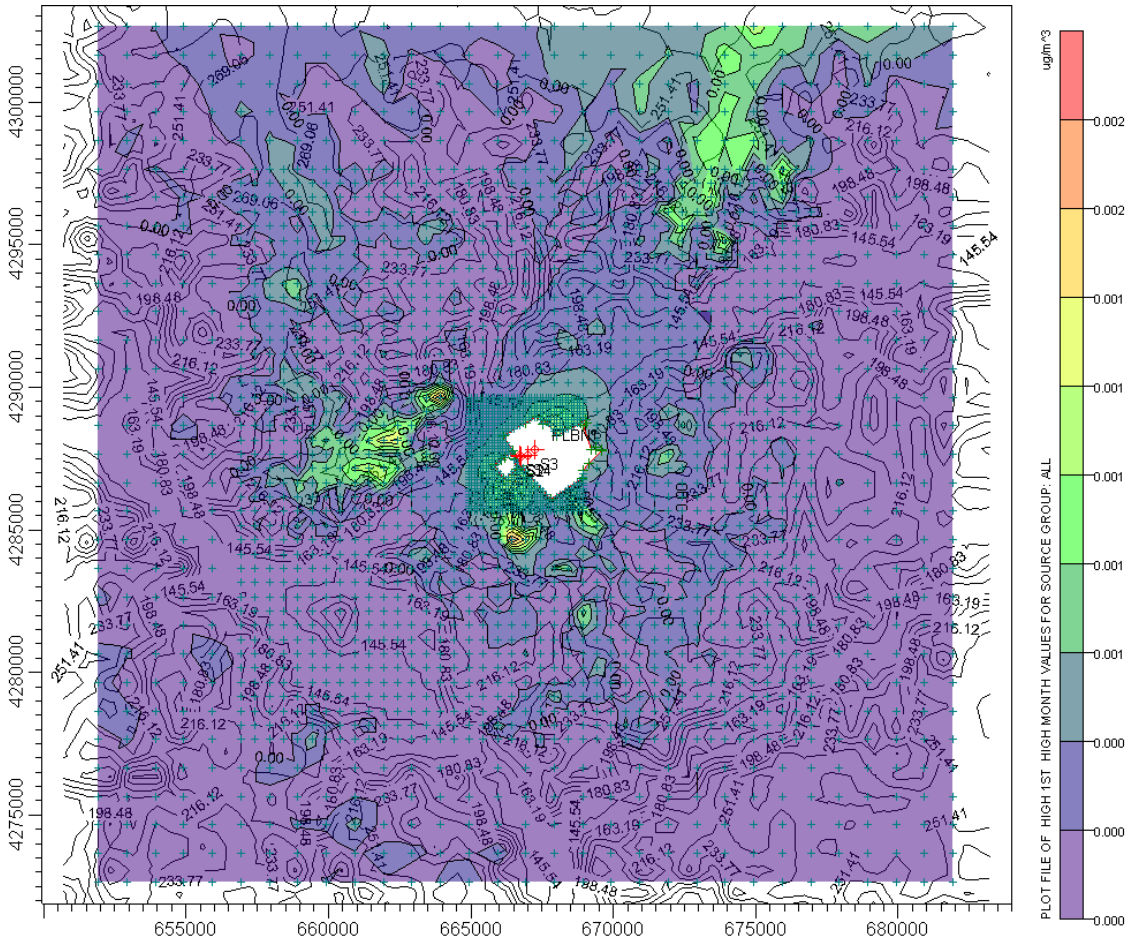


Figure 7.1 North American Stainless -Airport, High 1st High Monthly Average Concentration, Controlling Concentration

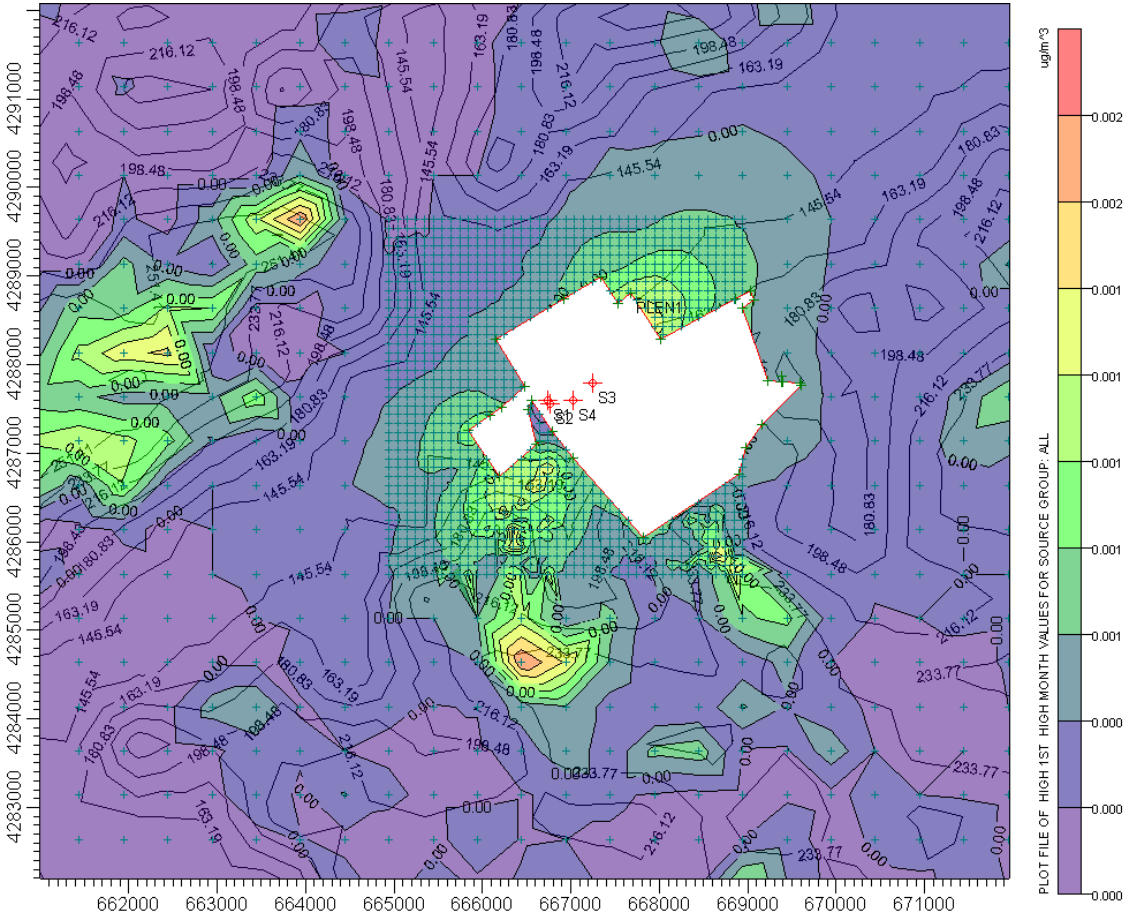


Figure 8. North American Stainless -Site, High 1st High Monthly Average Concentration, Entire Domain

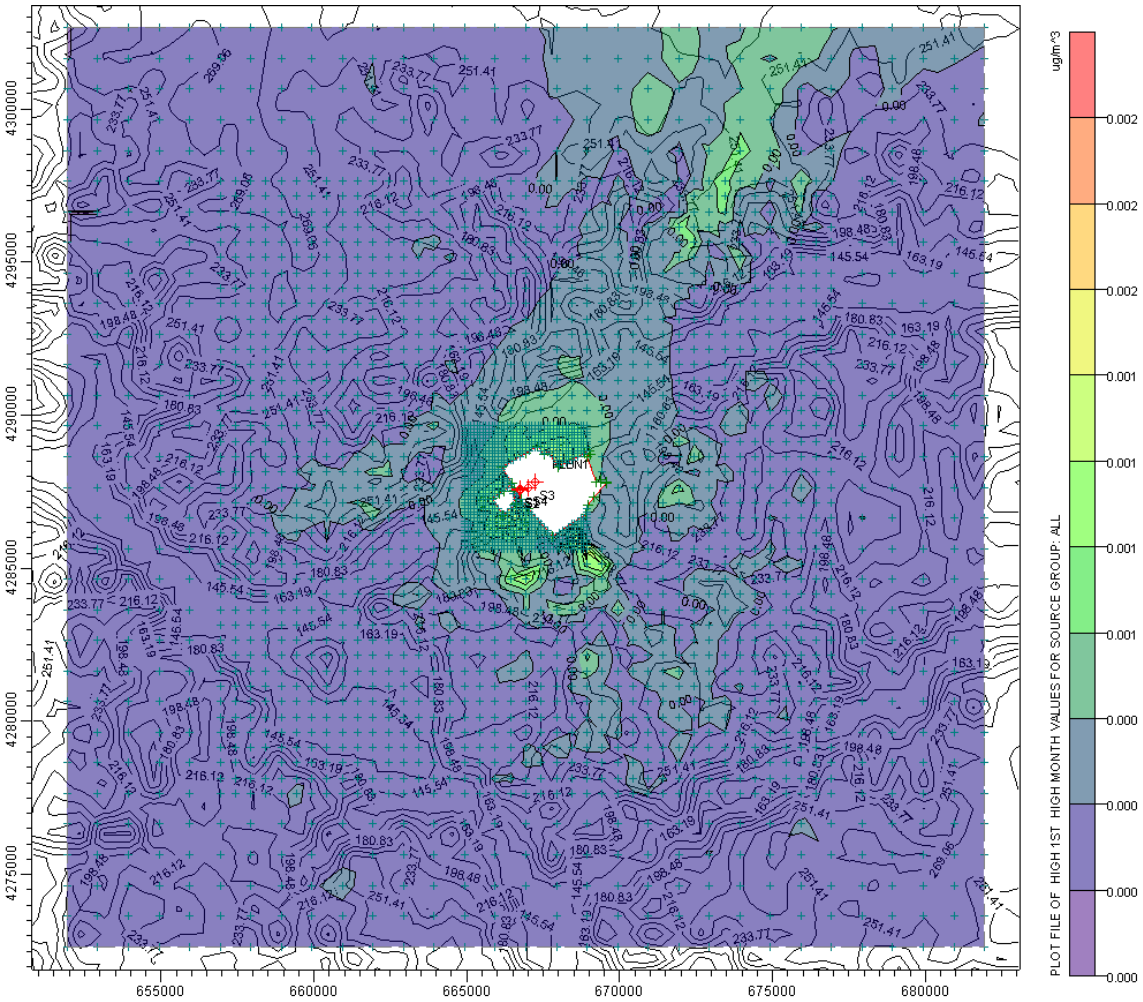


Figure 8.1 North American Stainless -Site, High 1st High Monthly Average Concentration, Controlling Concentration

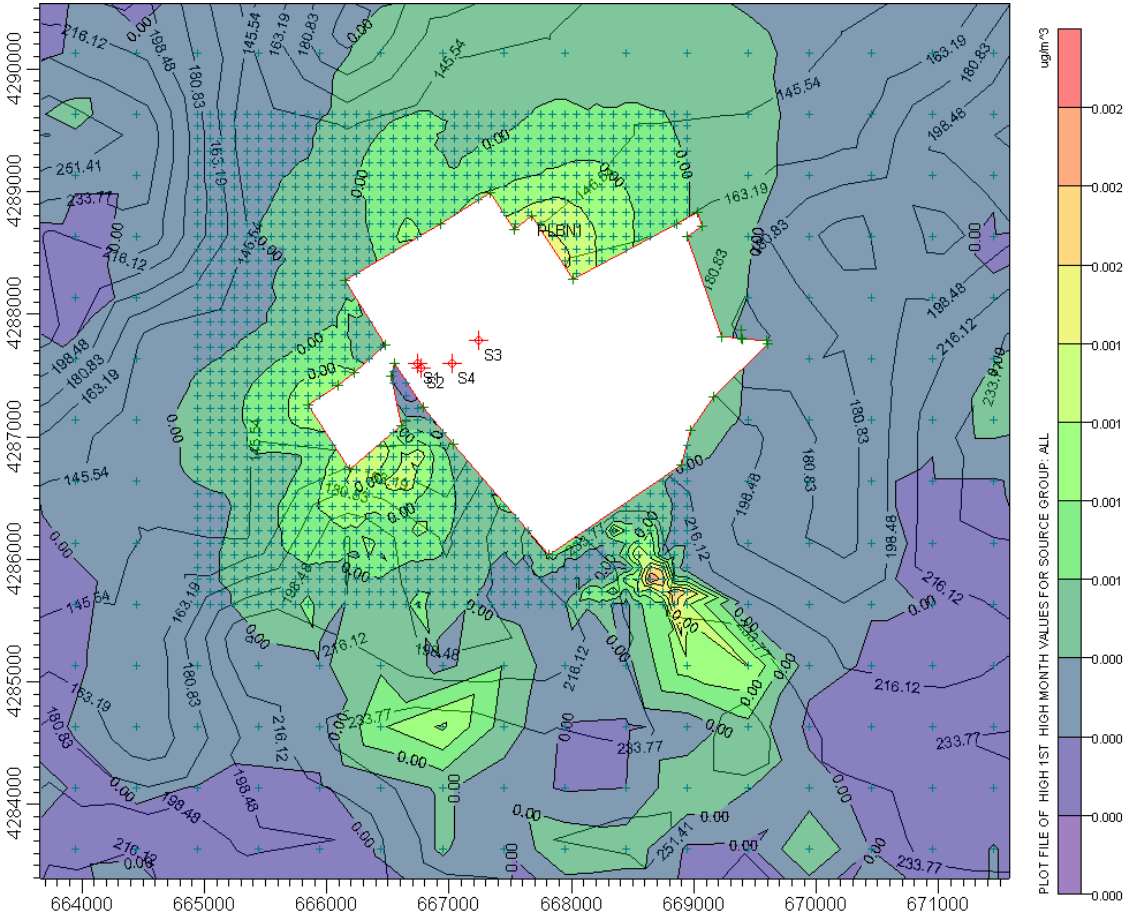


Figure 9. Newpage-Airport, High 1st High Monthly Average Concentration, Entire Domain

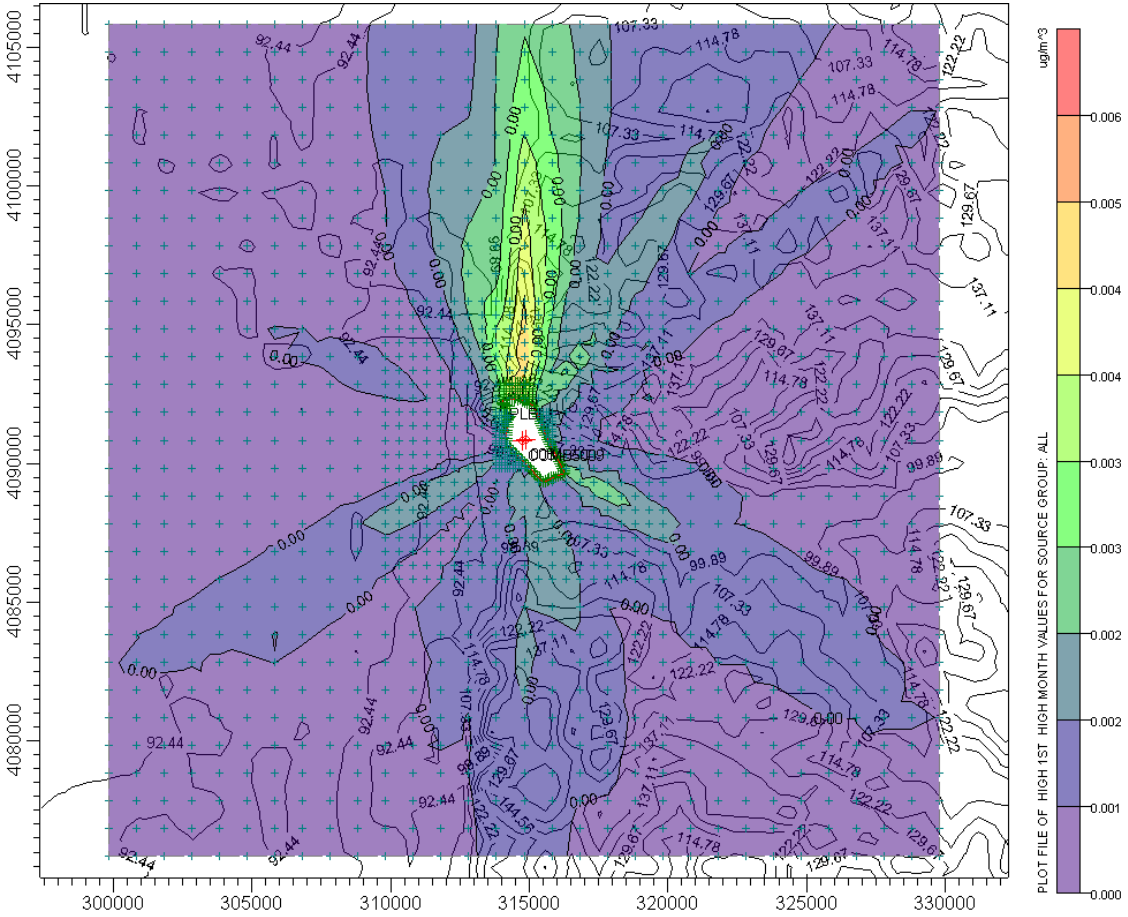


Figure 9.1 Newpage-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

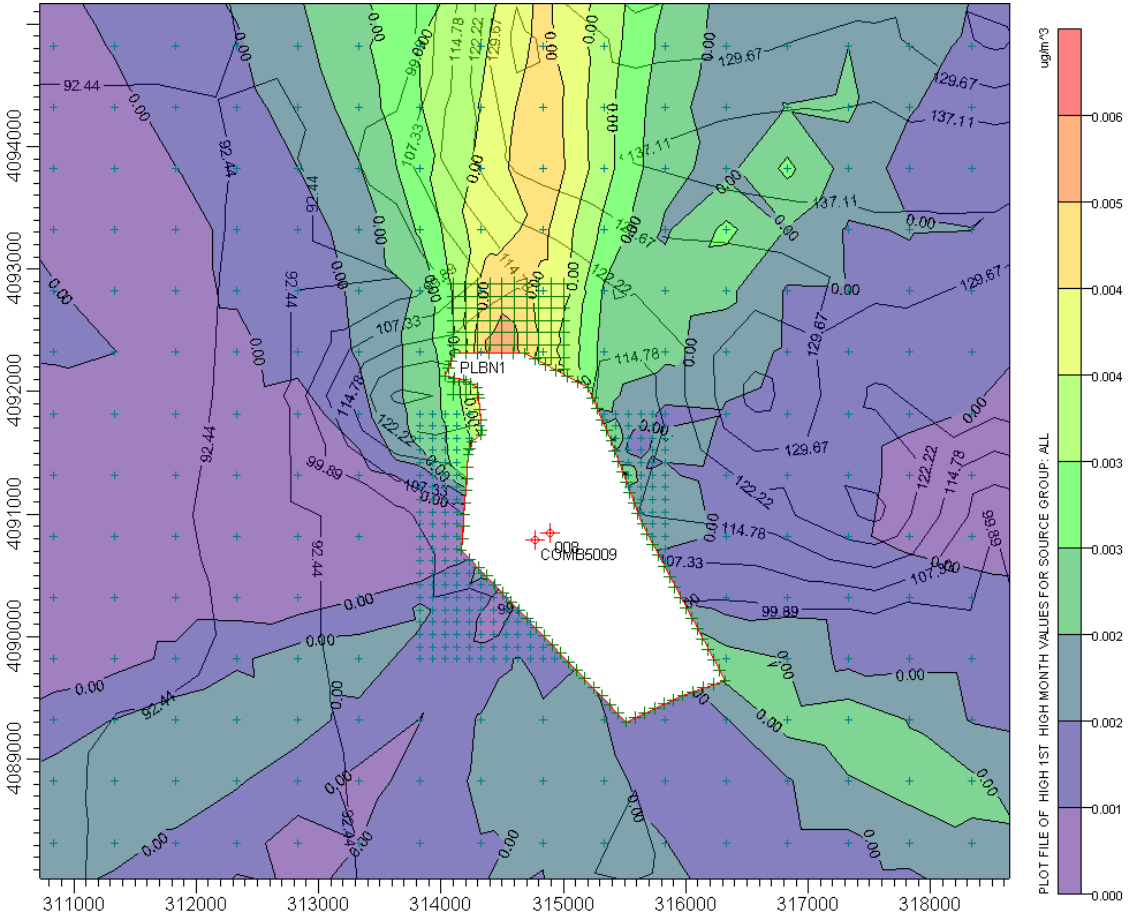


Figure 10. Newpage -Site, High 1st High Monthly Average Concentration, Entire Domain

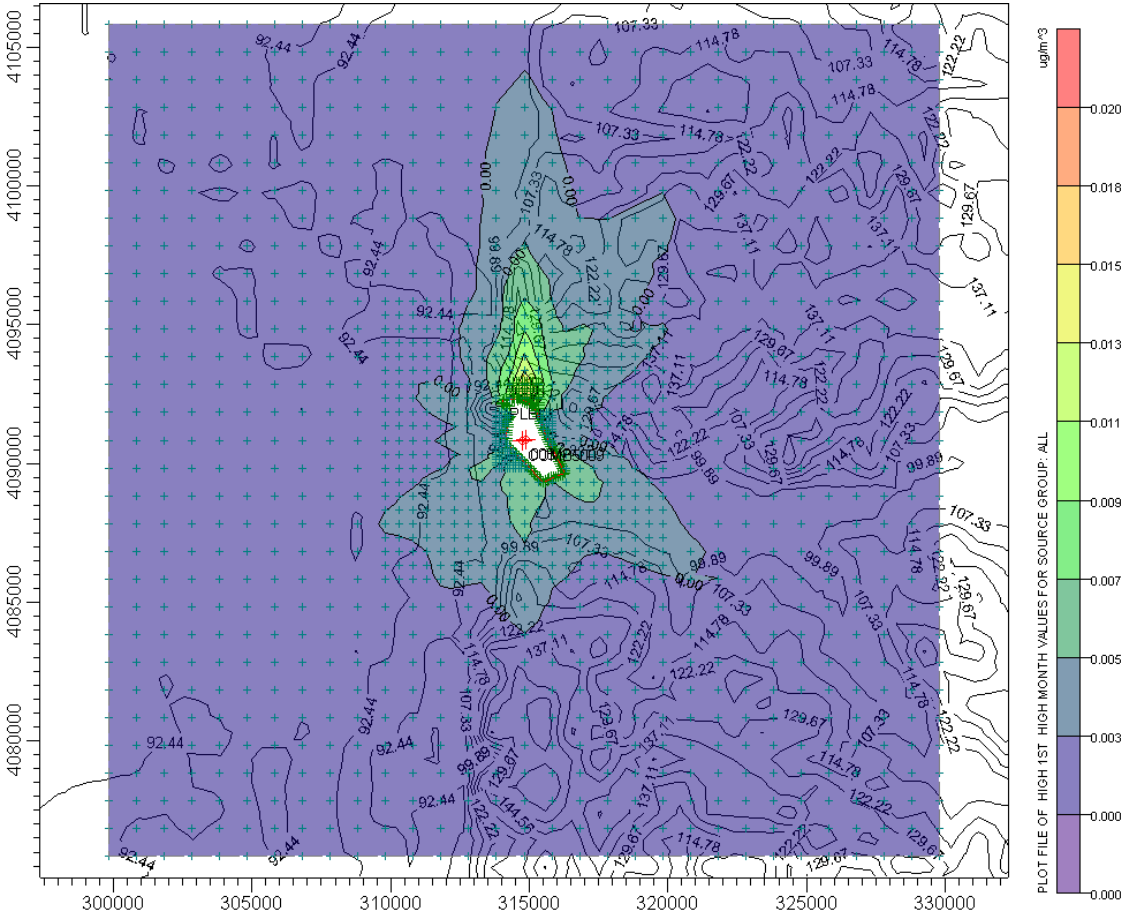


Figure 10.1 Newpage -Site, High 1st High Monthly Average Concentration, Controlling Concentration

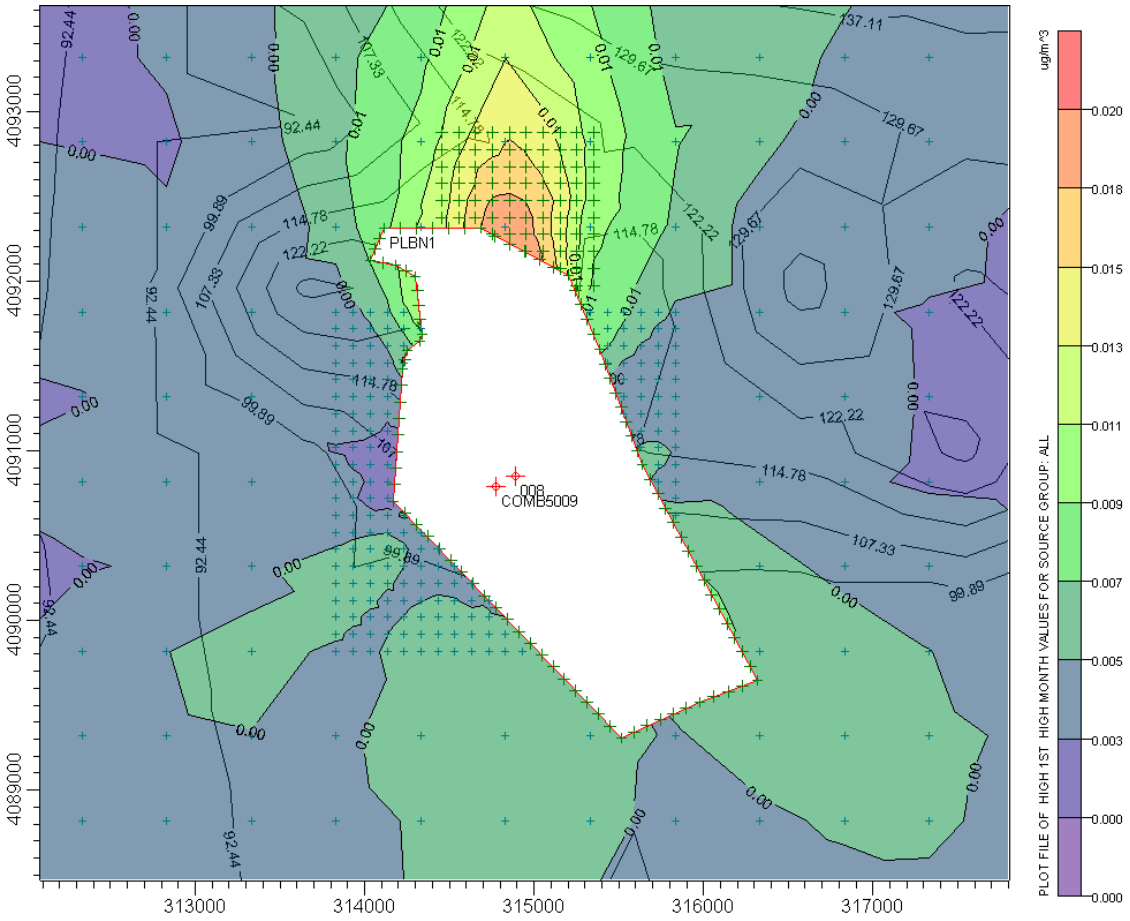


Figure 11. Superior Battery-Airport, High 1st High Monthly Average Concentration, Entire Domain

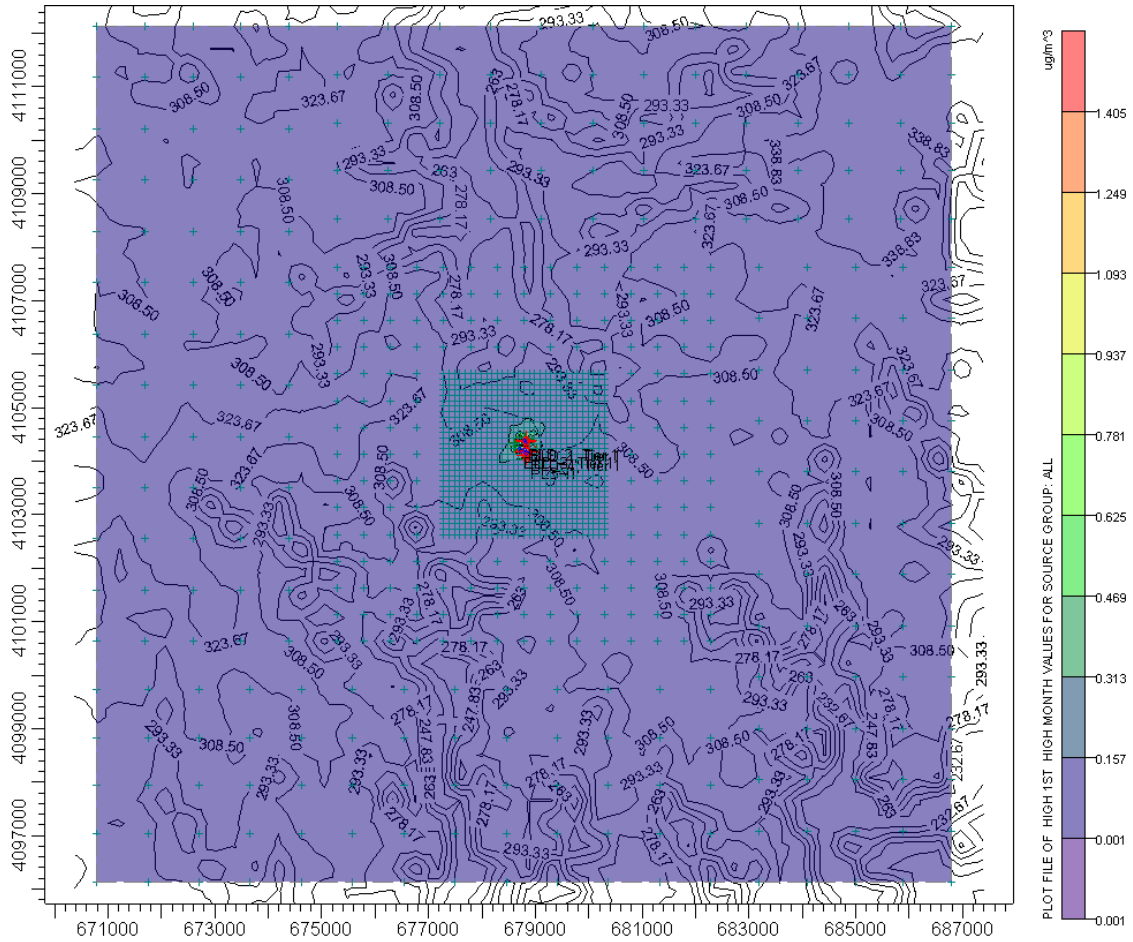


Figure 11.1 Superior Battery-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

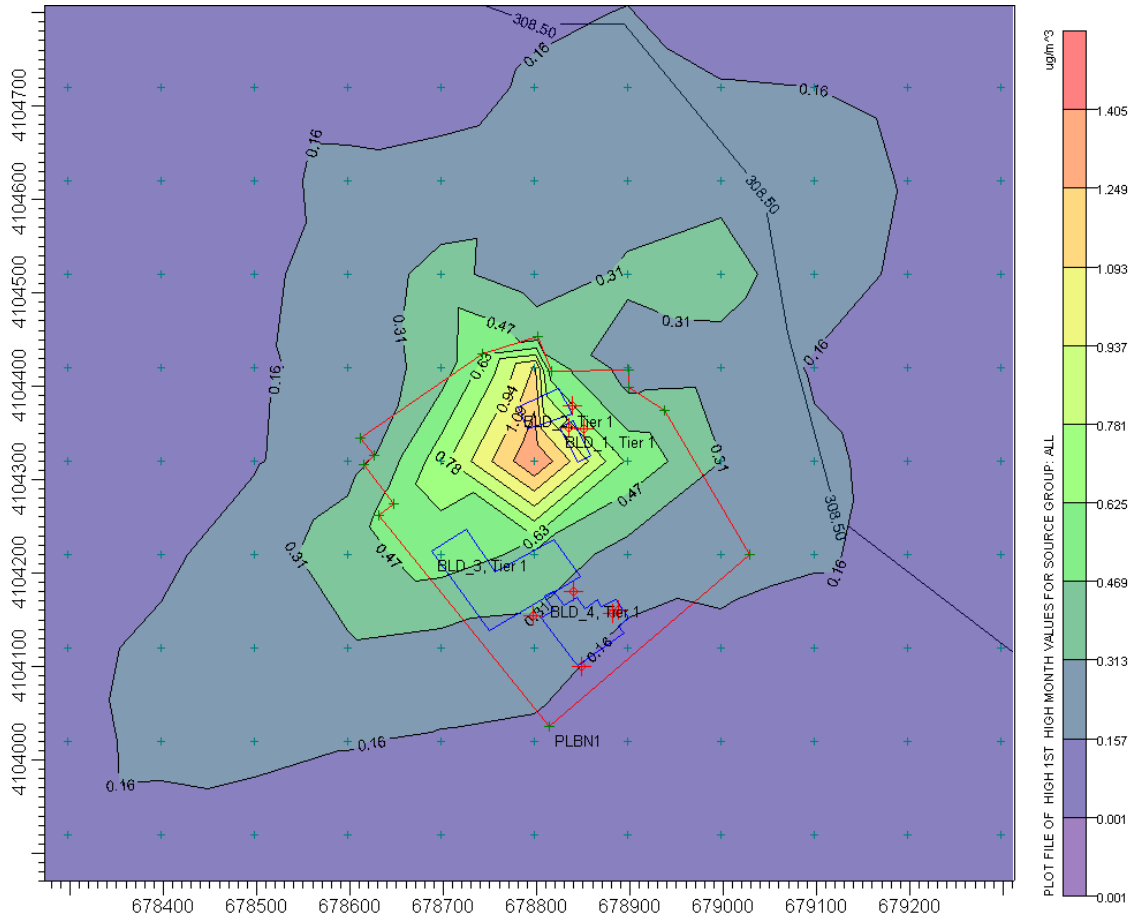


Figure 12. Superior Battery-Site, High 1st High Monthly Average Concentration, Entire Domain

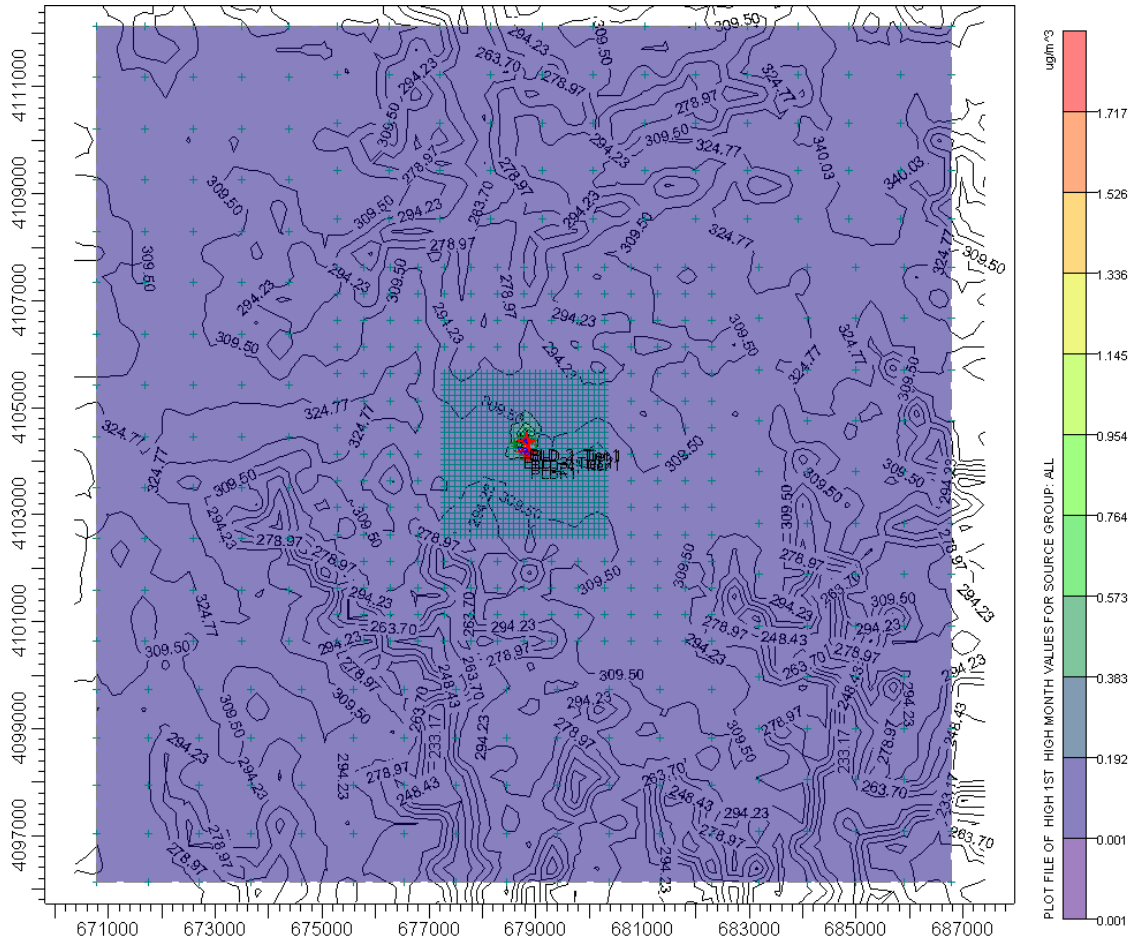


Figure 12.1 Superior Battery-Site, High 1st High Monthly Average Concentration, Controlling Concentration

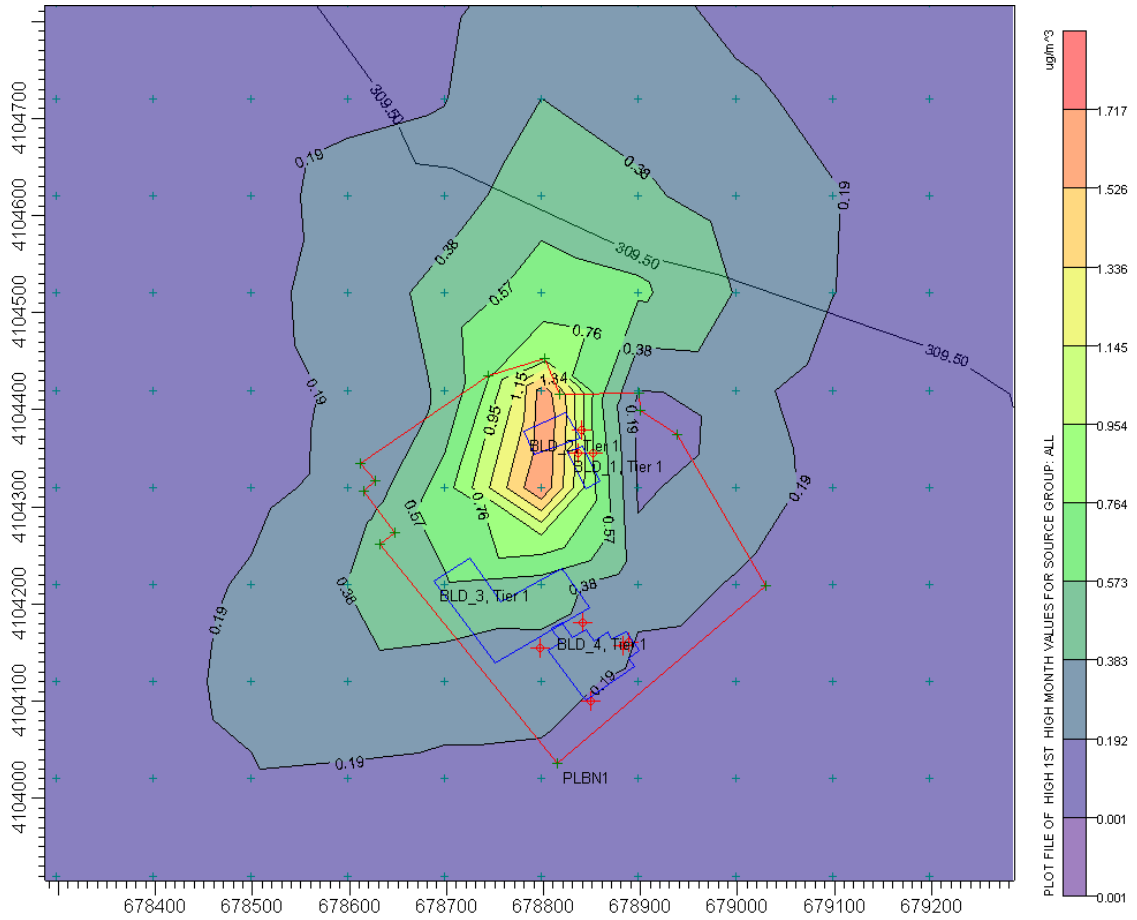


Figure 13. TVA-Airport, High 1st High Monthly Average Concentration, Entire Domain

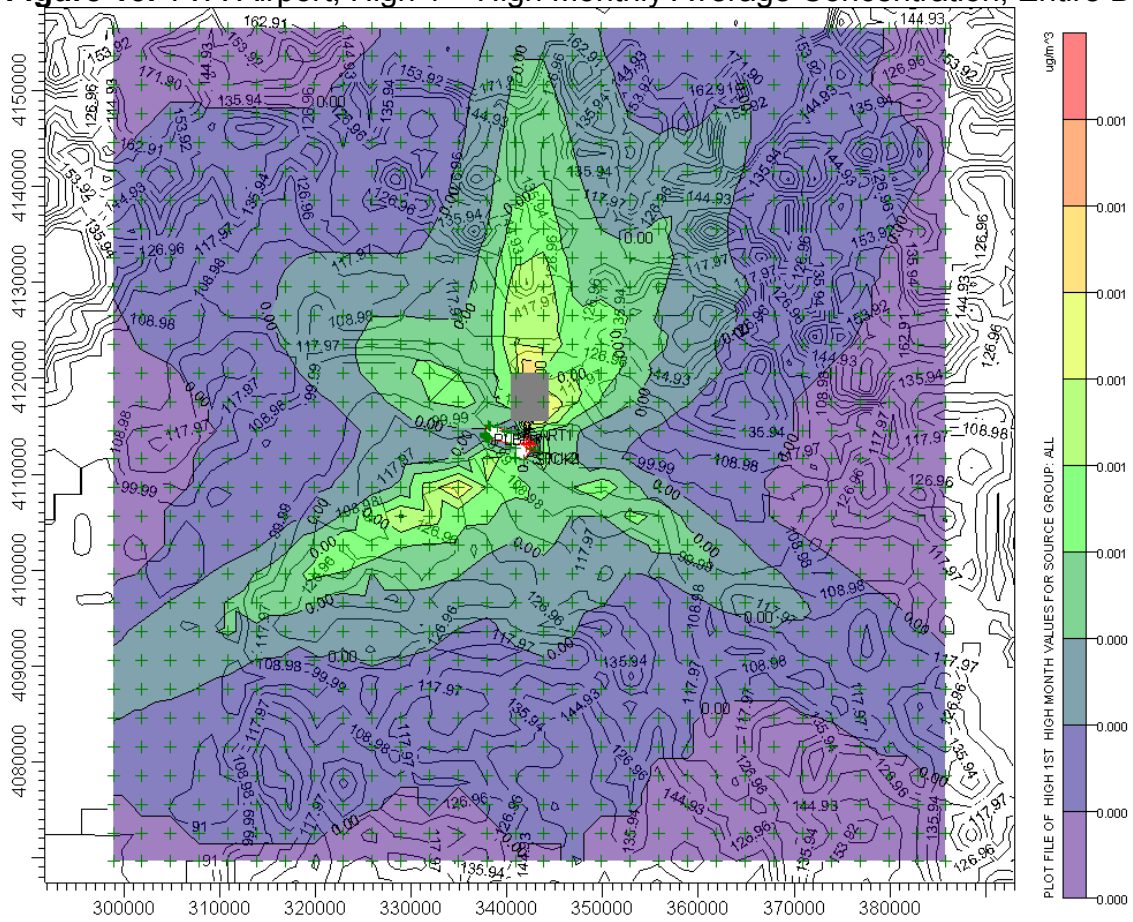


Figure 13.1 TVA-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

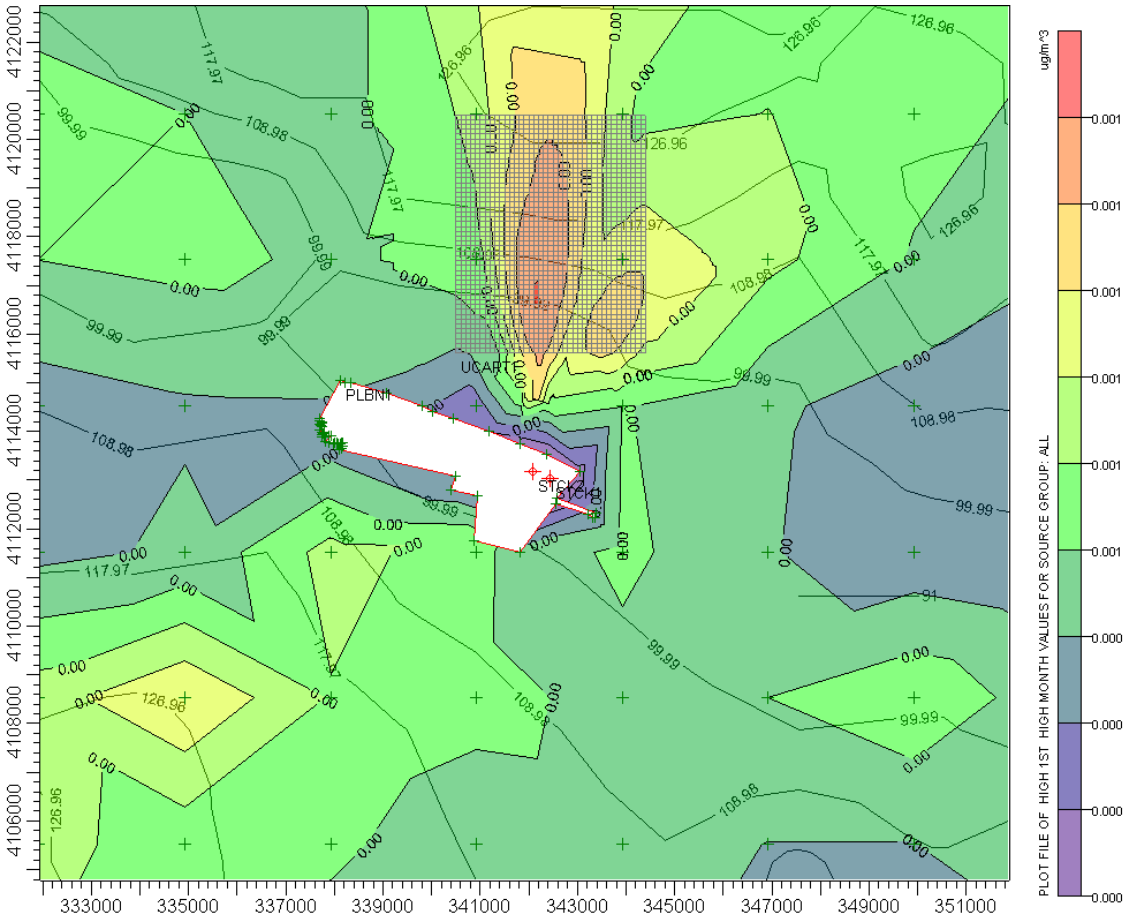


Figure 14. TVA-Site, High 1st High Monthly Average Concentration, Entire Domain

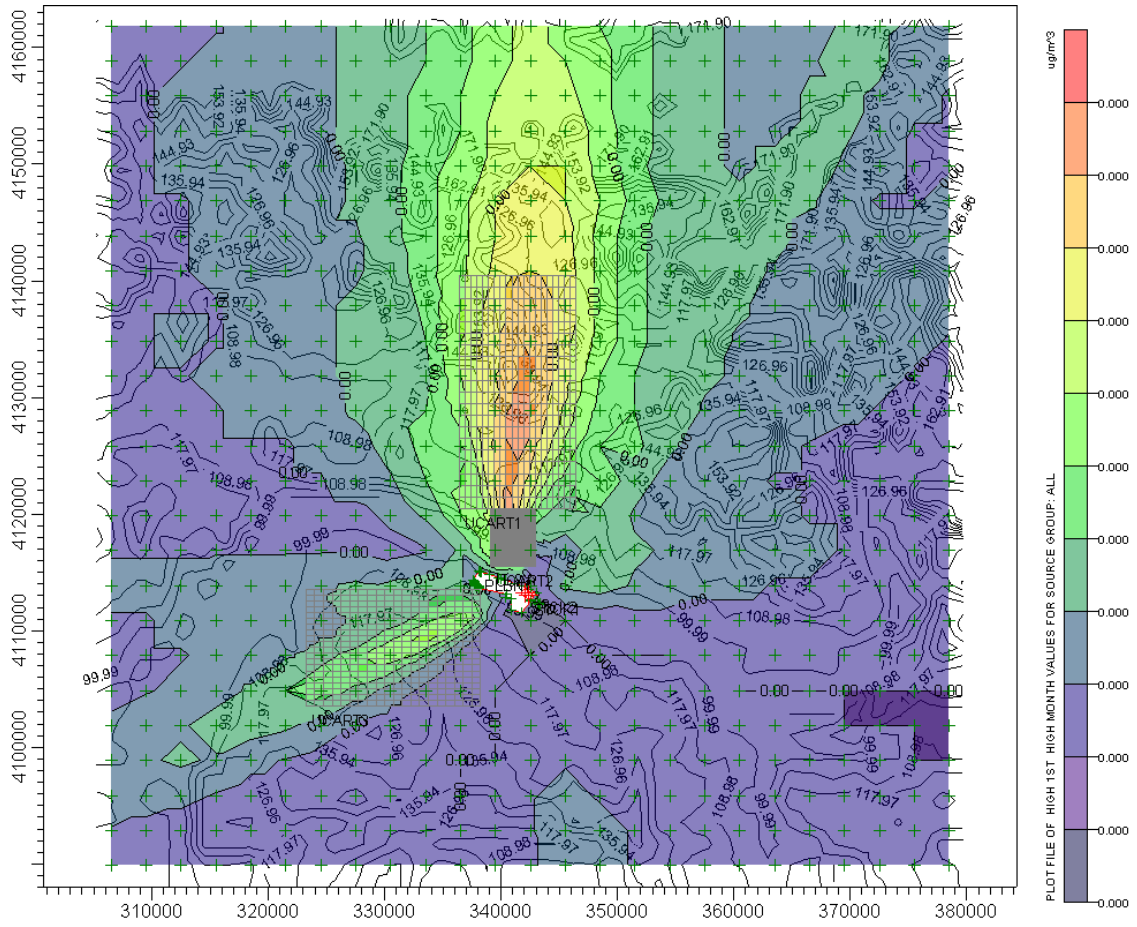
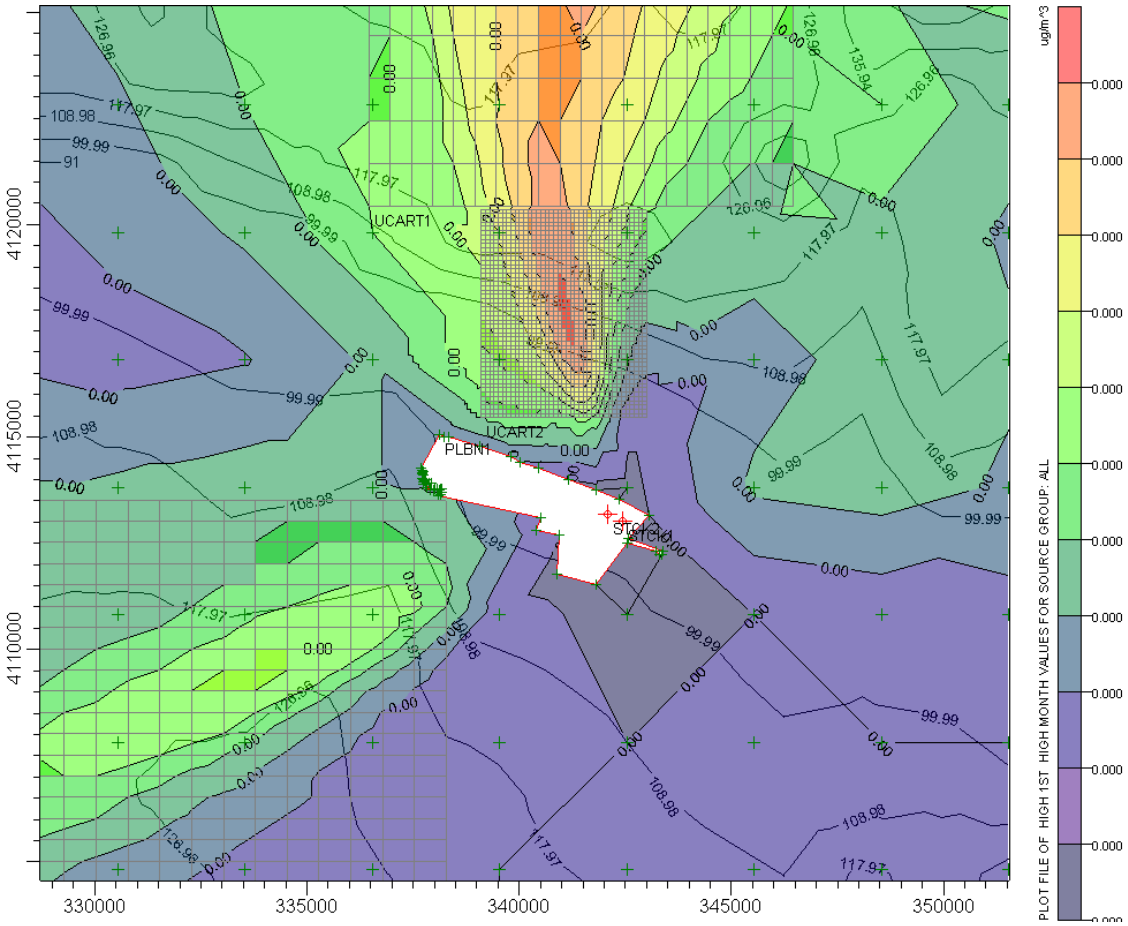


Figure 14.1 TVA-Site, High 1st High Monthly Average Concentration, Controlling Concentration



Ambient Air Monitoring Network Plan
for
Source Oriented Lead (Pb)
Request for Waiver

CBSA
Louisville-Jefferson County
KY-IN MSA

Louisville Metro Air Pollution Control District
850 Barret Avenue
Louisville, KY 40204

Prepared by:
Larry Garrison
Environmental Supervisor
Air Quality Unit
May 28, 2009

Introduction:

On November 12, 2008 the United States Environmental Protection Agency (EPA) strengthened the National Ambient Air Quality Standard (NAAQS) for lead to increase protection of public health and the environment. Since 1978 the ambient air lead standards have been set at 1.5μg/m^3 and were based on a quarterly average. The new revised standards are set at 0.15μg/m^3 for the primary (health-based) and the secondary (welfare-based) standards and are calculated using a 3-month rolling average. In conjunction with the revision of the lead NAAQS, the EPA promulgated new monitoring requirements which can be found in 40 CFR Part 58, Appendix D. One of the requirements is to evaluate the adequacy of existing source oriented lead monitoring networks and/or to determine if additional lead monitoring networks are needed. The deadline for this review and the identification of source oriented lead monitoring sites is July 1, 2009 with monitoring to begin January 1, 2010. Based on this requirement and guidance issued by EPA the Louisville Metro Air Pollution Control District (LMAPCD) has evaluated historical data as well as current emissions inventories to determine the applicability and design of a source oriented lead monitoring network in Jefferson County, Kentucky.

Wavier Provisions:

40 CFR Part 58 Appendix D, Section 4.5(ii) contains waiver provisions for source oriented lead monitoring. Monitoring may be waived for sources if the state or local agency can demonstrate that the lead source will not contribute to a maximum lead concentration in ambient air in excess of 50% of the NAAQS (0.075μg/m^3). This demonstration may be based on historical monitoring data, modeling, or other means.

Evaluation of Historical Data:

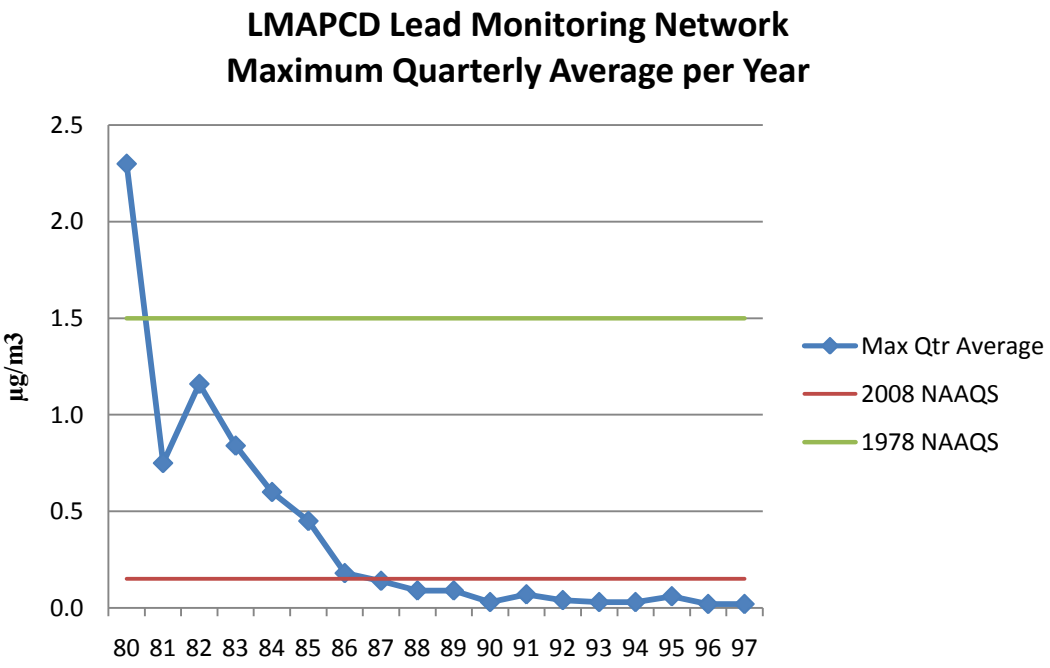
LMAPCD operated a lead monitoring network designed to monitor mobile and facility emissions during the period of (1980-1997). The monitoring was conducted according to the methods listed in 40 CFR Part 50 Appendix G *Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air.* Removal of lead from automotive gasoline and the installation of particulate control systems at facilities resulted in a sharp decline in lead emissions and as measured levels declined the monitoring network was reduced to just two sites in 1988. Based on recommendations made by EPA and the fact that measured levels were significantly below the NAAQS, LMAPCD discontinued lead monitoring in 1997 to free up resources for the upcoming $PM_{2.5}$ monitoring program. Table 1 and Chart 1 provide a summary of the data collected by that network. Although the averaging method used for the old standard is different the data indicate that at the end of the lead monitoring program, the maximum quarterly averages were approximately 13% of the new NAAQS.

Table 1
Lead: Monitoring History
Values are maximum quarterly averages ($\mu g/m^3$)

Site	Location	Sampling Year																	
		80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
6028	Shivley	1.2	0.47	0.40	0.30	0.17	0.11	0.08	-	-	-	-	-	-	-	-	-	-	-
6035	Sanders	0.6	0.26	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-
6036	Lake Dreamland	0.9	0.18	0.40	0.16	0.16	0.10	0.08	-	-	-	-	-	-	-	-	-	-	-
6038	Okolona	2.3	0.75	1.16	0.69	0.49	0.35	0.16	0.09	-	-	-	-	-	-	-	-	-	-
6038	Okolona(c)	-	-	-	-	-	0.38	0.16	0.10	-	-	-	-	-	-	-	-	-	-
6050	Floyd & Jefferson	2.3	0.49	0.89	0.55	0.41	0.38	0.16	0.14	-	-	-	-	-	-	-	-	-	-
6052	Deer Park	1.6	0.41	0.60	0.33	0.23	0.24	0.09	-	-	-	-	-	-	-	-	-	-	-
6054	Bates	0.4	0.13	0.31	0.13	0.10	0.09	0.05	0.02	-	-	-	-	-	-	-	-	-	-
6055	WLKY	1.3	0.37	0.62	0.32	0.19	0.19	0.09	-	-	-	-	-	-	-	-	-	-	-
6058	Buechel	1.3	0.39	0.44	0.41	0.24	0.17	0.08	0.06	-	-	-	-	-	-	-	-	-	-
6059	Portland	1.6	0.43	0.45	0.42	0.28	0.21	0.12	0.08	-	-	-	-	-	-	-	-	-	-
6061	Valley Village	1.5	0.42	0.79	0.39	0.26	0.21	0.10	0.07	-	-	-	-	-	-	-	-	-	-
6063	Saint Matthews	1.6	0.48	0.62	0.44	0.26	0.20	0.10	0.07	-	-	-	-	-	-	-	-	-	-
6099	Boy Scouts	-	-	0.94	0.84	0.60	0.45	-	-	-	-	-	-	-	-	-	-	-	-
6101	Southwick	-	-	-	0.38	0.27	0.19	0.09	0.07	-	-	-	-	-	-	-	-	-	-
6101	Southwick (c)	-	-	-	-	-	0.19	0.09	0.07	-	-	-	-	-	-	-	-	-	-
6102	Wyandotte	-	-	-	0.49	0.47	0.34	0.18	0.09	0.09	0.09	0.01	0.04	0.02	0.03	0.02	0.06	0.01	0.01
6106	Riverport	-	-	-	-	-	-	0.06	0.06	-	-	-	-	-	-	-	-	-	-
6107	St. Stephens	-	-	-	-	-	-	-	-	-	0.00	0.01	0.06	0.04	0.03	0.03	0.05	0.02	0.02
6107	St. Stephens (c)	-	-	-	-	-	-	-	-	-	0.00	0.03	0.07	0.03	0.03	0.02	0.05	0.02	0.02

(c)- co-located sampler

Chart 1:



West Jefferson Air Toxics Study

From April 2000-April 2001, LMAPCD conducted an air toxics study for West Jefferson County. A component of that study was the collection of metals which included lead. Samples were collected every 12 days using the Hi-Volume method prescribed in 40 CFR Part 50 Appendix G. The samples were analyzed at EPA's Science and Ecosystem Support Division (SESD) laboratory in Athens, Georgia using ICP/MS. According to SESD the typical detection limit using this method was 0.0006024µg/m^3. Table 2 contains a summary of the 3-month rolling averages from that data. The numbers in **Bold** are the maximum 3-month rolling average values for each site. The maximum 24-hour value recorded was 0.035µg/m^3.

Table 2: Lead Results from West Jefferson Air Toxics Study
(Results are 3 month rolling averages in µg/m^3)

Sampling Period	Ralph Avenue 21-111-0054	Lake Dreamland 21-111-0055	St. Stephens Church 21-111-0056	Shelby Campus 21-111-0057	Firearms Training 21-111-1014
04-06/2000	.0083	.0093	.0133	-	.0012
05-07/2000	.0090	.0081	.0113	.0066	.0103
06-08/2000	.0106	.0079	.0124	.0048	.0091
07-09/2000	.0084	.0070	**.0189**	.0039	.0088
08-10/2000	.0121	.0093	.0129	.0083	.0149
09-11/2000	.0167	.0142	.0143	.0134	**.0199**
10-12/2000	**.0174**	**.0155**	.0133	**.0138**	.0194
11-01/2000-2001	.0150	.0136	.0125	.0124	.0163
12-02/2000-2001	.0103	.0106	.0121	.0089	.0138
01-03/2001	.0105	.0103	.0123	.0072	.0129
02-04/2001	.0083	.0115	.0149	.0048	.0078

Identification of Lead Sources:
40 CFR Part 58, Appendix D, Section 4.5(a) requires monitoring at sources that emit 1.0 ton per year (tpy) or more of lead to the air. Monitoring agencies must use the most recent National Emissions Inventory (NEI) data or other scientifically justifiable methods and data to determine if a facility emits more than 1.0 tpy. Based on a review of the latest National Emissions Inventory data, 2006-2007 local inventory data and a review of the 2006-2007 Toxics Release Inventory (TRI) data, LMAPCD has identified the Louisville Gas & Electric Mill Creek facility as the only source in Jefferson County that emits more than 1.0 tpy of lead to the air. The 2005 NEI data for LG&E Mill Creek indicates their emissions were 0.97 tpy.

Table 3: Lead Sources in Jefferson County (tpy)

Facility Name	2006 LMAPCD inventory	2007 LMAPCD inventory
LG&E Mill Creek	0.94	**1.01**
LG&E Cane Run	0.35	0.35
Oxy Vinyls LP	0.11	0.13
Kosmos Cement Co.	0.11	0.108
Industrial Container Services	0.136	0.019
Bluegrass Cooperage	0.000	0.00498
Poly One	0.028	0.004

Modeling Parameters:

Using guidance provided in EPA's "Technical Note-Dispersion Modeling for Lead (Pb) Sources" LMAPCD conducted dispersion modeling for the Mill Creek facility using the AERMOD model for near-field dispersion. The modeling performed relied on five years of meteorological data taken from the most representative surface and upper air meteorological stations. For surface, meteorological data for years 1989-1993 from the Louisville International Airport were used. The airport is approximately 18 km north east of the facility and has similar topography. For upper air, meteorological data for 1989-1993 were used from the Dayton Wright Patterson Air Force Base. The 1989-1993 data sets were used because they were the most complete.

Source Pathway –Source Inputs

The LG&E Mill Creek facility is a coal fired electric utility that uses 4 commercial boilers (units) for generation of electricity via steam turbines and generators. The combined generating capacity of the 4 units is approximately 1,610 MW. Most of the lead emissions are attributed to the combustion of coal and the annual emission rates were calculated using updated throughputs and AP-42 emission factors for controlled coal combustion sources. Each unit utilizes emissions control equipment consisting of an electrostatic precipitator, a sulfur dioxide removal system and a dry centrifugal dust collector for the coal bunker. The final emission points are four individual stacks that are approximately 182 meters high. Table 4 contains the source inputs for each stack.

Table 4: Source Inputs

Source Type	ID	X coordinate (m)	Y coordinate (m)	Base elevation	Release Height (m)	Emission rate (g/s)	Gas Exit Temp (K)	Gas Exit velocity (m/s)	Stack Inside Diameter (m)
Point	STCK1	595606.79	4212148.98	0.00	182.88	0.14460	325.37	19.46	4.72
Point	STCK2	595606.10	4212191.80	0.00	182.88	0.12980	327.04	21.08	4.72
Point	STCK3	595600.37	4212287.52	0.00	182.88	0.18580	327.04	19.98	5.52
Point	STCK4	595602.65	4212307.55	0.00	182.88	0.24000	324.82	22.45	5.94

Other inputs used in the model were:

- Averaging time was set to one month to facilitate the calculation of a three month rolling average and to use the lead post processor provided by EPA.
- The toxics non default option was chosen to access the total deposition output.
- For source pathway "particulate" was chosen for gas and particle deposition.
- Based on the assumption that only a small fraction (<10%) of the mass is greater than 10 microns, Method 2 was selected for handling particle deposition by total particulate mass.
- Particle inputs for Method 2 consisted of the fine particle fraction equaling 0.75 and the mass mean particle diameter equaling 0.5 microns.
- No volume sources were specified.
- No area sources were specified.
- No open pit sources were specified.
- No circular area sources were specified.

- No polygon area sources were specified.
- No flare sources were specified.
- No line sources were specified.
- Flat terrain was assumed for the entire modeling domain.

Results and Discussion:

Although the historical monitoring data collected in 1980-1997 used a different averaging method, the evaluation of that data indicates that the measured values were significantly below 0.15μg/m^3 at the time monitoring was terminated in 1997. The evaluation of the lead results from the (2000-2001) West Jefferson County Air Toxics Study also indicates measured values significantly below the new standard. These results were compiled using the 3-month rolling average that applies to the new standard.

The modeling results for Mill Creek indicate that the maximum 1-month average was 0.01914μg/m^3. Using the post processor provided by EPA the overall maximum 3-month concentration was 0.01μg/m^3. This is substantially below the 50% NAAQS threshold of 0.075μg/m^3 and is consistent with the historical measured values indicated in Tables 1 and 2. The plots of the high month values for the source as well as the output files for the maximum 3-month average concentration are attached.

Conclusion:

Based on historical monitored data and the modeling results, LMAPCD has demonstrated that a source oriented lead monitoring network is not warranted and **requests a waiver** for monitoring at the LG&E Mill Creek facility. Should the waiver be granted, LMAPCD will renew the waiver request during each 5 year network assessment required by 40 CFR Part 58.10(d). LMAPCD will also review emissions inventory data during its annual network review to determine if significant changes in lead emissions occur.

APPENDIX D

Public Comment

NOTICE OF PUBLIC COMMENT PERIOD
KENTUCKY DIVISION FOR AIR QUALITY
AMBIENT AIR MONITORING NETWORK

In accordance with 40 C.F.R. 58.10(a)(1), the Kentucky Energy and Environment Cabinet will make the annual monitoring network plan available for public inspection for at least 30 days prior to submission to the U.S. EPA. The annual monitoring network plan details the operation and location of ambient air monitors operated by the Kentucky Division for Air Quality, Louisville Metro Air Pollution Control District, and the National Park Service.

The public comment period relating to the annual monitoring network will begin May 29, 2009, and will conclude on June 28, 2009. Copies of the annual monitoring plan are available for public inspection at the locations listed below. Any individual requiring copies may submit a request to the Division for Air Quality in writing, by telephone, by FAX, or by electronic mail. Requests for copies should be directed to the contact person. In addition, an electronic version of the proposed annual monitoring network plan and relevant attachments can be downloaded from the Division for Air Quality's website at:

http://www.air.ky.gov/homepage_repository/Public+Notices.htm

Again, to be considered part of the record, comments must be received by June 28, 2009. Comments should be sent directly to the contact person.

CONTACT PERSON: Andrea P. Keatley, Environmental Scientist II, Division for Air Quality, 200 Fair Oaks Lane, 1st Floor, Frankfort, Kentucky 40601. Phone: (502) 564-3999; FAX: (502) 564-4666; email: Andrea.Keatley@ky.gov

The Energy and Environment Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities.

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Ashland, KY 41102-8942

Bowling Green Regional Office
1508 Westen Avenue
Bowling Green, KY 42104

Frankfort Regional Office
663 Teton Trail, Suite B
Frankfort, KY 40601-1758

Hazard Regional Office
233 Birch Street, Suite 2
Hazard, KY 41701-2179

London Regional Office
875 S Main Street
London, KY 40741

Paducah Regional Office
130 Eagle Nest Drive
Paducah, KY 42003-0823

Florence Regional Office
8020 Veterans Mem Dr, Suite 110
Florence, KY 41042

Owensboro Regional Office
3032 Alvey Park Dr, Suite 700
Owensboro, KY 42303-2191

SCOPE

Shelby County Organized for Preservation and Enhancement, Inc.

4404 Cropper Road, Shelbyville, KY 40065

Reggie Van Stockum
President
502-633-3813

Ted Thomas
Vice President & Secretary
502-633-9529

Flora Sherrod
Treasurer
502-633-9505

June 18, 2009

Via U.S. Mail and
Email: Andrea.keatley@ky.gov

Andrea P. Keatley
Kentucky Energy and Environment Cabinet
Division for Air Quality
200 Fair Oaks Lane
Frankfort, KY 40601

RE: Public Comment on the Kentucky Ambient Air Monitoring Network

Dear Ms. Keatley:

Shelby County Organized for Preservation and Enhancement, Inc. (SCOPE) is a not-for-profit citizens' group in Shelby County, Kentucky. SCOPE offers the following comment to the Kentucky Division of Air Quality's (DAQ) Public Notice relating to its Ambient Air Monitoring Network.

SCOPE has examined DAQ's proposed Ambient Air Quality Monitoring Plan. SCOPE notes that there are multiple monitoring stations in Jefferson County, Oldham County and Bullitt County, Kentucky. There appear, however, to be no such stations existing in (or proposed for) Shelby County, Kentucky.

Shelby County, Kentucky is immediately adjacent to the east of Jefferson County, Kentucky, has a significant industrial base, and is bisected by Interstate I-65.

SCOPE wishes to preserve and enhance the quality of the air in Shelby County. SCOPE believes that air-monitoring stations similar to those found in Jefferson, Bullitt and Oldham Counties should be established in Shelby County for that purpose.

Thank you for your consideration of these comments.

Sincerely,

Ronald R. Van Stockum, Jr.
President, SCOPE

cc: SCOPE Board of Directors
John Lyons, DAQ

Paducah Area
CHAMBER OF COMMERCE

June 17, 2009

Andrea P. Keatley
Environmental Scientist II
Kentucky Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601

RE: Public Comment
Kentucky Division for Air Quality
Ambient Air Monitoring Network

Dear Ms. Keatley:

On behalf of the Board of Directors of the Paducah Area Chamber of Commerce, thank you for making the Division's Air Quality Monitoring Plan available for public review and comment.
The Paducah Commerce feels that monitoring the current status of air quality and reporting an area's progress on meeting the National Ambient Air Quality Standards is important to our community and to the Commonwealth.

However, we are not sure if the Division is aware that the Paducah Middle School located at 342 Lone Oak Road in Paducah is in the process of deciding on a site for a new school building. Currently, AQS Site ID 21-145-1004 Air Quality Monitor is located on the roof of the Paducah Middle School. If the Paducah Middle School decides to move, we feel the viability of an unoccupied building as an air monitoring site becomes questionable.

Although the move is not scheduled to occur prior 2012, we would suggest that the Division start the process to select an alternate site for this monitor.

The contact for the Paducah City School System is Mr. Troy Brock at 270-444-5600.

If the Chamber can be of assistance in relocating this monitoring location, please contact Chamber President Elaine Spalding at 270- 443-1746 x 205 or e-mail espalding@paducahchamber.org

Sincerely,

Susan Guess

Susan Guess
Chair of the Board

PADUCAH Kentucky
Art, Rhythm & Rivers
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Kentucky UNBRIDLED SPIRIT

Andrea P. Keatley
Environmental Scientist II
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, KY 40601

June 27, 2009

Dear Ms. Keatley,

Following are comments from the Kentucky Environmental Foundation et al on the 2009 Air Quality Ambient Air Monitoring Network. Our organizations are concerned with the impacts of toxic pollutants in our air and strive to find solutions to improve our air quality and protect our health and the environment, and provide this comments to the Department of Air Quality with that goal in mind.

Particulate Matter Monitoring

Given the number of stationary sources of particulate matter (PM) in Kentucky, namely coal fired power plants, and the health risks associated with PM2.5 in particular, it seems that the number of PM2.5 monitoring stations is inadequate. Particulate matter is linked to asthma, chronic obstructive pulmonary disorder, heart disease and a wide range of other serious illnesses.[1] Given that, the monitoring network appears to be lacking in monitors that could accurately measure emissions from facilities such as the Spurlock power plant in Maysville and the Dale plant in Clark County. We request that DAQ revisit the emissions deposition around these facilities. DAQ could use CMAQ modeling to predict maximum downwind impact from power plants, as a means of determining the best placement of PM2.5 monitors.

In addition, there are proposed coal-fired power plants in Clark and Estill Counties, yet the nearest monitoring station in Richmond may not be adequate to establish an accurate

[1] Health Effects Institute. Research Report: Extended Analysis of the American Cancer Society Study of Particulate Air Pollution and Mortality. Number 140, May 2009.
Pope,C.A., III, Ezzati,M., Dockery,D.W., 2009. Fine-Particulate Air Pollution and Life Expectancy in the United States, N Engl J Med 360, pp. 376-386.
Dominici,F., Peng,R.D., Bell,M.L., Pham,L., McDermott,A., Zeger,S.L., Samet,J.M., 2006. Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases, JAMA 295, pp. 1127-1134.
Pope,C.A., III, Burnett,R.T., Thun,M.J., Calle,E.E., Krewski,D., Ito,K., Thurston,G.D., 2002. Lung cancer, cardiopulmonary mortality and long-term exposure to fine particulate air pollution. JAMA 287, pp. 1132-1141.
Villeneuve PJ, Chen L, Rowe BH, Coates F. Outdoor air pollution and emergency department visits for asthma among children and adults: a case-crossover study in northern Alberta, Canada. Environmental Health, Dec. 24, 2007.

reading of air emissions from those facilities, should they come to be. DAQ should consider adding monitoring stations for particulate matter in these areas.

DAQ should also consider the increase in air pollution from increased residential and industrial development. Some regions of Kentucky, including the central Kentucky region surrounding Lexington, are fast changing with increasing residential sprawl into rural areas, an increase in automobile traffic, construction-related air emissions and therefore an increase in the levels of particulate matter from these and other sources. DAQ should consult with EPA on urban growth air modeling strategies and the necessity of additional monitoring capabilities.

Mercury Monitoring

Mercury is a high-risk toxicant with myriad human health impacts, most notably linked to developmental disorders.[2] Despite the fact that coal fired power plants are a leading source of mercury, Kentucky does not appear to be adequately measuring the most toxic form of mercury – methylmercury – originating from power plants and other industrial facilities. Kentucky's waterways already carry fish consumption advisories due to high levels of toxic mercury. The air monitoring network plan could include fish tissue sampling in order to determine the impacts of air releases of mercury on wildlife and human health, and back trajectory modeling of contaminated fish could also identify the source of the mercury, so that the state can take a more precautionary approach to reducing mercury emissions.

Lead Monitoring

To begin with, DAQ's monitoring network plan modeling ignored emissions from start-up and shut-down of facilities, which can be at emissions rates at 100 – 400 times more than routine facility operations. The plan should therefore be modified to include that inevitability.

KY DAQ is requesting a waiver of the source specific monitoring requirement for lead for Superior Battery, AEP Big Sandy Plant, Newpage, TVA Shawnee Fossil Plant, North American Stainless and LG&E Mill Creek even though these sources have over 1 ton per year (TPY) of lead emissions. However, because this request is based on inadequate modeling, it is arbitrary. Thus, the waiver cannot be granted and KY DAQ must design

[2] Philip W. Davidson, PhD, Gary J. Myers, MD and Bernard Weiss, PhD. Philip W. Mercury Exposure and Child Development Outcomes. PEDIATRICS Vol. 113 No. 4 April 2004.
RL Jones, PhD, T Sinks, PhD, SE Schober, PhD, M Pickett, MPH. Blood Mercury Levels in Young Children and Childbearing-Aged Women --- United States, 1999—2002. National Center for Environmental Health; National Center for Health Statistics, CDC. November 2004.
Clarkson N. Current concepts: the toxicology of mercury---current exposures and clinical manifestations [Review]. N Engl J Med 2003.
National Academy of Sciences. Toxicologic effects of methylmercury. Washington, DC: National Research Council; 2000.

its monitoring plan to include source specific monitoring for lead for Superior Battery, AEP Big Sandy Plant, Newpage, TVA Shawnee Fossil Plant, North American Stainless and LG&E Mill Creek.

To begin with, there is no evidence presented that the meteorological data used for the modeling that forms the basis of the waiver request is site-specific. See Plan at C-4. For Mill Creek, the upper air station data is from Dayton, Ohio, which is over 100 miles away from Mill Creek. See Plan at C-18. Modeling that is based on meteorological data from an area other than area that was modeled is not valid.

Furthermore, for Superior Battery, TVA Shawnee and Newpage, the modeling was based on upper air station meteorological data for just 26 days rather than 5 years of meteorological data. See Plan at C-4. DAQ admits that this data was inadequate. See Plan at C-4. There is no rational basis to assume that the 26 days of upper air station meteorological data in any way presents a rational approximation of actual ambient lead level impacts from these three sources. This is even more so the case in a place like Kentucky that experiences significant seasonal variations in weather and the 26 days of data was from the winter.

In addition, DAQ admits that it relied on outdated meteorological data because "The cost for more recent data for this particular project would be in excess of $2200. Unfortunately, funding for those data is unavailable." Plan at C-4. Thus, not only is the failure to require source specific monitoring for these sources arbitrary because the waiver request is based on outdated data, DAQ should not be allowed to implement the Clean Air Act with regard to lead at all. 42 U.S.C. 7410(a)(2)(E)(i) requires that State Implementation Plans include a demonstration that the state will have adequate funding to implement the program. Here, DAQ admits that it does not have adequate funding. It cannot come up with a mere $2200. Thus, EPA, rather than DAQ, should implement the Clean Air Act with regard to lead in Kentucky.

Turning back specifically to the lead monitoring waiver request, the modeling that DAQ is relying upon is arbitrary because it relies on airport meteorological data which is invalid and is contrary to EPA's modeling guidance. See Plan at C-4, C-18. For air dispersion modeling purposes, airport data are among the least desirable.

Problems with location and the general quality of data are the primary concerns. EPA, in their Meteorological Monitoring Guidance for Regulatory Modeling Applications, summarizes these concerns about using airport data:

For practical purposes, because airport data were readily available, most regulatory modeling was initially performed using these data; however, one should beware that airport data, in general do not meet this guidance.[3] First Airports are comprised of concrete runways, parking lots, passenger terminals, and other structures associated with air travel activities. These surface and building characteristics in turn affect the boundary

[3] EPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, p. 1-1.

layer meteorology present at the airport.[4] In addition, landings, takeoffs, and idling of airplanes affect the site-specific conditions at the airport such that the meteorological conditions are not representative of the area surrounding the 6 facilities requesting waivers, several of which are adjacent to a water bodies. Second, another major issue is the quality of the meteorological data collected at the Airports. It is important to remember that the airport data are not collected with the thought of air dispersion modeling in mind. For example, airport conditions are typically reported once per hour, based on a single observation (usually) taken in the last ten minutes of each hour. EPA recommends that sampling rates of 60 to 360 per hour, at a minimum, be used to calculate hourly-averaged meteorological data.[5] Air dispersion modeling requires hourly-averaged data, which represents the entire hour being modeled, not a snapshot taken in one moment during the hour.

In addition, data collected at Airports are not subject to the system accuracies required for meteorological data collected for air dispersion modeling. EPA recommends that meteorological monitoring for dispersion modeling use equipment that are sensitive enough to measure all conditions necessary for verifying compliance with the NAAQS and PSD increments. For example, low wind speeds (down to 1.0 meter per second) are usually associated with peak air quality impacts - this is because modeled impacts are inversely proportional to wind speed. Following EPA guidance, wind speed measuring devices (anemometers) should have a starting threshold of 0.5 meter per second or less.[6] Furthermore, wind speed measurements should be accurate to within plus or minus 0.2 meter per second, with a measurement resolution of 0.1 meter per second.[7]

Airport data, rather than being measured in 0.1 meter per second increments, is usually based on wind speed observations that are reported in whole knots. To further exemplify the problem of using the airport data, the lowest wind speed included in the airport meteorological data files is usually 1.56 meters per second (three knots).

In addition, all winds lower than three knots are reported as calms, and are thus excluded from the modeling analyses. The conditions most crucial for verifying compliance with the lead threshold for the waiver are being excluded from the analysis because of the choice to use the airport data. Sensitive and accurate measurements of wind speeds are necessary for measuring winds down to 0.5 meter per second (about one knot), which can then be used as 1.0 meter per second in the air dispersion modeling analyses. There would be no need to label such low wind speed hours as calm, which will greatly increase the number of hours included in the modeling analyses. Again, it is these low wind speed hours which must be included in the modeling data set to verify compliance with the lead threshold. Because DAQ failed to do this, a waiver cannot be granted and source specific monitoring of these 6 sources must be conducted.

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[4] Oke T.R., Boundary Layer Climates, Halsted Press, 1978, pp. 240-241.

[5] EPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, p. 4-2.

[6] Id., p. 5-2.

[7] Id., p. 5-1.

Thank you for your attention to these comments. If you have any questions please contact Elizabeth Crowe, Kentucky Environmental Foundation, (859) 986-0868. Otherwise we look forward to your response.

Sincerely,

Elizabeth Crowe, Executive Director
Kentucky Environmental Foundation
PO Box 467 Berea, KY 40403

James Gignac, Midwest Director
Sierra Club National Coal Campaign
70 East Lake Street, Suite 1500
Chicago, IL 60601

Robert Ukeiley
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PO Box 2174
Berea, KY 40403

KENTUCKY DIVISION FOR AIR QUALITY
AMBIENT AIR MONITORING NETWORK
Comments Received 6/29/2009

Energy and Environment cabinet
Department for Environmental Protection
Division for Air Quality

(1) A public comment period on the KENTUCKY DIVISION FOR AIR QUALITY AMBIENT AIR MONITORING NETWORK 2009 was held from May 29, 2009 through June 28, 2009.

(2) The following individuals submitted written comments during the public comment period:

Name and Title	**Organization**
Ronald R. Van Stockum, Jr., President	Shelby County Organized for Preservation and Enhancement, Inc.
Susan Guess, Chair of Board	Paducah Area Chamber of Commerce
Elizabeth Crowe, Executive Director	Kentucky Environmental Foundation
James Gignac, Midwest Director	Sierra Club National Coal Campaign
Robert Ukeiley	Law Office of Robert Ukeiley
John Belanger, MD	
Joan Moore, MS, FNP	

Summary of Comments

(1) Subject: Shelby County Air Monitoring

(a) Comment: The Shelby County Organized for Preservation and Enhancement, Inc. (SCOPE) commented "SCOPE wishes to preserve and enhance the quality of the air in Shelby County. SCOPE believes that air-monitoring stations similar to those found in Jefferson, Bullitt and Oldham Counties should be established in Shelby County for that purpose."
Ronald R. Van Stockum, Jr., Shelby County Organized for Preservation and Enhancement, Inc. (SCOPE)

(b) Response: The division acknowledges this comment and shall take it into consideration during the 2010 five-year network assessment. Currently, the division is meeting the monitoring requirements for the ambient air monitoring network as required in 40 CFR Part 58 Appendices A, C, D, E and G.

(2) Subject: Paducah Middle School Monitor Site 21-145-1004

(a) Comment: The Paducah Area Chamber of Commerce commented "…we are not sure if the Division is aware that the Paducah Middle School located at 342 Lone Oak Road in Paducah is in the process of deciding on a site for a new school building. Currently, AQS Site 21-145-1004 Air Quality Monitor is located on the roof of the Paducah Middle School. If the Paducah Middle School decides to move, we feel the viability of an unoccupied building as an air monitoring site becomes questionable. **Although the move is not scheduled to occur prior to 2012, we would suggest that the Division start the process to select an alternate site for this monitor**. "
Susan Guess, Paducah Area Chamber of Commerce

(b) Response: The division acknowledges this comment.

(3) Subject: Particulate Matter Monitoring

(a) Comment: The Kentucky Environmental Foundation et al commented "Given that, the monitoring network appears to be lacking in monitors that could accurately measure emissions from facilities such as the Spurlock power plant in Maysville and the Dale plant in Clark County. We request that DAQ revisit the emissions deposition around these facilities. DAQ could use CMAQ modeling to predict maximum downwind impact from power plants, as a means of determining the best placement of PM2.5 monitors."
Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(b) Response: The division acknowledges this comment. The division shall take into consideration the areas identified in the above mentioned comment for the 2010 five-year network assessment. However, the division is not lacking in monitors but exceeds the monitoring requirements for the PM2.5 network as required in 40 CFR Part 58 Appendices A, C, D, E and G.

(c) Comment: The Kentucky Environmental Foundation et al commented "In addition, there are proposed coal-fired power plants in Clark and Estill Counties, yet the nearest monitoring station in Richmond may not be adequate to establish an accurate reading of air emissions from those facilities, should they come to be. DAQ should consider adding monitoring stations for particulate matter in these areas."
Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(d) Response: The division acknowledges this comment. The division shall take into consideration the areas identified in the above mentioned comment for the 2010 five-year network assessment.

(e) Comment: The Kentucky Environmental Foundation et al commented "DAQ should also consider the increase in air pollution from increased residential and industrial development. Some regions of Kentucky, including the central Kentucky region surrounding Lexington, are fast changing with increasing residential sprawl into rural areas, an increase in automobile traffic, construction-related air emissions and therefore an increase in the levels of particulate matter from these and other sources. DAQ should consult with EPA on urban growth air modeling strategies and the necessity of additional monitoring capabilities."
Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(f) Response: The division acknowledges this comment. The division shall take into consideration the areas identified in the above mentioned comments for the 2010 five-year network assessment. However, the division is not lacking in monitors but exceeds the monitoring requirements for the PM2.5 network as required in 40 CFR Part 58 Appendices A, C, D, E and G.

(4) Subject: Mercury Monitoring

(a) Comment: The Kentucky Environmental Foundation et al commented "Despite the fact that coal fired power plants are a leading source of mercury, Kentucky does not appear to be adequately measuring the most toxic form of mercury – methylmercury – originating from power plants and other industrial facilities. Kentucky's waterways already carry fish consumption advisories due to high levels of toxic mercury. The air monitoring network plan could include fish tissue sampling in order to determine the impacts of air releases of mercury on wildlife and human health, and back trajectory modeling of contaminated fish could also identify the source of the mercury, so that the state can take a more precautionary approach to reducing mercury emissions."
Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(b) Response: The division acknowledges this comment. Fish tissue samples are collected by the Division of Water for the Department for Environmental Protection. The Division for Air Quality is also housed in the Department for Environmental Protection.

In January of 2007, an Affiliation Agreement was signed between the University of Louisville (UofL) and the Cabinet that houses the Department for Environmental Protection. The signed agreement allowed a student from the UofL School of Information and Public Health to begin the process of linking fish consumption advisories and all environmental data relating to mercury. The project cataloged all mercury data collected in Kentucky. The signed Affiliation Agreement allows current and future UofL students to continue the fish consumption advisory project.

(5) Subject: Lead Monitoring

(a) Comment: The Kentucky Environmental Foundation et al commented "…DAQ's monitoring network plan modeling ignored emissions from start-up and shut-down of facilities, which can be at emissions rates at 100 – 400 times more than routine facility operations. The plan should therefore be modified to include that inevitability. "
Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(b) Response: The division acknowledges this comment and does not concur that the plan should be modified. The division followed 40 CFR Part 51 Appendix W and guidance "AERMOD Implementation Guide" revised March 19, 2009, provided by the U.S. Environmental Protection Agency (EPA). EPA also provided comments on the proposed lead waiver document. The division worked with EPA to provide the best possible modeled data available of the lead waiver request.

(c) Comment: The Kentucky Environmental Foundation et al commented "…because this request is based on inadequate modeling, it is arbitrary. Thus, the waiver cannot be granted and KY DAQ must design its monitoring plan to include source specific monitoring for lead for Superior Battery, AEP Big Sandy Plant, Newpage, TVA Shawnee Fossil Plant, North American Stainless and LG&E Mill Creek."
Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(d) Response: The division does not concur. The division followed 40 CFR Part 51 Appendix W and guidance "AERMOD Implementation Guide" revised March 19, 2009, provided by EPA. EPA also provided comments on the proposed lead waiver document. The division worked with EPA to provide the best possible modeled data available of the lead waiver request.

(e) Comment: The Kentucky Environmental Foundation et al commented "… there is no evidence presented that the meteorological data used for the modeling that forms the basis of the waiver request is site-specific… Modeling that is based on meteorological data from an area other than area that was modeled is not valid…Furthermore, for Superior Battery, TVA Shawnee and Newpage, the modeling was based on upper air station meteorological data for just 26 days rather than 5 years of meteorological data…There is no rational basis to assume that the 26 days of upper air station meteorological data in any way presents a rational approximation of actual ambient lead level impacts from these three sources…DAQ admits that it relied on outdated meteorological data because "The cost for more recent data for this particular project would be in excess of $2200. Unfortunately, funding for those data is unavailable."… Thus, not only is the failure to require source specific monitoring for these sources arbitrary because the waiver request is based on outdated data, DAQ should not be allowed to implement the Clean Air Act with regard to lead at all…the modeling that DAQ is relying upon is arbitrary because it relies on airport meteorological data which is invalid and is contrary to EPA's modeling guidance…For air dispersion modeling purposes, airport data are among the least desirable."

Elizabeth Crowe, James Gignac, Robert Ukeiley, John Belanger, and Joan Moore, Kentucky Environmental Foundation et al.

(f) Response: The division concurs in part. The meteorological data used in the model was not current. However, the division has obtained more current meteorological data and has re-run the model for the lead sources. The new model demonstrates that all of the previous sources, requesting a waiver for lead monitoring, still do not contribute to the lead ambient concentrations by more than ½ the lead NAAQS with the exception of the Superior Battery source located in Russell Springs, KY. The division will be locating a monitoring site near the Superior Battery source location.

The division does not concur that "Modeling that is based on meteorological data from an area other than area that was modeled is not valid…" or that "the modeling that DAQ is relying upon is arbitrary because it relies on airport meteorological data which is invalid and is contrary to EPA's modeling guidance…" The division has followed modeling guidance provided by 40 CFR Part 51 Appendix W, "AERMOD Implementation Guide" revised March 19, 2009, and through personal correspondence with EPA. The guidance provides for meteorological data to be used from multiple sources including airports and not limited to site-specific data.