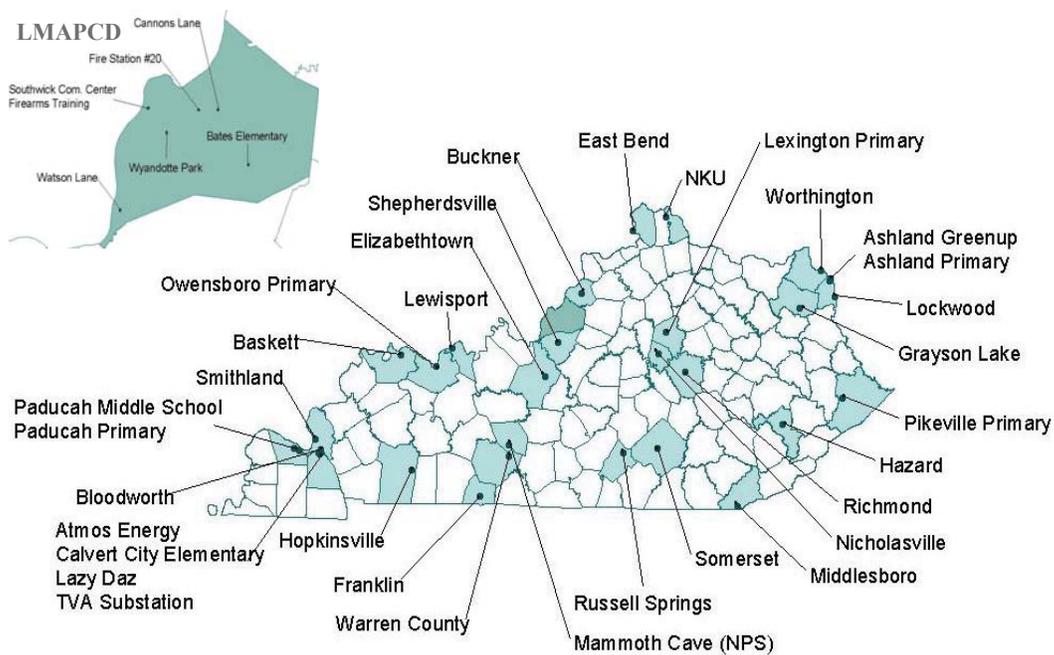


Kentucky Annual Ambient Air Monitoring Network Plan 2011



Commonwealth of Kentucky Energy & Environment Cabinet
 Department for Environmental Protection
 Division for Air Quality
 200 Fair Oaks Lane, 1st Floor,
 Frankfort, Kentucky 40601



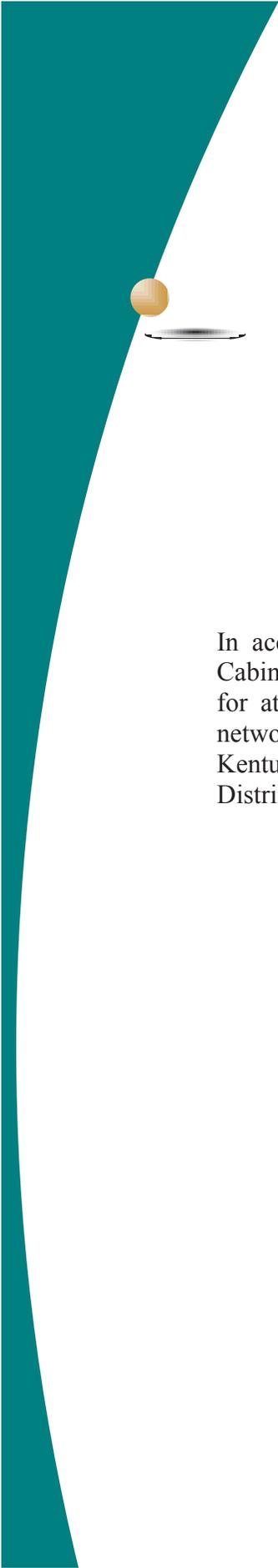


This is a publication of the Kentucky Division for Air Quality, part of the Department for Environmental Protection, Energy and Environment Cabinet. The Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, on request, reasonable accommodations including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities.

CERTIFICATION

By the signatures below, the Kentucky Division for Air Quality certifies that the information contained in this Surveillance Network document for sampling year 2011 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:	<u>Jennifer F. Miller</u> Environmental Technologist III	Signature:	<u><i>Jennifer F. Miller</i></u>	Date:	<u>6/30/11</u>
Print Name:	<u>Stephanie McCarthy</u> Technical Services Branch Manager	Signature:	<u><i>Stephanie McCarthy</i></u>	Date:	<u>6/30/11</u>
Print Name:	<u>John S. Lyons</u> Division Director	Signature:	<u><i>John S. Lyons</i></u>	Date:	<u>6/30/11</u>



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

INTRODUCTION	1
STATION DESCRIPTION FORMAT	3
KENTUCKY CORE BASED STATISTICAL AREAS AND COUNTIES MAP	11
NETWORK MAP	12
AIR STATION SUMMARIES	13
NETWORK CHANGES	14
METROPOLITAN STATISTICAL AREAS	
Bowling Green, KY	15
Cincinnati-Middletown, OH-KY-IN	18
Clarksville, TN-KY	23
Elizabethtown, KY	26
Evansville, IN-KY	29
Huntington-Ashland, WV-KY-OH	32
Lexington-Fayette, KY	41
Louisville-Jefferson County, KY-IN	46
Owensboro, KY	67
MICROPOLITAN STATISTICAL AREAS	
Middlesborough, KY	73
Paducah-Mayfield, KY-IN	75
Richmond-Berea, KY	83
Somerset, KY	85
NOT IN A METROPOLITAN OR MICROPOLITAN STATISTICAL AREA	
Grayson, KY	88
Calvert City, KY	90
Hazard, KY	98
Pikeville, KY	100
Franklin, KY	102
Russell Springs, KY	104
APPENDIX A - MEMORANDUM OF AGREEMENT - CINCINNATI, OH-KY-IN MSA	107
APPENDIX B - MEMORANDUM OF AGREEMENT - EVANSVILLE, IN-KY MSA	113

ACRONYMS

AEM	– Automated Equivalent Method
AQI	– Air Quality Index
AQS	– Air Quality System
ARM	– Automated Reference Method
BAM	– Beta Attenuation Monitor
CBSA	– Core-Based Statistical Area
CSA	– Combined Statistical Area
CO	– Carbon Monoxide
Cr⁺⁶	– Hexavalent Chromium
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
NATTS	– National Air Toxics Trends Stations
NO₂	– Nitrogen Dioxide
NPS	– National Park Service
NR-SPM	– Non-Regulatory Special Purpose Monitor
O₃	– Ozone
PAH	– Polycyclic Aromatic Hydrocarbons

TABLE OF CONTENTS (CONTINUED)

APPENDIX C - MEMORANDA OF AGREEMENT - CLARKSVILLE, TN-KY MSA	117
APPENDIX D - 2009 LEAD WAIVER REQUEST	121
APPENDIX E - 2011 LEAD WAIVER REQUEST	197
APPENDIX F - KENTUCKY SO₂ PWEI VALUES	257
APPENDIX G - WEST JEFFERSON COUNTY AIR TOXICS MONITORING STATIONS	259
APPENDIX H - PUBLIC COMMENTS	261
INDEX - KY DAQ AIR MONITORING STATIONS BY REGIONAL OFFICE	265

ACRONYMS (CONTINUED)

Pb – Lead
PM – Particulate Matter
SAMWG – Standing Air Monitoring Working Group
SLAMS – State and Local Air Monitoring Stations
SO₂ – Sulfur Dioxide
SPM – Special Purpose Monitors
TBD – To Be Determined
TEOM – Tapered Elemental Mass Transducer
U.S. EPA – United States Environmental Protection Agency
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 utilized 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 40 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, PM_{2.5} speciation, and meteorological data.

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 PM_{2.5} 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 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, and siting of instruments.

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 350,000. 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/NR-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 are designated as either Special Purpose Monitors (SPM) or Non-Regulatory Special Purpose Monitors (NR-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 (PM₁₀)

All PM₁₀ 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 46.2 mm 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 ($\mu\text{g}/\text{m}^3$). 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 ($\text{PM}_{2.5}$)**

The Division currently operates continuous TEOM monitors, continuous BAM monitors, and manual intermittent samplers for monitoring particulate matter 2.5 microns in size ($\text{PM}_{2.5}$). With the exception of continuous TEOM monitors, all $\text{PM}_{2.5}$ samplers operated by the Division for Air Quality are certified as either FRM or FEM samplers.

All FRM and FEM manual samplers are operated per the requirements set forth in 40 CFR 50, Appendix L. Samples are collected on 46.2 mm 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 ($\mu\text{g}/\text{m}^3$).

Continuous BAM FEM monitors measure $\text{PM}_{2.5}$ through beta ray attenuation. During sampling, ambient air passes through an inlet and a 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. Continuous $\text{PM}_{2.5}$ BAM monitors provide 24-hour daily reporting for the AQI.

Continuous $\text{PM}_{2.5}$ TEOM monitors also 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. Data is transmitted by telemetry for entry into the automated central data acquisition system.

(c) **PM_{2.5} Speciation and Carbon 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 two filters, one comprised of Teflon and a one comprised of nylon, over a 24-hour sampling period. The filters are composed of either Teflon or nylon in order to collect specific types of toxic pollutants.

A second instrument collects a sample on a quartz filter over a 24-hour sampling period. The quartz filter is used to collect a speciated carbon sample.

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 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 method is 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. These samplers use a brushless motor and a critical flow orifice in order to achieve a sampling flow rate between 1.10 and 1.70 cubic meters per minute (m³/min) over the course of 24 hours. Samples are collected on 8x10 glass fiber filters. Upon collection, the filters are sent to an EPA certified laboratory for analysis. The sample filters are cut into strips, acid digested according to 40 CFR Part 50, Appendix G, and analyzed by Inductively Coupled Plasma with Mass Spectroscopy Detection (ICP-MS).

(i) **Air Toxics**

Air toxics samples are classified into five categories: metals, volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), hexavalent chromium, and carbonyls.

Metal samples are collected on 46.2 mm PTFE filter over a 24-hour period similar to the PM₁₀ 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/m³). 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 Environmental Services Branch laboratory for inductively coupled plasma/mass spectrometer analysis to determine the concentration of metals in ng/m³.

VOC samples are collected in a passivated vacuum canister. Ambient air is pulled into the canister over a 24-hour sampling period. The sample is shipped to either the Environmental Services Branch laboratory or an EPA contract laboratory for gas chromatography/mass spectrometer analysis. VOC concentrations determined in the sample are reported in ug/m³.

PAH samples are collected by a hi-volume air sampler over a 24-hour period. The sample is collected on a polyurethane foam filter cartridge. After sampling, the filter cartridge is packed on ice and shipped to an EPA contract laboratory for analysis via gas chromatography/mass spectrometry. PAH concentrations are reported in ng/m³.

Hexavalent chromium samples are collected on ashless cellulose filters. During sampling, ambient air is pulled through the filter over a 24-hour period. After sampling, the filter is shipped to an EPA contract laboratory for analysis via ion chromatography. Hexavalent chromium concentrations are reported in ng/m³.

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 Environmental Service Branch laboratory for high-pressure liquid chromatography analysis. Carbonyl concentrations determined in the sample are reported in ug/m³.

(j) **RadNet**

The EPA RadNet fixed air station consists of a high-volume sampler that pulls ambient air through a 4-inch diameter filter at a rate of 1,000 liters per minute. Filters are collected twice each week. The instrument also consists of two radiation detectors that continuously measure gamma and beta radiation from particulates collected on the air filter. Data is recorded to the monitor's CPU and is sent hourly to the National Air and Radiation Environmental Laboratory (NAREL) for evaluation.

The EPA RadNet network, which has stations in each State, has been used to track environmental releases of radioactivity from nuclear weapons tests and nuclear accidents. RadNet also documents the status and trends of environmental radioactivity. In general, data generated from RadNet provides the information base for making decisions necessary to ensure the protection of public health. The system helps the EPA determine whether additional sampling or other actions are needed in response to particular releases of radioactivity to the environment. RadNet can also provide supplementary information on population exposure, radiation trends, and other aspects of releases. Data is published by NAREL in a quarterly report entitled *Environmental Radiation Data*. While the Division operates the monitor, all other aspects, including maintenance and data responsibility, are handled by the EPA. For more information, please visit the EPA's RadNet website: <http://www.epa.gov/narel/radnet/>.

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 and the National Park Service, 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.

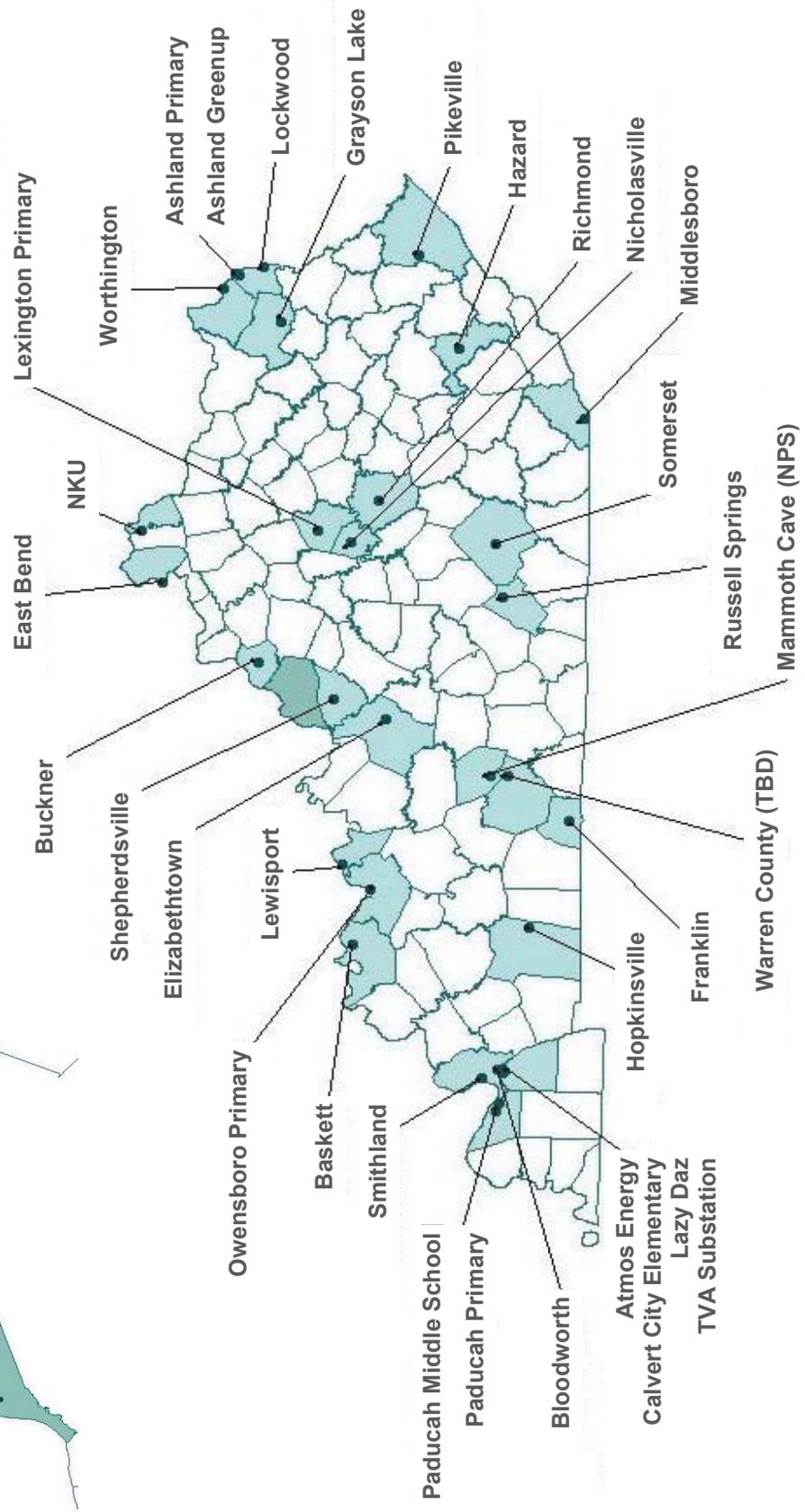
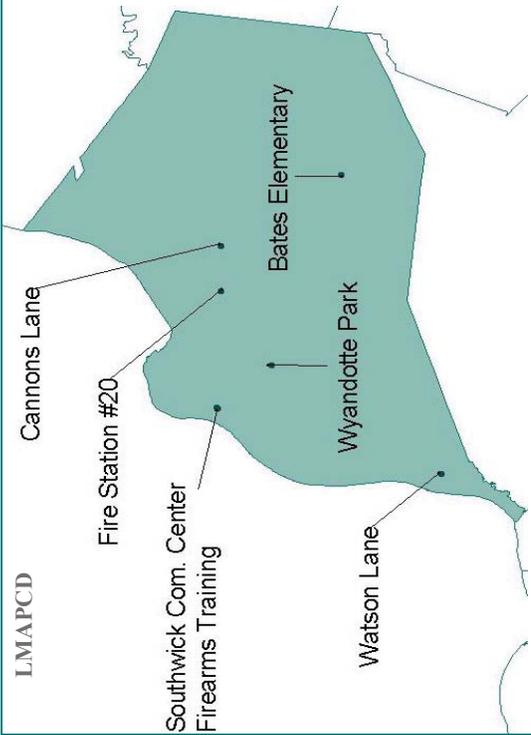
The design intent in siting stations is to correctly match the area dimensions represented by the sample of monitored air with the area dimensions most appropriate for the monitoring objective of the station. The following relationship of the four basic objectives and the area of representativeness are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

<u>Monitoring Exposures</u>	<u>Siting Area Scale</u>
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://air.ky.gov>. The report is located under **Resources**.

KYDAQ Ambient Air Monitoring Network



AIR MONITORING STATIONS SUMMARY

Metropolitan Statistical Area	Number of Sites	PM _{2.5}	PM ₁₀	SO ₂	NO ₂	NO _x	CO	O ₃	Pb	VOC	Carb-onyl	PAH	Cr ⁺⁶	PM _{2.5} Speciation	Carbon Speciation	Rad-net	MET
Bowling Green, KY	2	4 ^{CT}	0	1	1	0	1	2	0	0	0	0	0	0	0	0	1
Cincinnati-Middletown, OH-KY-IN	2	2 ^B	0	1	1	0	0	2	0	0	0	0	0	0	0	0	1
Clarksville, TN-KY	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Elizabethtown, KY	1	3 ^{CB}	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Evansville, IN-KY	1	2 ^T	1 [*]	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Huntington-Ashland, WV-KY-OH	4	2 ^T	2 ^{C*}	2	1	0	0	2	1	1	1	0	0	1	1	0	1
Lexington-Fayette, KY	2	2 ^T	1 [*]	2	1	0	0	2	0	1	1	0	0	1	1	1	1
Louisville-Jefferson County, KY-IN	9	9 ^{CT} 5 ^{BL*}	5 ^{CT}	3	1	1	2	5	0	0	0	0	0	1	1	1	3
Owensboro, KY	2	2 ^T	0	1	1	0	0	2	0	0	0	0	0	0	0	0	1
Metropolitan Statistical Area																	
Paducah, KY-IL	4	2 ^T	1	1	1	0	0	2	0	1	0	0	0	0	0	0	1
Somerset, KY	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Middlesboro, KY	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Richmond-Berea, KY	1	1	0	0	0	0	0	0	2 ^C	0	0	0	0	0	0	0	0
Not in a MSA																	
Carter County	1	1	2 ^{C*}	0	0	0	0	1	0	1 ^D	1 ^D	1	2 ^C	1	1	0	1
Marshall County	4	0	1 [*]	0	0	0	0	0	0	5 ^C	0	0	0	0	0	0	1
Perry County	1	1 ^T	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Pike County	1	3 ^{CT}	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Russell County	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Simpson County	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
TOTALS	40	37	13	13	7	1	3	26	4	9	3	1	2	4	4	2	14

C=Collocated monitors; D=Duplicate monitor; T or B= Continuous PM2.5 monitors or continuous PM10 monitors; *=Multiple analysis; #=PM10 Teflon filters used for PM10, metals, and/or PM10c monitoring; L= PM10 Teflon filter used for lead analysis

SUMMARY OF NETWORK CHANGES 2011

Metropolitan Statistical Area Summary:

Huntington-Ashland, WV-KY-OH - 21st and Greenup (21-019-0002): Reduce the sampling frequency of the PM₁₀ duplicate sampler from one sample every six days to one sample every twelve days. The primary PM₁₀ sampler will remain on a one in six day frequency.

Bowling Green, KY - Oakland (21-227-0008): Relocate air monitoring station to another location within Warren County. The current air monitoring station is located within a floodplain, as well as a doline of a sinkhole.

Clarksville, TN-KY - Hopkinsville (21-047-0006): Establish a SO₂ monitor at the site. The monitor will be designated as special purpose.

Elizabethtown, KY - Elizabethtown (21-093-0006): Replace the continuous PM_{2.5} TEOM monitor with a continuous PM_{2.5} FEM BAM monitor.

Lexington-Fayette, KY - University of Kentucky (21-067-0014) and Lexington Primary (21-067-0012): Discontinue the University of Kentucky (21-067-0014) station, which currently consists of one FRM PM_{2.5} sampler and one FRM PM₁₀ sampler. The PM₁₀ will be moved to the Lexington Primary (21-067-0012) station.

Louisville-Jefferson County, KY-IN - Shepherdsville (21-029-0006): Discontinue the FEM PM_{2.5} sampler. Three PM_{2.5} samplers are required in the MSA. LMAPCD currently operates four samplers and Indiana operates three samplers in the MSA.

Micropolitan Statistical Area Summary:

Paducah-Mayfield, KY-IN - Smithland (21-139-0003): Discontinue SO₂ monitoring at the site. The Division currently operates two SO₂ monitors in the Paducah-Mayfield, KY-IN micropolitan statistical area; the second monitor is located at the Jackson Purchase site (21-145-1024) and is the design value monitor for the area. Only one PWEI based monitor is required for the CBSA.

Frankfort, KY - Frankfort (21-073-0006): Discontinue the air monitoring station, which currently consists of one FEM PM_{2.5} sampler. No PM_{2.5} samplers are required in the micropolitan statistical area, based upon population and 2010 three-year design values.

Somerset, KY - Somerset (21-199-0003): Replace the continuous PM_{2.5} FEM BAM monitor with a manual FEM PM_{2.5} sampler.

Not in a Metropolitan or Micropolitan Statistical Area Summary:

Grayson, KY - Grayson Lake (21-043-0500): Reduce the sampling frequency of the PM₁₀ duplicate sampler from one sample every six days to one sample every twelve days. The primary PM₁₀ sampler will remain on a one in six day frequency. Also, the Division will discontinue acid precipitation sampling. Sampling for acid precipitation is not required by CFR and is voluntary.

Bowling Green, KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-061-0501 (NPS)	Alfred Cook Road Mammoth Cave (Edmonson)	X(tl)		X	X	X	X					X
21-227-0009	TBD (Warren County)	X(ctl)					X(s)					
TOTAL		4	0	1	1	1	2	0	0	0	0	1

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

(Rev.5/16/11)

CSA/MSA: Bowling Green, KY MSA

401 KAR 50:020 Air Quality Region: South Central Kentucky Intrastate (105)

Site Name: TBD

AQS Site ID: 21-227-0009

Location: TBD

County: Warren

GPS Coordinates: TBD

Date Established: TBD

Inspection Date: TBD

Inspection By: TBD

Site Approval Status: Siting and monitor design has not been approved by the EPA.



This monitoring site is being established as a replacement for the Oakland (Warren County) air monitoring station (21-227-0008). In October 2010, the Oakland site was found to be siting within the doline of a sinkhole and is to be discontinued. The new site will be located within Warren County and will consist of a stationary equipment shelter. The site will be established in accordance with 40 CFR 58, Appendices A, C, D, E and G.

Monitoring Objective:

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

Monitors:

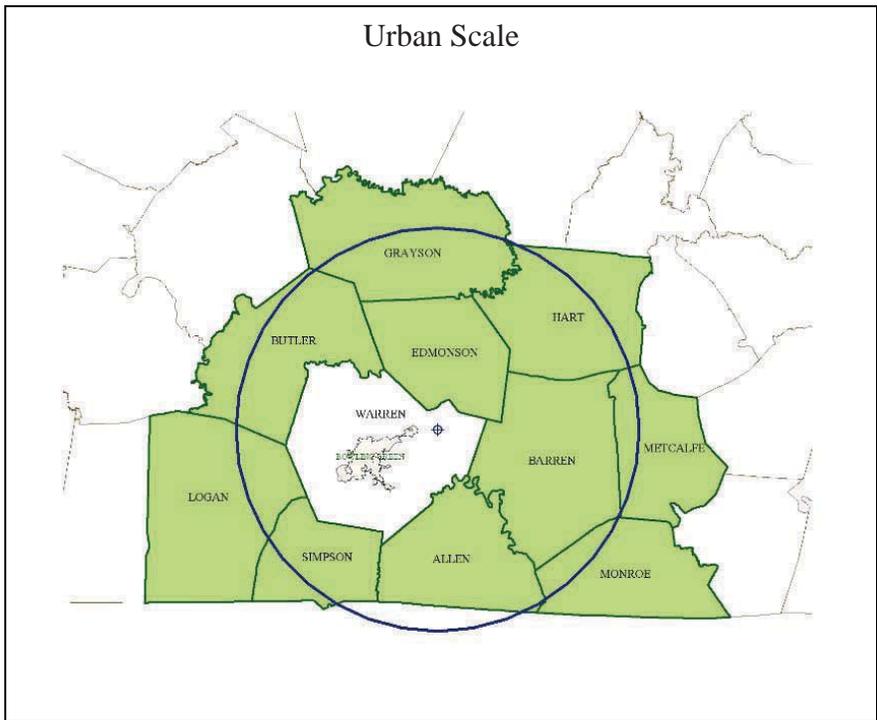
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	TBD	SPM AQI	UV photometry	Continuously March 1 – October 31
PM _{2.5} TEOM	TBD	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
FEM PM _{2.5}	TBD	SLAMS	Gravimetric	24-hours every third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

Quality Assurance Status:

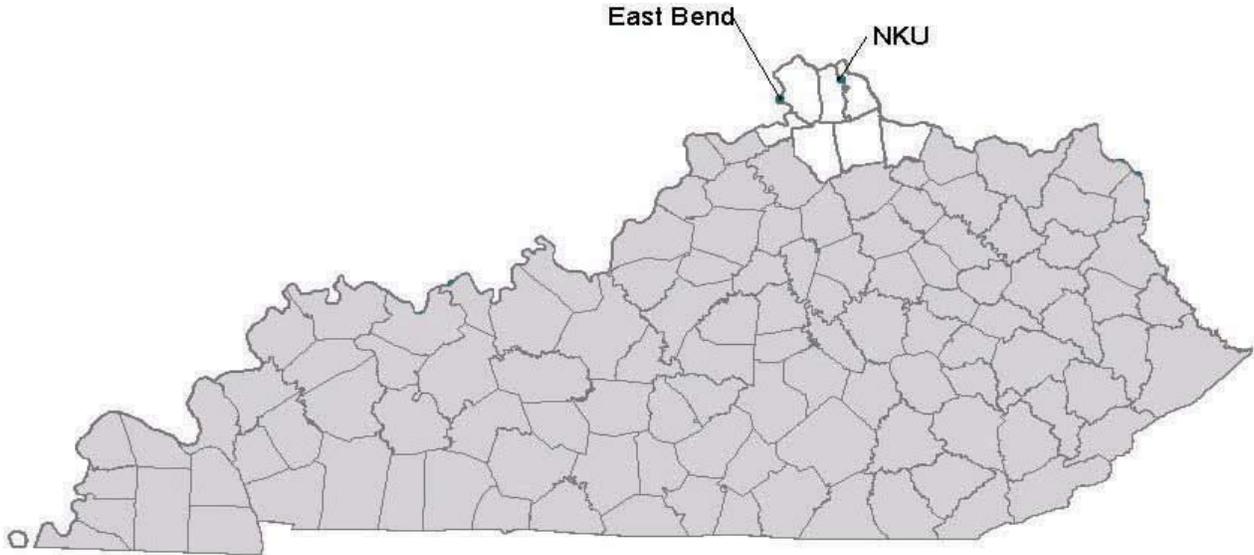
All Quality Assurance procedures will be implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

This site will represent population exposure on an urban scale for particulates. This site will also represent maximum concentration on an urban scale for ozone.



Cincinnati-Middletown, OH-KY-IN



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	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(Ib)		X(I)	X		X(Ie)					
TOTAL		2	0	1	1	0	2	0	0	0	0	1

- (e) Emergency Episode Monitor
- (I) Air Quality Index Monitor
- (s) Special Purpose
- (b) Continuous PM Monitor

(Rev.5/16/11)

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: 38.918243, -84.852609 (WGS 84)

Date Established: July 1, 1977

Inspection Date: October 15, 2010

Inspection By: Jennifer F. Miller

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 inlet is 15 meters from the nearest road. The most recent site inspection was conducted on October 15, 2010. 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 and E.

Monitoring Objective:

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

Monitors:

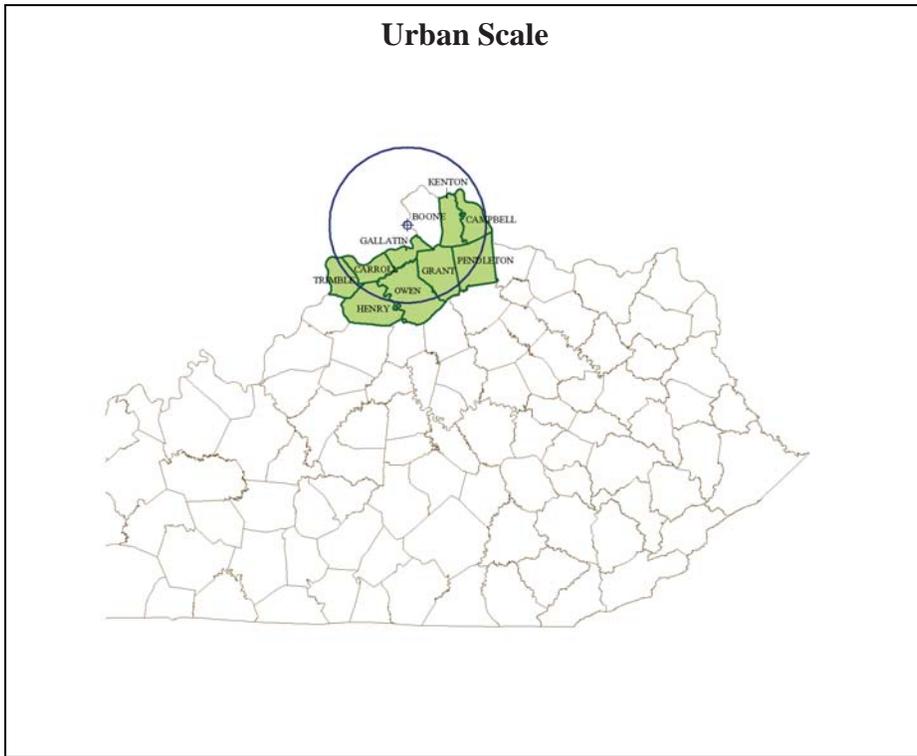
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SLAMS AQI	UV photometry	Continuously March 1 – October 31
Meteorological	6.9	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

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.



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 (WGS 84)

Date Established: August 1, 2007

Inspection Date: October 15, 2010

Inspection By: Jennifer F. Miller

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 Northern Kentucky University in Highland Heights, Kentucky. The sample inlets are 22 meters from the nearest road, which is a dirt service drive for a radio tower. The most recent site inspection was conducted on October 15, 2010. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, C, D, E and G.

Monitoring Objective:

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

Monitors:

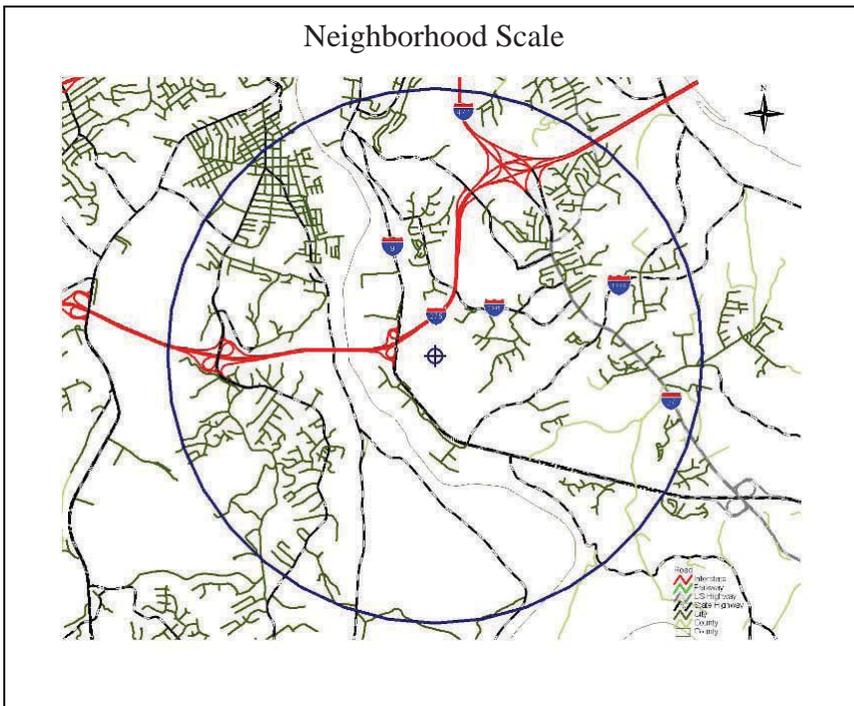
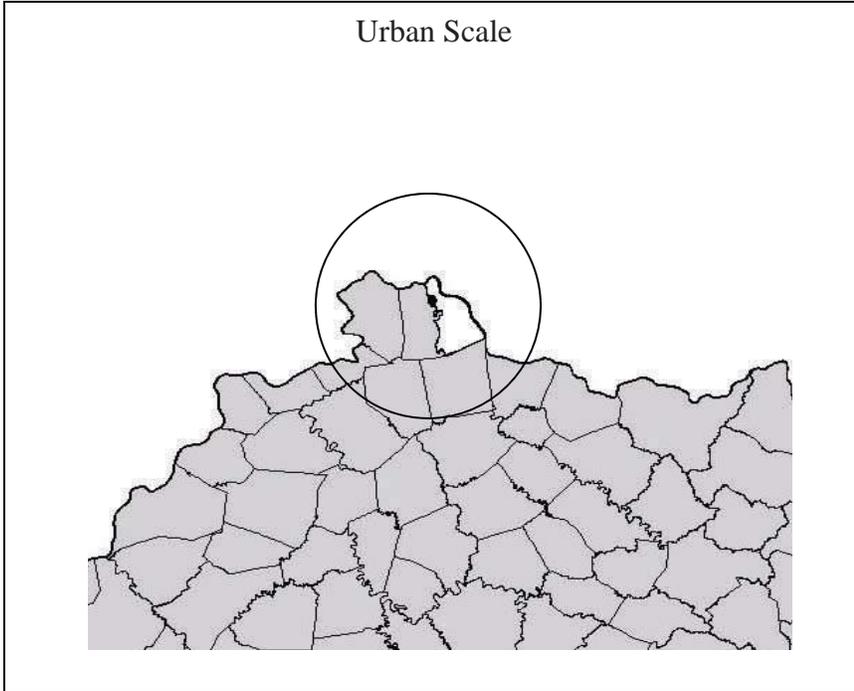
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.8	SLAMS	Chemiluminescence	Continuously
AEM Ozone	3.8	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
FRM PM _{2.5}	4.6	SLAMS	Gravimetric	24-hours every third day
FEM PM _{2.5} BAM	4.0	NR-SPM AQI	Beta Attenuation Mass Monitor	Continuously
AEM Sulfur Dioxide	3.9	SLAMS AQI	UV fluorescence	Continuously
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, and sulfur dioxide on an urban scale. This site also represents population exposure on a neighborhood scale for particulate matter.



Clarksville, TN-KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-047-0006	10800 Pilot Rock Road Hopkinsville (Christian)	X		X(s)			X					
TOTAL		1	0	1	0	0	1	0	0	0	0	0

(s) Special Purpose

(Rev. 6/20/11)

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: 36.91171, -87.323337(WGS 84)

Date Established: January 1, 1999

Inspection Date: July 8, 2010

Inspection By: Jennifer F. Miller

Site Approval Status: Site and monitors meet all design criteria for the monitoring network.



The monitoring site consists of a PM_{2.5} monitoring platform and an adjacent stationary equipment shelter. The site is located in a field on the property of a private residence, located at 10800 Pilot Rock Road in Hopkinsville, Kentucky. The sample inlets are 108 meters from the nearest road. The most recent site inspection was conducted on July 8, 2010. 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.

On June 22, 2010, the EPA promulgated a new final rule regarding SO₂ monitoring. The new rule requires that SO₂ monitoring sites be established based upon a Population Weighted Emissions Index (PWEI). On March 3, 2011, the EPA released preliminary PWEI values; these values initially indicated that the Clarksville, TN-KY MSA would required one SO₂ monitor. On May 31, 2011, the EPA released updated PWEI values; these PWEI values showed that the Clarksville, TN-KY MSA did not require any SO₂ monitors. The Division will still establish SO₂ monitoring at the Hopkinsville site. However, the monitor will be designated as special purpose.

Monitoring Objective:

The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to determine levels of interstate regional transport of fine particulate matter and ozone. The monitoring objective will also include determining levels of regional transport of sulfur dioxide.

Monitors:

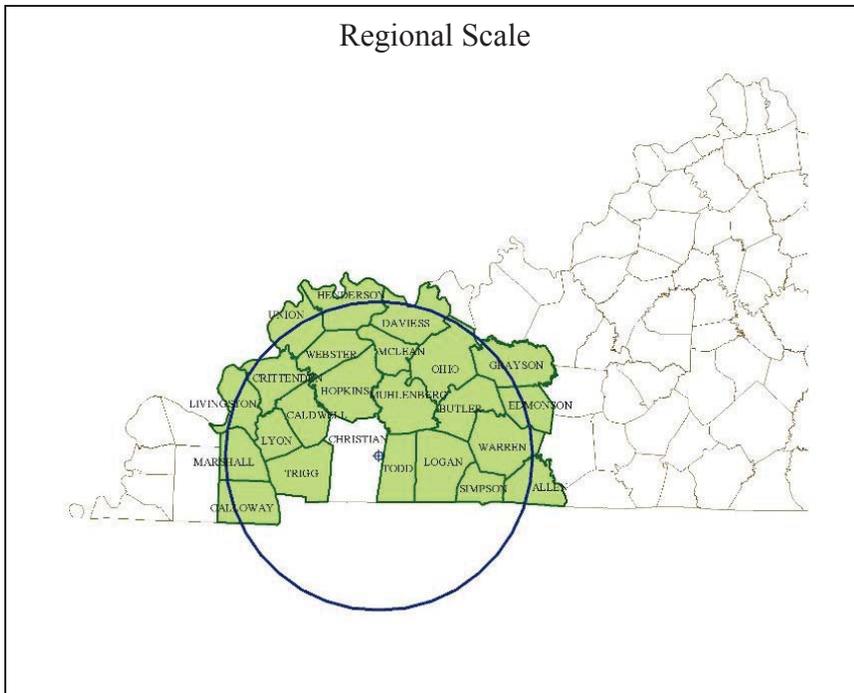
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.4	SLAMS AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	TBD	SPM	UV fluorescence	Continuously
FEM PM _{2.5}	3.3	SLAMS	Gravimetric	24-hours every third day

Quality Assurance Status:

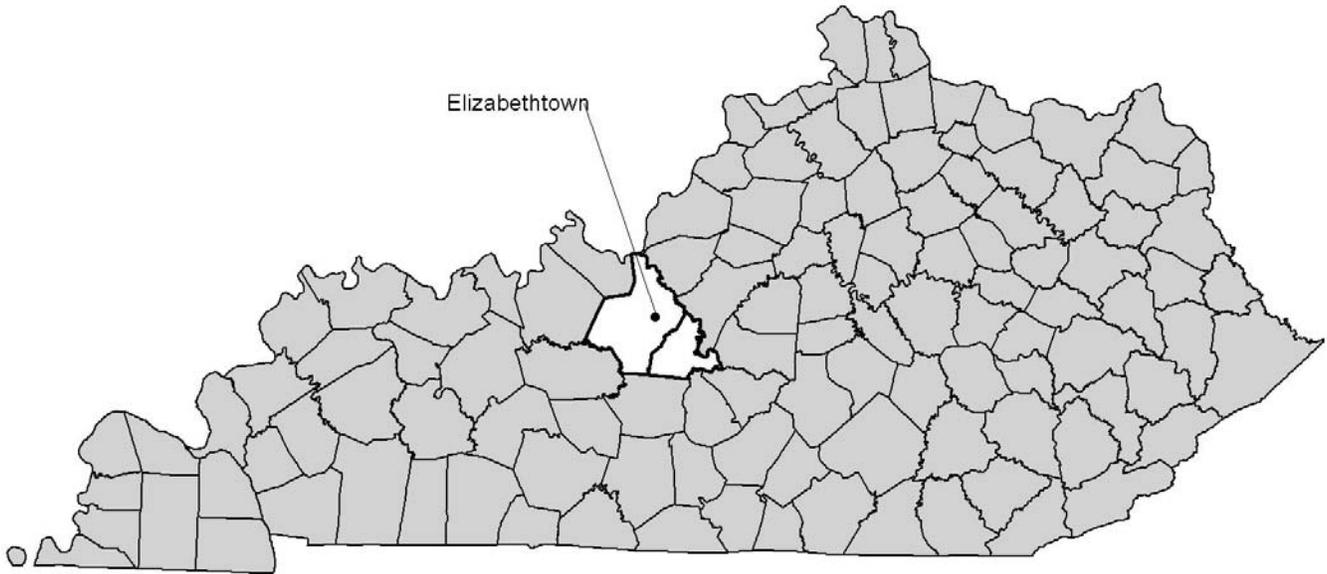
All Quality Assurance procedures for PM_{2.5} have been implemented in accordance with 40 CFR 58, Appendix A. Quality Assurance Procedures will be implemented for SO₂ in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

This site represents population exposure on a regional scale for ozone and PM_{2.5}. This site will also represent population exposure on an urban scale for sulfur dioxide.



Elizabethtown, KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-093-0006	801 N Miles St, Am Legion Park Elizabethtown (Hardin)	X(cb)					X(s)					
TOTAL		3	0	0	0	0	1	0	0	0	0	0

- (c) Collocated Monitor
- (s) Special Purpose Monitor
- (b) Continuous PM Monitor

(Rev.5/16/11)

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: 37.70558, -85.85245 (WGS 84)

Date Established: February 24, 2000

Inspection Date: September 22, 2010

Inspection By: Jennifer F. Miller

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 32 meters from the nearest road. The most recent site inspection was conducted on September 22, 2010. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, 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:

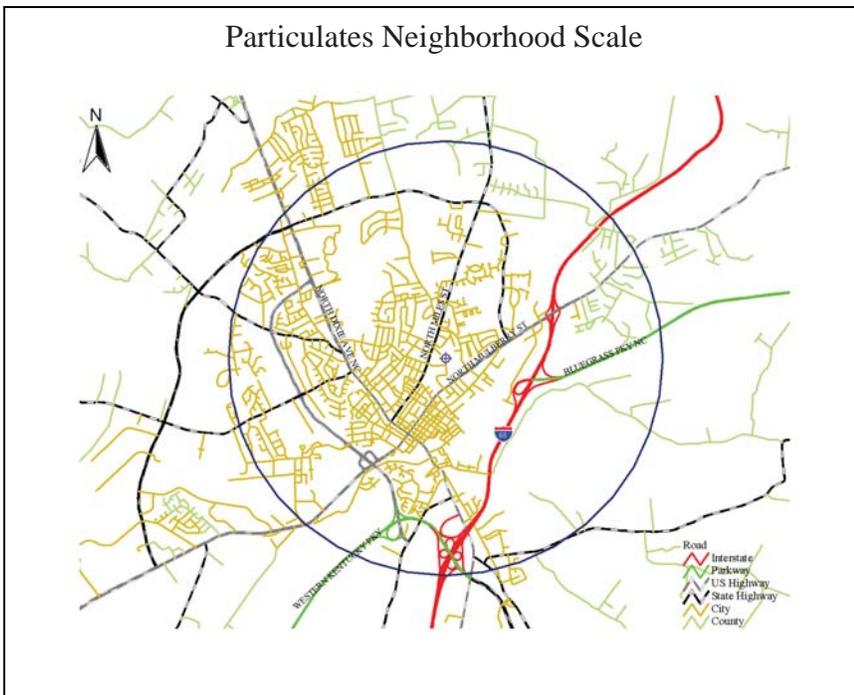
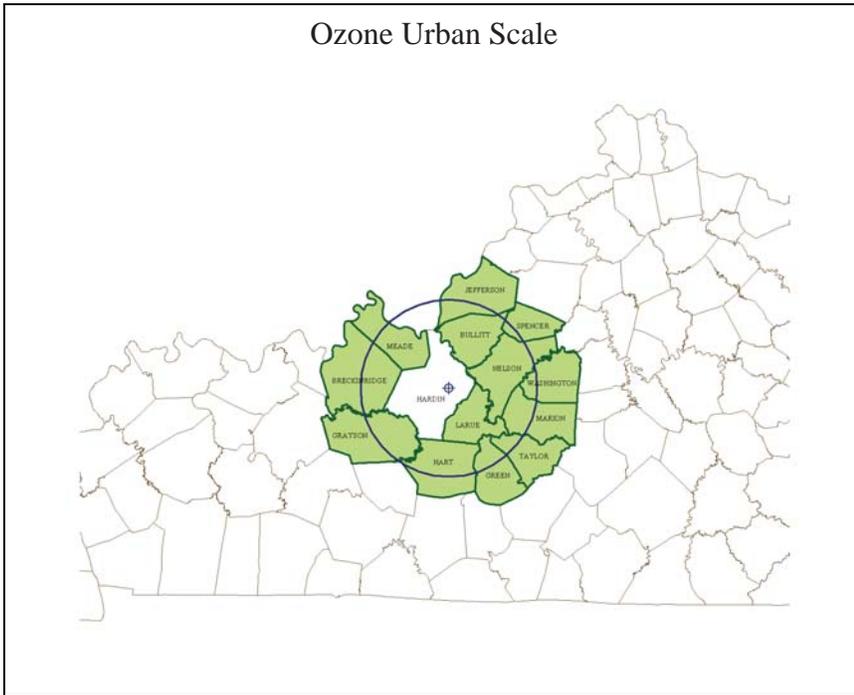
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.4	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM PM _{2.5}	4.6	SLAMS	Gravimetric	24-hours every third day
- Collocated FEM PM _{2.5}	4.6	SLAMS	Gravimetric	24-hours every sixth day
FEM PM _{2.5} BAM	4.0	NR-SPM AQI	Beta Attenuation Mass Monitor	Continuously

Quality Assurance Status:

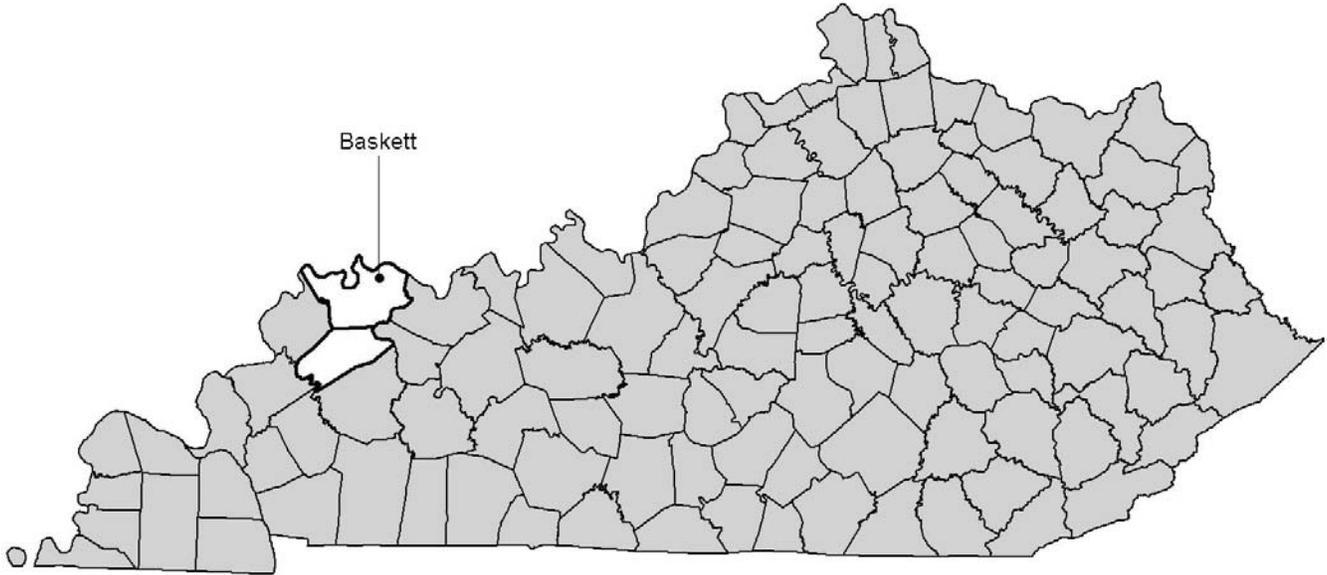
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

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



Evansville, IN-KY



<u>AQS ID</u>	<u>ADDRESS</u>	<u>PM2.5</u>	<u>PM10</u>	<u>SO2</u>	<u>NO2</u>	<u>CO</u>	<u>O3</u>	<u>Lead</u>	<u>VOC</u>	<u>Carbonyl</u>	<u>Speciation</u>	<u>MET</u>
21-101-0014	Baskett Fire Department Baskett (Henderson)	X(t)	X(m)	X			X(s)					
TOTAL		2	1	1	0	0	1	0	0	0	0	0

- (s) Special Purpose Monitor
- (t) Continuous PM Monitor
- (m) Metals

(Rev. 5/16/11)

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: 37.87120, -87.46375 (WGS 84)
Date Established: February 27, 1992
Inspection Date: December 20, 2010
Inspection By: Jennifer F. Miller
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 6.5 meters from the nearest road. The most recent site inspection was conducted on December 20, 2010. 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:

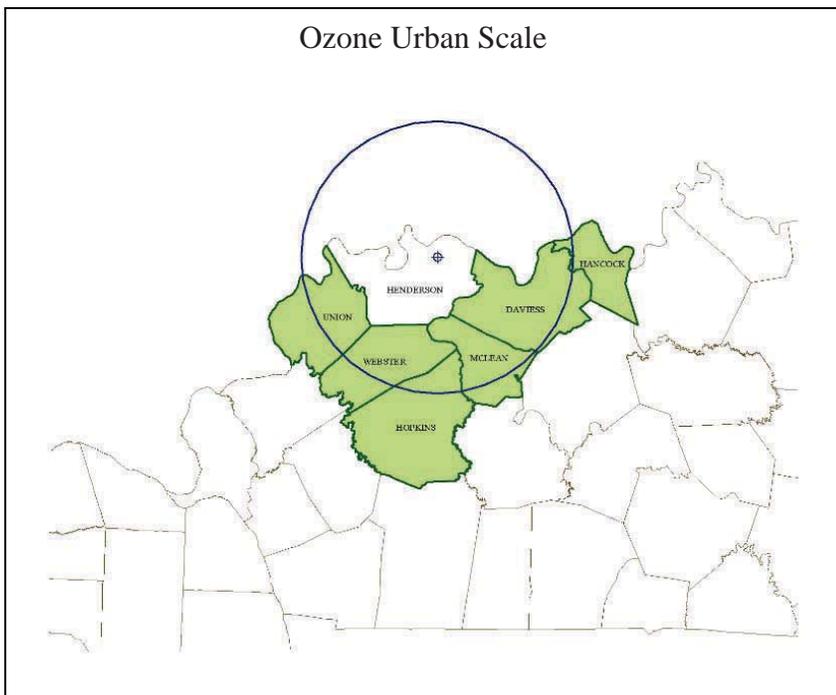
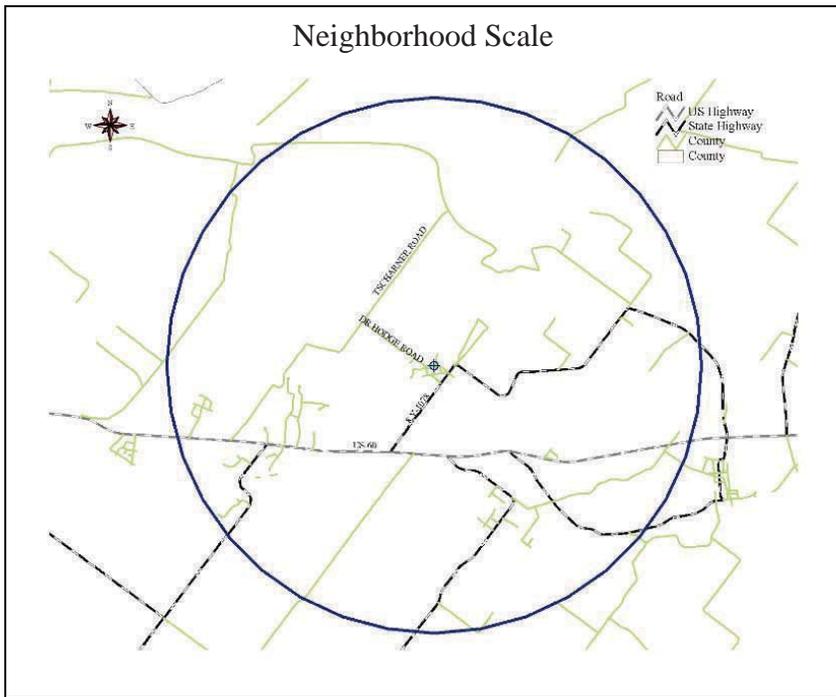
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.9	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM PM _{2.5}	4.5	SLAMS	Gravimetric	24-hours every third day
PM _{2.5} TEOM	4.7	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
FRM PM ₁₀	4.7	SLAMS	Gravimetric	24-hours every sixth day
- PM ₁₀ Metals		SPM	Determined from the PM ₁₀ sample using EPA method IO 3.4	Same as PM ₁₀
AEM Sulfur Dioxide	3.5	SLAMS AQI	UV fluorescence	Continuously

Quality Assurance Status:

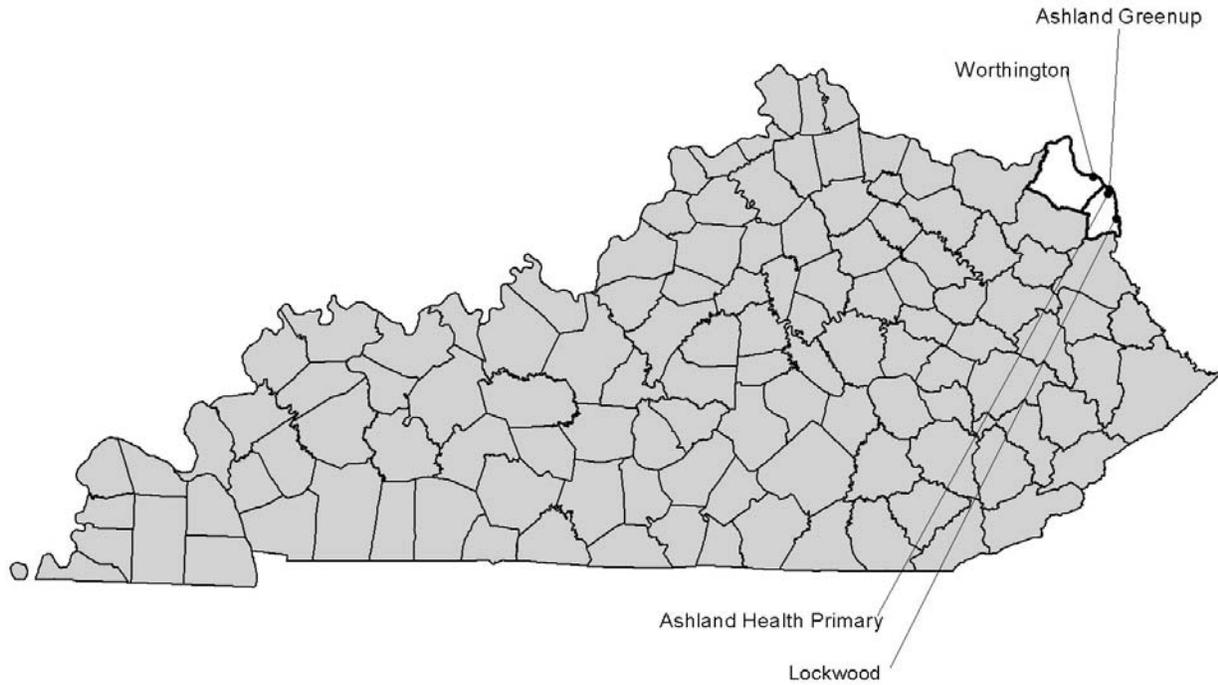
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

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



Huntington-Ashland, WV-KY-OH



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-019-0002	21 st & Greenup Ashland (Boyd)		X(cm)									
21-019-0016	18138 Cherrywood Catlettsburg (Boyd)							X				
21-019-0017	2924 Holt St, FIVCO Health Dept Ashland (Boyd)	X(t)		X(e)	X(e)		X(e)		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	1	1	1	1	1

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

(Rev.5/16/11)

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 (21st and Greenup)

AQS Site ID: 21-019-0002

Location: 122 22nd Street, Ashland, KY 41101

County: Boyd

GPS Coordinates: 38.47676, -82.63137 (WGS 84)

Date Established: April 2, 1978

Inspection Date: December 7, 2010

Inspection By: Jennifer F. Miller

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 20 meters from the nearest road. The most recent site inspection was conducted on December 7, 2010. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, 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	6.4	SLAMS	Gravimetric	24-hours every sixth day
- Collocated FRM PM ₁₀	6.4	SLAMS	Gravimetric	24-hours every twelfth 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: 18138 Cherrywood, Lockwood Estates, Catlettsburg, KY 41129

County: Boyd

GPS Coordinates: 38.33150, -82.59106 (WGS 84)

Date Established: January 1, 2010

Inspection Date: November 16, 2010

Inspection By: Jennifer F. Miller

Site Approval Status: Site and monitors meet all design criteria for the monitoring network.



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 was 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.

The lead monitor is located on a sampling platform and the inlets are 76 meters from the nearest road. The most recent site inspection, on November 16, 2010 showed the sampler and inlet to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:

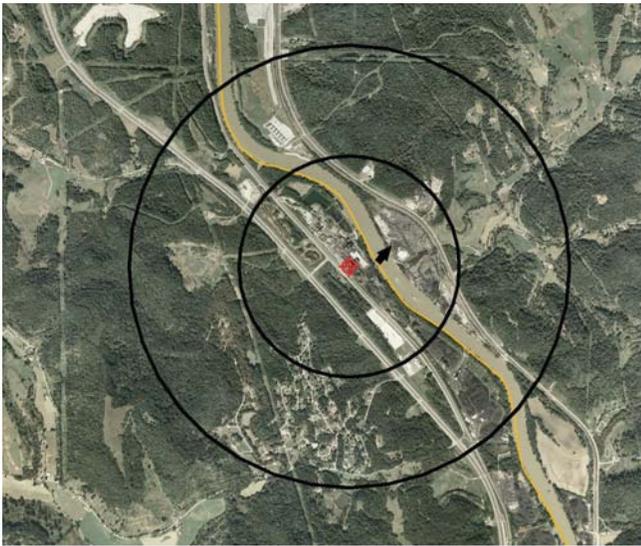
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM Lead	2.0	SLAMS	High volume air sampler. Analysis via ICP-MS.	24-hours every sixth day

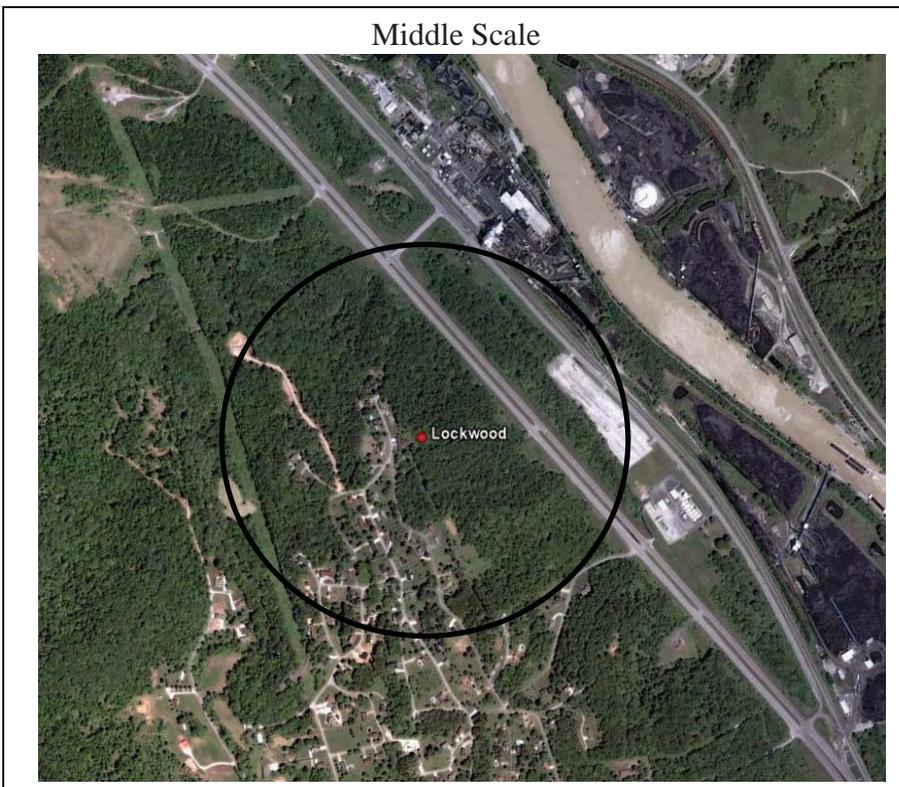
Quality Assurance Status:

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



Area Representativeness:

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: 38.45934, -82.64041 (WGS 84)

Date Established: January 1, 1999

Inspection Date: December 7, 2010

Inspection By: Jennifer F. Miller

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 70 meters from the nearest road. The most recent site inspection was conducted on December 7, 2010. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, 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 Sulfur Dioxide	4.3	SLAMS AQI EPISODE	UV fluorescence	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	Ion chromatography and X-ray fluorescence	24-hours every sixth day
- Carbon Speciation	4.8	SLAMS	Thermal-optical	24-hours every sixth day
PM _{2.5} TEOM	4.7	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
Volatile Organic Compounds	3.8	SPM	EPA method TO-15	24-hours every sixth day
Carbonyls	4.0	SPM	EPA method TO-11A	24-hours every sixth day

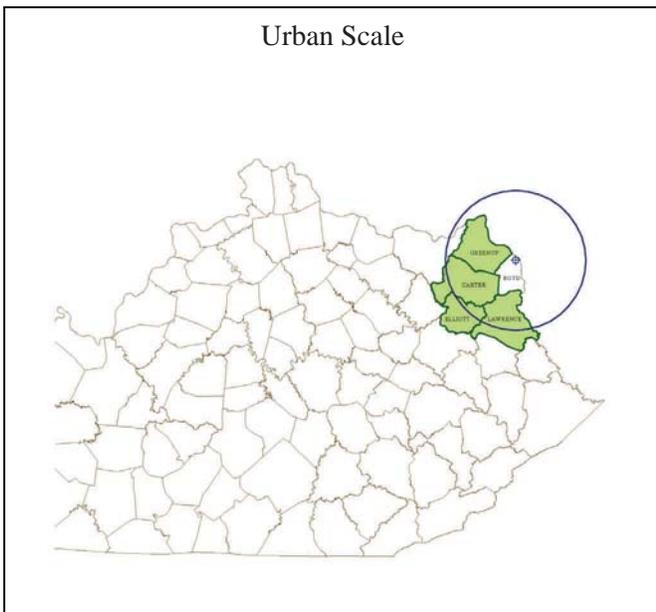
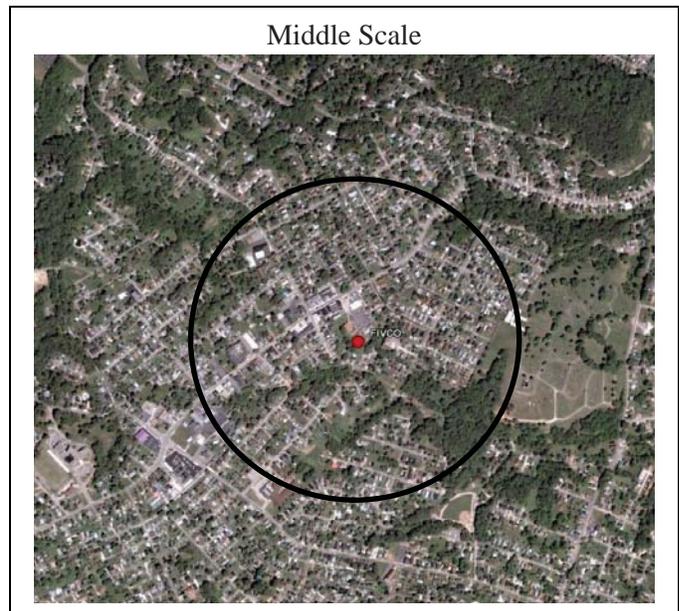
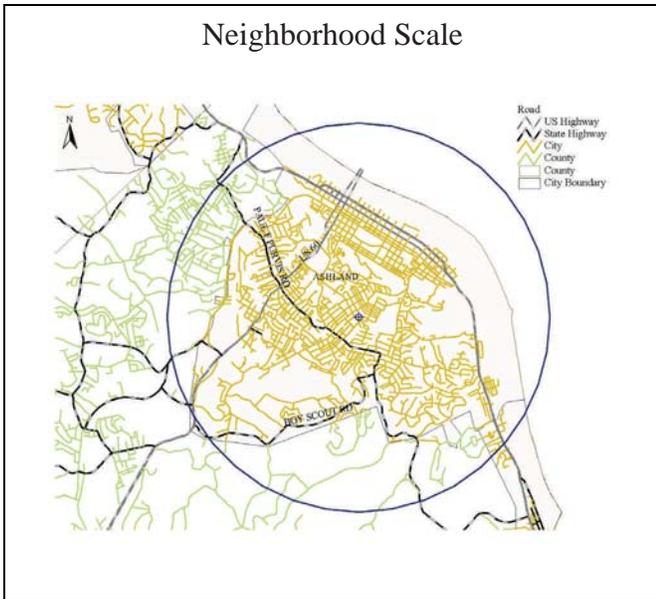
Meteorological	5.9	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure, and temperature	Continuously
----------------	-----	-------	--	--------------

Quality Assurance Status:

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

Area Representativeness:

This site also represents population exposure on a neighborhood scale for air toxics, ozone, and sulfur dioxide. This site also represents maximum concentrations on a middle scale for particulates, as well as an urban scale for nitrogen dioxide.



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: 38.548164, -82.731131 (WGS 84)

Date Established: October 12, 1980

Inspection Date: December 7, 2010

Inspection By: Jennifer F. Miller

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 18 meters from the nearest road. The most recent site inspection was conducted on December 7, 2010. 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 ozone and sulfur dioxide; and to provide pollutant levels for daily air quality index reporting.

Monitors:

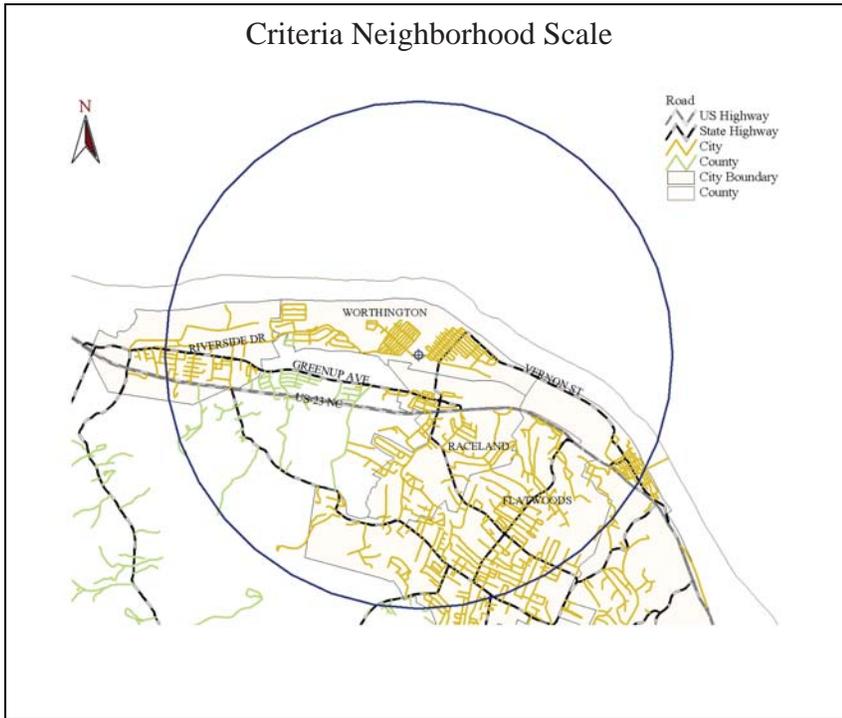
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.2	SLAMS AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	4.2	SPM	UV fluorescence	Continuously

Quality Assurance Status:

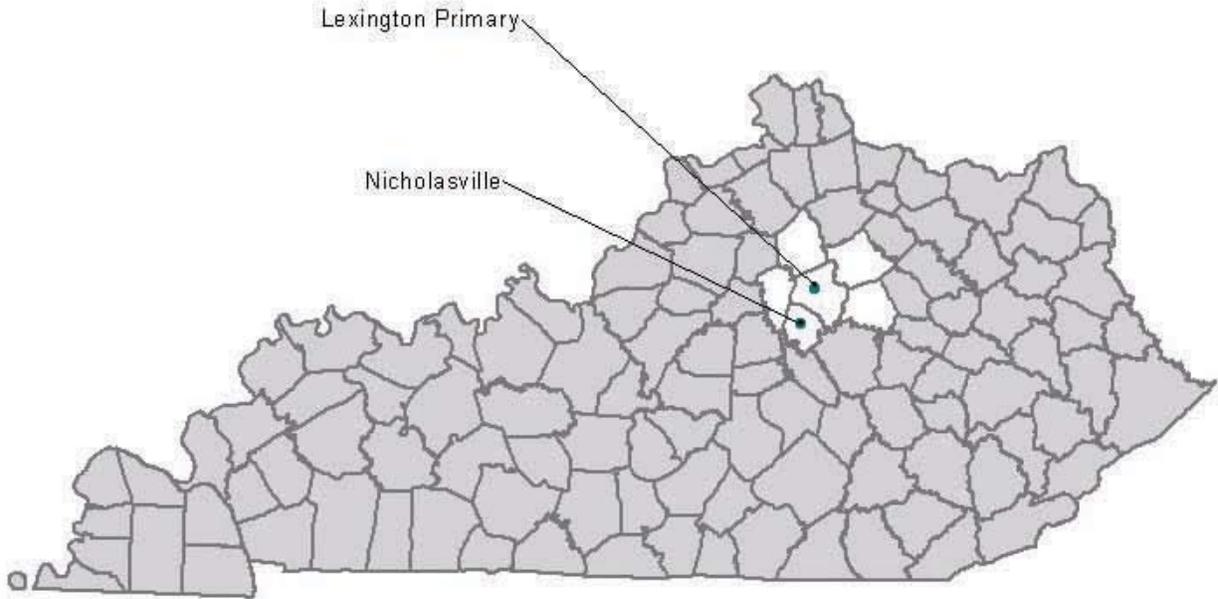
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

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



Lexington-Fayette, KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	MET
21-067-0012	650 Newtown Pike Lexington (Fayette)	X(t)	X(m)	X(eI)	X(e)		X(I e)		X(s)	X(s)	X(s)	X	
21-113-0001	KY DOT Garage, US 27 Bypass Nicholasville (Jessamine)			X(s)			X						X
TOTAL		2	1	2	1	0	2	0	1	1	1	1	1

- (e) Emergency Episode Monitor
- (I) Air Quality Index Monitor
- (s) Special Purpose Monitor
- (t) Continuous PM Monitor
- (m) Metals

(Rev.5/16/11)

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: 38.06503, -84.49761 (WGS 84)

Date Established: November 8, 1979

Inspection Date: October 5, 2010

Inspection By: Jennifer F. Miller

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 122 meters from the nearest road. The most recent site inspection was conducted on October 5, 2010. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, 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, particulates, and sulfur dioxide; and to provide pollutant levels for daily air quality index.

Monitors:

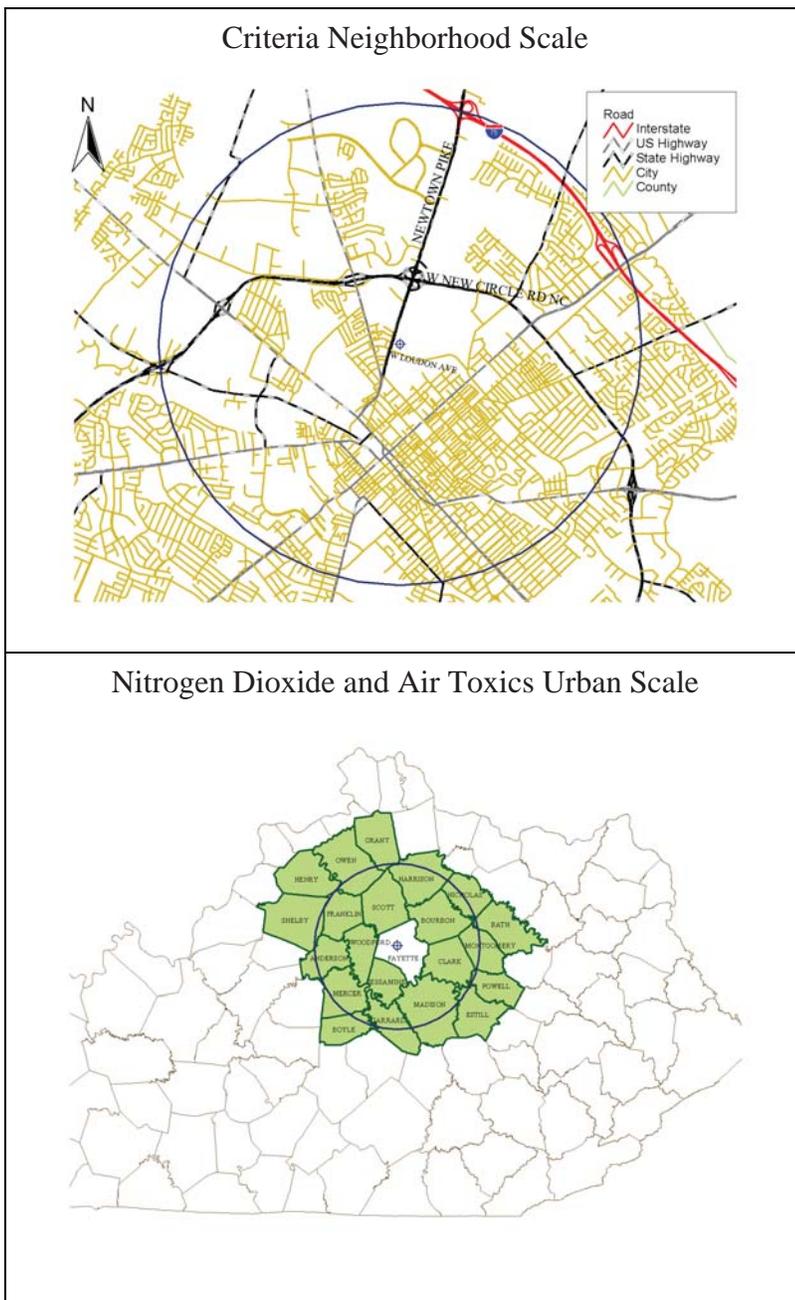
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
ARM Nitrogen Dioxide	4.1	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.8	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
FEM PM _{2.5}	4.7	SLAMS	Gravimetric	24-hours every third day
PM ₁₀	4.5	SLAMS	Gravimetric	24-hours every sixth day
- PM ₁₀ Metals		SPM	Determined from the PM ₁₀ sample using EPA method IO 3.4	Same as PM ₁₀
PM _{2.5} Speciation	2.1	SLAMS	Ion chromatography and X-ray fluorescence	24-hours every sixth day
- Carbon Speciation	2.4	SLAMS	Thermal-optical	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	3.4	SPM	EPA method TO-15	24-hours every sixth day
Carbonyls	3.4	SPM	EPA method TO-11A	24-hours every sixth day
Radiation	4.0	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.



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: 37.89147, -84.58825 (WGS 84)
Date Established: August 1, 1991
Inspection Date: September 22, 2010
Inspection By: Jennifer F. Miller
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 110 meters from the nearest road. The most recent site inspection was conducted on September 22, 2010. 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:

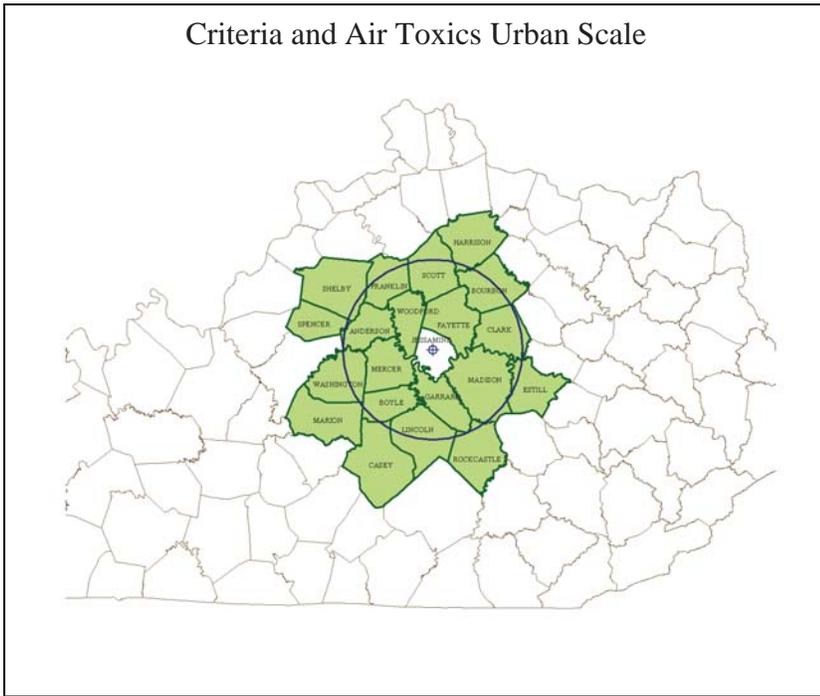
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.9	SLAMS AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	3.9	SPM AQI	UV fluorescence	Continuously
Meteorological	5.9	Other	Wind speed, wind direction, temperature, barometric pressure	Continuously
	1.3		Rain Gauge	Continuously

Quality Assurance Status:

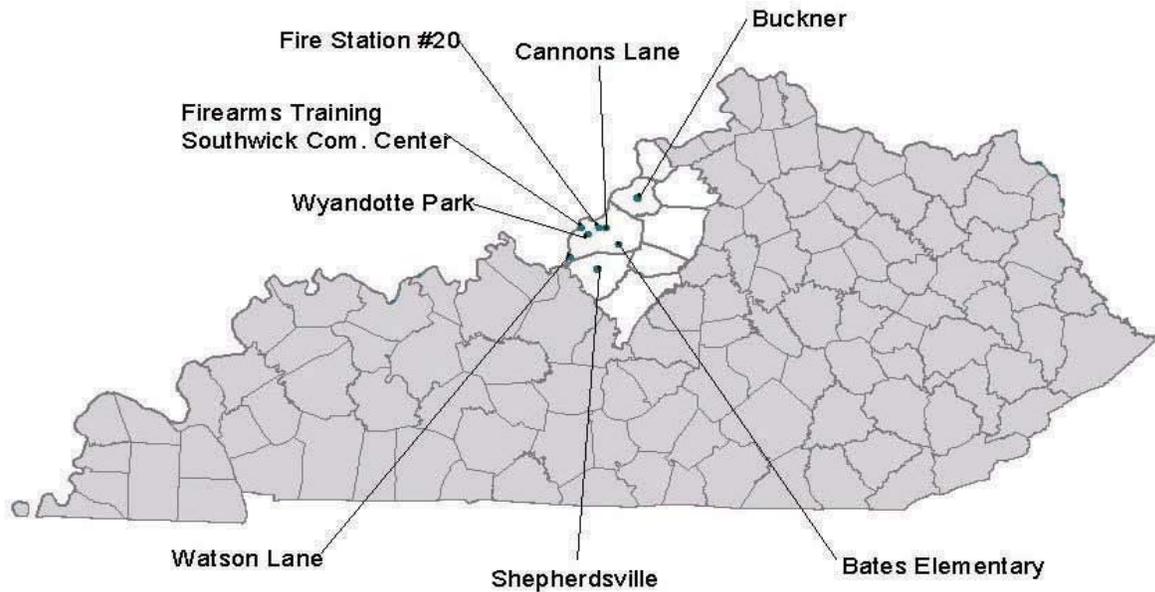
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

This site represents population exposure on an urban scale.



Louisville-Jefferson County, KY-IN



AQS ID	ADDRESS	PM2.5	PM10	SO2	NOx	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	MET
21-029-0006	2nd & Carpenter Streets Shepherdsville (Bullitt)							X(sI)						X
21-185-0004	DOT Garage, 3995 Morgan Rd Buckner (Oldham)							X(sI)						
21-111-0027	7601 Bardstown Road Louisville (Jefferson)	X(tsI)						X(I)						
21-111-0043	3621 Southern Avenue Louisville (Jefferson)	X(ctI)	X(ctI)											X
21-111-0044	1032 Beecher Avenue Louisville (Jefferson)	X	X(tI)											
21-111-0051	7201 Watson Lane Louisville (Jefferson)	X(tsI)		X				X(I)						X
21-111-0067	2730 Cannons Lane Louisville (Jefferson)	X(bl)	X(bsI)	X(I)	X(I)	X	X(I)	X(I)	X			X	X	X
21-111-1019	1735 Bardstown Road Louisville (Jefferson)						X(I)							
21-111-1041	4201 Algonquin Parkway Louisville (Jefferson)				X(e)									
TOTAL		9	5	3	1	1	2	5	1	0	0	1	1	4

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

(Rev. 4/25/11)

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: 37.98629, -85.71192 (WGS 84)

Date Established: January 30, 1992

Inspection Date: September 22, 2010

Inspection By: Jennifer F. Miller

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 56 meters from the nearest road. The most recent site inspection was conducted on September 22, 2010. 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:

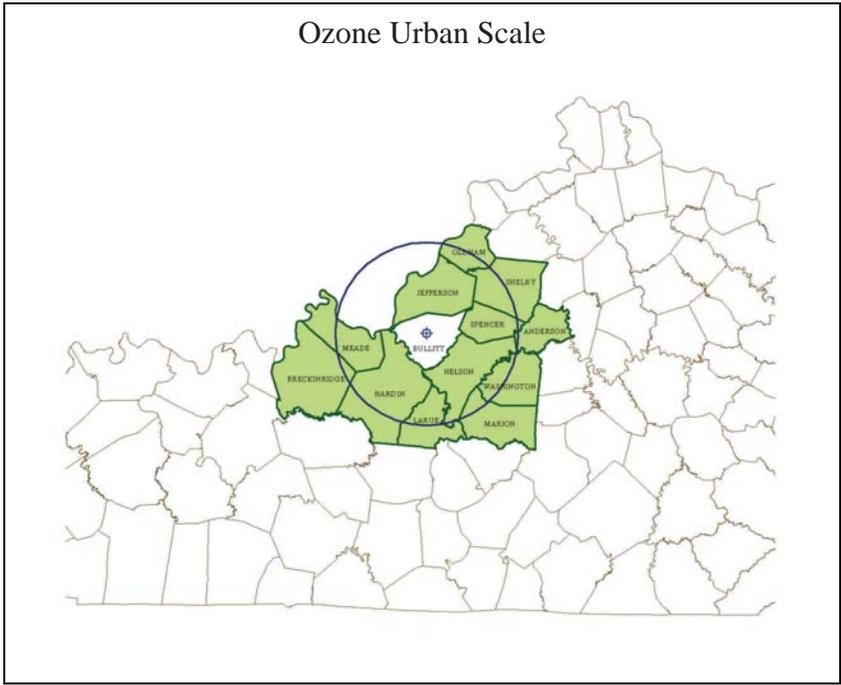
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.0	SPM AQI	UV photometry	Continuously March 1 – October 31
Meteorological	5.7	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure and temperature	Continuously

Quality Assurance Status:

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

Area Representativeness:

This site represents population exposure on an urban scale for ozone.



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: 38.40020, -85.44428 (WGS 84)

Date Established: May 1, 1981

Inspection Date: September 22, 2010

Inspection By: Jennifer F. Miller

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 51 meters from the nearest road. The most recent site inspection was conducted on September 22, 2010. 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:

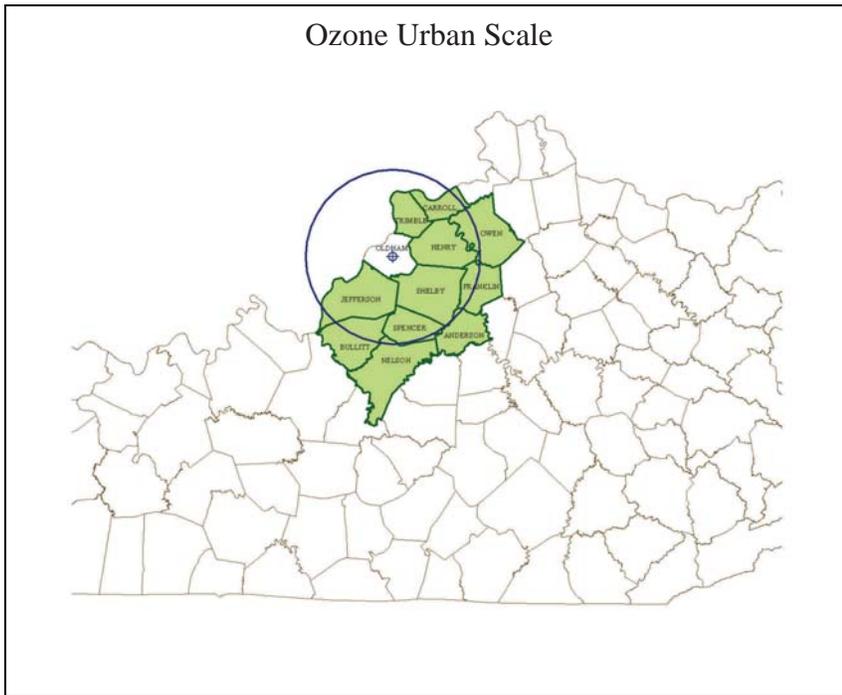
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.8	SPM AQI	UV photometry	Continuously March 1 – October 31

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.



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 (WGS 84)

Date Established: January 4, 1973

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

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 4.0 meters above ground level and 115 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. 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:

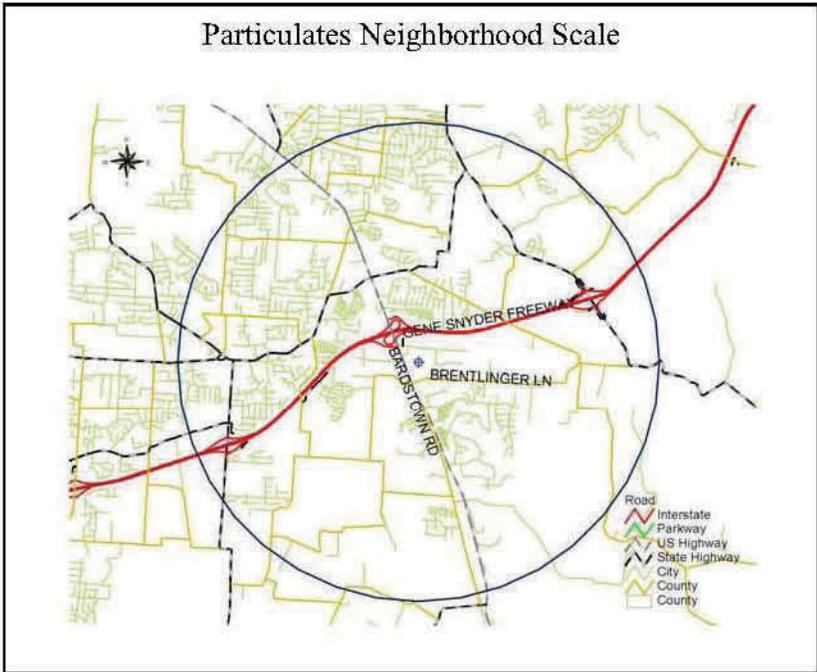
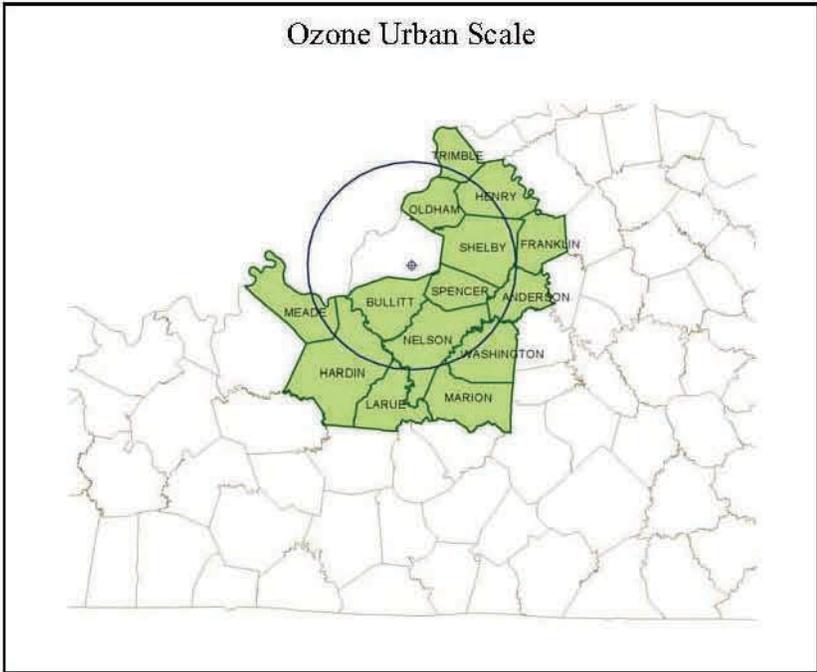
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.0	SLAMS AQI	UV photometry	Continuously March 1 – October 31
PM _{2.5} TEOM	5.6	Other AQI	Tapered element oscillating microbalance, gravimetric	Continuously

Quality Assurance Status:

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

Area Representativeness:

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



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 (WGS 84)

Date Established: January 1, 2009

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

Site Approval Status: EPA SLAMS approval on December 22, 2008; EPA NCore approval on October 30, 2009.



The station is located on property leased by LMAPCD. The location is in the NE quadrant of Jefferson County and is approximately 9 km from the urban core of Metro Louisville. In December 2010, a solar electric array designed to produce approximately 6,336 kWh per year was installed. The array provides over 50% of the power used by the air monitoring station. The most recent site inspection was conducted on December 15, 2010. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices A, C, D, E and G.

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	Inlet Height (meters)	Designations	Analysis Method	Frequency of Sampling	Startup Date
Carbon Monoxide (CO)	4.6	NCORE SLAMS AQI	Automated Reference Method utilizing trace level non-dispersive infrared analysis.	Continuously	06/01/2011
Nitrogen Oxide (NO _x)	4.6	NCORE SLAMS AQI	Automated Reference Method utilizing chemiluminescence analysis.	Continuously	01/01/2010
Total Reactive Nitrogen (NO/NO _y)	8.8	NCORE	Automated method utilizing trace level chemiluminescence analysis.	Continuously	01/01/2011
Ozone (O ₃)	4.6	NCORE SLAMS AQI	Automated Equivalent Method utilizing UV photometry analysis.	Continuously	01/01/2010
Sulfur Dioxide (SO ₂)	4.6	NCORE SLAMS AQI	Automated Equivalent Method utilizing trace level UV fluorescence analysis.	Continuously	06/01/2010
PM _{2.5} BAM	4.6	NCORE NR-SPM AQI	Automated Equivalent Method utilizing Beta Attenuation.	Continuously	01/24/2011
PM ₁₀ BAM	4.6	NCORE NR-SPM AQI	Automated Equivalent Method utilizing Beta Attenuation.	Continuously	01/24/2011
- PM _{Coarse} (PM ₁₀ -PM _{2.5}) BAM			Differential Automated Equivalent Method utilizing Beta Attenuation.	Continuously	01/24/2011
PM _{2.5} Speciation	2.2	NCORE SLAMS	Multi-Species manual collection method utilizing thermal optical ion chromatography, gravimetric, and X-ray fluorescence. A second PM _{2.5} speciation sampler provides 1/3 day sampling coverage for weekends and holidays.	1/6 days 1/3 days	01/01/2009 01/01/2011
- PM _{2.5} Carbon Speciation	2.4	NCORE SLAMS	Multi-species manual collection method utilizing thermal optical and gravimetric analyses. A second carbon speciation sampler provides 1/3 day sampling coverage for weekends and holidays.	1/6 days 1/3 days	01/01/2009 01/01/2011
FRM PM _{2.5}	2.4	NCORE SLAMS	Manual Reference Method utilizing differential gravimetric analysis	1/3 days	01/01/2009
PM _{10c} Filter	2.4	NCORE SLAMS	Manual Reference Method PM _{10c} utilizing differential gravimetric analysis.	1/3 days	01/01/2009
- Lead			Every other PM _{10c} Manual Reference Method filter analyzed via X-ray fluorescence.	1/6 days	12/29/2011

Monitors (Continued):

Monitor Type	Inlet Height (meters)	Designations	Analysis Method	Frequency of Sampling	Startup Date
Meteoro-logical	9.3	NCore	Air Quality Measurements approved instrumentation for wind speed, wind direction, humidity, and temperature	Continuously	01/16/2010
-Solar Radiation	5.0	NCore	Air Quality Measurements approved instrumentation for solar radiation	Continuously	1/16/2010
-Rain Gauge	1.8	NCore	Air Quality Measurements approved instrumentation for precipitation	Continuously	1/16/2010
Radiation	1.5	RadNet	RadNet fixed station air monitor, manual and automated methods	Continuously + 2 weekly filters	01/01/2009

Area Representativeness:

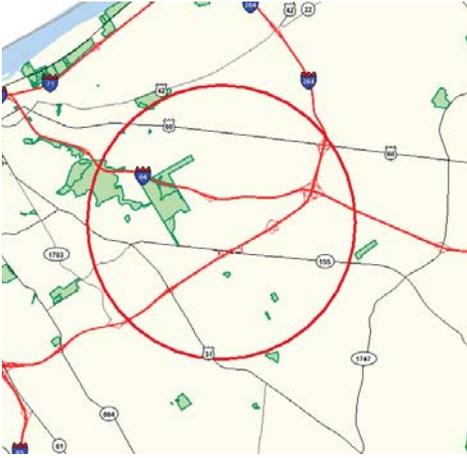
The air monitoring equipment at the Cannon’s Lane NCore station is specifically located at the urban and neighborhood scales. These scales are generally the most representative of the expected population exposures that occur throughout metropolitan areas.

Quality Assurance Status:

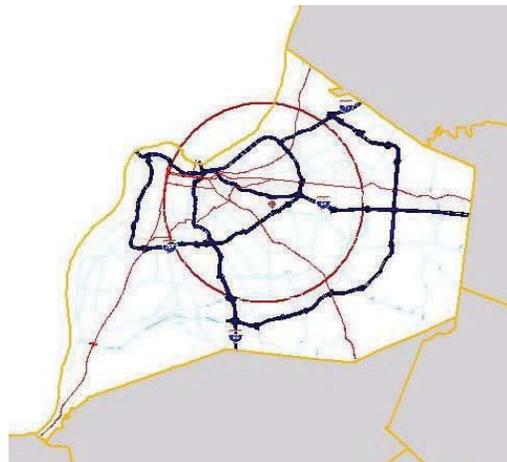
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A. The District’s current Quality Assurance Project Plan covers trace-level O₃, NO_x, SO₂, and CO, as well as PM_{2.5} speciation, lead, and meteorological measurements. Standard operating procedures for trace-level CO and SO₂ monitors have been developed. Additional standard operating procedures manuals will be adopted or developed for new instrumentation.

Pollutant	Spatial Scale	Comments
Ozone	Neighborhood and Urban Scale	10 km radius
NO _x /NO _y	Neighborhood and Urban Scale	10 km radius
Carbon Monoxide	Neighborhood Scale	There is no urban scale for CO
SO ₂	Neighborhood Scale	There is no urban scale for SO ₂
Particulates	Urban	
Radiation	Urban	
VOCs	Neighborhood	

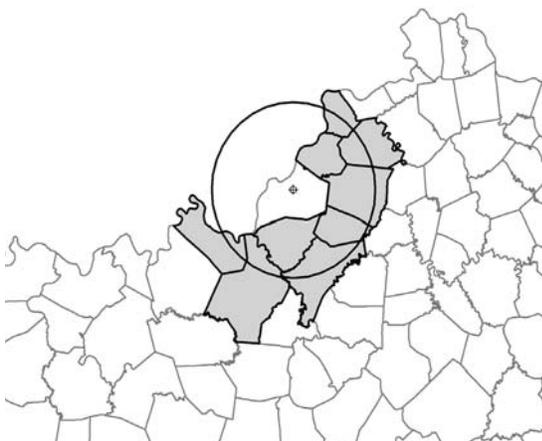
Neighborhood Scale (4 km): Carbon Monoxide, Sulfur Dioxide, and VOCs



Neighborhood and Urban Scales (10 km): Nitrogen Oxides and Ozone



Urban Scale (50 km): Particulates and Radiation



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 (WGS 84)

Date Established: July 1, 1983

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

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 6 meters above ground level and 45 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. The air monitoring site was found to be in accordance with 40 CFR Part 58, Appendices A, 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	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
PM ₁₀ TEOM	5.9	AQI SLAMS	Tapered element oscillating microbalance, gravimetric	Continuously
- Collocated PM ₁₀ TEOM	5.9	AQI SLAMS	Tapered element oscillating microbalance, gravimetric	Continuously
FRM PM _{2.5}	6.0	SLAMS	Gravimetric	24-hours everyday
- Collocated FRM PM _{2.5}	6.0	Other	Gravimetric	24-hours every sixth day
PM _{2.5} TEOM	6.0	Other AQI	Tapered element oscillating microbalance, gravimetric	Continuously
Meteorological	11.4	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure, and temperature	Continuously
-Rain Gauge	7.8	Other	AQM grade instrument for precipitation.	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. This site also represents population exposure, highest concentration for SLAMS speciation particulates.



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 (WGS 84)

Date Established: September 1, 1983

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

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 5 meters above ground level and 54 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. 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:

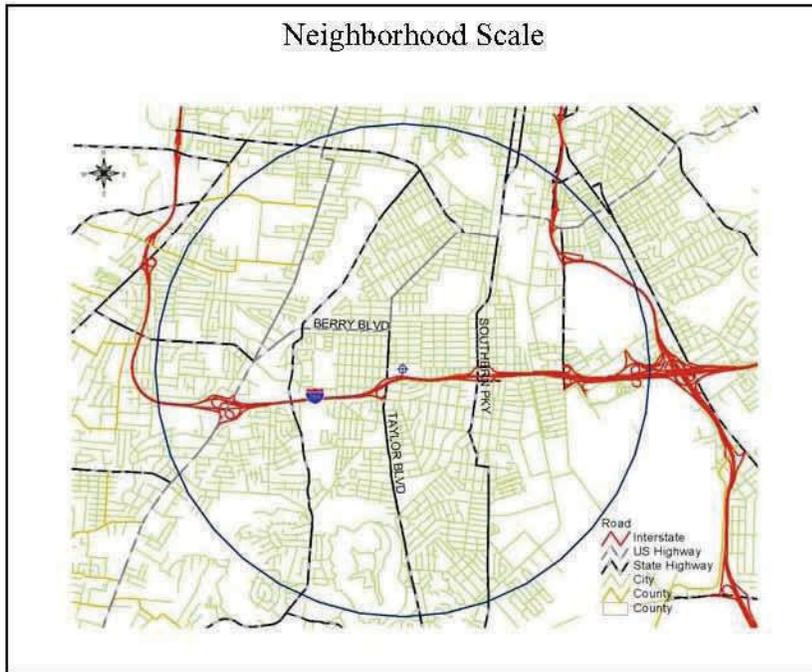
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM _{2.5}	5.0	SLAMS	Gravimetric	24-hours everyday
PM ₁₀ TEOM	4.8	AQI	Tapered element oscillating microbalance, gravimetric	Continuously

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.



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 (WGS 84)

Date Established: July 16, 1992

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

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 4 meters above ground level and 34 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. 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:

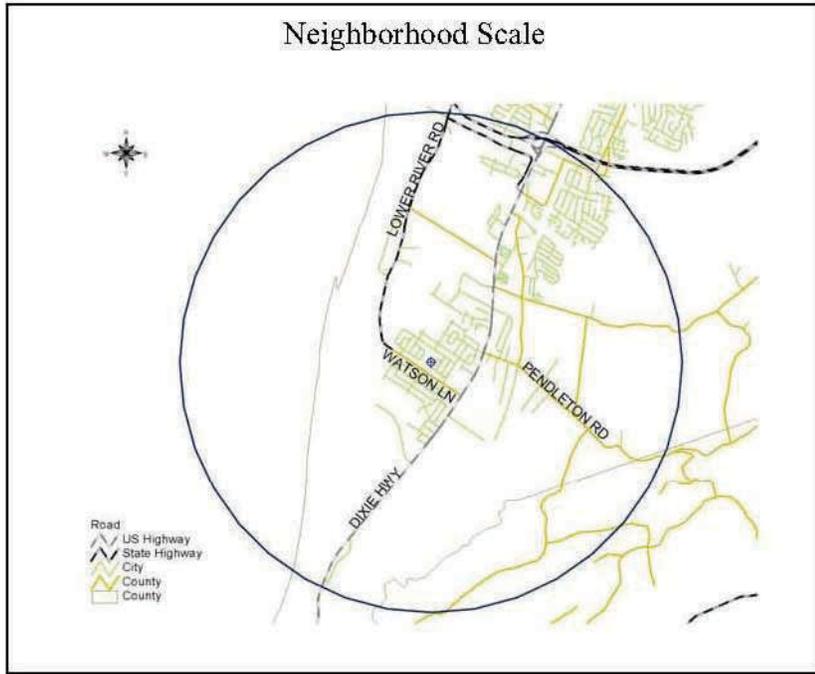
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.3	SLAMS AQI	UV photometry	Continuously March 1 – October 31
FRM PM _{2.5}	4.8	SLAMS	Gravimetric	24-hours every sixth day
PM _{2.5} TEOM	4.6	Other AQI	Tapered element oscillating microbalance, gravimetric	Continuously
AEM Sulfur Dioxide	4.3	SLAMS	UV fluorescence	Continuously
Meteorological	6.0	Other	AQM grade instruments for wind speed and wind direction. Not reported to AQS.	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: Fire Station 20

AQS Site ID: 21-111-1019

Location: Fire Station 20, 1735 Bardstown Road, Louisville, KY 40205

County: Jefferson

GPS Coordinates: 38.2290, -85.7018 (WGS 84)

Date Established: January 1, 1973

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

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 3.5 meters above ground level and 5 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. 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:

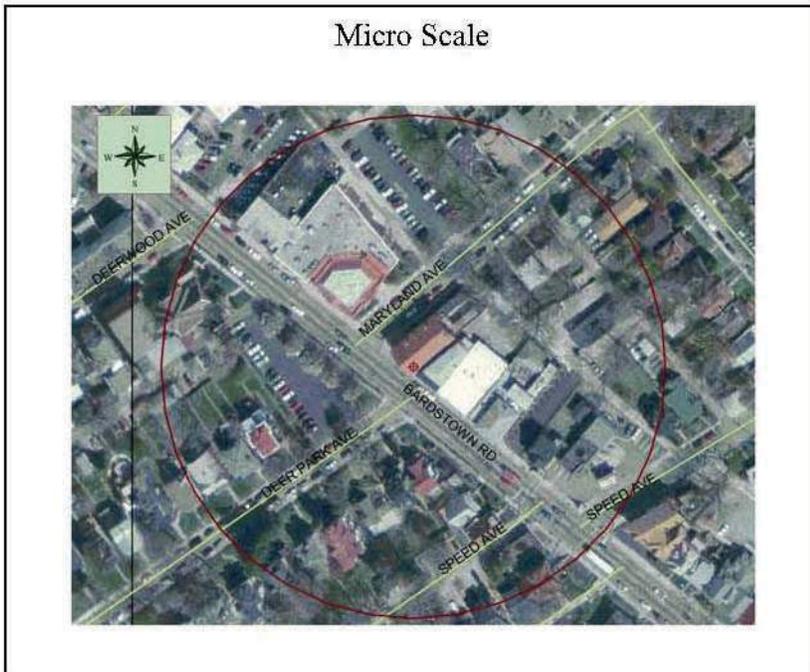
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
ARM Carbon Monoxide	3.5	SLAMS AQI	Non-dispersive infrared	Continuously

Quality Assurance Status:

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

Area Representativeness:

This site represents maximum concentrations on a 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, -85.82675 (WGS 84)

Date Established: April 13, 1978

Inspection Date: December 15, 2010

Inspection By: Jennifer F. Miller

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 4.5 meters above ground level and 52 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. 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 detect episode levels for the activation of emergency control procedures.

Monitors:

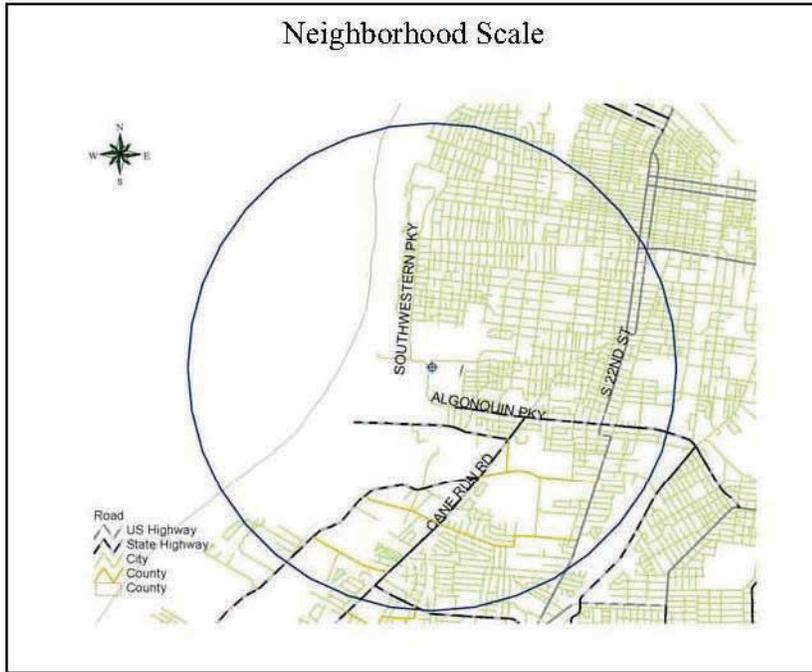
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Sulfur Dioxide	4.5	SLAMS EPISODE	UV fluorescence	Continuously

Quality Assurance Status:

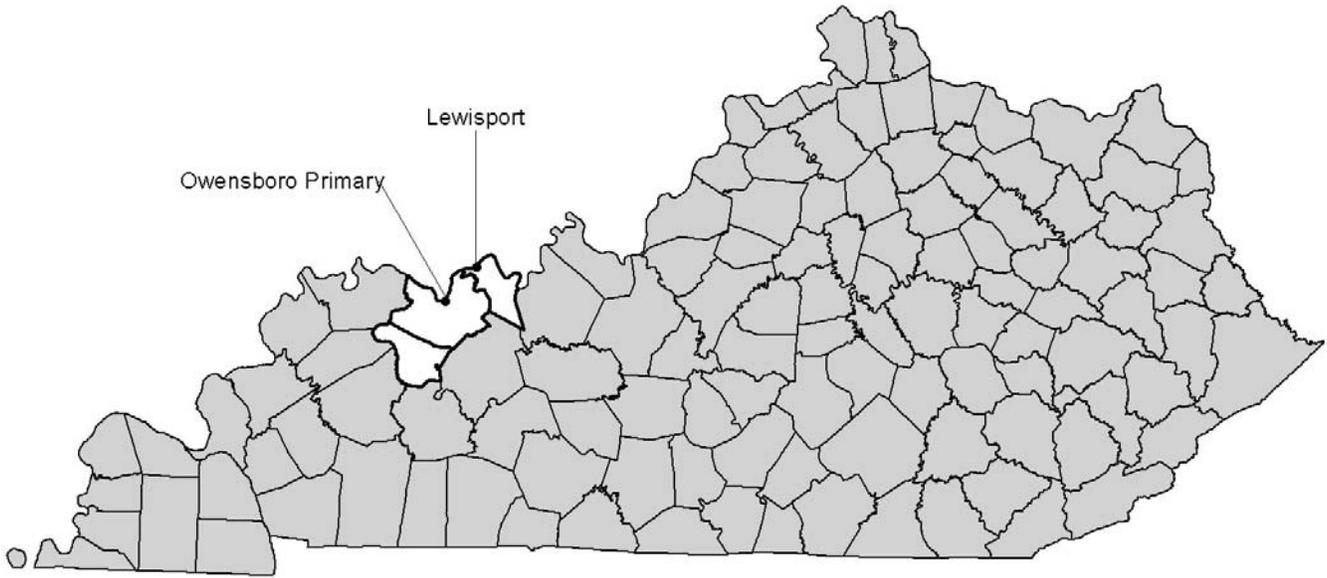
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

This site represents population exposure on a neighborhood scale.



Owensboro, KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-059-0005	716 Pleasant Valley Road Owensboro (Davies)	X(tle)		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	1

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

(Rev.5/24/11)

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 (WGS 84)

Date Established: December 1, 1970

Inspection Date: December 10, 2010

Inspection By: Jennifer F. Miller

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 48 meters from the nearest road. The most recent site inspection was conducted on December 10, 2010. 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:

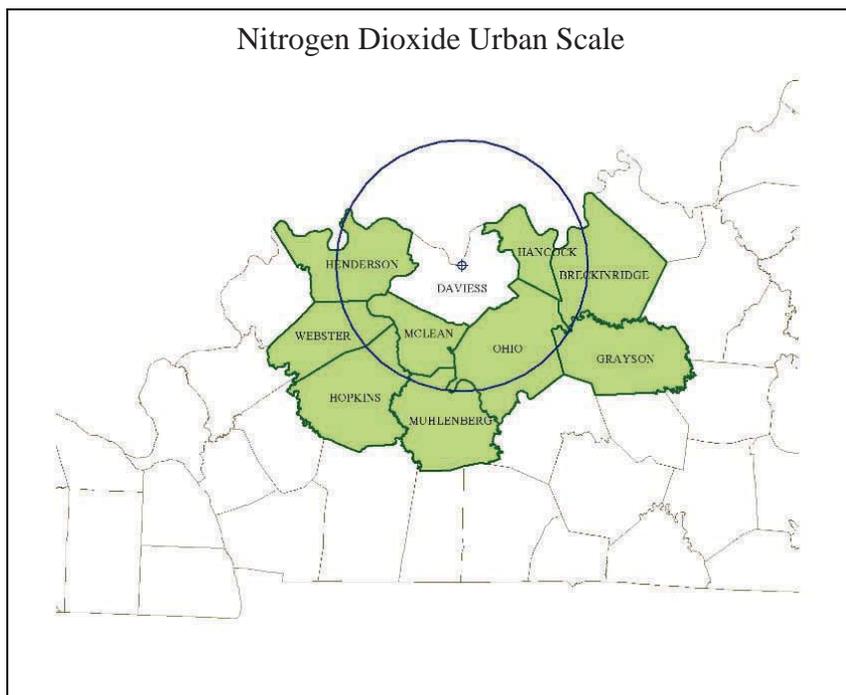
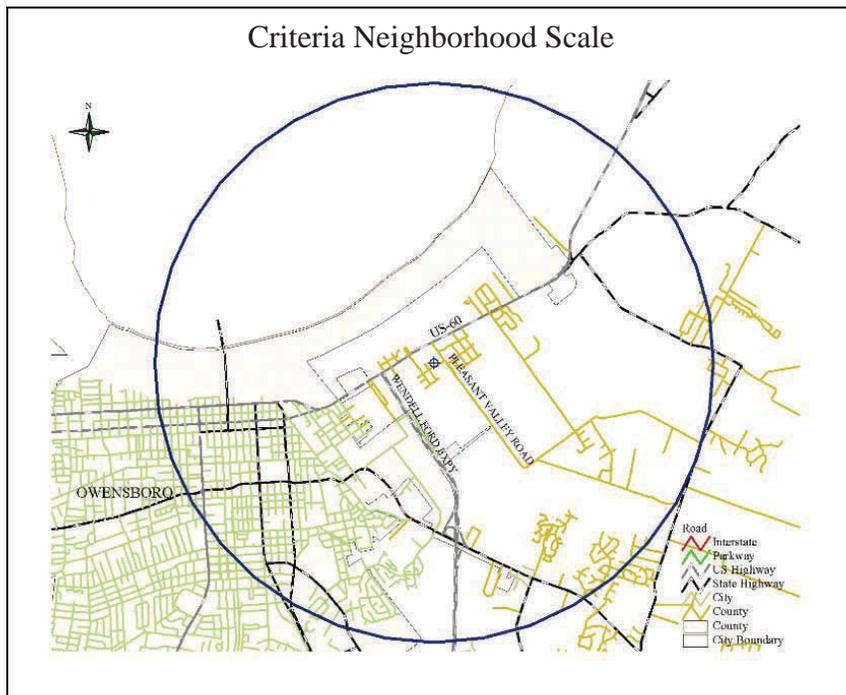
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.5	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.5	SLAMS EPISODE AQI	UV photometry	Continuously March 1 – October 31
FEM PM _{2.5}	2.2	SLAMS EPISODE AQI	Gravimetric	24-hours every third day
PM _{2.5} TEOM	4.6	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.



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: 37.93829, -86.89719 (WGS 84)

Date Established: September 5, 1980

Inspection Date: December 10, 2010

Inspection By: Jennifer F. Miller

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 57 meters from the nearest road. The most recent site inspection was conducted on December 10, 2010. 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:

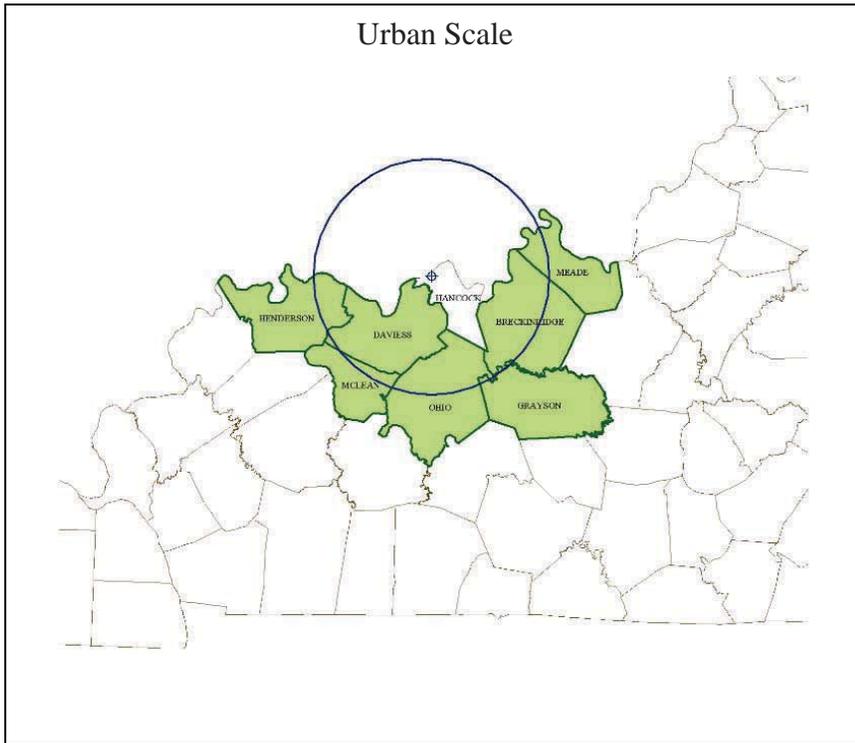
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.9	SLAMS AQI	UV photometry	Continuously March 1 – October 31

Quality Assurance Status:

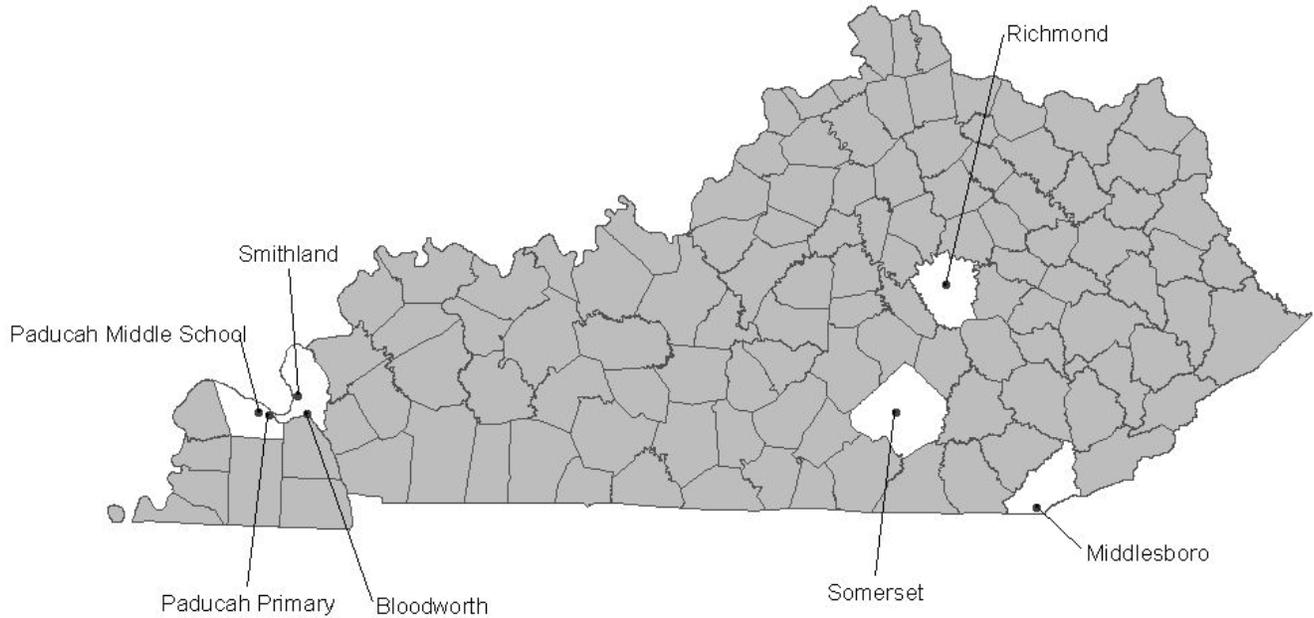
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:

This site represents maximum concentration on an urban scale.



Micropolitan Statistical Areas



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-013-0002	Airport, 34th & Dorchester Middlesboro (Bell)	X(s)					X(s)					X
21-139-0003	DOT Garage, 811 Hwy 60 East Smithland (Livingston)						X					
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	JPRECC, 2901 Powell Street Paducah (McCracken)	X(tIe)		X(eI)	X(e)		X(eI)					
21-151-0003	Mayfield Elementary, Bond St. Richmond (Madison)	X						X(e)				
21-199-0003	Somerset Gas Co., Clifty Street Somerset (Pulaski)	X(s)					X(s)					
TOTAL		5	1	1	1	0	4	2	1	0	0	2

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

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: 36.60843, -83.73694 (WGS 84)
Date Established: February 14, 1992
Inspection Date: December 15, 2010
Inspection By: Jennifer F. Miller
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 92 meters from the nearest road. The most recent site inspection was conducted on December 15, 2010. 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:

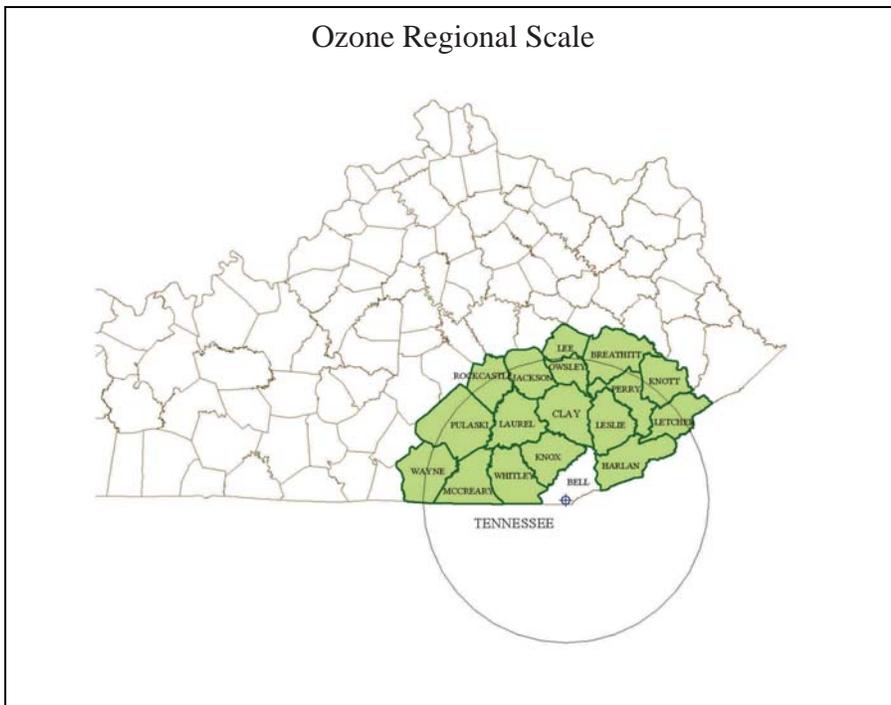
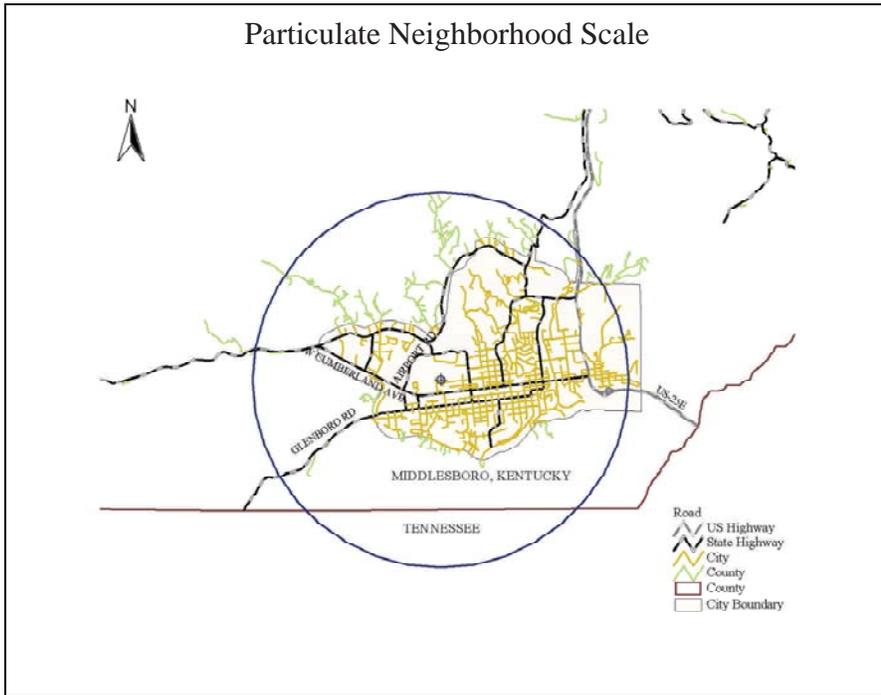
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.1	SPM AQI	UV photometry	Continuously March 1 – October 31
FRM PM _{2.5}	4.6	SPM	Gravimetric	24-hours every sixth day
Meteorological	5.7	Other	AQM grade instruments for wind speed, wind direction, humidity, 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 population exposure on a neighborhood scale for particulates. This site also represents transport on a regional scale for ozone.



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: 37.155392, -88.394024 (WGS 84)
Date Established: April 1, 1988
Inspection Date: July 7, 2010
Inspection By: Jennifer F. Miller
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 139 meters from the nearest road. The most recent site inspection was conducted on July 7, 2010. 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:

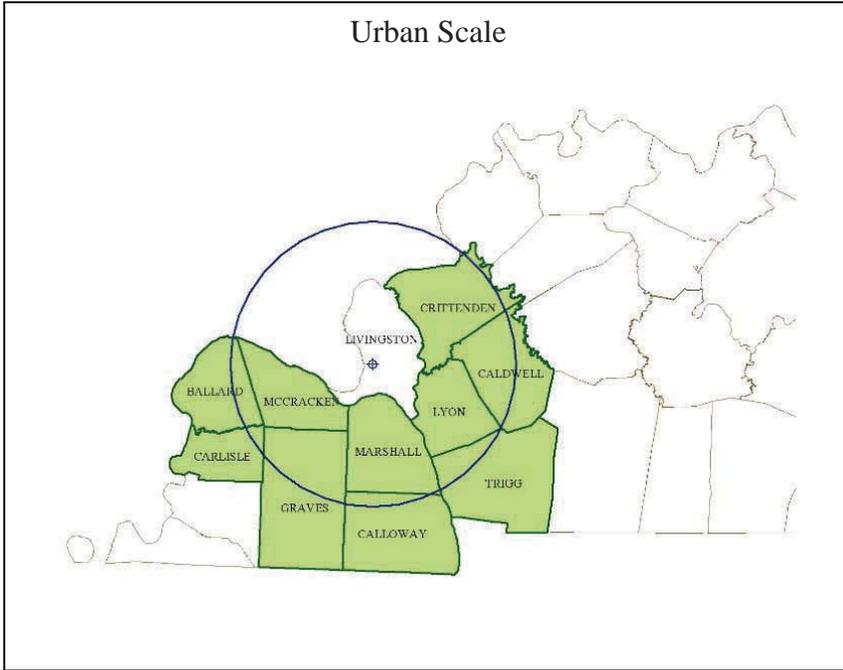
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.3	SLAMS AQI	UV photometry	Continuously March 1 – October 31

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.



CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Metropolitan 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: 37.07151, -88.33389 (WGS 84)
Date Established: September 15, 1986
Inspection Date: July 7, 2010
Inspection By: Jennifer F. Miller
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 8 meters from the nearest road. The most recent site inspection was conducted on July 7, 2010. 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	4.6	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.

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: 37.06636, -88.63774 (WGS 84)
Date Established: July 1, 1969
Inspection Date: July 8, 2010
Inspection By: Jennifer F. Miller
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 60 meters from the nearest road. The most recent site inspection was conducted on July 8, 2010. 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:

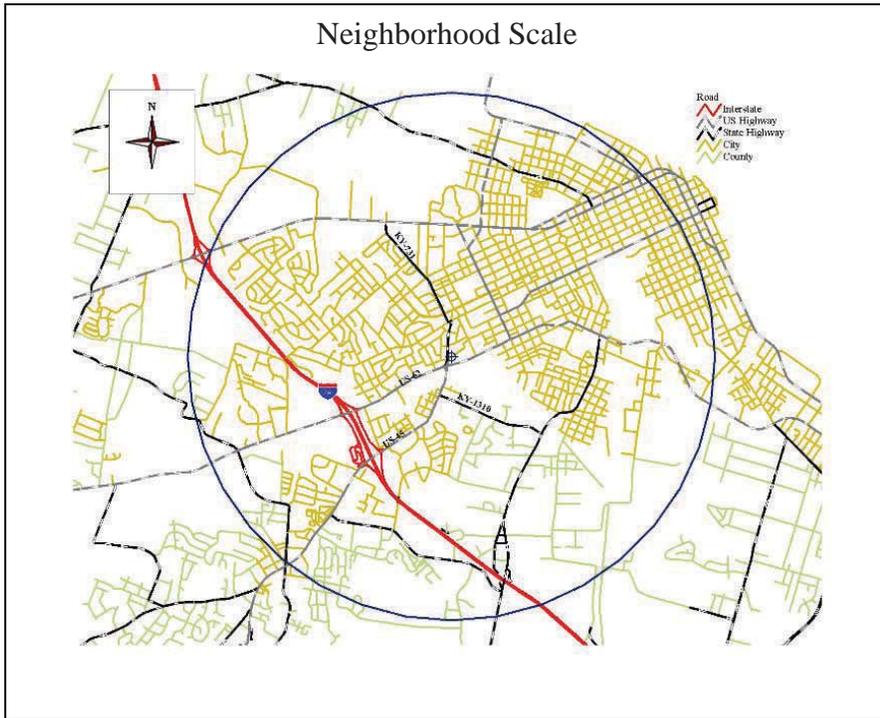
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FEM PM _{2.5}	10.1	SLAMS	Gravimetric	24-hours every third day
FRM PM ₁₀	9.9	SLAMS	Gravimetric	24-hours every sixth day

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.



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: 37.05822, -88.57251 (WGS 84)
Date Established: August 15, 1980
Inspection Date: July 8, 2010
Inspection By: Jennifer F. Miller
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 9 meters from the nearest road. The most recent site inspection was conducted on July 8, 2010. 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:

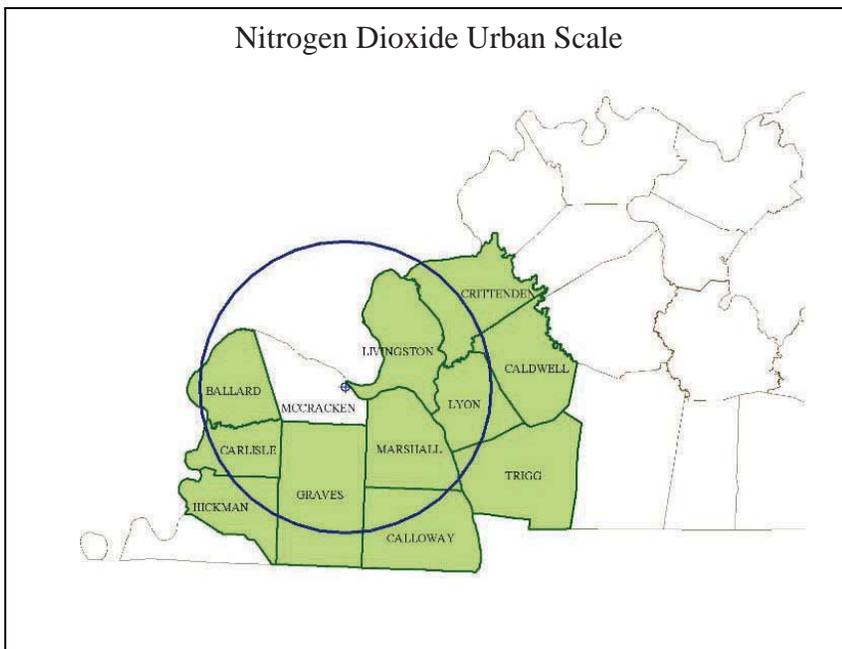
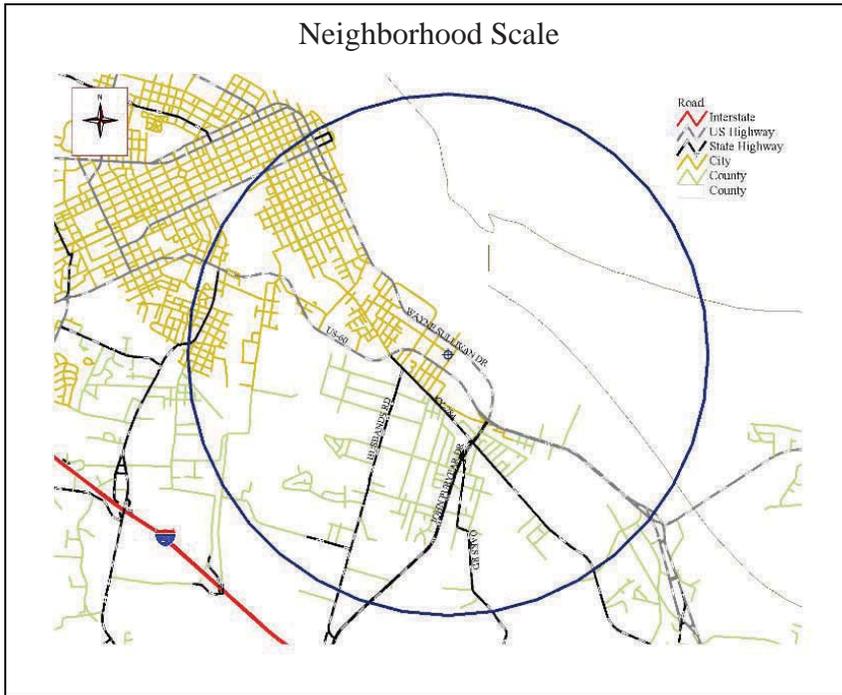
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.7	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.7	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
PM _{2.5} TEOM	4.8	SPM AQI	Tapered element oscillating microbalance, 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.



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: 37.73846, -84.28484 (WGS 84)

Date Established: January 1, 1999

Inspection Date: October 5, 2010

Inspection By: Jennifer F. Miller

Site Approval Status: Site and PM_{2.5} monitors meet all design criteria for the monitoring network. Siting criteria for the lead samplers has not been approved by the EPA.



The monitoring site is located on the roof of the Mayfield Elementary School in Richmond, Kentucky. The sample inlets are 65 meters from the nearest road. The most recent site inspection was conducted on October 5, 2010. Upon inspection, the sample inlet and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, C, D and E.

Monitoring Objective:

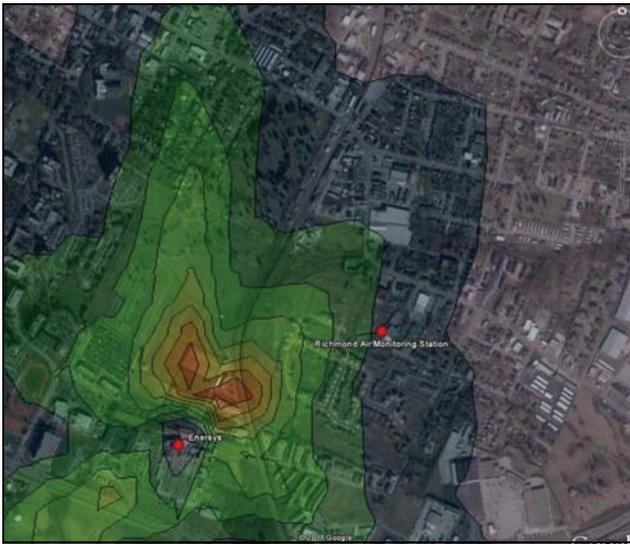
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM _{2.5}	5.5	SLAMS	Gravimetric	24-hours every third day
FRM Lead	4.5	SLAMS	High volume air sampler. Analysis via ICP-MS.	24-hours every sixth day
- Collocated FRM Lead	4.5	SLAMS	High volume air sampler. Analysis via ICP-MS.	24-hours every twelfth day

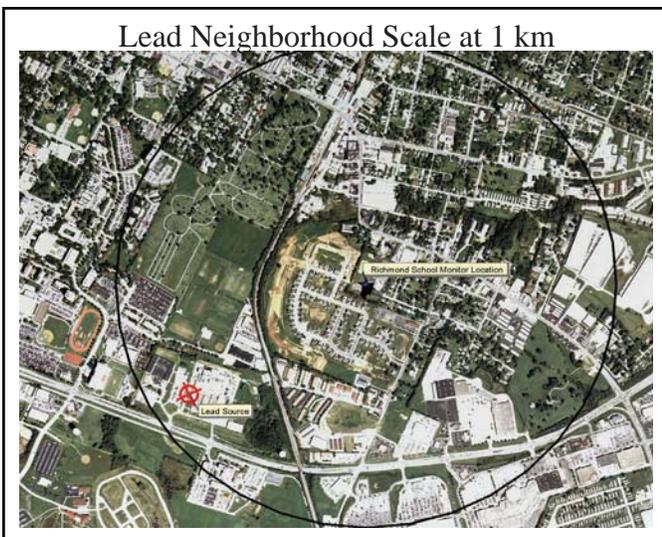
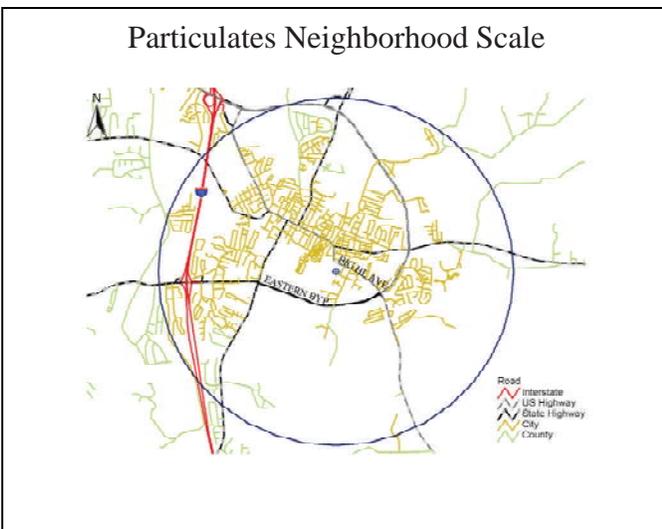
Quality Assurance Status:

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.



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: 37.09798, -84.61152 (WGS 84)
Date Established: February 14, 1992
Inspection Date: November 30, 2010
Inspection By: Jennifer F. Miller
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 10 meters from the nearest road. The most recent site inspection was conducted on November 30, 2010. 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, and E.

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:

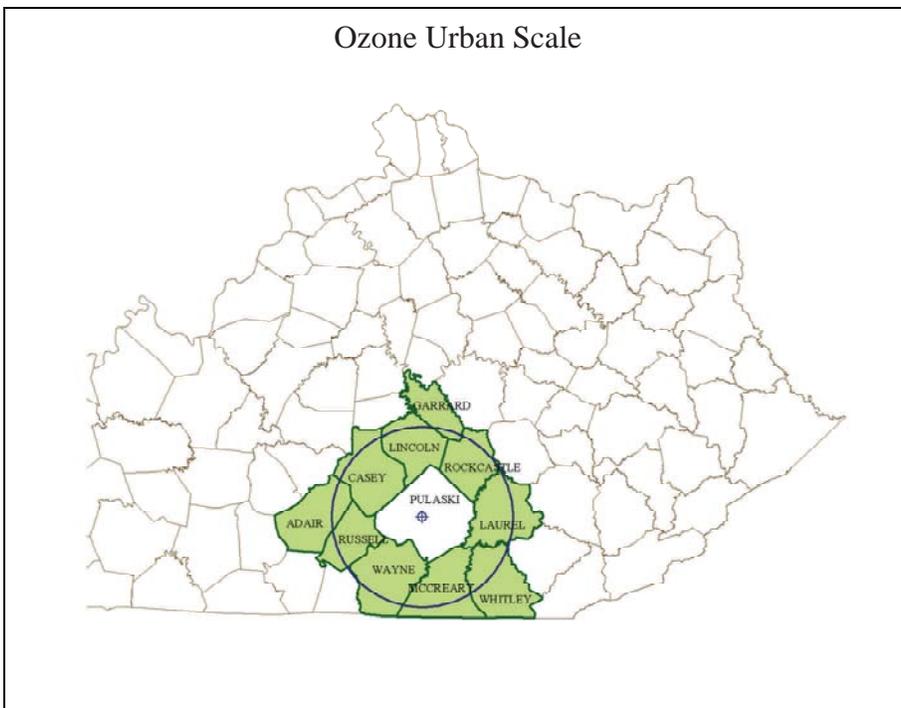
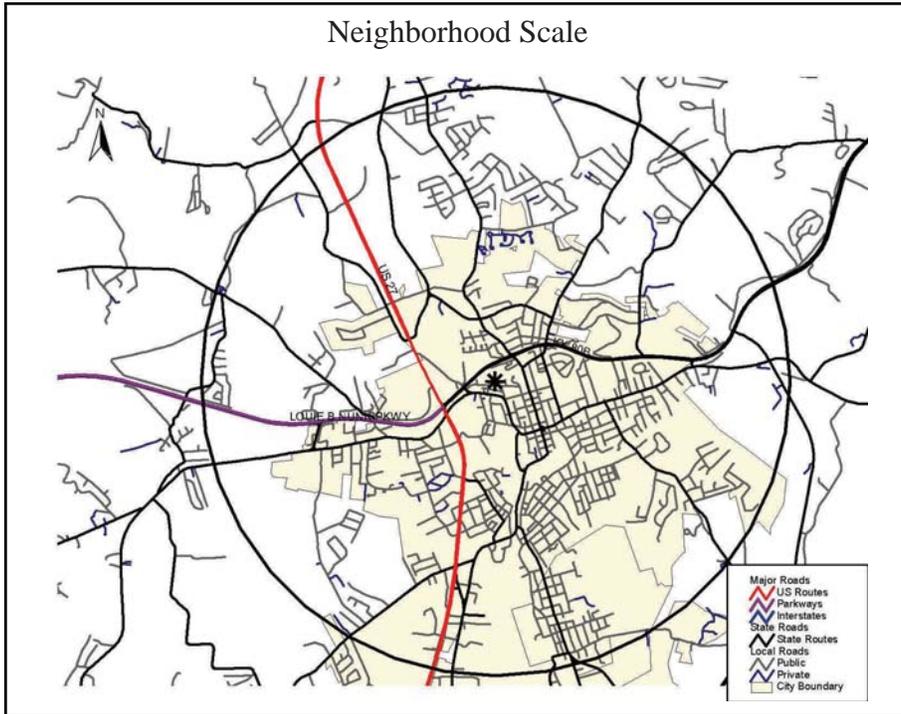
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.4	SPM AQI	UV photometry	Continuously March 1 – October 31
FRM PM _{2.5}	4.6	SPM	Gravimetric	24-hours every third day

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



Not in a Metropolitan or Micropolitan Statistical Area



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	CO	O3	Lead	VOC	Carbonyl	Speciation	MET
21-043-0500	Camp Webb, Grayson Lake Grayson (Carter)	X	X(cm)				X(s)		X(d)	X(d)	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(sm)						X			
21-157-0019	4237 Gilbertsville Hwy Calvert City (Marshall)								X			
21-193-0003	Perry County Horse Park Hazard (Perry)	X(t)					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)					X
21-207-0001	Salem Elementary Russell Springs (Russell)							X				
TOTAL		5	3	0	0	0	4	1	7	2	1	3

- (c) Collocated Monitors
- (d) Duplicate Monitor
- (s) Special Purpose Monitor
- (t) Continuous PM Monitor
- (m) Metals

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: 38.23887, -82.98810 (WGS 84)

Date Established: May 13, 1981

Inspection Date: December 7, 2010

Inspection By: Jennifer F. Miller

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 and is 98 meters from the site. The most recent site inspection was conducted on December 7, 2010. Upon inspection, the sample lines and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, C, D, and E.

Monitoring Objective:

The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to determine background levels of PM_{2.5} and PM₁₀; to provide ozone data upwind of the Ashland area; 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	4.0	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	Ion chromatography and X-ray fluorescence	24-hours every sixth day
- Carbon Speciation	4.0	SLAMS	Thermal-optical	24-hours every sixth day
FRM PM ₁₀	3.2	SLAMS	Gravimetric	24-hours every sixth day
- Collocated PM ₁₀	3.2	SLAMS	Gravimetric	24-hours every twelfth day
- Metals PM ₁₀		NATTS	Determined from the PM ₁₀ samples using EPA method IO 3.5	Same as PM ₁₀

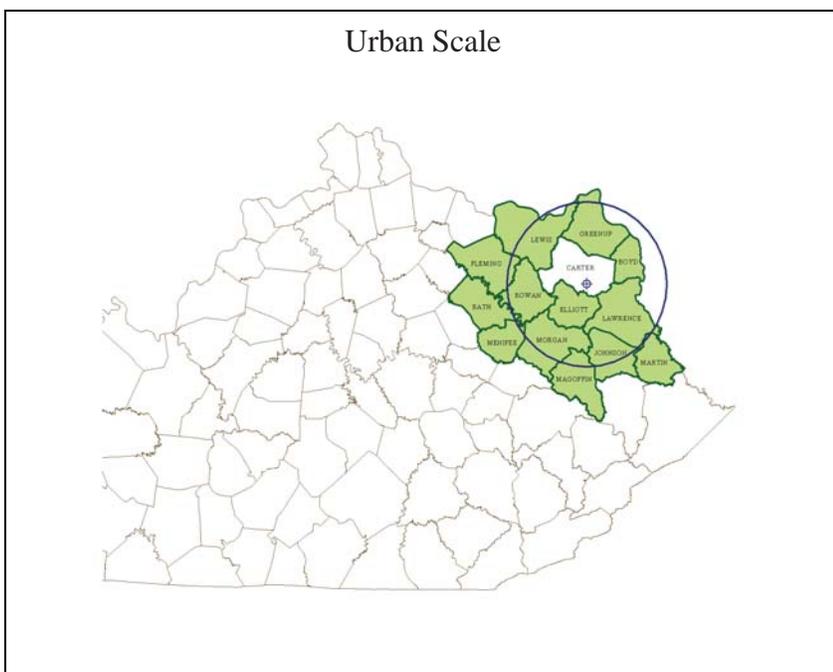
Volatile Organic Compounds	4.2	NATTS	EPA method TO-15.	24-hours every sixth day
- Duplicate Volatile Organic Compounds		NATTS	EPA method TO-15. Collected via same sampling system as primary VOCs.	24-hours. 6 samples per year.
Polycyclic Aromatic Hydrocarbons	1.7	NATTS	EPA method TO-13A	24-hours every sixth day
Carbonyls	3.9	NATTS	EPA method TO-11A	24-hours every sixth day
- Duplicate Carbonyls		NATTS	EPA method TO-11A. Collected via same sampling system as primary carbonyls.	24-hours every twelfth day
Chrome _{VI}	3.4	NATTS	SOP for the Determination of Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography (IC)	24-hours every sixth day
- Collocated Chrome _{VI}	3.3	NATTS	SOP for the Determination of Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography (IC)	24-hours every twelfth day
Meteorological	7.5 4.7 1.3	Other	AQM grade instruments for wind speed, wind direction, relative humidity, and temperature Solar Radiation 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.



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: 37.04520, -88.33087 (WGS 84)

Date Established: January 1, 2005

Inspection Date: July 8, 2010

Inspection By: Jennifer F. Miller

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 inlets are 2 meters above ground level. The inlets are 230 meters from the nearest road. The most recent site inspection was conducted on July 8, 2010. Upon inspection, the sample inlets and monitors were found to be in good condition.

Monitoring Objective:

The monitoring objectives are to detect and quantify air toxic pollutants.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	2.1	SPM	EPA method TO-15	24-hours every sixth day
- Collocated Volatile Organic Compounds	2.0	SPM	EPA method TO-15	24-hours every sixth day

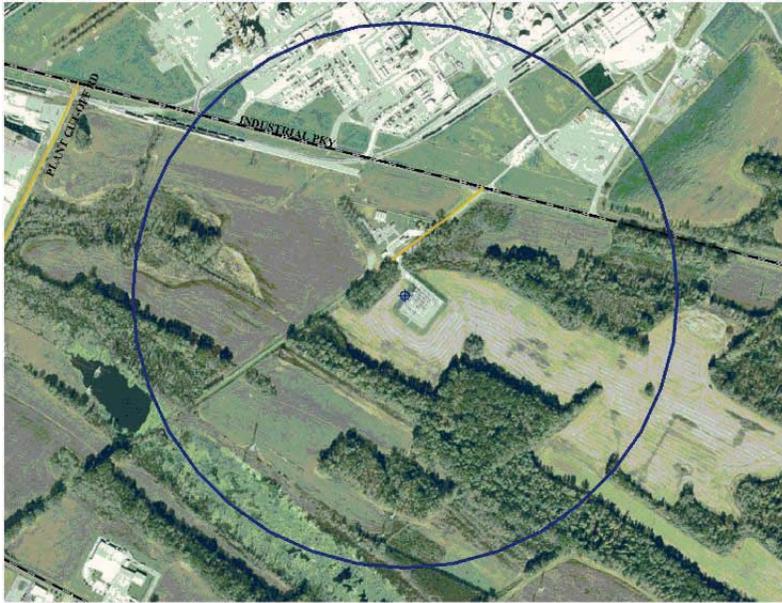
Quality Assurance Status:

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: 37.04176, -88.35407 (WGS 84)
Date Established: January 1, 2005
Inspection Date: July 8, 2010
Inspection By: Jennifer F. Miller
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 and 43 meters from the nearest road. The most recent site inspection was conducted on July 8, 2010. Upon inspection, the sample inlet and monitor were found to be in good condition.

Monitoring Objective:

The monitoring objectives are to detect and quantify air toxic pollutants.

Monitors:

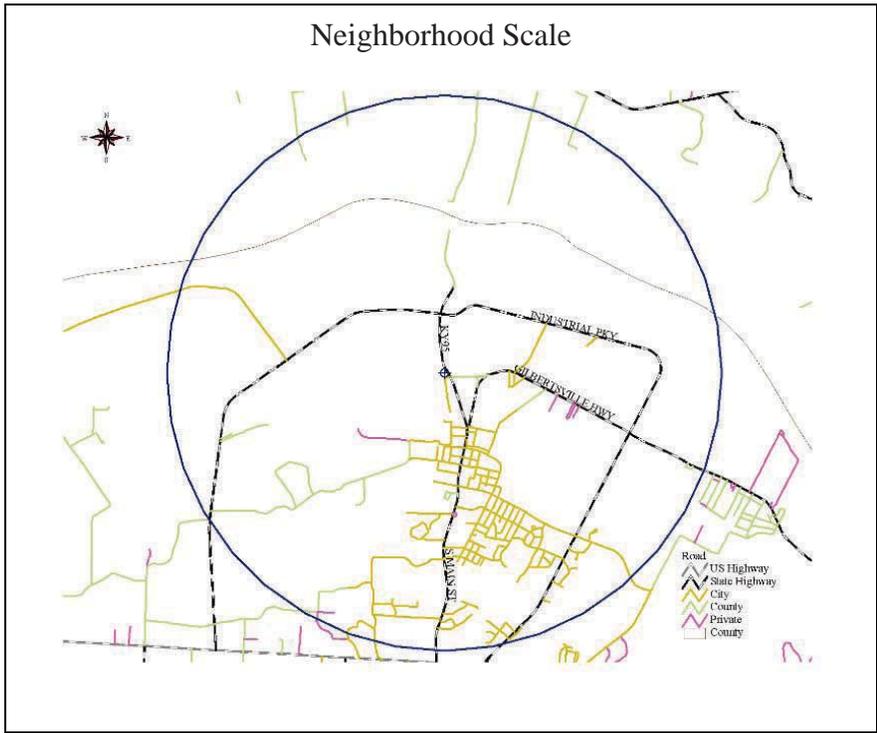
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	1.9	SPM	EPA method TO-15	24-hours every sixth day

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.



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: 37.02702, -88.34387(WGS 84)

Date Established: May 1, 2005

Inspection Date: July 7, 2010

Inspection By: Jennifer F. Miller

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 128 meters from the nearest road. The most recent site inspection was conducted on July 7, 2010. 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 detect and quantify air toxic pollutants, and to provide meteorological data for air toxics analysis.

Monitors:

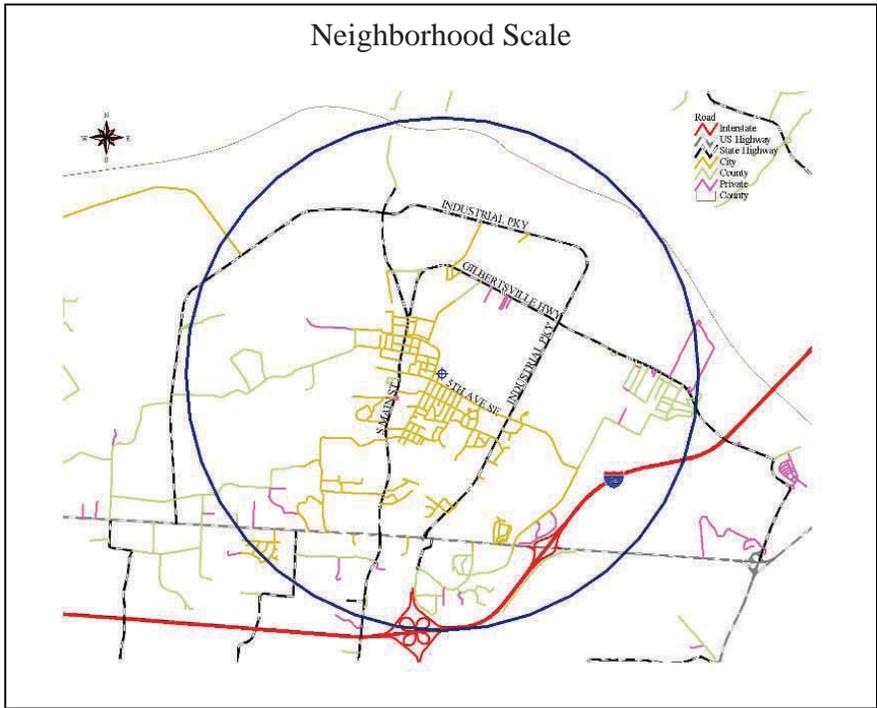
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM ₁₀	4.4	SPM	Gravimetric	24-hours every sixth day
- Metals PM ₁₀		SPM	Determined from the PM ₁₀ sample using EPA method IO 3.5	Same as PM ₁₀
Volatile Organic Compounds	4.4	SPM	EPA method TO-15	24-hours every sixth 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.



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 (WGS 84)

Date Established: September 15, 2007

Inspection Date: July 8, 2010

Inspection By: Jennifer F. Miller

Site Approval Status: Site and monitor meet all design criteria for the monitoring network.



The monitoring site consists of a 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 28 meters from the nearest road. The most recent site inspection was conducted on July 8, 2010. Upon inspection, the sample inlet and monitor were found to be in good condition.

Monitoring Objectives:

The monitoring objectives are to detect and quantify air toxic pollutants.

Monitors:

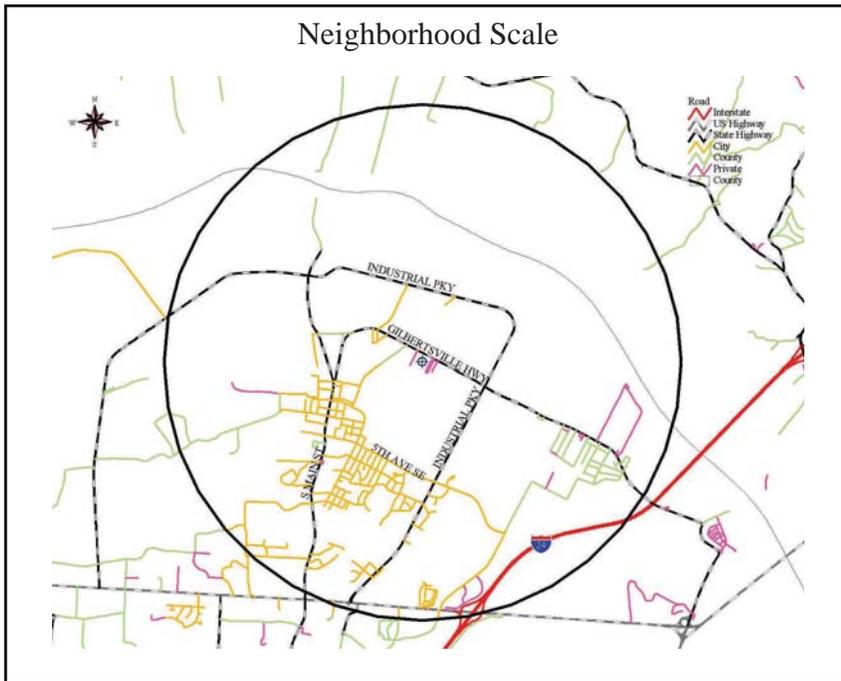
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Volatile Organic Compounds	2.0	SPM	EPA method TO-15	24-hours every sixth day

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.



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: 37.28329, -83.20932 (WGS 84)

Date Established: April 1, 2000

Inspection Date: December 8, 2010

Inspection By: Jennifer F. Miller

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 33 meters from the nearest road. The most recent site inspection was conducted on December 8, 2010. 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:

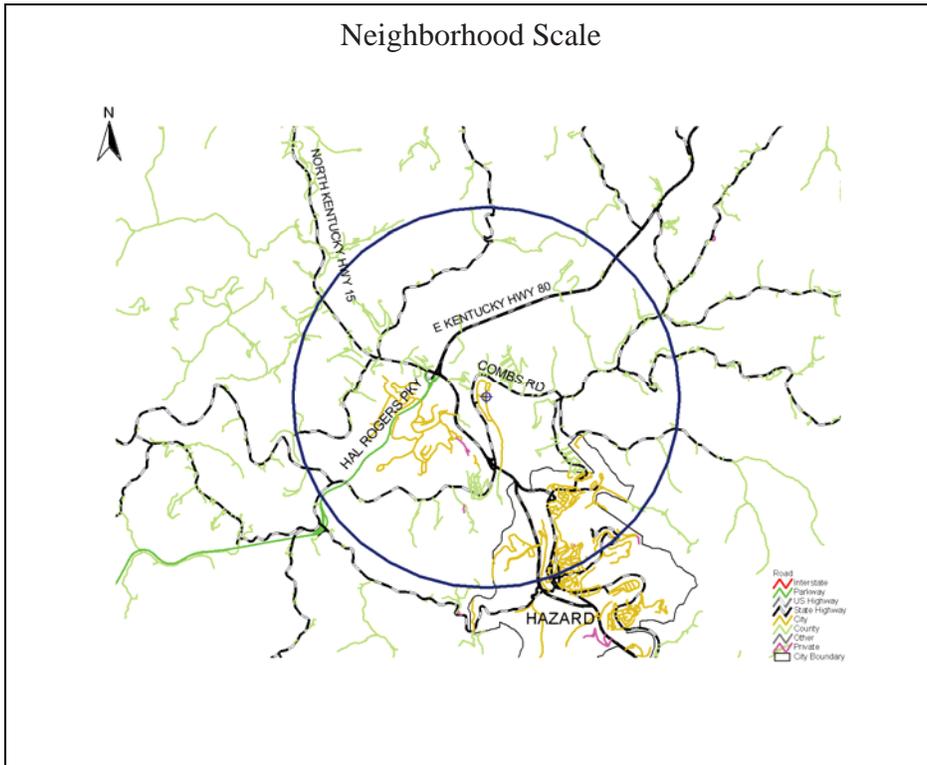
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.6	SPM EPISODE AQI	UV photometry	Continuously March 1 – October 31
PM _{2.5} TEOM	5.3	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
Meteorological	13	Other	AQM grade instruments 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.



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: 37.48260, 82.53532 (WGS 84)

Date Established: May 1, 1994

Inspection Date: December 8, 2010

Inspection By: Jennifer F. Miller

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 88 meters from the nearest road. The most recent site inspection was conducted on December 8, 2010. Upon inspection the sample lines and monitors were found to be in good condition. This site meets the requirements of 40 CFR 58, Appendices A, 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	3.7	SPM AQI	UV photometry	Continuously March 1 – October 31
FRM PM _{2.5}	4.7	SLAMS	Gravimetric	24-hours every sixth day
- Collocated FRM PM _{2.5}	4.7	SLAMS	Gravimetric	24-hours every sixth day
PM _{2.5} TEOM	4.7	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.

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: 36.708607, -86.566284 (WGS 84)

Date Established: June 19, 1991

Inspection Date: October 28, 2010

Inspection By: Jennifer F. Miller

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 39 meters from the nearest road. The most recent site inspection was conducted on October 28, 2010. 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:

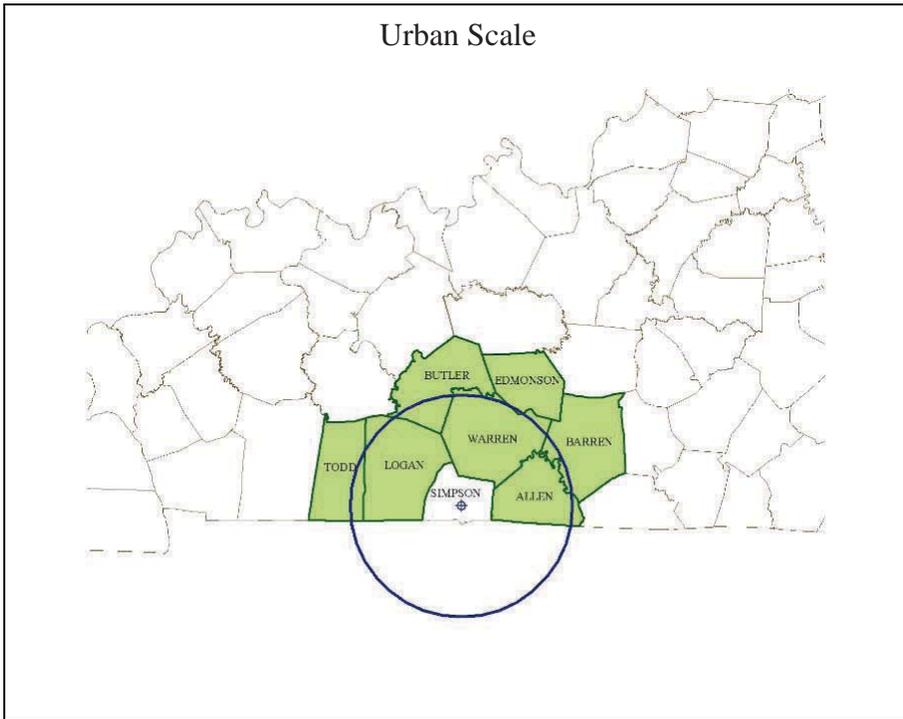
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.3	SPM AQI	UV photometry	Continuously March 1 – October 31
Meteorological	7.5	Other	AQM grade instruments for wind speed, wind direction, relative humidity, barometric pressure, and temperature	Continuously

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.



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: 21-207-0001

Location: Salem Elementary School, 1409 S. Highway 76, Russell Springs, KY 42642

County: Russell

GPS Coordinates: 37.06944; -84.98925 (WGS 84)

Date Established: January 1, 2010

Inspection Date: Jennifer F. Miller

Inspection By: November 30, 2010

Site Approval Status: Site and monitors meet all design criteria for the monitoring network.



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 is 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. The sample inlet is 8.5 meters from the nearest road. The most recent site inspection was conducted on November 30, 2010. The site was found to be in accordance with 40 CFR Part 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 Lead	2.0	SLAMS	High volume air sampler. Analysis via optical emission spectroscopy.	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:

The site represents maximum concentrations, from a source, on a micro scale for lead.



This page intentionally left blank



APPENDIX A

**MEMORANDUM OF AGREEMENT
CINCINNATI, OH-KY-IN MSA**

MEMORANDUM OF AGREEMENT
ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR
THE CINCINNATI OH-KY-IN
METROPOLITAN STATISTICAL AREA (MSA)

Participating Agencies:

Kentucky Department for Environmental Protection (KDEP)
Division for Air Quality (DAQ)

Hamilton County Department of Environmental Services (HCDOES)

Indiana Department of Environmental Management (IDEM)
Office of Air Quality (OAQ)

PURPOSE/OBJECTIVES/GOALS

The purpose of this Memorandum of Agreement (MOA) is to establish the Cincinnati OH-KY-IN Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement among KDEP, IDEM, and HCDOES to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for particles of an aerodynamic diameter of 10 micrometers and less (PM10), particles of an aerodynamic diameter of 2.5 micrometers and less (PM2.5), and ozone; as well as other criteria pollutant air quality monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all parties. According to 40 CFR Part 58, Appendix D, the Cincinnati OH-KY-IN MSA minimum monitoring requirements (based on a population of 2,172,000) are (2) ozone monitors, (2-4) PM-10 monitors, (3) FRM PM-2.5 monitors, and (2) collocated continuous PM-2.5 monitors with the FRM PM-2.5 monitors. This MOA will formalize and reaffirm the collective agreement in order to provide adequate criteria pollutant monitoring for the Cincinnati OH-KY-IN MSA as required by 40 CFR 58 Appendix D, Section 2(e).

PM2.5 MSA monitoring network includes:

County	Federal Reference Method PM2.5	Continuous PM2.5	Speciation PM2.5	Collocated PM2.5
Campbell County, KY KDEP	1	1	0	0
Boone County, KY KDEP	0	0	0	0
Hamilton County, OH HCDOES	4	2	1	1
Butler County, OH HCDOES	2	0	0	1
Clermont County, OH HCDOES	1	1	0	0
Warren County, OH HCDOES	1	1	0	0
Franklin County, IN IDEM	0	0	0	0
Dearborn County, IN IDEM	0	0	0	0
Ohio County, IN IDEM	0	0	0	0

Criteria Air Pollutant MSA monitoring network includes:

County	PM10	O ₃	NO _x /NO/NO ₂	CO	SO ₂
Campbell County, KY KDEP	0	1	1	0	1
Boone County, KY KDEP	0	1	0	0	0
Hamilton County, OH HCDOES	3	3	1	1	1
Butler County, OH HCDOES	2	2	0	0	0
Clermont County, OH HCDOES	0	1	0	0	0
Warren County, OH HCDOES	0	1	0	0	0
Franklin County, IN IDEM	0	0	0	0	0
Dearborn County, IN IDEM	0	0	0	0	0
Ohio County, IN IDEM	0	0	0	0	0

RESPONSIBILITIES/ACTIONS

Each of the parties to this Agreement is responsible for ensuring that its obligations under the MOA are met. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected agency shall inform the other affected agencies via telephone or email of any monitoring changes occurring within its jurisdiction of the MSA at its earliest convenience, after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to natural disasters, or any occurrences that result in an extended (greater than one quarter) or permanent change in the monitoring network.

LIMITATIONS

- All commitments made in this MOA are subject to the availability of appropriated funds and each agency's budget priorities. Nothing in this MOA obligates KDEP, IDEM, or HCDOES to expend appropriations or to enter into any contract, assistance agreement, interagency agreement or other financial obligation.
- This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this agreement will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate agreements that will be affected in writing by representatives of the parties.
- This MOA does not create any right or benefit enforceable by law or equity against KDEP, IDEM, or HCDOES, their officers or employees, or any other person. This MOA does not apply to any entity outside KDEP, IDEM, or HCDOES.
- No proprietary information or intellectual property is anticipated to arise out of this MOA.

TERMINATION

This Memorandum of Agreement may be revised upon the mutual consent of KDEP, IDEM, and HCDDES. Each party reserves the right to terminate this MOA. A thirty (30) day written notice must be given prior to the date of termination.

APPROVALS

We agree with the provisions outlined in this Memorandum of Agreement and commit our agencies to implement them in a spirit of cooperation and mutual support.

Kentucky Department for Environmental Protection
Division for Air Quality

BY: John Lyons

TITLE: Director, Division for Air Quality

DATE: 5/13/10

Hamilton County Department of Environmental Services

BY: Cory Chadwick

TITLE: Director

DATE: 5/13/10

Indiana Department of Environmental Management
Office of Air Quality

BY: Keith Baugues

TITLE: Assistant Commissioner, Office of Air Quality

DATE: 5/14/10

This page intentionally left blank



APPENDIX B

**MEMORANDUM OF AGREEMENT
EVANSVILLE, IN-KY MSA**

**MEMORANDUM OF AGREEMENT
ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR
THE EVANSVILLE, IN-HENDERSON, KY
METROPOLITAN STATISTICAL AREA (MSA)**

Participating Agencies:

Kentucky Department for Environmental Protection (KDEP)
Division for Air Quality (DAQ)

Indiana Department of Environmental Management (IDEM)
Office of Air Quality (OAQ)

PURPOSE/OBJECTIVES/GOALS

The purpose of this Memorandum of Agreement (MOA) is to establish the Evansville, IN-Henderson, KY Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement among KDEP and IDEM to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for particles of an aerodynamic diameter of 10 micrometers and less (PM 10), particles of an aerodynamic diameter of 2.5 micrometers and less (PM2.5), and ozone; as well as other criteria pollutant air quality monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all parties. According to 40 CFR Part 58, Appendix D, the Evansville, IN-Henderson, KY MSA minimum monitoring requirements (based on a population of 350,000) are (2) ozone monitors, (0-1) PM-10 monitors, (1) FRM PM-2.5 monitor, and (1) collocated continuous PM-2.5 monitor with the FRM pm-2.5 monitor. This MOA will formalize and reaffirm the collective agreement in order to provide adequate criteria pollutant monitoring for the Evansville, IN-Henderson, KY MSA as required by 40 CFR 58 Appendix D, Section 2, (e).

PM 2.5 MSA monitoring network includes:

County	Federal Reference Method PM2.5	Continuous PM2.5	Speciation PM2.5	Collocated PM2.5
Henderson County, KY KDEP	1	1	0	0
Vanderburgh County, IN IDEM	3	1	1	1

Criteria Air Pollutant MSA monitoring network includes:

County	PM10	O ₃	NO _x /NO/NO ₂	CO	SO ₂
Henderson County, KY KDEP	1	1	0	0	1
Vanderburgh County, IN IDEM	1	2	1	1	1

RESPONSIBILITIES/ACTIONS

Each of the parties to this Agreement is responsible for ensuring that its obligations under the MOA are met. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected agency shall inform the other affected agencies via telephone or email of any monitoring changes occurring within its jurisdiction of the MSA at its earliest convenience, after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to natural disasters, or any occurrences that result in an extended (greater than one quarter) or permanent change in the monitoring network.

LIMITATIONS

- All commitments made in this MOA are subject to the availability of appropriated funds and each agency's budget priorities. Nothing in this MOA obligates KDEP or IODEM to expend appropriations or to enter into any contract, assistance agreement, interagency agreement or other financial obligation.
- This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this agreement will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate agreements that will be affected in writing by representatives of the parties.
- This MOA does not create any right or benefit enforceable by law or equity against KDEP or IDEM, their officers or employees, or any other person. This MOA does not apply to any entity outside KDEP or IDEM.
- No proprietary information or intellectual property is anticipated to arise out of this MOA.

TERMINATION

This Memorandum of Agreement may be revised upon the mutual consent of KDEP and IDEM. Each party reserves the right to terminate this MOA. A thirty (30) day written notice must be given prior to the date of termination.

APPROVALS

We agree with the provisions outlined in this Memorandum of Agreement and commit our agencies to implement them in a spirit of cooperation and mutual support.

Kentucky Department for Environmental Protection
Division for Air Quality

BY: John S. Lyons

TITLE: Director, Division for Air Quality

DATE: 5/14/10

Indiana Department of Environmental Management
Office of Air Quality

BY: Keith Baugues

TITLE: Assistant Commissioner, Office of Air Quality

DATE: 5/24/10



APPENDIX C

**MEMORANDA OF AGREEMENT
CLARKSVILLE, TN-KY MSA**



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
 DIVISION OF AIR POLLUTION CONTROL
 9TH FLOOR, L & C ANNEX
 401 CHURCH STREET
 NASHVILLE, TN 37243-1531



October 25, 2007

John S. Lyons, Director
 Kentucky Division for Air Quality
 Kentucky Department for Environmental Protection
 803 Schenkel Lane
 Frankfort, KY 40601

Dear Mr. Lyons:

The United States Environmental Protection Agency (EPA) revised monitoring regulations promulgated in Federal Register / Vol. 71, No. 200 / Tuesday, October 17, 2006 / Rules and Regulations, 40 CFR Part 58, Appendix D states in part: "The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator." This revision of the CFR also describes the minimum monitoring requirements for the NAAQS pollutants, including continuous PM 2.5 as it applies to MSA areas where the population is sufficient to warrant monitoring for that pollutant. Tennessee and Kentucky share the Clarksville, TN-KY MSA, which is comprised of Trigg and Christian counties in Kentucky and Stewart and Montgomery counties in Tennessee. The US Census Bureau lists this area as containing a population in excess of 230,000:

CBSA Code	Geographic area	Legal/statistical area description	July 1, 2005 Estimate	2000 Census
17300	Clarksville, TN-KY	Metropolitan Statistical Area	243,665	232,000

The Tennessee Division of Air Pollution Control (TDAPC) currently operates one (1) PM 2.5 FRM monitor and one (1) speciation monitor in Montgomery county and is installing a new continuous PM 2.5 monitor in this area. The TDAPC believes the operation of the existing PM 2.5 monitors; (FRM, speciation and new continuous), are sufficient to properly characterize the particulate air quality in the entire Clarksville, TN-KY MSA and comply with the requirements for both population and concentration based monitoring identified in the revised monitoring regulations as found at FR Vol. 71, No. 200 / Tuesday, October 17, 2006 p. 61321, "Table D-5" and FR Vol. 71, No. 200 / Tuesday, October 17, 2006 p. 61322, "4.7.2 Requirement for Continuous PM2.5 Monitoring". The TDAPC would like to invite the Kentucky Division for Air Quality to participate in Tennessee's annual ambient air monitoring network review. Tennessee commits to sharing with Kentucky any and all quality assured ambient air

John S. Lyons
October 25, 2007
Page 2

monitoring data collected in the Tennessee portion of the Clarksville, TN-KY MSA. Tennessee also will notify Kentucky in advance of the intent to relocate or shutdown any of the PM 2.5 monitors referenced above so that adequate monitoring arrangements can be made to meet the entire MSA monitoring requirements for PM 2.5.

Sincerely,

A handwritten signature in black ink, reading "Barry R. Stephens". The signature is written in a cursive style with a large, sweeping flourish at the end.

Barry R. Stephens, PE
Director, Air Pollution Control Division

BRS/erb

cc: Beverly Banister, US EPA Region IV



ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

Ernie Fletcher
Governor

Department for Environmental Protection
Division for Air Quality
803 Schenkel Lane
Frankfort, Kentucky 40601-1403

Teresa J. Hill
Secretary

November 27, 2007

Barry R. Stephens, PE
Director
Division of Air Pollution Control
9th Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243-1531

Dear Mr. Stephens:

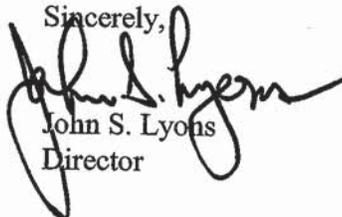
In a letter from your office dated October 25, 2007, the Tennessee Division of Air Pollution Control (TDAPC) agrees to operate a continuous PM_{2.5} monitor in the Clarksville/Hopkinsville metropolitan statistical area (MSA) to meet U.S. EPA's monitoring requirements. The Kentucky Division for Air Quality (DAQ) appreciates TDAPC's commitment to operate the PM_{2.5} monitor to meet all of the regulatory requirements for the MSA. DAQ also looks forward to participating in TDAPC's annual ambient air monitoring network review.

In accordance with Table D-2 of Appendix D to 40 CFR Part 58, one (1) ozone monitor is required to be operated in the Clarksville/Hopkinsville MSA. To satisfy the regulatory requirement, the DAQ agrees to operate an ozone monitor at the Hopkinsville monitoring station. DAQ commits to sharing with TDAPC any and all quality assured ambient air monitoring data collected in the Kentucky portion of the Clarksville/Hopkinsville MSA.

In the event that a shutdown or relocation of the ozone monitor is necessary, DAQ will notify TDAPC prior to the shutdown or relocation. Also, DAQ will operate the ozone monitor in accordance with all ambient air monitoring requirements located in 40 CFR Parts 50, 53, and 58.

If you have questions or concerns, please contact me at (502) 573-3382.

Sincerely,



John S. Lyons
Director

JSL/SOA/bss
c: Doug Neeley, US EPA Region 4





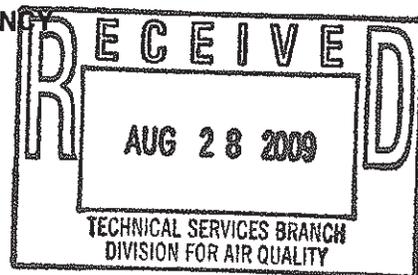
APPENDIX D

2009 LEAD WAIVER REQUEST



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960



AUG 20 2009

Ms. Stephanie B. McCarthy
Manager
Technical Services Branch
Kentucky Division for Air Quality
200 Fair Oaks Lane
Frankfort, Kentucky 40601

Dear Ms. McCarthy:

This is in response to your letter dated June 30, 2009, requesting that the U.S. Environmental Protection Agency (EPA) Region 4 grant a waiver of source-oriented lead (Pb) monitoring requirements for several sources. Ambient air monitoring network design criteria for Pb are found at Section 4.5 of appendix D to 40 CFR part 58. This section requires that, at a minimum, there must be one source-oriented State or Local Air Monitoring Station (SLAMS) located to measure the maximum Pb concentration in ambient air resulting from each Pb source which emits 1.0 or more tons per year. Section 4.5(a)(ii) of appendix D to 40 CFR part 58, however, provides the following provisions for a waiver of these requirements:

“(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near 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 [National Ambient Air Quality Standards (NAAQS)] (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).”

The Kentucky Division for Air Quality (KDAQ) has submitted air modeling indicating that the following sources will not contribute to a maximum Pb concentration in the ambient air in excess of 50% the NAAQS:

American Electric Power
Big Sandy Generating Plant
US 23 6 Miles N
Louisa, Kentucky 41230

NewPage Wickliffe Mill
1724 Fort Jefferson Hill Road
Wickliffe, Kentucky 42087

Tennessee Valley Authority
Shawnee Fossil Plant
7900 Metropolis Lake Road
Paducah, Kentucky 42002

North American Stainless
6870 US Highway 42 East
Ghent, Kentucky 41045

EPA has reviewed this information and concurs that the Pb emissions from each of these sources will not contribute to a maximum Pb concentration in the ambient air in excess of 50% the NAAQS. Therefore, EPA is granting a waiver of the source-oriented ambient air monitoring requirements at these sources. The waivers must be renewed once every 5 years as part of the network assessment required under 40 CFR §58.10(d).

EPA also concurs with KDAQ's modeling submitted with the June 30, 2009, letter which indicates that the following sources do not qualify for a waiver of the monitoring requirements.

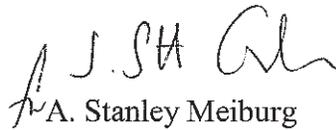
Energys
761 Eastern Bypass
Richmond, Kentucky 40475

Superior Battery
2515 Highway 910
Russell Springs, Kentucky 42642

Calgon Carbon
15024 US Route 23
Catlettsburg, Kentucky 41129

KDAQ will be required to conduct ambient air monitoring at these sources under Section 4.5 of appendix D to 40 CFR part 58. Should you have any questions, please feel free to contact Doug Neeley at (404) 562-9097 or Daniel Garver of the EPA Region 4 staff at (404) 562-9839 or via e-mail at Garver.Daniel@epa.gov.

Sincerely,



A. Stanley Meiburg
Acting Regional Administrator

cc: Dick Schutt, EPA R4

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 $0.15 \mu\text{g}/\text{m}^3$ 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., $0.075 \mu\text{g}/\text{m}^3$). 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
Energys	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
Energys	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", 12-30° 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
Energys	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 µg/m³ 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. Energys 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
Energys	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 ($\mu\text{g}/\text{m}^3$)	3-Month Rolling Average Concentration ($\mu\text{g}/\text{m}^3$)
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
Energysys	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 compiled 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
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

Energys Airport					Energys 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	0.045	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	0.051	6	1	0.18	0.47	0.284
6	2	0.18	0.5	0.094	6	2	0.18	0.47	0.276
6	3	0.18	0.5	0.117	6	3	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
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	0.16	0.93	0.834
11	12	0.16	0.82	0.714	11	0.16	0.93	0.569
12	1	0.16	0.82	0.232	12	0.17	0.93	0.133
12	2	0.16	0.82	0.206	12	0.17	0.93	0.028
12	3	0.16	0.82	0.299	12	0.17	0.93	0.037
12	4	0.16	0.82	0.488	12	0.17	0.93	0.119
12	5	0.16	0.82	0.372	12	0.17	0.93	0.106
12	6	0.16	0.82	0.199	12	0.17	0.93	0.185
12	7	0.16	0.82	0.192	12	0.17	0.93	0.283
12	8	0.16	0.82	0.044	12	0.17	0.93	0.272
12	9	0.16	0.82	0.04	12	0.17	0.93	0.165
12	10	0.16	0.82	0.06	12	0.17	0.93	0.274
12	11	0.16	0.82	0.383	12	0.17	0.93	0.402
12	12	0.16	0.82	0.303	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
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
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	0.009
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		Ratio		Length	
1	1	0.17	0.79	0.16	0.75	0.047	1	0.16	0.75	0.036	1
1	2	0.17	0.79	0.16	0.75	0.061	1	0.16	0.75	0.023	2
1	3	0.17	0.79	0.16	0.75	0.05	1	0.16	0.75	0.05	3
1	4	0.17	0.79	0.16	0.75	0.044	1	0.16	0.75	0.15	4
1	5	0.17	0.79	0.16	0.75	0.053	1	0.16	0.75	0.209	5
1	6	0.17	0.79	0.16	0.75	0.06	1	0.16	0.75	0.167	6
1	7	0.17	0.79	0.16	0.75	0.056	1	0.16	0.75	0.051	7
1	8	0.17	0.79	0.16	0.75	0.034	1	0.16	0.75	0.023	8
1	9	0.17	0.79	0.16	0.75	0.019	1	0.16	0.75	0.026	9
1	10	0.17	0.79	0.16	0.75	0.055	1	0.16	0.75	0.036	10
1	11	0.17	0.79	0.16	0.75	0.04	1	0.16	0.75	0.017	11
1	12	0.17	0.79	0.16	0.75	0.035	1	0.16	0.75	0.022	12
2	1	0.17	0.79	0.16	0.75	0.047	2	0.16	0.75	0.036	1
2	2	0.17	0.79	0.16	0.75	0.061	2	0.16	0.75	0.023	2
2	3	0.17	0.79	0.16	0.75	0.05	2	0.16	0.75	0.05	3
2	4	0.17	0.79	0.16	0.75	0.044	2	0.16	0.75	0.15	4
2	5	0.17	0.79	0.16	0.75	0.053	2	0.16	0.75	0.209	5
2	6	0.17	0.79	0.16	0.75	0.06	2	0.16	0.75	0.167	6
2	7	0.17	0.79	0.16	0.75	0.056	2	0.16	0.75	0.051	7
2	8	0.17	0.79	0.16	0.75	0.034	2	0.16	0.75	0.023	8
2	9	0.17	0.79	0.16	0.75	0.019	2	0.16	0.75	0.026	9
2	10	0.17	0.79	0.16	0.75	0.055	2	0.16	0.75	0.036	10
2	11	0.17	0.79	0.16	0.75	0.04	2	0.16	0.75	0.017	11
2	12	0.17	0.79	0.16	0.75	0.035	2	0.16	0.75	0.022	12
3	1	0.15	0.49	0.15	0.48	0.055	3	0.15	0.48	0.051	1
3	2	0.15	0.49	0.15	0.48	0.067	3	0.15	0.48	0.034	2
3	3	0.15	0.49	0.15	0.48	0.056	3	0.15	0.48	0.076	3
3	4	0.15	0.49	0.15	0.48	0.051	3	0.15	0.48	0.235	4
3	5	0.15	0.49	0.15	0.48	0.062	3	0.15	0.48	0.316	5
3	6	0.15	0.49	0.15	0.48	0.069	3	0.15	0.48	0.265	6
3	7	0.15	0.49	0.15	0.48	0.067	3	0.15	0.48	0.078	7

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
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 1 Boiler- 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 Furnace
	001	738518	4179618	302.04	17.07	8.97E-05	322.04	17.678	1.524	Grid Casting baghouse (4 total)
Energys	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
North American Stainless	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
	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
Newpage	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
COMB5009	008	314893.44	4090844.76	109.01	24.38	5.75E-03	349.82	9.144	1.753	Lime Kiln
	008	314893.44	4090844.76	109.01	24.38	5.75E-03	349.82	9.144	1.753	Lime Kiln

	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	STCK1	342436.92	4113016.64	94.71	243.84	0.1211	429.82	29.428	8.534	Units 1-5
Shawnee	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

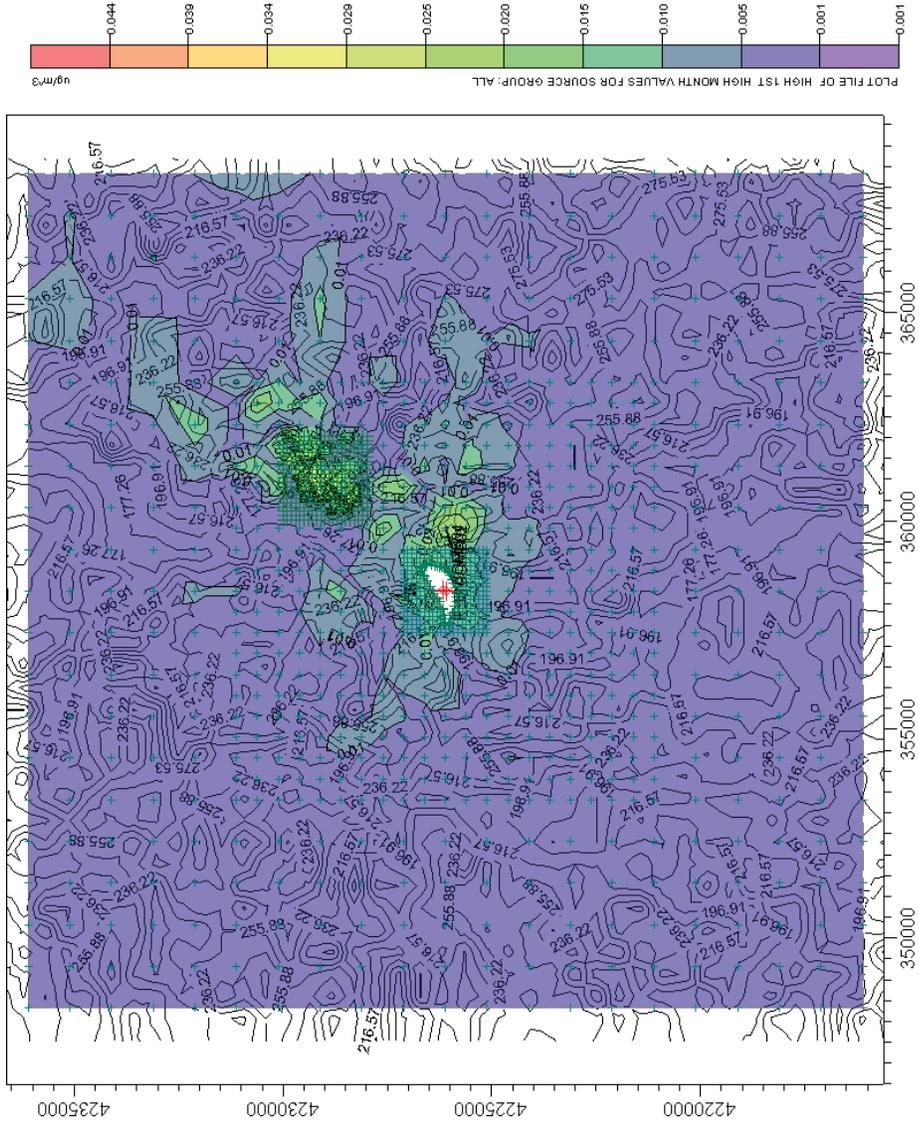


Figure 1.1 Big Sandy-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

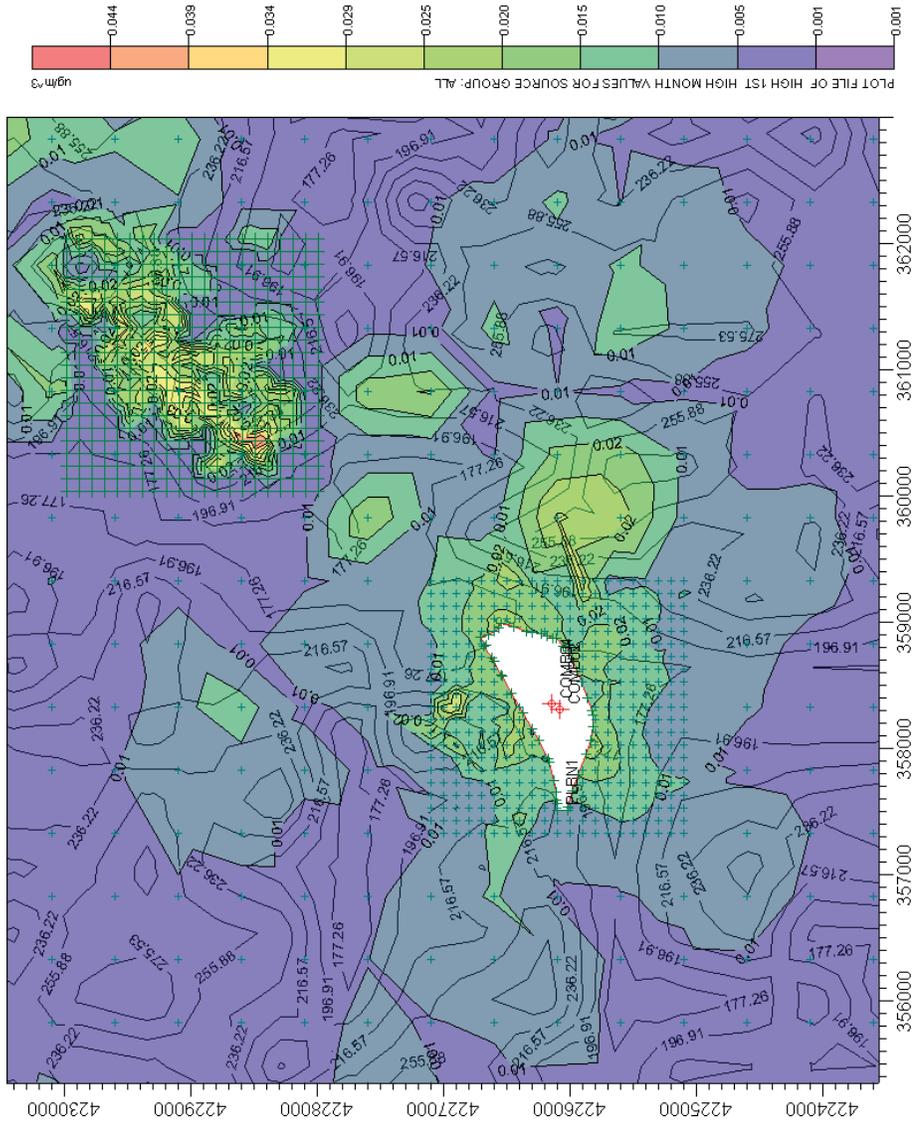


Figure 2. Big Sandy-Site, High 1st High Monthly Average Concentration, Entire Domain

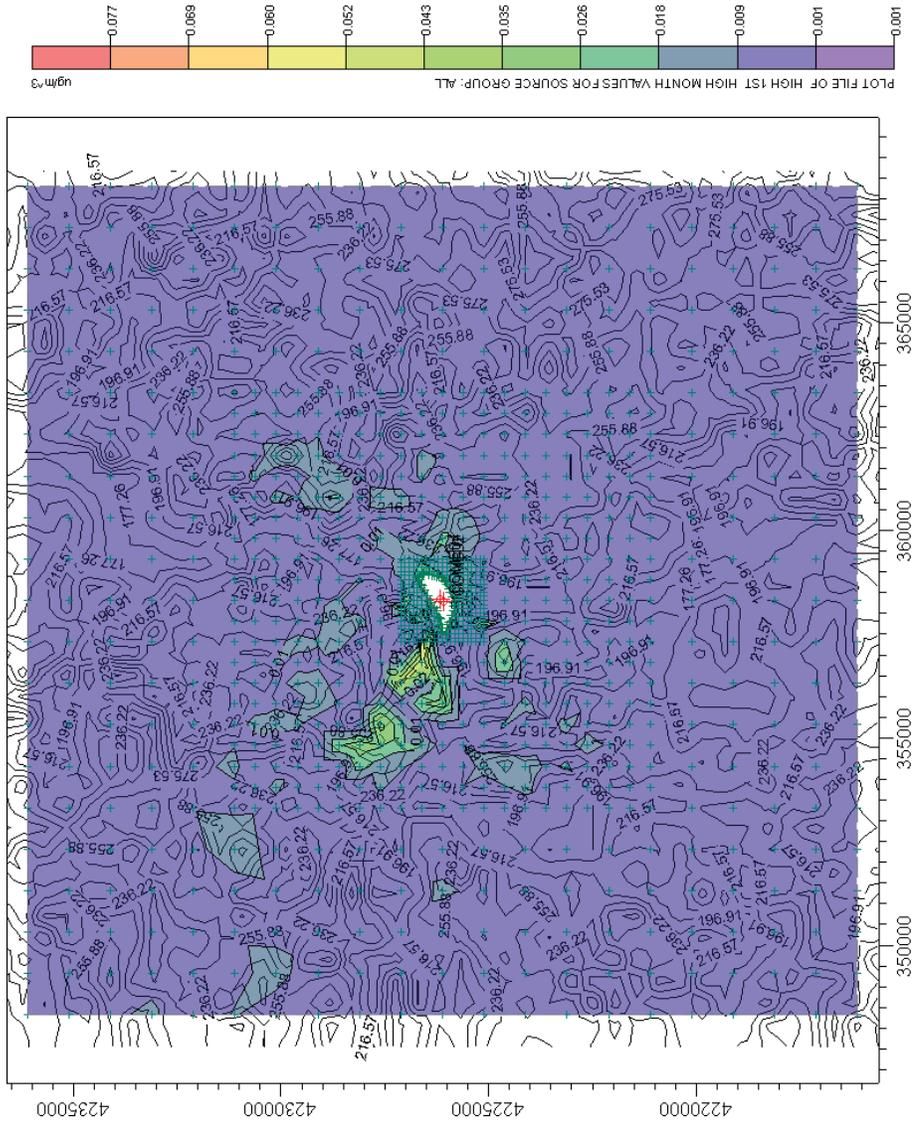


Figure 2.1 Big Sandy-Site, High 1st High Monthly Average Concentration, Controlling Concentration

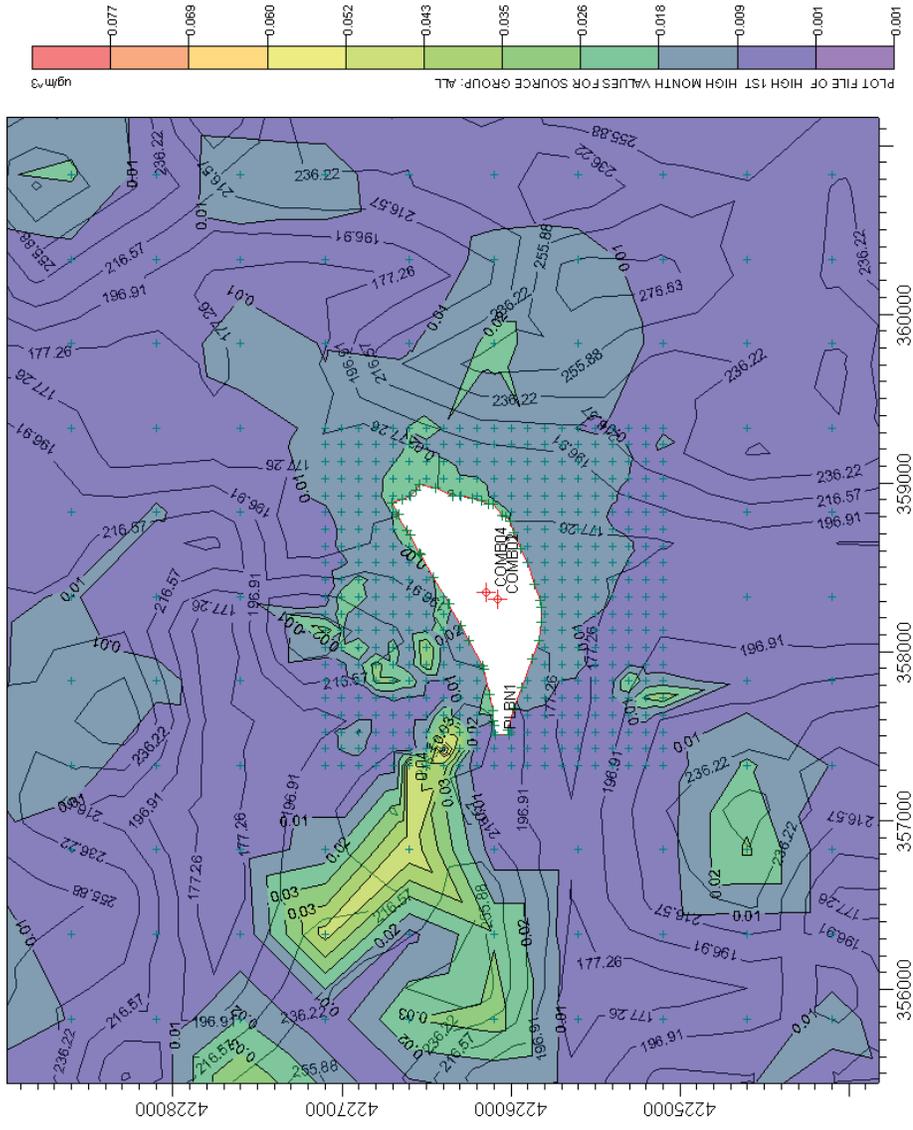


Figure 3. Calgon Carbon-Airport, High 1st High Monthly Average Concentration, Entire Domain

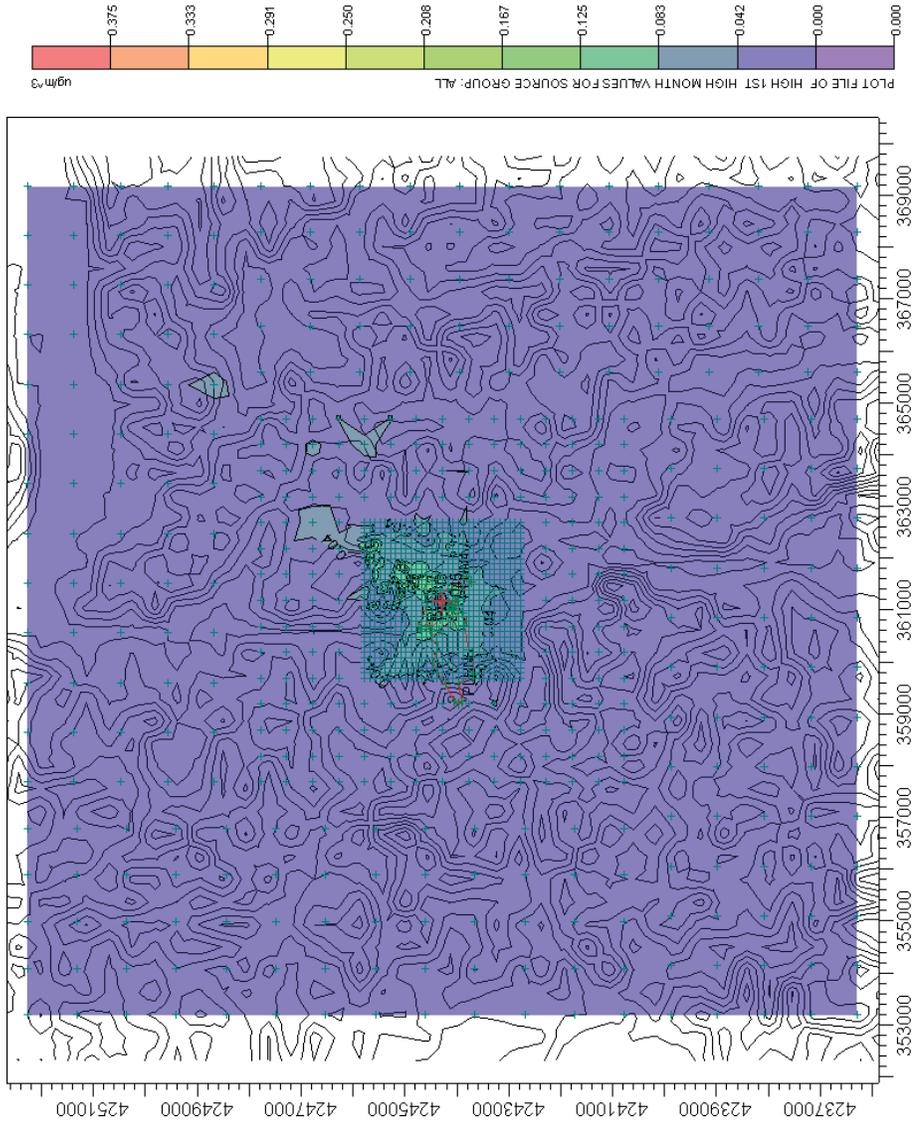


Figure 3.1 Calgon Carbon-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

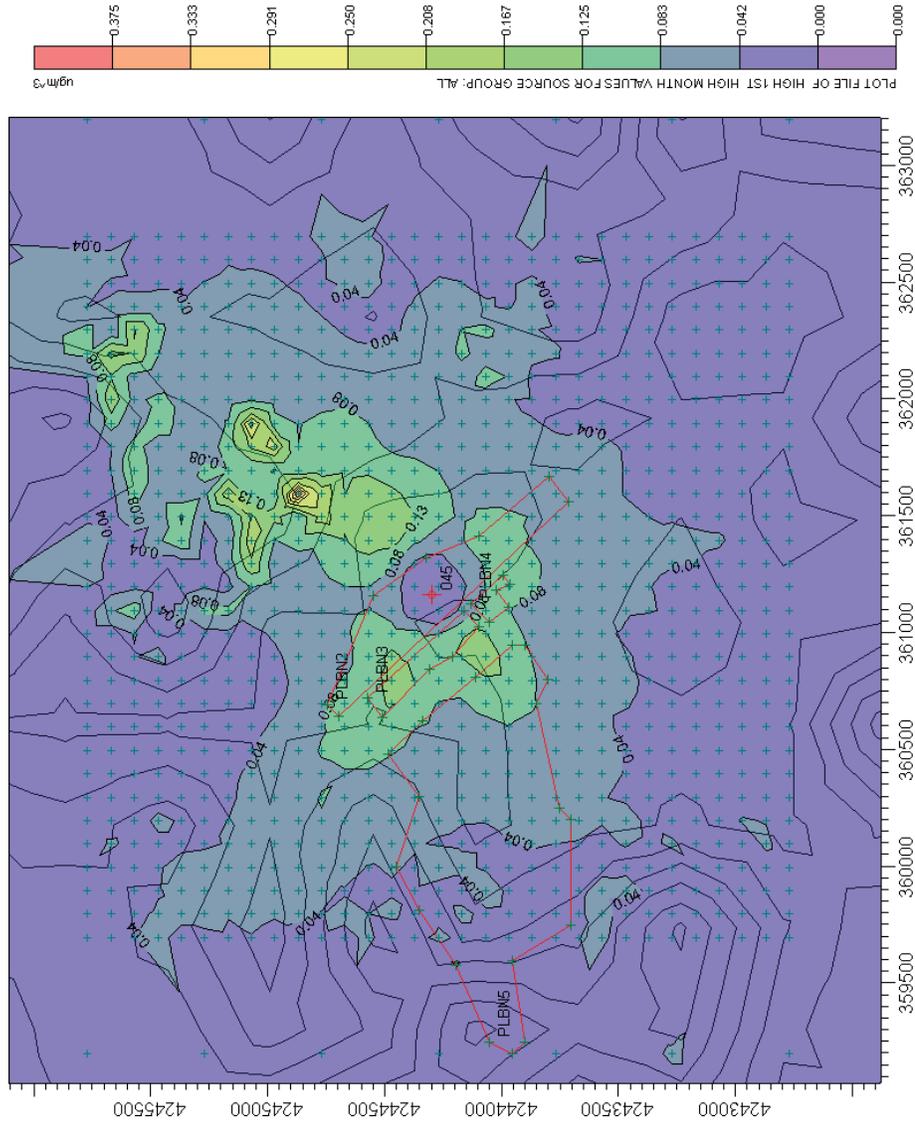


Figure 4. Calgon Carbon-Site, High 1st High Monthly Average Concentration, Entire Domain

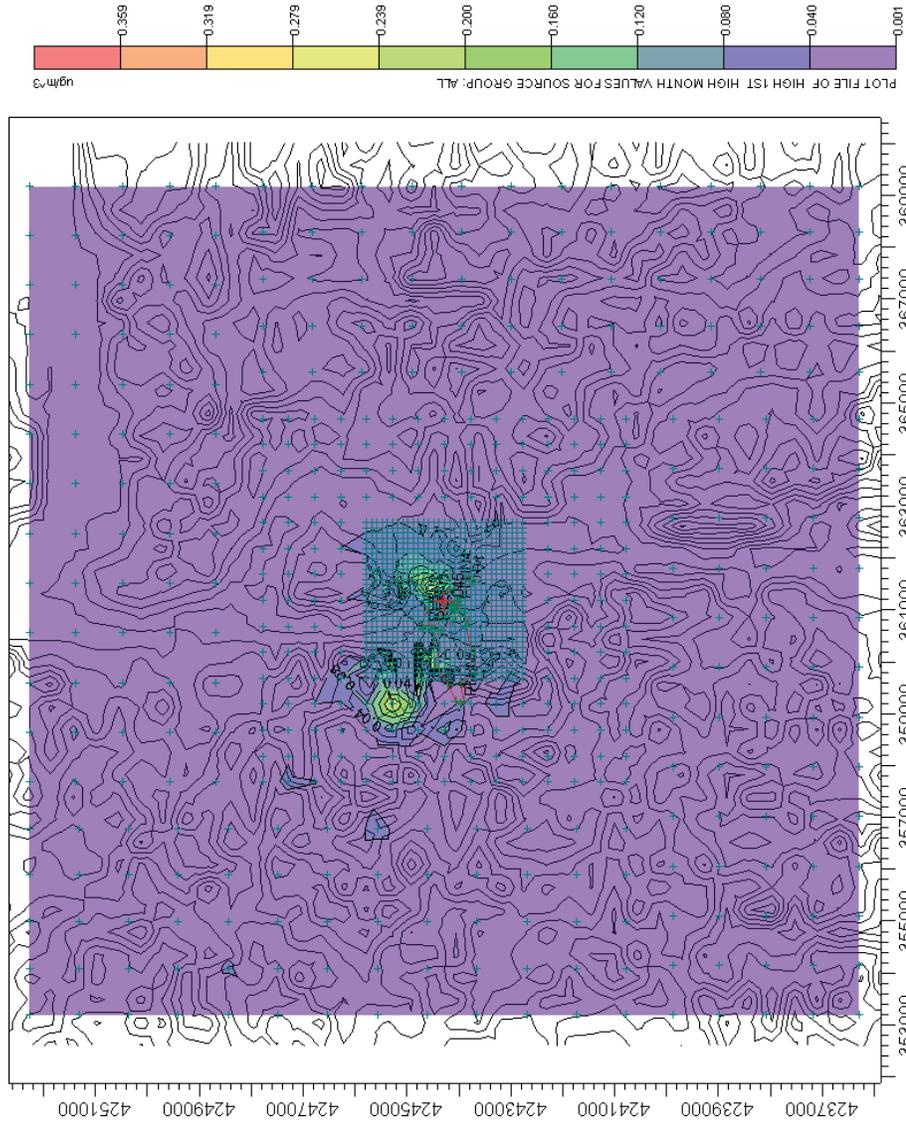


Figure 4.1 Calgon Carbon-Site, High 1st High Monthly Average Concentration, Controlling Concentration

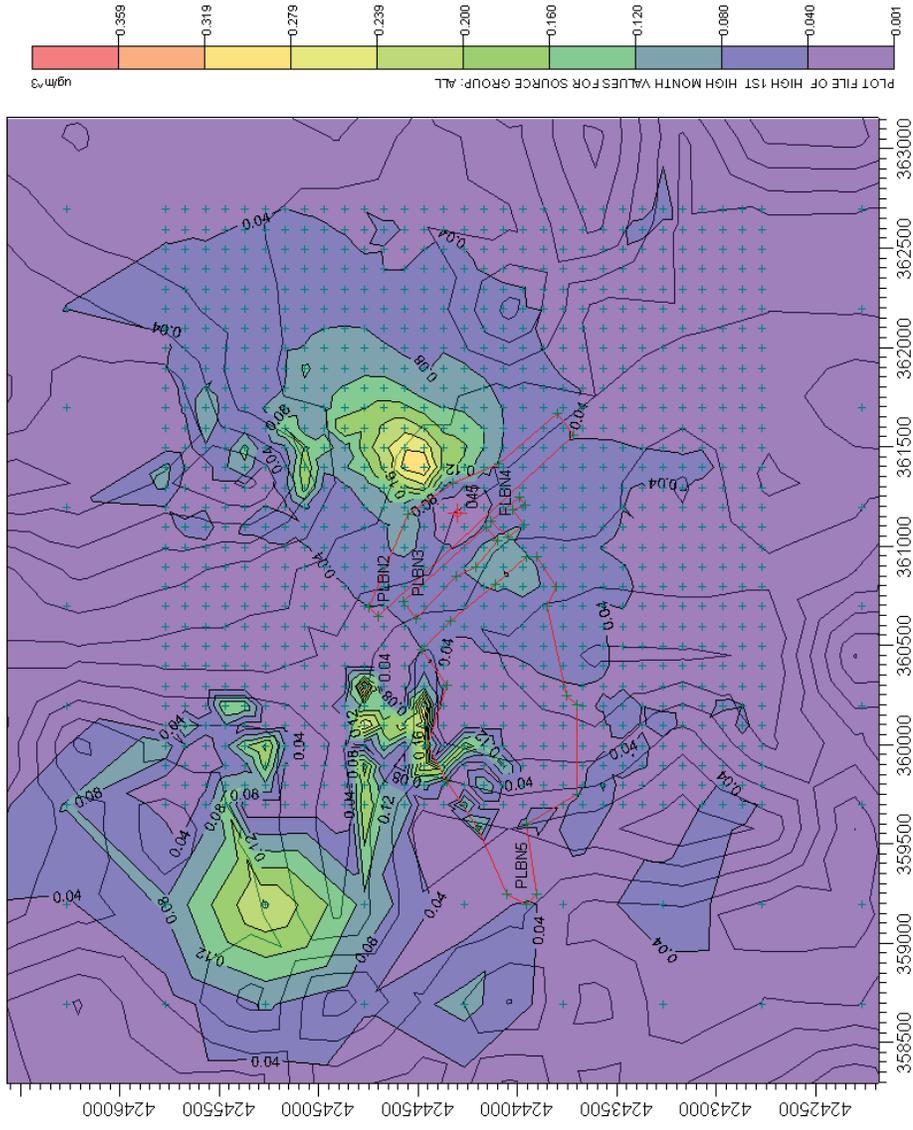


Figure 5. Enersys-Airport, High 1st High Monthly Average Concentration, Entire Domain

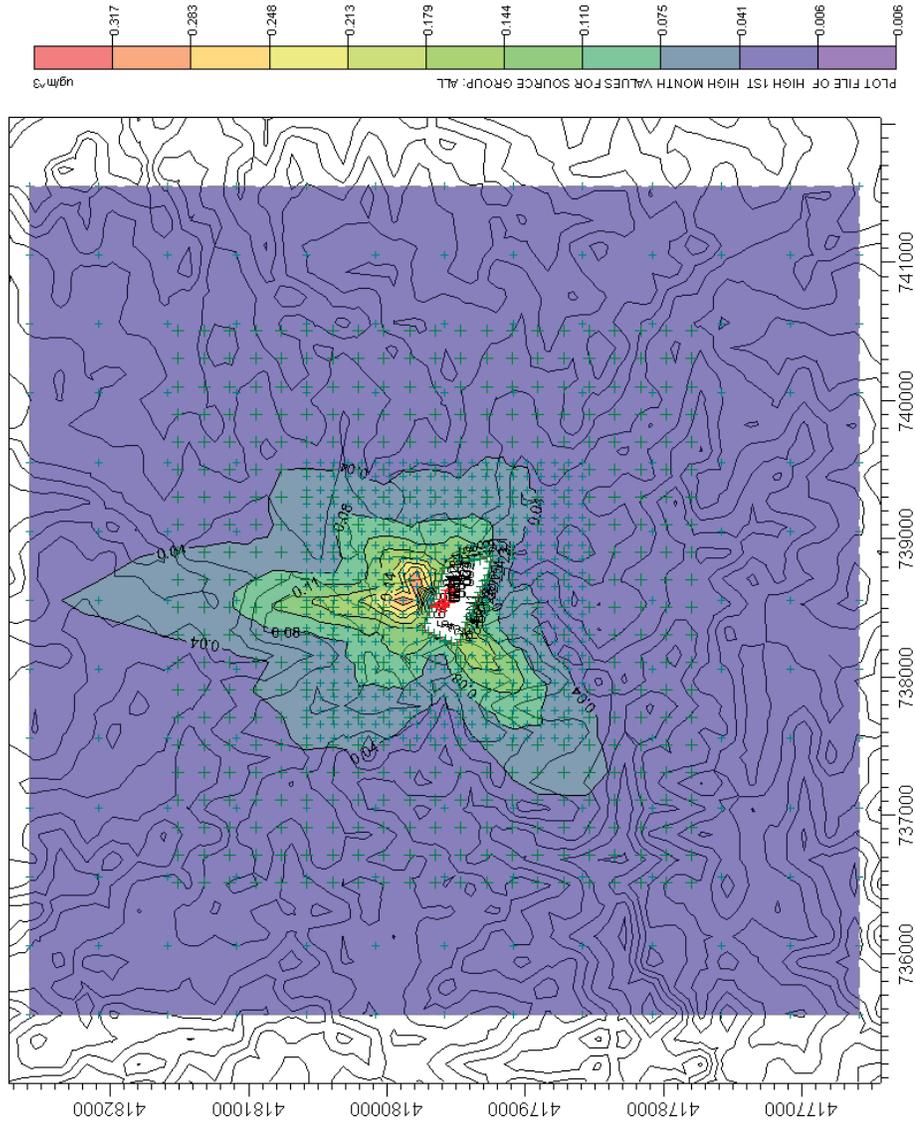


Figure 5.1 Enersys-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

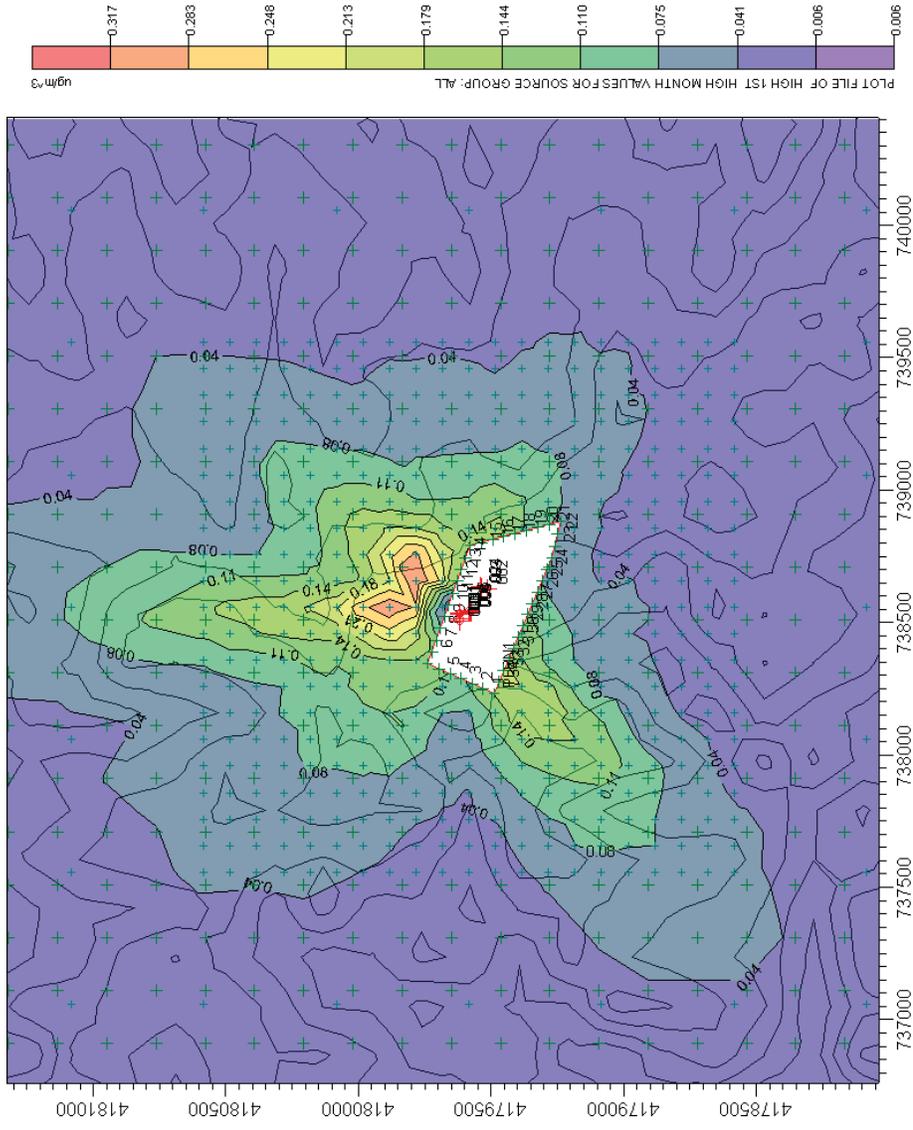


Figure 6.1 Enersys -Site, High 1st High Monthly Average Concentration, Controlling Concentration

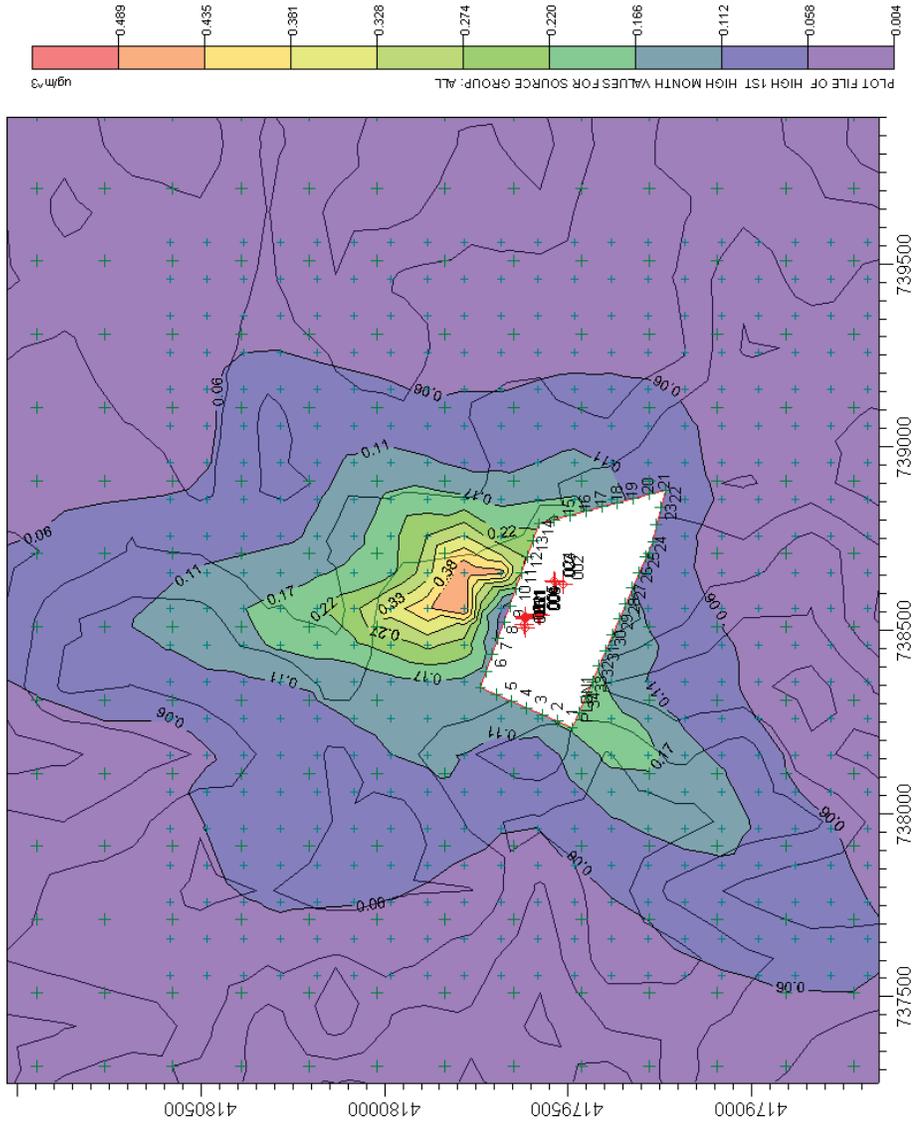


Figure 7.1 North American Stainless -Airport, High 1st High Monthly Average Concentration, Controlling Concentration

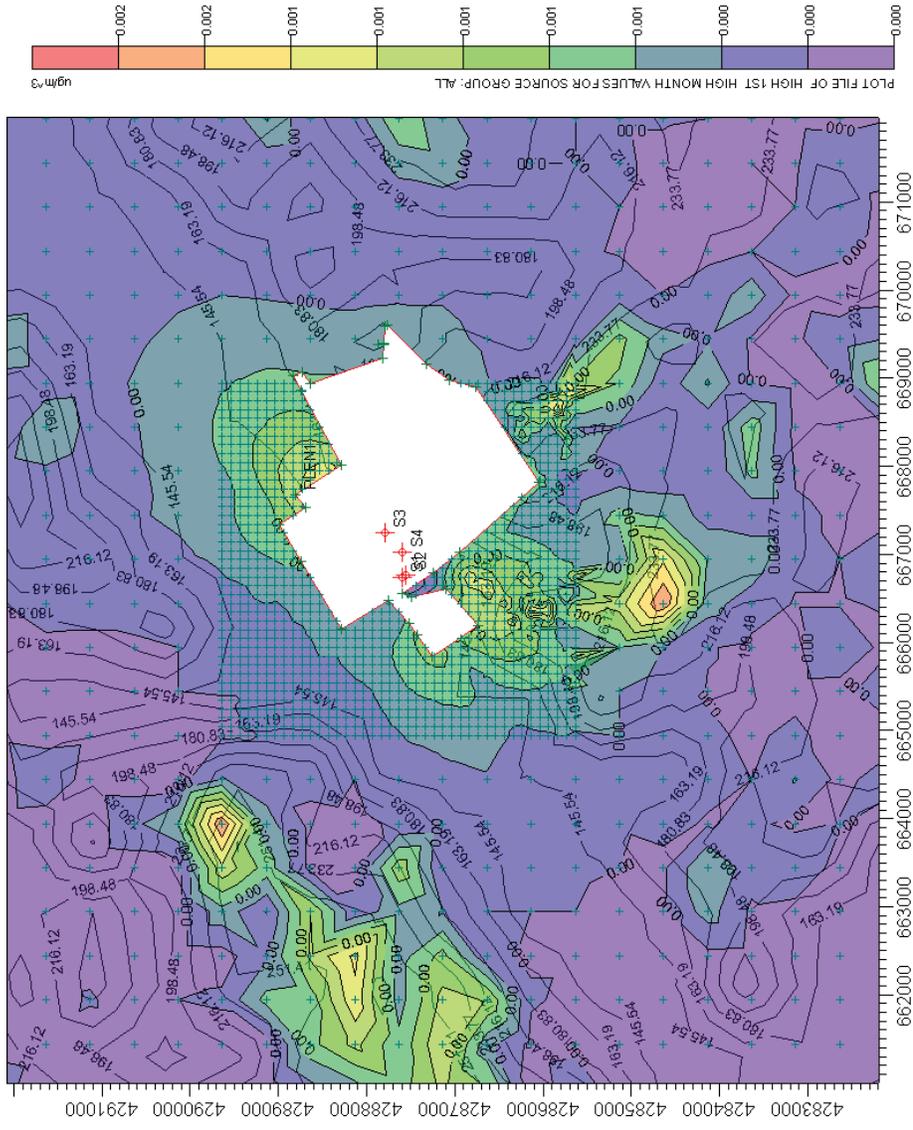


Figure 8. North American Stainless -Site, High 1st High Monthly Average Concentration, Entire Domain

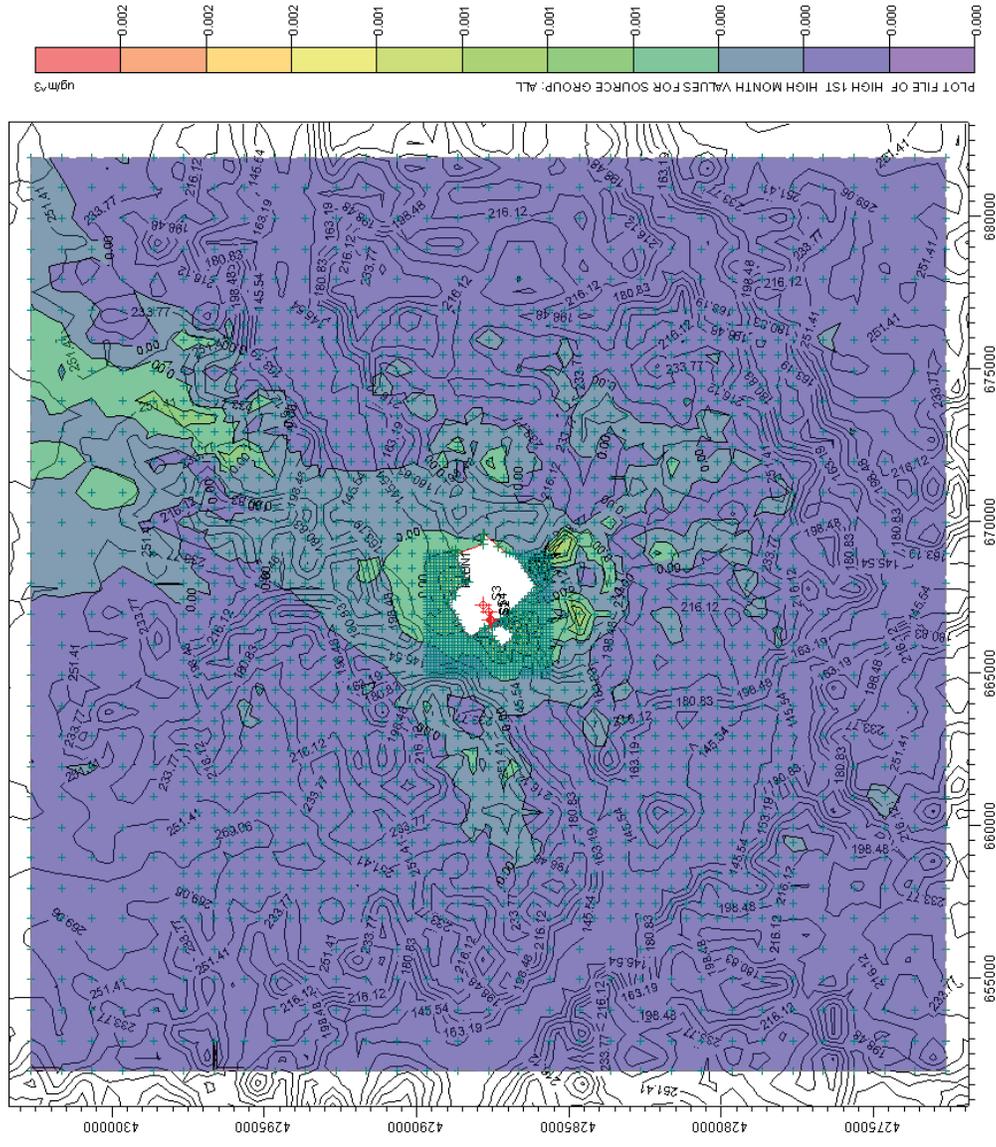


Figure 8.1 North American Stainless -Site, High 1st High Monthly Average Concentration, Controlling Concentration

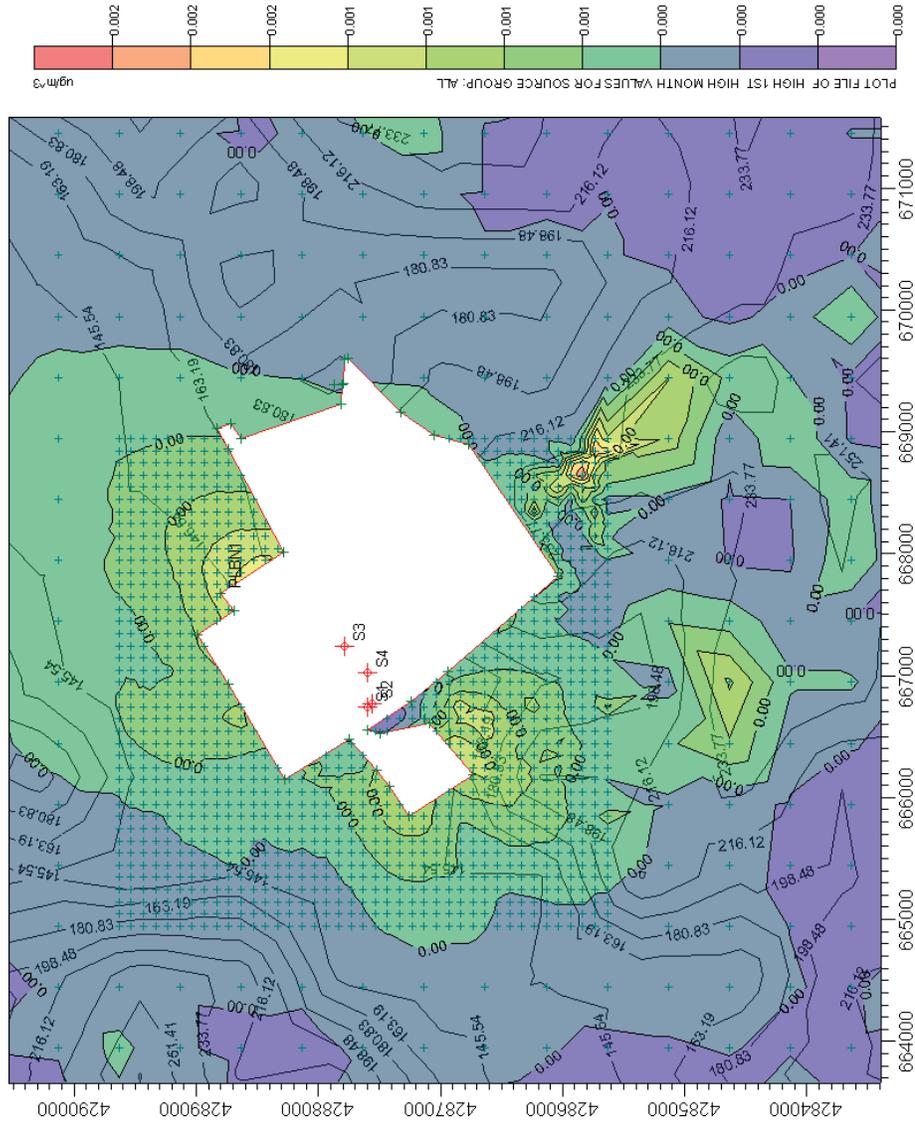


Figure 9. Newpage-Airport, High 1st High Monthly Average Concentration, Entire Domain

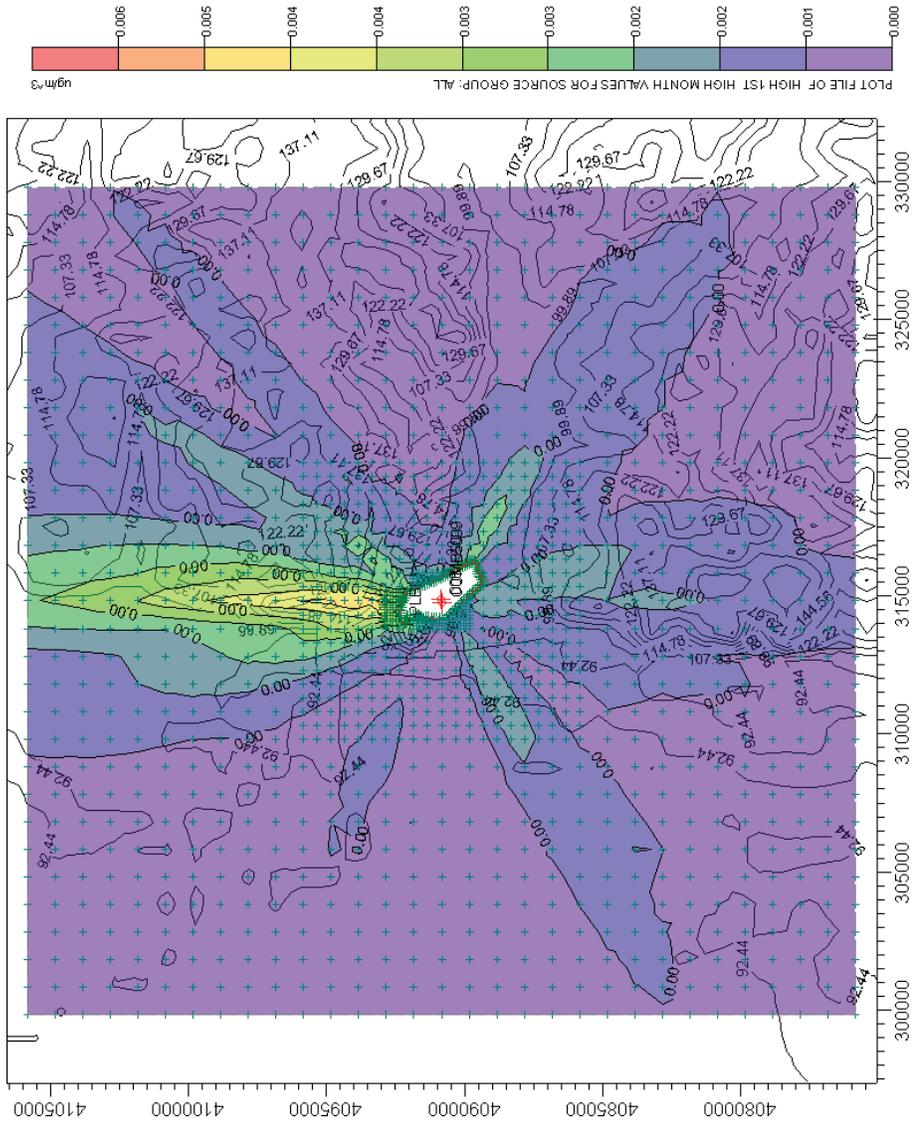


Figure 10. Newpage -Site, High 1st High Monthly Average Concentration, Entire Domain

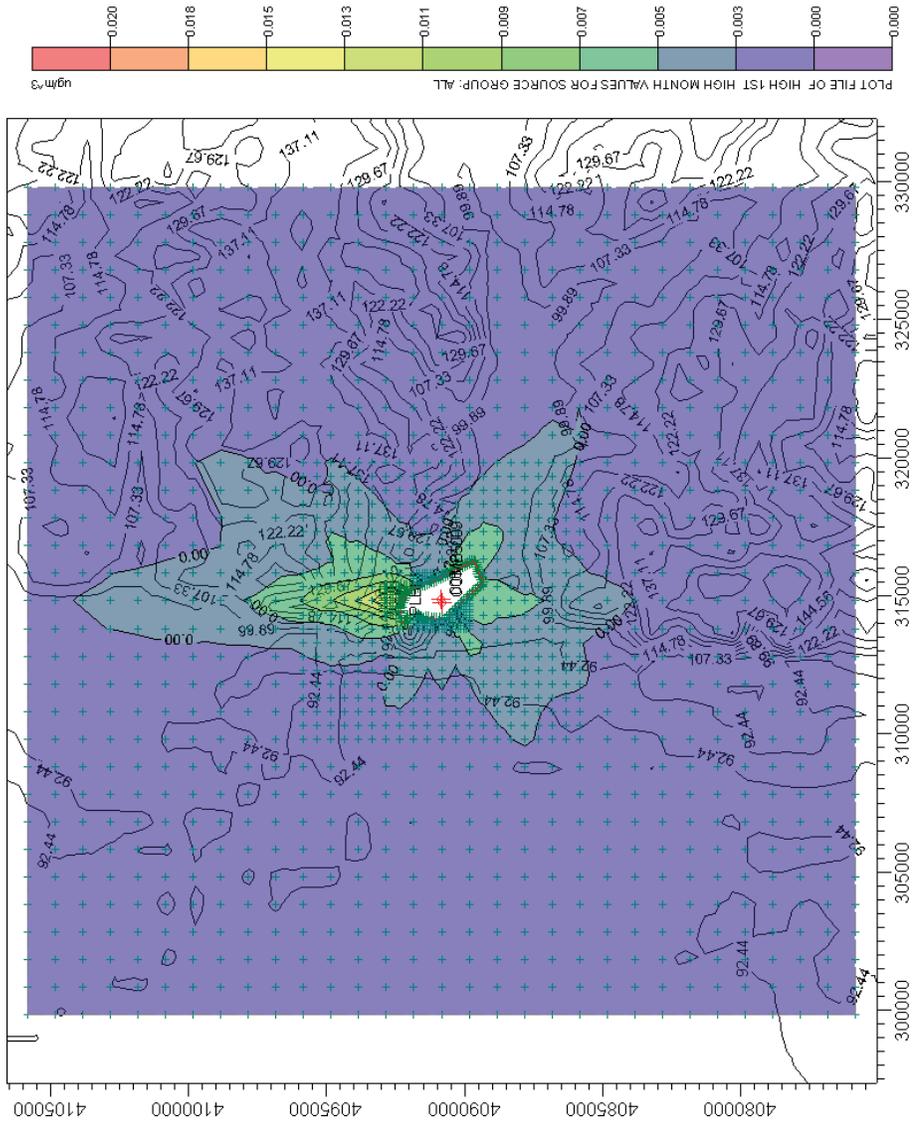


Figure 10.1 Newpage -Site, High 1st High Monthly Average Concentration, Controlling Concentration

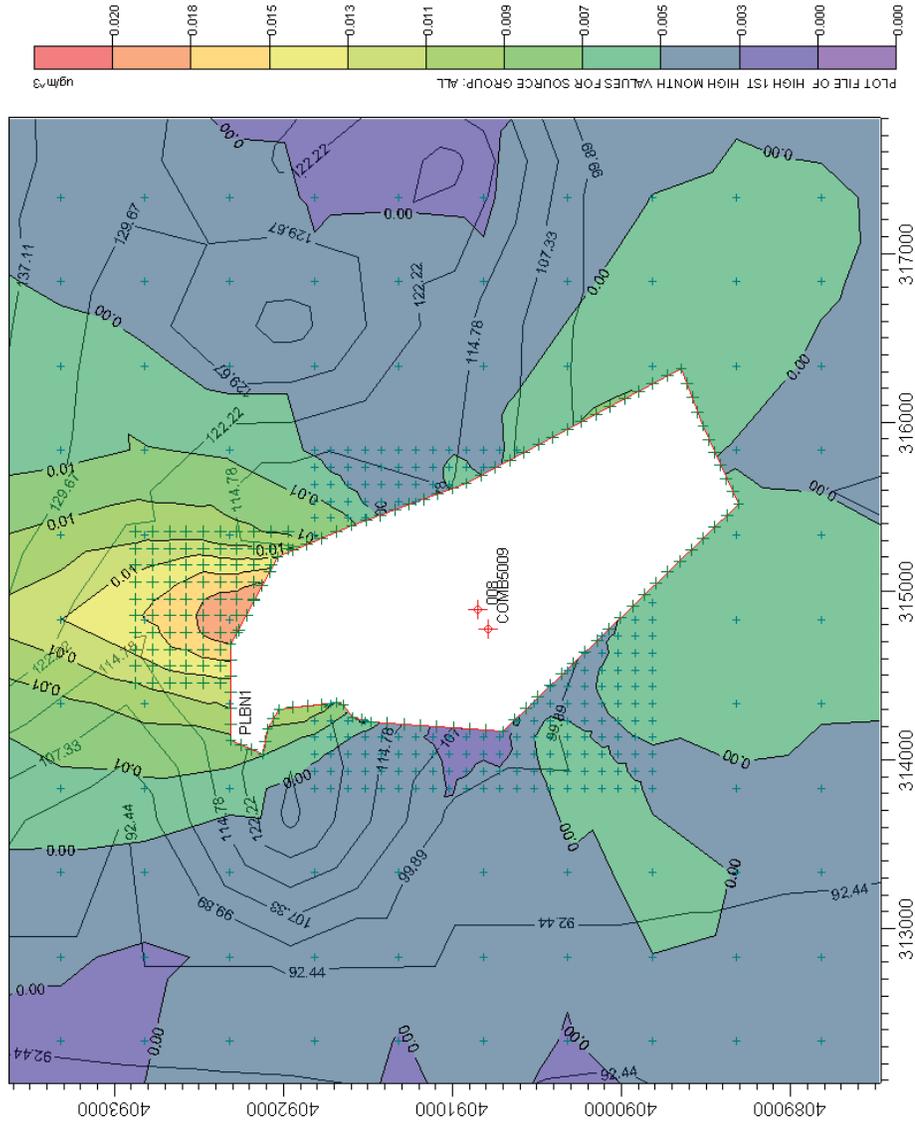


Figure 11. Superior Battery-Airport, High 1st High Monthly Average Concentration, Entire Domain

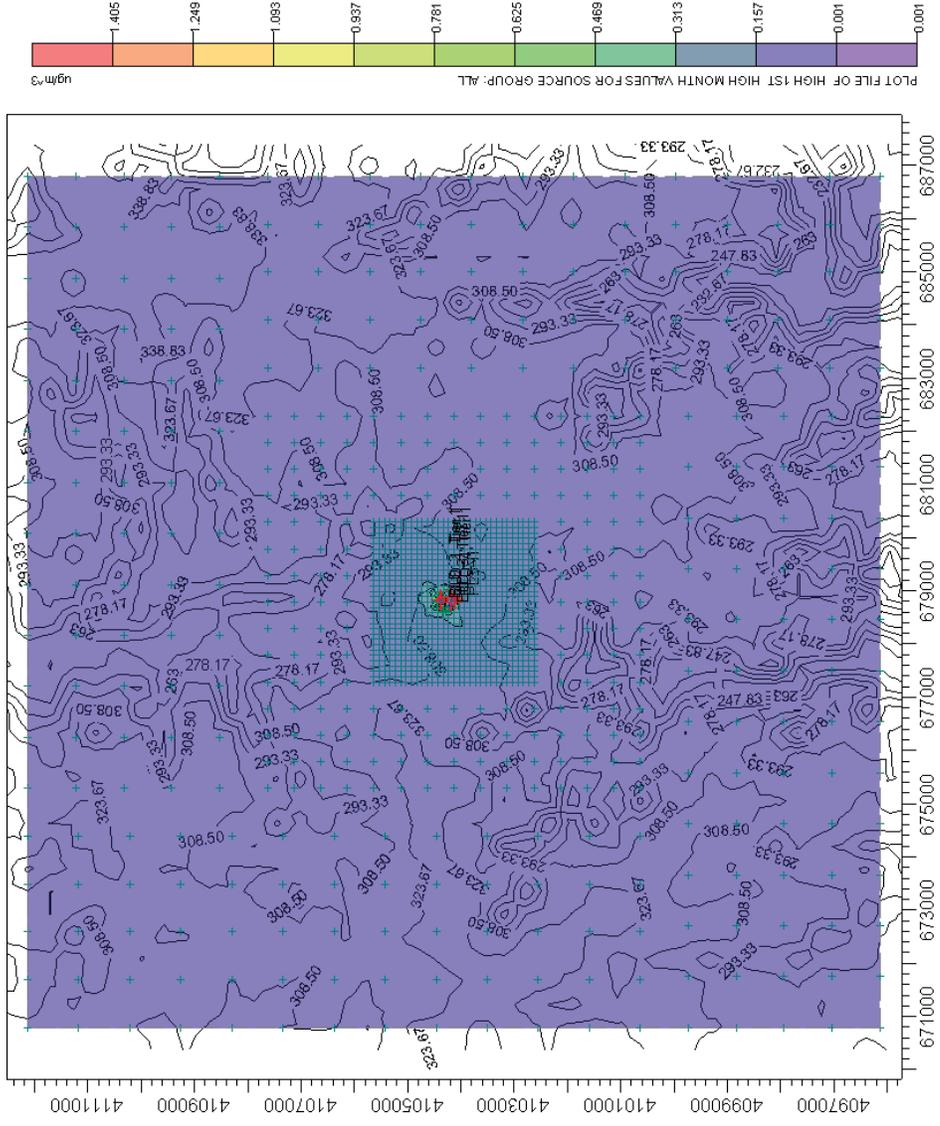


Figure 11.1 Superior Battery-Airport, High 1st High Monthly Average Concentration, Controlling Concentration

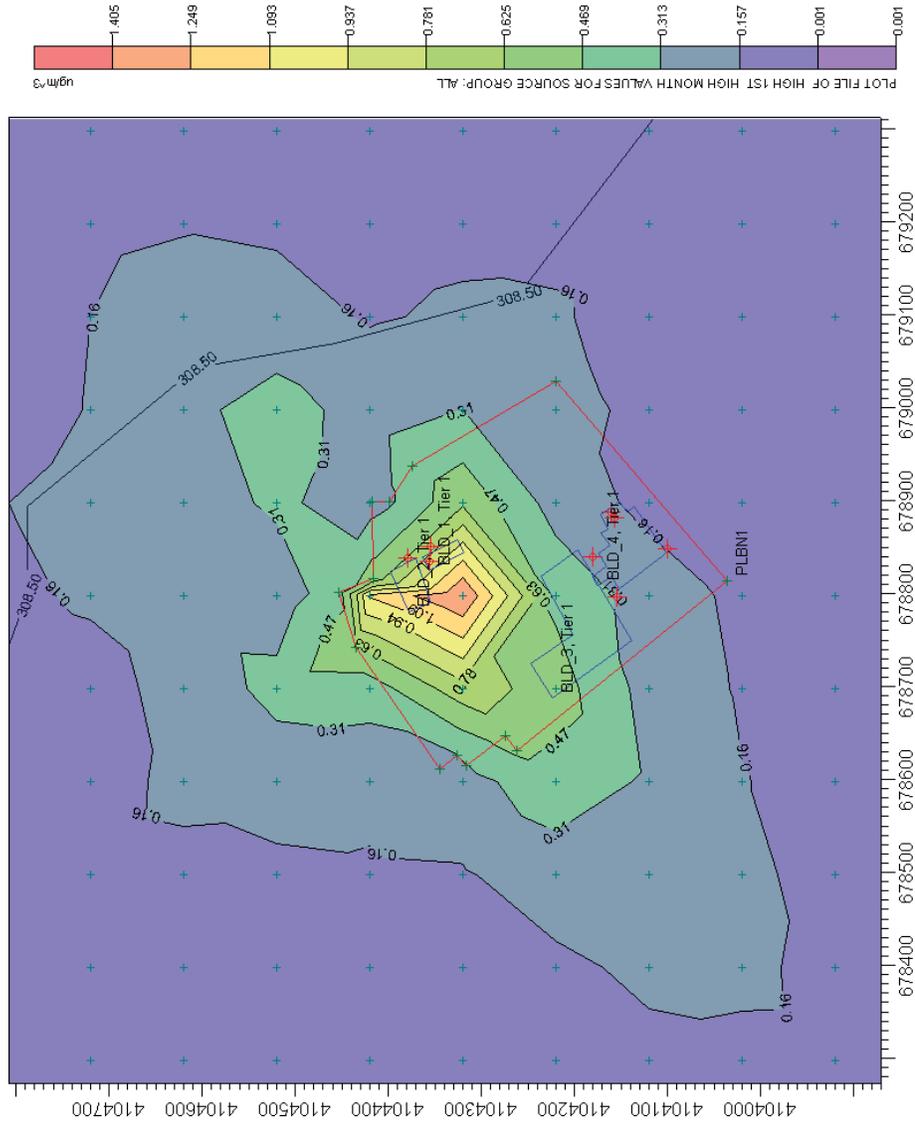


Figure 12. Superior Battery-Site, High 1st High Monthly Average Concentration, Entire Domain

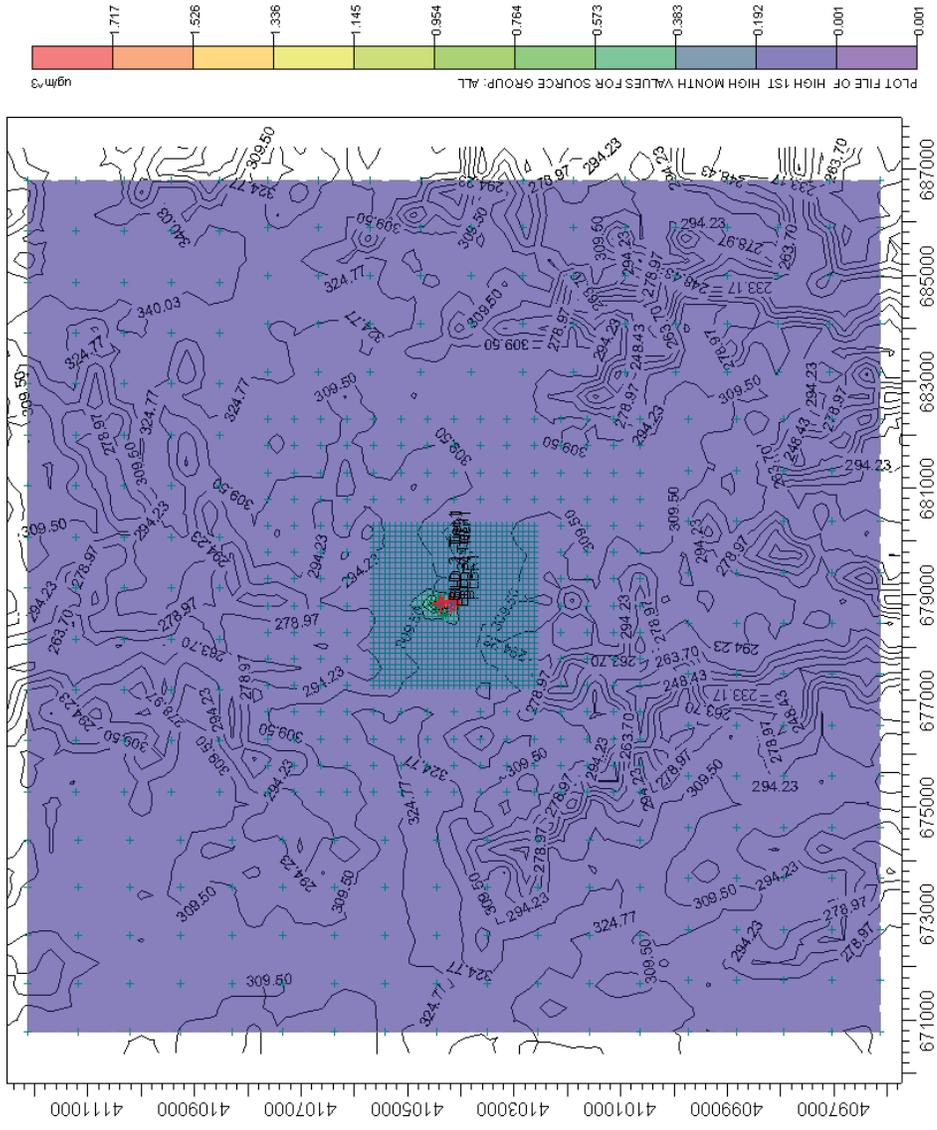


Figure 13. TVA-Airport, High 1st High Monthly Average Concentration, Entire Domain

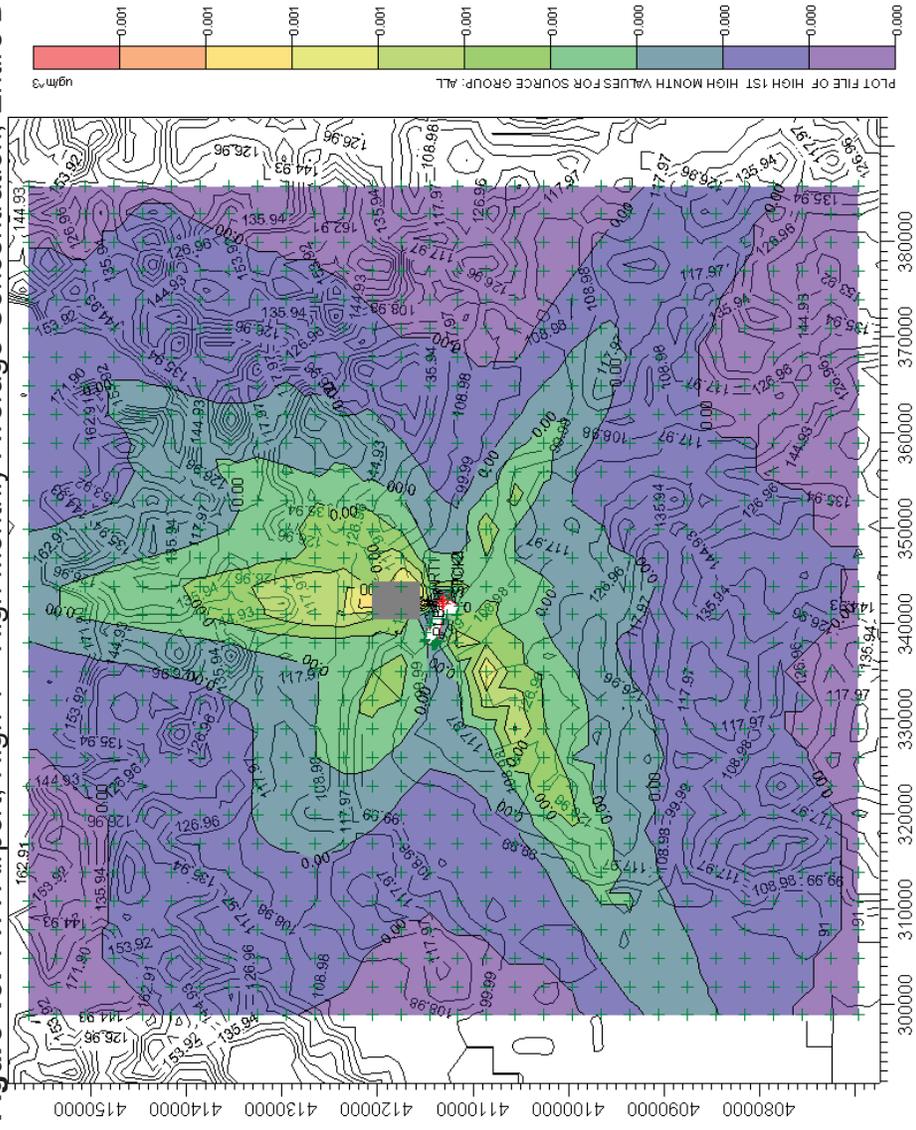


Figure 14. TVA-Site, High 1st High Monthly Average Concentration, Entire Domain

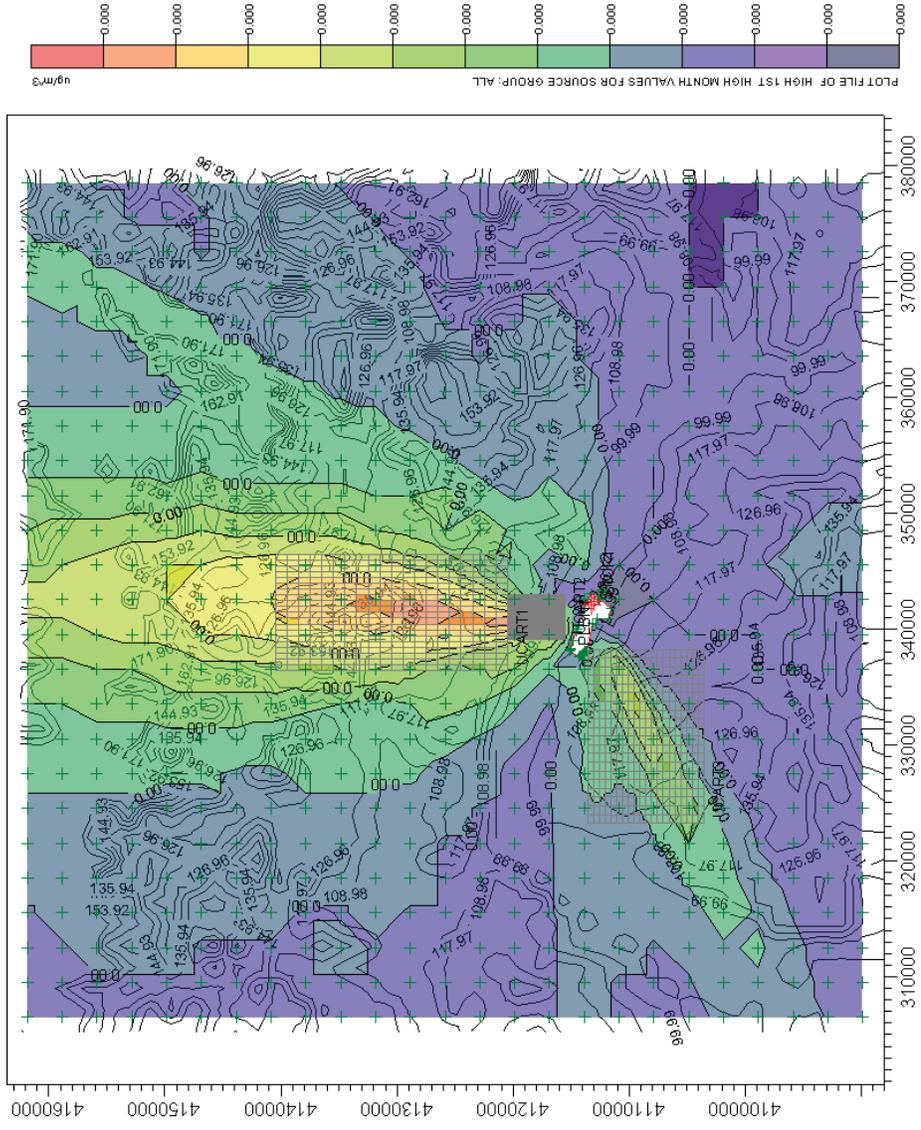
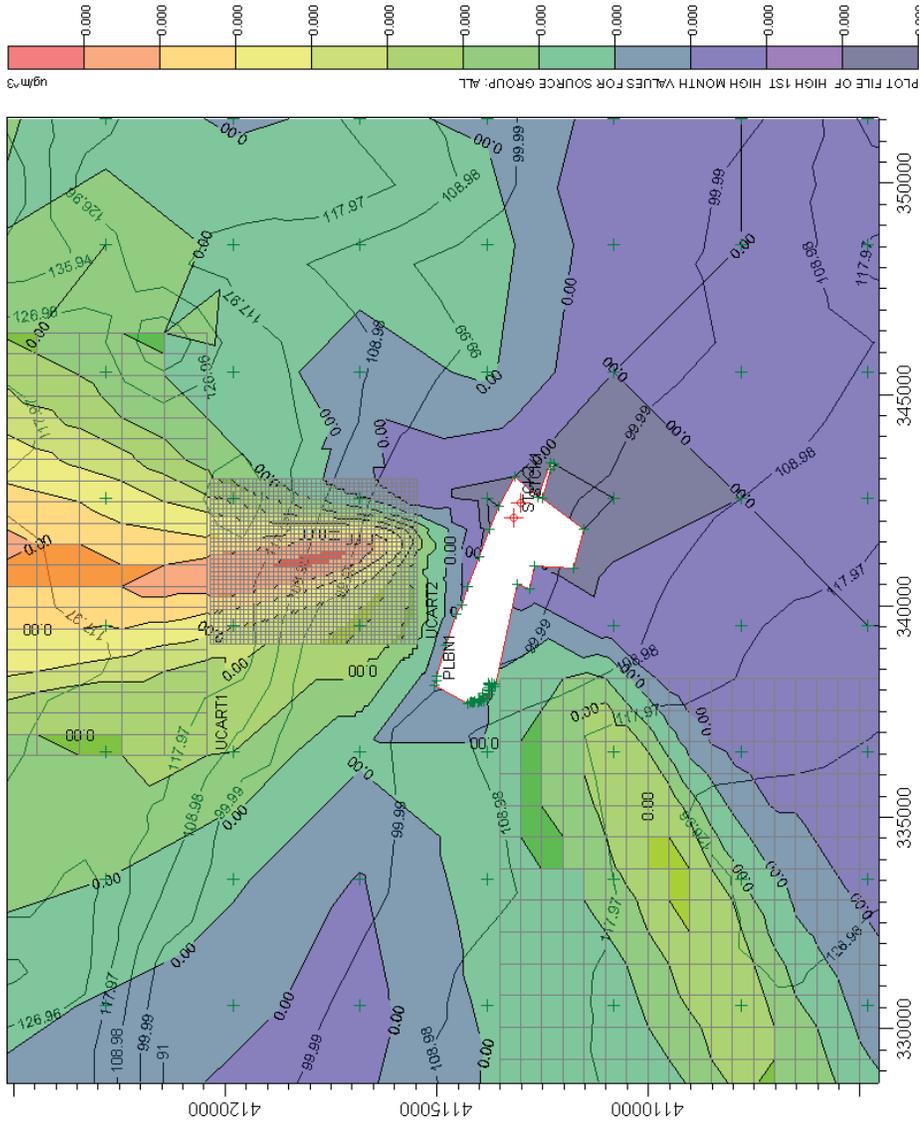


Figure 14.1 TVA-Site, High 1st High Monthly Average Concentration, Controlling Concentration





APPENDIX E

2011 LEAD WAIVER REQUEST

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

Table of Contents

INTRODUCTION	3
EMISSIONS INVENTORY DATA	4
SELECTION CRITERIA FOR THE MODELED FACILITIES	4
MODEL PARAMETERS	5
Urban versus Rural Determination.....	5
Meteorological Data.....	5
Representativeness/Surface Characteristics	5
Pollutant Averaging	6
Building Downwash.....	6
Lead Emission Sources	6
Receptors/Terrain.....	7
Background.....	9
Non-Default Parameters.....	9
RESULTS	10
Modeled Plots	10
CONCLUSION	10
ADDITIONAL INFORMATION.....	10
Appendix A. Kentucky Facilities with Lead Emissions over 0.5TPY	12
Appendix B. AERSURFACE Tables.....	13
Appendix C. Lead Emission Sources.....	31
Appendix D. Radial Plot Map	36
Appendix E. Modeled Impacts.....	36
Appendix F. Files on CD	52

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 was set at 0.15 $\mu\text{g}/\text{m}^3$ 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, detailed in 40 CFR Part 58, Appendix D, paragraph 4.5. Pursuant to the revised regulations, source-oriented monitoring was required for those facilities which emitted 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. Seven facilities were identified: 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 allows that some sources may be eligible to receive waivers, if the state 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. Therefore, those seven facilities with lead emissions over 1.0 tpy were modeled using the near field regulatory model AERMOD. The document, *AERMOD Modeling Analysis in Support of the Lead NAAQS Waiver Requests for the State of Kentucky (June 2009)*, explained the procedure and results of modeling of those seven facilities. Waivers were requested for AEP Big Sandy, New Page Wickliffe Mill, North American Stainless, and Tennessee Valley Authority Shawnee Fossil Plant. On August 20, 2009, the EPA granted approval to the waiver request for these four facilities and exempted monitoring in these locations.

On December 30, 2009, the EPA published proposed revisions to the lead monitoring requirements in the Federal Register. The proposed rule would lower the emissions threshold for facilities from 1.0 tpy to 0.5 tpy emissions. Following the publication of the proposed rule, the Division compiled a list of facilities that emitted 0.5 tpy of lead based on information from the Division's Emissions Inventory Section (KY-EIS), National Emission Inventory (NEI), and Toxics Release Inventory (TRI). Four facilities were identified: CC Metals & Alloys, LLC in Calvert City, KY; B & B Automotive in Madisonville, KY; Modern Welding Company, Inc in Elizabethtown, KY; and Kentucky Utilities Company-Ghent Generation Station in Ghent, KY.

On December 27, 2010, revised monitoring requirements for the new lead NAAQS were finalized and published in the Federal Register. The final rule lowered the emissions threshold for lead sources from 1.0 tpy to 0.5 tpy, as proposed. Pursuant to this revised regulation, the Division compiled another, more current list of facilities emitting 0.5 tpy of lead. Four additional sources were identified: Blue Grass Army Depot in Richmond, KY; Tennessee Valley Authority (TVA) Paradise Fossil Plant in Drakesboro, KY; US Army Fort Campbell Military Reservation in Fort Campbell, KY; and US Army Fort Knox in Fort Knox, KY.

Hence, upon examination of these eight aforementioned facilities, it was determined that the Modern Welding Company, Inc has not exceeded more than 82 pounds of lead emissions in a single year according to their Semi-Annual Report for the years 2005 through 2009. In addition, B & B Automotive has gone out of business. Therefore, Modern Welding Company, Inc and B & B Automotive were excluded from further analysis. Moreover, the Division determined that Toxics Release Inventory (TRI) data were over-reported for both the Ft. Campbell and Ft. Knox military bases. Emissions are significantly less than 0.5 tpy with corrected emissions data for these two facilities. Hence, only four facilities were left to consider. These facilities are listed in *Appendix A: Kentucky Facilities with Lead Emissions over 0.5 tpy* in this document and exclude the previously modeled facilities from the 2009 Lead Waiver Request.

Emissions Inventory Data

The Division’s KY-EIS has completed calculations for 2005-2009 data, which indicates that the four facilities listed in *Appendix A* emit more than 0.5 tpy of lead. However, as previously noted, Modern Welding Company, Inc, B & B Automotive, US Army Fort Campbell Military Reservation, and US Army Fort Knox were excluded from further analysis based on an evaluation of the corresponding emissions data and operational status. Modeling was completed to determine if a waiver should be pursued for the remaining four facilities.

Emissions Inventory Reports for the four modeled facilities are included with this document on a compact disc (CD) for review. The CD contains Kentucky Emissions Inventory data files for 2005-2009. Table 1 shows the results of the recent EIS calculations.

Table 1. Kentucky Emissions Inventory Data (*Bolted values are the emission values used in the modeling)

Facility Name	2005 Actual Emissions (tpy)	2006 Actual Emissions (tpy)	2007 Actual Emissions (tpy)	2008 Actual Emissions (tpy)	2009 Actual Emissions (tpy)
CC Metals & Alloys	.0502	.692	.311	.503	.418
KY Utilities - Ghent	.259	.264	.580	.622	.535
Blue Grass Army Depot	.048	.168	.102	.123	.570
TVA Paradise	1.325	1.166	.806	.982	1.230

Selection Criteria for the Modeled Facilities

In accordance with the EPA Memo titled “Lead NAAQS Ambient Air Monitoring Network: Network Design Options Under Consideration” dated March 3, 2008, Division compiled a list of facilities that emitted over 0.5 tpy of lead. Each facility’s emissions data was

acquired from the 2005-2009 KY Division for Air Quality Emissions Inventory Section (KY-EIS), 2005 National Emission Inventory (NEI), and 2005 Toxics Release Inventory (TRI). The values used in the model were accepted based on the source of data; KY-EIS data being the first choice for values, then NEI, then TRI. 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 Part 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. ASOS 1-minute wind data was utilized in conjunction with the surface air station data in AERMET. 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. The facilities were modeled with meteorological data ranging from 2005 to 2009.

Table 2. Meteorological Modeling Data

Facility	Met Years	Surface Air Station/ 1-min ASOS	Upper Air Station
CC Metals & Alloys	2005-2009	PAH Paducah Barkley Field	BNA Nashville, Tennessee
KY Utilities - Ghent	2005-2009	CVG Cincinnati/Greater Airport	ILN Wilmington, Ohio
Blue Grass Army Depot	2005-2009	LEX Blue Grass/Lexington	ILN Wilmington, Ohio
TVA Paradise	2005-2009	PAH Paducah Barkley Field	BNA Nashville, Tennessee

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”, twelve 30° averaged sectors were used throughout the analysis.

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

Facility	Surface Moisture	Temporal Resolution	Number of 30° Sectors
CC Metals & Alloys	Average	Monthly	12
KY Utilities - Ghent	Average	Monthly	12
Blue Grass Army Depot	Average	Monthly	12
TVA Paradise	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 these facilities since their modeled concentration fell significantly under the 0.075 µg/m³ lead concentration on a 3-month rolling average. Therefore, neither facility had the building downwash (BPIP) algorithm applied in the model.

Lead Emission Sources

CC Metals & Alloys, LLC produces ferrosilicon and various ferroalloy specialty products. Primary emission units include four submerged electric arc furnaces (EAF). KY Utilities-Ghent Generation Station is an electric power generating station consisting of four (4) pulverized coal-fired, dry bottom boilers. Blue Grass Army Depot neutralizes chemical weapons and agent stockpiles on-site. TVA Paradise Fossil Plant operates three cyclone-furnaces, coal-fired boiler units for electricity production. The facility also consist of three distillate oil-fired heating boilers, eleven distillate oil-fired space heaters, three natural-draft cooling towers, solid fuel, limestone, ash, and gypsum handling processes and coal handling equipment and coal wash plant disposal processes.

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

Receptors/Terrain

As stated in Section 7.2.2 of 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 100 by 100 meter grid. This is achieved by either expanding a tiered receptor grid or including a separate (Discrete Cartesian) grid to cover the maximum impact area.

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
CC Metals & Alloys LLC	Airport Model	5883	50 x 50 grid with 1000m x 1000m spacing 40 x 40 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED
	Site Model	6885	50 x 50 grid with 1000m x 1000m spacing 40 x 40 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED

KY Utilities - Ghent	Airport Model	3435	40 x 40 grid with 1000m x 1000m spacing 20 x 20 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED
	Site Model	3435	40 x 40 grid with 1000m x 1000m spacing 20 x 20 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED
Blue Grass Army Depot	Airport Model	3605	40 x 40 grid with 1000m x 1000m spacing 30 x 30 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED
	Site Model	6105	40 x 40 grid with 1000m x 1000m spacing 70 x 70 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED
TVA Paradise	Airport Model	5719	40 x 40 grid with 1500m x 1500m spacing 70 x 70 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED
	Site Model	5719	40 x 40 grid with 1500m x 1500m spacing 70 x 70 grid with 100m x 100m spacing surrounding the SIA	No	Yes	NED

Background

Nearby lead sources within a 50 km radius of the four modeled facilities were examined for background contributions. Nearby lead sources emissions data was acquired from the 2005-2009 KY Division for Air Quality Emissions Inventory Section (KY-EIS). In each case, the year with the highest actual emission was modeled. 50km radius plots representing the modeled facilities and the nearby lead source can be found in Appendix D.

Within the Source Pathway, source groups were assigned to each facility and modeled for maximum impacts and background contributions. The default SRCGROUP ALL was used for each model. Once the point source maximum impact receptor was assigned, the nearby lead source group was selected for the impact on the aforementioned receptor. This nearby lead source concentration at this receptor was used as the lead background concentration. The 3-month rolling average from the point source was added to a lead background concentration for comparison to the NAAQS.

TVA Paradise is not in proximity of major lead emitting sources. In the interest of being conservative towards human health, the lead emission tons per year for TVA Paradise were doubled to simulate background contributions.

A spreadsheet containing the 3-month rolling averages, background concentrations from nearby lead sources, and contribution concentration from the modeled sources on the nearby lead source can be found in Appendix F.

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.

In the interest of being conservative towards human health, total deposition was selected without wet and dry depletion for all model runs. In turn, a decreased rate of lead particles in the pollutant mass should be removed from the plume as it travels downwind.

Results

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

Table 5. 3-Month Rolling Average Concentrations

Facility	Surface Characteristics	One-half Lead NAAQS ($\mu\text{g}/\text{m}^3$)	3-Month Rolling Average Concentration ($\mu\text{g}/\text{m}^3$)
CC Metals & Alloys	Airport	0.075	0.002
	Site	0.075	0.003
KY Utilities - Ghent	Airport	0.075	0.002
	Site	0.075	0.002
Blue Grass Army Depot	Airport	0.075	0.008
	Site	0.075	0.002
TVA Paradise	Airport	0.075	0.001
	Site	0.075	0.001

Upon review, the output concentrations from the models show that the 3-month rolling averages for CC Metals & Alloys, LLC, KY Utilities Co-Ghent Generation Station, Blue Grass Army Depot, and TVA Paradise 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 E. 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. The facility's boundary is depicted with red boundary lines.

Conclusion

As mentioned previously, modeling has demonstrated that a waiver for monitoring lead at CC Metals & Alloys, LLC, KY Utilities Co-Ghent Generation Station, Blue Grass Army Depot, and TVA Paradise can be requested based upon a maximum 3-month rolling average below one-half the lead NAAQS.

Additional Information

In addition, data has been compiled for each facility and is available on the attached compact disc. Each facility has a designated folder which contains files specific to 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). Additional Modeling files for Blue Grass Army Depot and KU Ghent were used to evaluate nearby source lead contributions. The list of modeling files can be found in Appendix F.

Appendix A. Kentucky Facilities with Lead Emissions over 0.5TPY

Facility	City	State	Lead Emissions (tpy)	Data Source
CC Metals & Alloys LLC	Calvert City	Kentucky	0.692	2006 KY EIS Actual Emissions
KY Utilities Co - Ghent Generation Station	Ghent	Kentucky	0.622	2008 KY EIS Actual Emissions
Blue Grass Army Depot	Richmond	Kentucky	0.570	2009 KY EIS Actual Emissions
TVA Paradise Fossil Plant	Drakesboro	Kentucky	1.325	2005 KY EIS Actual Emissions

Appendix B. AERSURFACE Tables

CC Metals & Alloys - Airport					CC Metals & Alloys -Site				
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.17	0.72	0.024	1	1	0.17	0.64	0.023
1	2	0.17	0.72	0.057	1	2	0.17	0.64	0.05
1	3	0.17	0.72	0.038	1	3	0.17	0.64	0.257
1	4	0.17	0.72	0.025	1	4	0.17	0.64	0.45
1	5	0.17	0.72	0.022	1	5	0.17	0.64	0.359
1	6	0.17	0.72	0.022	1	6	0.17	0.64	0.171
1	7	0.17	0.72	0.021	1	7	0.17	0.64	0.151
1	8	0.17	0.72	0.014	1	8	0.17	0.64	0.146
1	9	0.17	0.72	0.018	1	9	0.17	0.64	0.333
1	10	0.17	0.72	0.021	1	10	0.17	0.64	0.243
1	11	0.17	0.72	0.024	1	11	0.17	0.64	0.082
1	12	0.17	0.72	0.034	1	12	0.17	0.64	0.021
2	1	0.17	0.72	0.024	2	1	0.17	0.64	0.023
2	2	0.17	0.72	0.057	2	2	0.17	0.64	0.05
2	3	0.17	0.72	0.038	2	3	0.17	0.64	0.257
2	4	0.17	0.72	0.025	2	4	0.17	0.64	0.45
2	5	0.17	0.72	0.022	2	5	0.17	0.64	0.359
2	6	0.17	0.72	0.022	2	6	0.17	0.64	0.171
2	7	0.17	0.72	0.021	2	7	0.17	0.64	0.151
2	8	0.17	0.72	0.014	2	8	0.17	0.64	0.146
2	9	0.17	0.72	0.018	2	9	0.17	0.64	0.333
2	10	0.17	0.72	0.021	2	10	0.17	0.64	0.243
2	11	0.17	0.72	0.024	2	11	0.17	0.64	0.082
2	12	0.17	0.72	0.034	2	12	0.17	0.64	0.021
3	1	0.14	0.36	0.035	3	1	0.14	0.38	0.024
3	2	0.14	0.36	0.079	3	2	0.14	0.38	0.051
3	3	0.14	0.36	0.054	3	3	0.14	0.38	0.257
3	4	0.14	0.36	0.037	3	4	0.14	0.38	0.461
3	5	0.14	0.36	0.032	3	5	0.14	0.38	0.393

3	6	0.14	0.36	0.03	3	6	0.14	0.38	0.19
3	7	0.14	0.36	0.027	3	7	0.14	0.38	0.167
3	8	0.14	0.36	0.02	3	8	0.14	0.38	0.167
3	9	0.14	0.36	0.025	3	9	0.14	0.38	0.37
3	10	0.14	0.36	0.031	3	10	0.14	0.38	0.258
3	11	0.14	0.36	0.036	3	11	0.14	0.38	0.083
3	12	0.14	0.36	0.051	3	12	0.14	0.38	0.022
4	1	0.14	0.36	0.035	4	1	0.14	0.38	0.024
4	2	0.14	0.36	0.079	4	2	0.14	0.38	0.051
4	3	0.14	0.36	0.054	4	3	0.14	0.38	0.257
4	4	0.14	0.36	0.037	4	4	0.14	0.38	0.461
4	5	0.14	0.36	0.032	4	5	0.14	0.38	0.393
4	6	0.14	0.36	0.03	4	6	0.14	0.38	0.19
4	7	0.14	0.36	0.027	4	7	0.14	0.38	0.167
4	8	0.14	0.36	0.02	4	8	0.14	0.38	0.167
4	9	0.14	0.36	0.025	4	9	0.14	0.38	0.37
4	10	0.14	0.36	0.031	4	10	0.14	0.38	0.258
4	11	0.14	0.36	0.036	4	11	0.14	0.38	0.083
4	12	0.14	0.36	0.051	4	12	0.14	0.38	0.022
5	1	0.14	0.36	0.035	5	1	0.14	0.38	0.024
5	2	0.14	0.36	0.079	5	2	0.14	0.38	0.051
5	3	0.14	0.36	0.054	5	3	0.14	0.38	0.257
5	4	0.14	0.36	0.037	5	4	0.14	0.38	0.461
5	5	0.14	0.36	0.032	5	5	0.14	0.38	0.393
5	6	0.14	0.36	0.03	5	6	0.14	0.38	0.19
5	7	0.14	0.36	0.027	5	7	0.14	0.38	0.167
5	8	0.14	0.36	0.02	5	8	0.14	0.38	0.167
5	9	0.14	0.36	0.025	5	9	0.14	0.38	0.37
5	10	0.14	0.36	0.031	5	10	0.14	0.38	0.258
5	11	0.14	0.36	0.036	5	11	0.14	0.38	0.083
5	12	0.14	0.36	0.051	5	12	0.14	0.38	0.022
6	1	0.19	0.45	0.104	6	1	0.17	0.37	0.029
6	2	0.19	0.45	0.252	6	2	0.17	0.37	0.051

6	3	0.19	0.45	0.19	6	3	0.17	0.37	0.257
6	4	0.19	0.45	0.162	6	4	0.17	0.37	0.478
6	5	0.19	0.45	0.119	6	5	0.17	0.37	0.467
6	6	0.19	0.45	0.06	6	6	0.17	0.37	0.224
6	7	0.19	0.45	0.033	6	7	0.17	0.37	0.209
6	8	0.19	0.45	0.028	6	8	0.17	0.37	0.197
6	9	0.19	0.45	0.042	6	9	0.17	0.37	0.445
6	10	0.19	0.45	0.098	6	10	0.17	0.37	0.28
6	11	0.19	0.45	0.18	6	11	0.17	0.37	0.084
6	12	0.19	0.45	0.241	6	12	0.17	0.37	0.03
7	1	0.19	0.45	0.104	7	1	0.17	0.37	0.029
7	2	0.19	0.45	0.252	7	2	0.17	0.37	0.051
7	3	0.19	0.45	0.19	7	3	0.17	0.37	0.257
7	4	0.19	0.45	0.162	7	4	0.17	0.37	0.478
7	5	0.19	0.45	0.119	7	5	0.17	0.37	0.467
7	6	0.19	0.45	0.06	7	6	0.17	0.37	0.224
7	7	0.19	0.45	0.033	7	7	0.17	0.37	0.209
7	8	0.19	0.45	0.028	7	8	0.17	0.37	0.197
7	9	0.19	0.45	0.042	7	9	0.17	0.37	0.445
7	10	0.19	0.45	0.098	7	10	0.17	0.37	0.28
7	11	0.19	0.45	0.18	7	11	0.17	0.37	0.084
7	12	0.19	0.45	0.241	7	12	0.17	0.37	0.03
8	1	0.19	0.45	0.104	8	1	0.17	0.37	0.029
8	2	0.19	0.45	0.252	8	2	0.17	0.37	0.051
8	3	0.19	0.45	0.19	8	3	0.17	0.37	0.257
8	4	0.19	0.45	0.162	8	4	0.17	0.37	0.478
8	5	0.19	0.45	0.119	8	5	0.17	0.37	0.467
8	6	0.19	0.45	0.06	8	6	0.17	0.37	0.224
8	7	0.19	0.45	0.033	8	7	0.17	0.37	0.209
8	8	0.19	0.45	0.028	8	8	0.17	0.37	0.197
8	9	0.19	0.45	0.042	8	9	0.17	0.37	0.445
8	10	0.19	0.45	0.098	8	10	0.17	0.37	0.28
8	11	0.19	0.45	0.18	8	11	0.17	0.37	0.084

8	12	0.19	0.45	0.241	8	12	0.17	0.37	0.03
9	1	0.19	0.71	0.095	9	1	0.17	0.62	0.029
9	2	0.19	0.71	0.249	9	2	0.17	0.62	0.051
9	3	0.19	0.71	0.188	9	3	0.17	0.62	0.257
9	4	0.19	0.71	0.159	9	4	0.17	0.62	0.474
9	5	0.19	0.71	0.113	9	5	0.17	0.62	0.451
9	6	0.19	0.71	0.052	9	6	0.17	0.62	0.215
9	7	0.19	0.71	0.027	9	7	0.17	0.62	0.204
9	8	0.19	0.71	0.022	9	8	0.17	0.62	0.183
9	9	0.19	0.71	0.035	9	9	0.17	0.62	0.43
9	10	0.19	0.71	0.091	9	10	0.17	0.62	0.271
9	11	0.19	0.71	0.18	9	11	0.17	0.62	0.083
9	12	0.19	0.71	0.241	9	12	0.17	0.62	0.03
10	1	0.19	0.71	0.095	10	1	0.17	0.62	0.029
10	2	0.19	0.71	0.249	10	2	0.17	0.62	0.051
10	3	0.19	0.71	0.188	10	3	0.17	0.62	0.257
10	4	0.19	0.71	0.159	10	4	0.17	0.62	0.474
10	5	0.19	0.71	0.113	10	5	0.17	0.62	0.451
10	6	0.19	0.71	0.052	10	6	0.17	0.62	0.215
10	7	0.19	0.71	0.027	10	7	0.17	0.62	0.204
10	8	0.19	0.71	0.022	10	8	0.17	0.62	0.183
10	9	0.19	0.71	0.035	10	9	0.17	0.62	0.43
10	10	0.19	0.71	0.091	10	10	0.17	0.62	0.271
10	11	0.19	0.71	0.18	10	11	0.17	0.62	0.083
10	12	0.19	0.71	0.241	10	12	0.17	0.62	0.03
11	1	0.19	0.71	0.095	11	1	0.17	0.62	0.029
11	2	0.19	0.71	0.249	11	2	0.17	0.62	0.051
11	3	0.19	0.71	0.188	11	3	0.17	0.62	0.257
11	4	0.19	0.71	0.159	11	4	0.17	0.62	0.474
11	5	0.19	0.71	0.113	11	5	0.17	0.62	0.451
11	6	0.19	0.71	0.052	11	6	0.17	0.62	0.215
11	7	0.19	0.71	0.027	11	7	0.17	0.62	0.204
11	8	0.19	0.71	0.022	11	8	0.17	0.62	0.183

11	9	0.19	0.71	0.035	11	9	0.17	0.62	0.43
11	10	0.19	0.71	0.091	11	10	0.17	0.62	0.271
11	11	0.19	0.71	0.18	11	11	0.17	0.62	0.083
11	12	0.19	0.71	0.241	11	12	0.17	0.62	0.03
12	1	0.17	0.72	0.024	12	1	0.17	0.64	0.023
12	2	0.17	0.72	0.057	12	2	0.17	0.64	0.05
12	3	0.17	0.72	0.038	12	3	0.17	0.64	0.257
12	4	0.17	0.72	0.025	12	4	0.17	0.64	0.45
12	5	0.17	0.72	0.022	12	5	0.17	0.64	0.359
12	6	0.17	0.72	0.022	12	6	0.17	0.64	0.171
12	7	0.17	0.72	0.021	12	7	0.17	0.64	0.151
12	8	0.17	0.72	0.014	12	8	0.17	0.64	0.146
12	9	0.17	0.72	0.018	12	9	0.17	0.64	0.333
12	10	0.17	0.72	0.021	12	10	0.17	0.64	0.243
12	11	0.17	0.72	0.024	12	11	0.17	0.64	0.082
12	12	0.17	0.72	0.034	12	12	0.17	0.64	0.021

KY Utilities-Ghent - Airport				KY Utilities-Ghent -Site					
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.17	0.79	0.042	1	1	0.16	0.68	0.021
1	2	0.17	0.79	0.061	1	2	0.16	0.68	0.131
1	3	0.17	0.79	0.052	1	3	0.16	0.68	0.034
1	4	0.17	0.79	0.045	1	4	0.16	0.68	0.214
1	5	0.17	0.79	0.056	1	5	0.16	0.68	0.408
1	6	0.17	0.79	0.06	1	6	0.16	0.68	0.33
1	7	0.17	0.79	0.057	1	7	0.16	0.68	0.189
1	8	0.17	0.79	0.03	1	8	0.16	0.68	0.347
1	9	0.17	0.79	0.019	1	9	0.16	0.68	0.243
1	10	0.17	0.79	0.055	1	10	0.16	0.68	0.018
1	11	0.17	0.79	0.036	1	11	0.16	0.68	0.018
1	12	0.17	0.79	0.042	1	12	0.16	0.68	0.04
2	1	0.17	0.79	0.042	2	1	0.16	0.68	0.021
2	2	0.17	0.79	0.061	2	2	0.16	0.68	0.131

2	3	0.17	0.79	0.052	2	3	0.16	0.68	0.034
2	4	0.17	0.79	0.045	2	4	0.16	0.68	0.214
2	5	0.17	0.79	0.056	2	5	0.16	0.68	0.408
2	6	0.17	0.79	0.06	2	6	0.16	0.68	0.33
2	7	0.17	0.79	0.057	2	7	0.16	0.68	0.189
2	8	0.17	0.79	0.03	2	8	0.16	0.68	0.347
2	9	0.17	0.79	0.019	2	9	0.16	0.68	0.243
2	10	0.17	0.79	0.055	2	10	0.16	0.68	0.018
2	11	0.17	0.79	0.036	2	11	0.16	0.68	0.018
2	12	0.17	0.79	0.042	2	12	0.16	0.68	0.04
3	1	0.15	0.49	0.05	3	1	0.14	0.43	0.023
3	2	0.15	0.49	0.068	3	2	0.14	0.43	0.145
3	3	0.15	0.49	0.059	3	3	0.14	0.43	0.041
3	4	0.15	0.49	0.053	3	4	0.14	0.43	0.292
3	5	0.15	0.49	0.065	3	5	0.14	0.43	0.615
3	6	0.15	0.49	0.068	3	6	0.14	0.43	0.501
3	7	0.15	0.49	0.068	3	7	0.14	0.43	0.272
3	8	0.15	0.49	0.04	3	8	0.14	0.43	0.505
3	9	0.15	0.49	0.027	3	9	0.14	0.43	0.331
3	10	0.15	0.49	0.077	3	10	0.14	0.43	0.02
3	11	0.15	0.49	0.049	3	11	0.14	0.43	0.02
3	12	0.15	0.49	0.052	3	12	0.14	0.43	0.045
4	1	0.15	0.49	0.05	4	1	0.14	0.43	0.023
4	2	0.15	0.49	0.068	4	2	0.14	0.43	0.145
4	3	0.15	0.49	0.059	4	3	0.14	0.43	0.041
4	4	0.15	0.49	0.053	4	4	0.14	0.43	0.292
4	5	0.15	0.49	0.065	4	5	0.14	0.43	0.615
4	6	0.15	0.49	0.068	4	6	0.14	0.43	0.501
4	7	0.15	0.49	0.068	4	7	0.14	0.43	0.272
4	8	0.15	0.49	0.04	4	8	0.14	0.43	0.505
4	9	0.15	0.49	0.027	4	9	0.14	0.43	0.331
4	10	0.15	0.49	0.077	4	10	0.14	0.43	0.02
4	11	0.15	0.49	0.049	4	11	0.14	0.43	0.02

4	12	0.15	0.49	0.052	4	12	0.14	0.43	0.045
5	1	0.15	0.49	0.05	5	1	0.14	0.43	0.023
5	2	0.15	0.49	0.068	5	2	0.14	0.43	0.145
5	3	0.15	0.49	0.059	5	3	0.14	0.43	0.041
5	4	0.15	0.49	0.053	5	4	0.14	0.43	0.292
5	5	0.15	0.49	0.065	5	5	0.14	0.43	0.615
5	6	0.15	0.49	0.068	5	6	0.14	0.43	0.501
5	7	0.15	0.49	0.068	5	7	0.14	0.43	0.272
5	8	0.15	0.49	0.04	5	8	0.14	0.43	0.505
5	9	0.15	0.49	0.027	5	9	0.14	0.43	0.331
5	10	0.15	0.49	0.077	5	10	0.14	0.43	0.02
5	11	0.15	0.49	0.049	5	11	0.14	0.43	0.02
5	12	0.15	0.49	0.052	5	12	0.14	0.43	0.045
6	1	0.17	0.44	0.056	6	1	0.16	0.33	0.025
6	2	0.17	0.44	0.073	6	2	0.16	0.33	0.159
6	3	0.17	0.44	0.064	6	3	0.16	0.33	0.047
6	4	0.17	0.44	0.059	6	4	0.16	0.33	0.354
6	5	0.17	0.44	0.072	6	5	0.16	0.33	0.86
6	6	0.17	0.44	0.075	6	6	0.16	0.33	0.677
6	7	0.17	0.44	0.076	6	7	0.16	0.33	0.49
6	8	0.17	0.44	0.048	6	8	0.16	0.33	0.797
6	9	0.17	0.44	0.034	6	9	0.16	0.33	0.444
6	10	0.17	0.44	0.109	6	10	0.16	0.33	0.025
6	11	0.17	0.44	0.078	6	11	0.16	0.33	0.027
6	12	0.17	0.44	0.059	6	12	0.16	0.33	0.056
7	1	0.17	0.44	0.056	7	1	0.16	0.33	0.025
7	2	0.17	0.44	0.073	7	2	0.16	0.33	0.159
7	3	0.17	0.44	0.064	7	3	0.16	0.33	0.047
7	4	0.17	0.44	0.059	7	4	0.16	0.33	0.354
7	5	0.17	0.44	0.072	7	5	0.16	0.33	0.86
7	6	0.17	0.44	0.075	7	6	0.16	0.33	0.677
7	7	0.17	0.44	0.076	7	7	0.16	0.33	0.49
7	8	0.17	0.44	0.048	7	8	0.16	0.33	0.797

7	9	0.17	0.44	0.034	7	9	0.16	0.33	0.444
7	10	0.17	0.44	0.109	7	10	0.16	0.33	0.025
7	11	0.17	0.44	0.078	7	11	0.16	0.33	0.027
7	12	0.17	0.44	0.059	7	12	0.16	0.33	0.056
8	1	0.17	0.44	0.056	8	1	0.16	0.33	0.025
8	2	0.17	0.44	0.073	8	2	0.16	0.33	0.159
8	3	0.17	0.44	0.064	8	3	0.16	0.33	0.047
8	4	0.17	0.44	0.059	8	4	0.16	0.33	0.354
8	5	0.17	0.44	0.072	8	5	0.16	0.33	0.86
8	6	0.17	0.44	0.075	8	6	0.16	0.33	0.677
8	7	0.17	0.44	0.076	8	7	0.16	0.33	0.49
8	8	0.17	0.44	0.048	8	8	0.16	0.33	0.797
8	9	0.17	0.44	0.034	8	9	0.16	0.33	0.444
8	10	0.17	0.44	0.109	8	10	0.16	0.33	0.025
8	11	0.17	0.44	0.078	8	11	0.16	0.33	0.027
8	12	0.17	0.44	0.059	8	12	0.16	0.33	0.056
9	1	0.17	0.78	0.05	9	1	0.16	0.68	0.025
9	2	0.17	0.78	0.068	9	2	0.16	0.68	0.155
9	3	0.17	0.78	0.059	9	3	0.16	0.68	0.044
9	4	0.17	0.78	0.053	9	4	0.16	0.68	0.333
9	5	0.17	0.78	0.066	9	5	0.16	0.68	0.845
9	6	0.17	0.78	0.069	9	6	0.16	0.68	0.651
9	7	0.17	0.78	0.069	9	7	0.16	0.68	0.477
9	8	0.17	0.78	0.041	9	8	0.16	0.68	0.791
9	9	0.17	0.78	0.027	9	9	0.16	0.68	0.427
9	10	0.17	0.78	0.097	9	10	0.16	0.68	0.025
9	11	0.17	0.78	0.069	9	11	0.16	0.68	0.026
9	12	0.17	0.78	0.052	9	12	0.16	0.68	0.056
10	1	0.17	0.78	0.05	10	1	0.16	0.68	0.025
10	2	0.17	0.78	0.068	10	2	0.16	0.68	0.155
10	3	0.17	0.78	0.059	10	3	0.16	0.68	0.044
10	4	0.17	0.78	0.053	10	4	0.16	0.68	0.333
10	5	0.17	0.78	0.066	10	5	0.16	0.68	0.845

10	6	0.17	0.78	0.069	10	6	0.16	0.68	0.651
10	7	0.17	0.78	0.069	10	7	0.16	0.68	0.477
10	8	0.17	0.78	0.041	10	8	0.16	0.68	0.791
10	9	0.17	0.78	0.027	10	9	0.16	0.68	0.427
10	10	0.17	0.78	0.097	10	10	0.16	0.68	0.025
10	11	0.17	0.78	0.069	10	11	0.16	0.68	0.026
10	12	0.17	0.78	0.052	10	12	0.16	0.68	0.056
11	1	0.17	0.78	0.05	11	1	0.16	0.68	0.025
11	2	0.17	0.78	0.068	11	2	0.16	0.68	0.155
11	3	0.17	0.78	0.059	11	3	0.16	0.68	0.044
11	4	0.17	0.78	0.053	11	4	0.16	0.68	0.333
11	5	0.17	0.78	0.066	11	5	0.16	0.68	0.845
11	6	0.17	0.78	0.069	11	6	0.16	0.68	0.651
11	7	0.17	0.78	0.069	11	7	0.16	0.68	0.477
11	8	0.17	0.78	0.041	11	8	0.16	0.68	0.791
11	9	0.17	0.78	0.027	11	9	0.16	0.68	0.427
11	10	0.17	0.78	0.097	11	10	0.16	0.68	0.025
11	11	0.17	0.78	0.069	11	11	0.16	0.68	0.026
11	12	0.17	0.78	0.052	11	12	0.16	0.68	0.056
12	1	0.17	0.79	0.042	12	1	0.16	0.68	0.021
12	2	0.17	0.79	0.061	12	2	0.16	0.68	0.131
12	3	0.17	0.79	0.052	12	3	0.16	0.68	0.034
12	4	0.17	0.79	0.045	12	4	0.16	0.68	0.214
12	5	0.17	0.79	0.056	12	5	0.16	0.68	0.408
12	6	0.17	0.79	0.06	12	6	0.16	0.68	0.33
12	7	0.17	0.79	0.057	12	7	0.16	0.68	0.189
12	8	0.17	0.79	0.03	12	8	0.16	0.68	0.347
12	9	0.17	0.79	0.019	12	9	0.16	0.68	0.243
12	10	0.17	0.79	0.055	12	10	0.16	0.68	0.018
12	11	0.17	0.79	0.036	12	11	0.16	0.68	0.018
12	12	0.17	0.79	0.042	12	12	0.16	0.68	0.04

Blue Grass Army Depot - Airport							Blue Grass Army Depot -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	0.05				
1	2	0.17	0.79	0.036	1	2	0.17	0.78	0.164				
1	3	0.17	0.79	0.032	1	3	0.17	0.78	0.17				
1	4	0.17	0.79	0.028	1	4	0.17	0.78	0.109				
1	5	0.17	0.79	0.063	1	5	0.17	0.78	0.083				
1	6	0.17	0.79	0.053	1	6	0.17	0.78	0.045				
1	7	0.17	0.79	0.04	1	7	0.17	0.78	0.222				
1	8	0.17	0.79	0.038	1	8	0.17	0.78	0.117				
1	9	0.17	0.79	0.066	1	9	0.17	0.78	0.048				
1	10	0.17	0.79	0.089	1	10	0.17	0.78	0.009				
1	11	0.17	0.79	0.06	1	11	0.17	0.78	0.01				
1	12	0.17	0.79	0.045	1	12	0.17	0.78	0.013				
2	1	0.17	0.79	0.067	2	1	0.17	0.78	0.05				
2	2	0.17	0.79	0.036	2	2	0.17	0.78	0.164				
2	3	0.17	0.79	0.032	2	3	0.17	0.78	0.17				
2	4	0.17	0.79	0.028	2	4	0.17	0.78	0.109				
2	5	0.17	0.79	0.063	2	5	0.17	0.78	0.083				
2	6	0.17	0.79	0.053	2	6	0.17	0.78	0.045				
2	7	0.17	0.79	0.04	2	7	0.17	0.78	0.222				
2	8	0.17	0.79	0.038	2	8	0.17	0.78	0.117				
2	9	0.17	0.79	0.066	2	9	0.17	0.78	0.048				
2	10	0.17	0.79	0.089	2	10	0.17	0.78	0.009				
2	11	0.17	0.79	0.06	2	11	0.17	0.78	0.01				
2	12	0.17	0.79	0.045	2	12	0.17	0.78	0.013				
3	1	0.15	0.41	0.075	3	1	0.14	0.41	0.073				
3	2	0.15	0.41	0.047	3	2	0.14	0.41	0.238				
3	3	0.15	0.41	0.045	3	3	0.14	0.41	0.261				
3	4	0.15	0.41	0.04	3	4	0.14	0.41	0.163				
3	5	0.15	0.41	0.09	3	5	0.14	0.41	0.126				
3	6	0.15	0.41	0.073	3	6	0.14	0.41	0.066				
3	7	0.15	0.41	0.055	3	7	0.14	0.41	0.329				

3	8	0.15	0.41	0.048	3	8	0.14	0.41	0.169
3	9	0.15	0.41	0.082	3	9	0.14	0.41	0.061
3	10	0.15	0.41	0.114	3	10	0.14	0.41	0.011
3	11	0.15	0.41	0.072	3	11	0.14	0.41	0.013
3	12	0.15	0.41	0.052	3	12	0.14	0.41	0.017
4	1	0.15	0.41	0.075	4	1	0.14	0.41	0.073
4	2	0.15	0.41	0.047	4	2	0.14	0.41	0.238
4	3	0.15	0.41	0.045	4	3	0.14	0.41	0.261
4	4	0.15	0.41	0.04	4	4	0.14	0.41	0.163
4	5	0.15	0.41	0.09	4	5	0.14	0.41	0.126
4	6	0.15	0.41	0.073	4	6	0.14	0.41	0.066
4	7	0.15	0.41	0.055	4	7	0.14	0.41	0.329
4	8	0.15	0.41	0.048	4	8	0.14	0.41	0.169
4	9	0.15	0.41	0.082	4	9	0.14	0.41	0.061
4	10	0.15	0.41	0.114	4	10	0.14	0.41	0.011
4	11	0.15	0.41	0.072	4	11	0.14	0.41	0.013
4	12	0.15	0.41	0.052	4	12	0.14	0.41	0.017
5	1	0.15	0.41	0.075	5	1	0.14	0.41	0.073
5	2	0.15	0.41	0.047	5	2	0.14	0.41	0.238
5	3	0.15	0.41	0.045	5	3	0.14	0.41	0.261
5	4	0.15	0.41	0.04	5	4	0.14	0.41	0.163
5	5	0.15	0.41	0.09	5	5	0.14	0.41	0.126
5	6	0.15	0.41	0.073	5	6	0.14	0.41	0.066
5	7	0.15	0.41	0.055	5	7	0.14	0.41	0.329
5	8	0.15	0.41	0.048	5	8	0.14	0.41	0.169
5	9	0.15	0.41	0.082	5	9	0.14	0.41	0.061
5	10	0.15	0.41	0.114	5	10	0.14	0.41	0.011
5	11	0.15	0.41	0.072	5	11	0.14	0.41	0.013
5	12	0.15	0.41	0.052	5	12	0.14	0.41	0.017
6	1	0.18	0.5	0.093	6	1	0.18	0.42	0.24
6	2	0.18	0.5	0.116	6	2	0.18	0.42	0.527
6	3	0.18	0.5	0.143	6	3	0.18	0.42	0.562
6	4	0.18	0.5	0.177	6	4	0.18	0.42	0.419

6	5	0.18	0.5	0.238	6	5	0.18	0.42	0.359
6	6	0.18	0.5	0.194	6	6	0.18	0.42	0.241
6	7	0.18	0.5	0.106	6	7	0.18	0.42	0.64
6	8	0.18	0.5	0.076	6	8	0.18	0.42	0.424
6	9	0.18	0.5	0.131	6	9	0.18	0.42	0.114
6	10	0.18	0.5	0.147	6	10	0.18	0.42	0.022
6	11	0.18	0.5	0.08	6	11	0.18	0.42	0.017
6	12	0.18	0.5	0.06	6	12	0.18	0.42	0.024
7	1	0.18	0.5	0.093	7	1	0.18	0.42	0.24
7	2	0.18	0.5	0.116	7	2	0.18	0.42	0.527
7	3	0.18	0.5	0.143	7	3	0.18	0.42	0.562
7	4	0.18	0.5	0.177	7	4	0.18	0.42	0.419
7	5	0.18	0.5	0.238	7	5	0.18	0.42	0.359
7	6	0.18	0.5	0.194	7	6	0.18	0.42	0.241
7	7	0.18	0.5	0.106	7	7	0.18	0.42	0.64
7	8	0.18	0.5	0.076	7	8	0.18	0.42	0.424
7	9	0.18	0.5	0.131	7	9	0.18	0.42	0.114
7	10	0.18	0.5	0.147	7	10	0.18	0.42	0.022
7	11	0.18	0.5	0.08	7	11	0.18	0.42	0.017
7	12	0.18	0.5	0.06	7	12	0.18	0.42	0.024
8	1	0.18	0.5	0.093	8	1	0.18	0.42	0.24
8	2	0.18	0.5	0.116	8	2	0.18	0.42	0.527
8	3	0.18	0.5	0.143	8	3	0.18	0.42	0.562
8	4	0.18	0.5	0.177	8	4	0.18	0.42	0.419
8	5	0.18	0.5	0.238	8	5	0.18	0.42	0.359
8	6	0.18	0.5	0.194	8	6	0.18	0.42	0.241
8	7	0.18	0.5	0.106	8	7	0.18	0.42	0.64
8	8	0.18	0.5	0.076	8	8	0.18	0.42	0.424
8	9	0.18	0.5	0.131	8	9	0.18	0.42	0.114
8	10	0.18	0.5	0.147	8	10	0.18	0.42	0.022
8	11	0.18	0.5	0.08	8	11	0.18	0.42	0.017
8	12	0.18	0.5	0.06	8	12	0.18	0.42	0.024
9	1	0.18	0.79	0.09	9	1	0.18	0.78	0.24

9	2	0.18	0.79	0.112	9	2	0.18	0.78	0.527
9	3	0.18	0.79	0.139	9	3	0.18	0.78	0.562
9	4	0.18	0.79	0.176	9	4	0.18	0.78	0.419
9	5	0.18	0.79	0.234	9	5	0.18	0.78	0.359
9	6	0.18	0.79	0.188	9	6	0.18	0.78	0.241
9	7	0.18	0.79	0.095	9	7	0.18	0.78	0.64
9	8	0.18	0.79	0.069	9	8	0.18	0.78	0.424
9	9	0.18	0.79	0.124	9	9	0.18	0.78	0.114
9	10	0.18	0.79	0.136	9	10	0.18	0.78	0.022
9	11	0.18	0.79	0.075	9	11	0.18	0.78	0.015
9	12	0.18	0.79	0.056	9	12	0.18	0.78	0.021
10	1	0.18	0.79	0.09	10	1	0.18	0.78	0.24
10	2	0.18	0.79	0.112	10	2	0.18	0.78	0.527
10	3	0.18	0.79	0.139	10	3	0.18	0.78	0.562
10	4	0.18	0.79	0.176	10	4	0.18	0.78	0.419
10	5	0.18	0.79	0.234	10	5	0.18	0.78	0.359
10	6	0.18	0.79	0.188	10	6	0.18	0.78	0.241
10	7	0.18	0.79	0.095	10	7	0.18	0.78	0.64
10	8	0.18	0.79	0.069	10	8	0.18	0.78	0.424
10	9	0.18	0.79	0.124	10	9	0.18	0.78	0.114
10	10	0.18	0.79	0.136	10	10	0.18	0.78	0.022
10	11	0.18	0.79	0.075	10	11	0.18	0.78	0.015
10	12	0.18	0.79	0.056	10	12	0.18	0.78	0.021
11	1	0.18	0.79	0.09	11	1	0.18	0.78	0.24
11	2	0.18	0.79	0.112	11	2	0.18	0.78	0.527
11	3	0.18	0.79	0.139	11	3	0.18	0.78	0.562
11	4	0.18	0.79	0.176	11	4	0.18	0.78	0.419
11	5	0.18	0.79	0.234	11	5	0.18	0.78	0.359
11	6	0.18	0.79	0.188	11	6	0.18	0.78	0.241
11	7	0.18	0.79	0.095	11	7	0.18	0.78	0.64
11	8	0.18	0.79	0.069	11	8	0.18	0.78	0.424
11	9	0.18	0.79	0.124	11	9	0.18	0.78	0.114
11	10	0.18	0.79	0.136	11	10	0.18	0.78	0.022

11	11	0.18	0.79	0.075	11	11	0.18	0.78	0.015
11	12	0.18	0.79	0.056	11	12	0.18	0.78	0.021
12	1	0.17	0.79	0.067	12	1	0.17	0.78	0.05
12	2	0.17	0.79	0.036	12	2	0.17	0.78	0.164
12	3	0.17	0.79	0.032	12	3	0.17	0.78	0.17
12	4	0.17	0.79	0.028	12	4	0.17	0.78	0.109
12	5	0.17	0.79	0.063	12	5	0.17	0.78	0.083
12	6	0.17	0.79	0.053	12	6	0.17	0.78	0.045
12	7	0.17	0.79	0.04	12	7	0.17	0.78	0.222
12	8	0.17	0.79	0.038	12	8	0.17	0.78	0.117
12	9	0.17	0.79	0.066	12	9	0.17	0.78	0.048
12	10	0.17	0.79	0.089	12	10	0.17	0.78	0.009
12	11	0.17	0.79	0.06	12	11	0.17	0.78	0.01
12	12	0.17	0.79	0.045	12	12	0.17	0.78	0.013

TVA Paradise -Airport				TVA Paradise -Site					
Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length	Month	Sector	Albedo	Bowen Ratio	Surface Roughness Length
1	1	0.17	0.72	0.024	1	1	0.16	0.72	0.101
1	2	0.17	0.72	0.057	1	2	0.16	0.72	0.279
1	3	0.17	0.72	0.038	1	3	0.16	0.72	0.356
1	4	0.17	0.72	0.025	1	4	0.16	0.72	0.258
1	5	0.17	0.72	0.022	1	5	0.16	0.72	0.122
1	6	0.17	0.72	0.022	1	6	0.16	0.72	0.015
1	7	0.17	0.72	0.021	1	7	0.16	0.72	0.216
1	8	0.17	0.72	0.014	1	8	0.16	0.72	0.338
1	9	0.17	0.72	0.018	1	9	0.16	0.72	0.214
1	10	0.17	0.72	0.021	1	10	0.16	0.72	0.355
1	11	0.17	0.72	0.024	1	11	0.16	0.72	0.22
1	12	0.17	0.72	0.034	1	12	0.16	0.72	0.057
2	1	0.17	0.72	0.024	2	1	0.16	0.72	0.101
2	2	0.17	0.72	0.057	2	2	0.16	0.72	0.279
2	3	0.17	0.72	0.038	2	3	0.16	0.72	0.356
2	4	0.17	0.72	0.025	2	4	0.16	0.72	0.258

2	5	0.17	0.72	0.022	2	5	0.16	0.72	0.122
2	6	0.17	0.72	0.022	2	6	0.16	0.72	0.015
2	7	0.17	0.72	0.021	2	7	0.16	0.72	0.216
2	8	0.17	0.72	0.014	2	8	0.16	0.72	0.338
2	9	0.17	0.72	0.018	2	9	0.16	0.72	0.214
2	10	0.17	0.72	0.021	2	10	0.16	0.72	0.355
2	11	0.17	0.72	0.024	2	11	0.16	0.72	0.22
2	12	0.17	0.72	0.034	2	12	0.16	0.72	0.057
3	1	0.14	0.36	0.035	3	1	0.15	0.52	0.103
3	2	0.14	0.36	0.079	3	2	0.15	0.52	0.283
3	3	0.14	0.36	0.054	3	3	0.15	0.52	0.37
3	4	0.14	0.36	0.037	3	4	0.15	0.52	0.294
3	5	0.14	0.36	0.032	3	5	0.15	0.52	0.136
3	6	0.14	0.36	0.03	3	6	0.15	0.52	0.017
3	7	0.14	0.36	0.027	3	7	0.15	0.52	0.278
3	8	0.14	0.36	0.02	3	8	0.15	0.52	0.4
3	9	0.14	0.36	0.025	3	9	0.15	0.52	0.226
3	10	0.14	0.36	0.031	3	10	0.15	0.52	0.366
3	11	0.14	0.36	0.036	3	11	0.15	0.52	0.223
3	12	0.14	0.36	0.051	3	12	0.15	0.52	0.059
4	1	0.14	0.36	0.035	4	1	0.15	0.52	0.103
4	2	0.14	0.36	0.079	4	2	0.15	0.52	0.283
4	3	0.14	0.36	0.054	4	3	0.15	0.52	0.37
4	4	0.14	0.36	0.037	4	4	0.15	0.52	0.294
4	5	0.14	0.36	0.032	4	5	0.15	0.52	0.136
4	6	0.14	0.36	0.03	4	6	0.15	0.52	0.017
4	7	0.14	0.36	0.027	4	7	0.15	0.52	0.278
4	8	0.14	0.36	0.02	4	8	0.15	0.52	0.4
4	9	0.14	0.36	0.025	4	9	0.15	0.52	0.226
4	10	0.14	0.36	0.031	4	10	0.15	0.52	0.366
4	11	0.14	0.36	0.036	4	11	0.15	0.52	0.223
4	12	0.14	0.36	0.051	4	12	0.15	0.52	0.059
5	1	0.14	0.36	0.035	5	1	0.15	0.52	0.103

5	2	0.14	0.36	0.079	5	2	0.15	0.52	0.283
5	3	0.14	0.36	0.054	5	3	0.15	0.52	0.37
5	4	0.14	0.36	0.037	5	4	0.15	0.52	0.294
5	5	0.14	0.36	0.032	5	5	0.15	0.52	0.136
5	6	0.14	0.36	0.03	5	6	0.15	0.52	0.017
5	7	0.14	0.36	0.027	5	7	0.15	0.52	0.278
5	8	0.14	0.36	0.02	5	8	0.15	0.52	0.4
5	9	0.14	0.36	0.025	5	9	0.15	0.52	0.226
5	10	0.14	0.36	0.031	5	10	0.15	0.52	0.366
5	11	0.14	0.36	0.036	5	11	0.15	0.52	0.223
5	12	0.14	0.36	0.051	5	12	0.15	0.52	0.059
6	1	0.19	0.45	0.104	6	1	0.16	0.34	0.104
6	2	0.19	0.45	0.252	6	2	0.16	0.34	0.284
6	3	0.19	0.45	0.19	6	3	0.16	0.34	0.377
6	4	0.19	0.45	0.162	6	4	0.16	0.34	0.314
6	5	0.19	0.45	0.119	6	5	0.16	0.34	0.144
6	6	0.19	0.45	0.06	6	6	0.16	0.34	0.018
6	7	0.19	0.45	0.033	6	7	0.16	0.34	0.318
6	8	0.19	0.45	0.028	6	8	0.16	0.34	0.441
6	9	0.19	0.45	0.042	6	9	0.16	0.34	0.232
6	10	0.19	0.45	0.098	6	10	0.16	0.34	0.372
6	11	0.19	0.45	0.18	6	11	0.16	0.34	0.225
6	12	0.19	0.45	0.241	6	12	0.16	0.34	0.06
7	1	0.19	0.45	0.104	7	1	0.16	0.34	0.104
7	2	0.19	0.45	0.252	7	2	0.16	0.34	0.284
7	3	0.19	0.45	0.19	7	3	0.16	0.34	0.377
7	4	0.19	0.45	0.162	7	4	0.16	0.34	0.314
7	5	0.19	0.45	0.119	7	5	0.16	0.34	0.144
7	6	0.19	0.45	0.06	7	6	0.16	0.34	0.018
7	7	0.19	0.45	0.033	7	7	0.16	0.34	0.318
7	8	0.19	0.45	0.028	7	8	0.16	0.34	0.441
7	9	0.19	0.45	0.042	7	9	0.16	0.34	0.232
7	10	0.19	0.45	0.098	7	10	0.16	0.34	0.372

7	7	11	0.19	0.45	0.18	7	11	0.16	0.34	0.225
7	7	12	0.19	0.45	0.241	7	12	0.16	0.34	0.06
8	1	1	0.19	0.45	0.104	8	1	0.16	0.34	0.104
8	2	2	0.19	0.45	0.252	8	2	0.16	0.34	0.284
8	3	3	0.19	0.45	0.19	8	3	0.16	0.34	0.377
8	4	4	0.19	0.45	0.162	8	4	0.16	0.34	0.314
8	5	5	0.19	0.45	0.119	8	5	0.16	0.34	0.144
8	6	6	0.19	0.45	0.06	8	6	0.16	0.34	0.018
8	7	7	0.19	0.45	0.033	8	7	0.16	0.34	0.318
8	8	8	0.19	0.45	0.028	8	8	0.16	0.34	0.441
8	9	9	0.19	0.45	0.042	8	9	0.16	0.34	0.232
8	10	10	0.19	0.45	0.098	8	10	0.16	0.34	0.372
8	11	11	0.19	0.45	0.18	8	11	0.16	0.34	0.225
8	12	12	0.19	0.45	0.241	8	12	0.16	0.34	0.06
9	1	1	0.19	0.71	0.095	9	1	0.16	0.69	0.104
9	2	2	0.19	0.71	0.249	9	2	0.16	0.69	0.284
9	3	3	0.19	0.71	0.188	9	3	0.16	0.69	0.376
9	4	4	0.19	0.71	0.159	9	4	0.16	0.69	0.314
9	5	5	0.19	0.71	0.113	9	5	0.16	0.69	0.144
9	6	6	0.19	0.71	0.052	9	6	0.16	0.69	0.018
9	7	7	0.19	0.71	0.027	9	7	0.16	0.69	0.317
9	8	8	0.19	0.71	0.022	9	8	0.16	0.69	0.437
9	9	9	0.19	0.71	0.035	9	9	0.16	0.69	0.232
9	10	10	0.19	0.71	0.091	9	10	0.16	0.69	0.372
9	11	11	0.19	0.71	0.18	9	11	0.16	0.69	0.224
9	12	12	0.19	0.71	0.241	9	12	0.16	0.69	0.06
10	1	1	0.19	0.71	0.095	10	1	0.16	0.69	0.104
10	2	2	0.19	0.71	0.249	10	2	0.16	0.69	0.284
10	3	3	0.19	0.71	0.188	10	3	0.16	0.69	0.376
10	4	4	0.19	0.71	0.159	10	4	0.16	0.69	0.314
10	5	5	0.19	0.71	0.113	10	5	0.16	0.69	0.144
10	6	6	0.19	0.71	0.052	10	6	0.16	0.69	0.018
10	7	7	0.19	0.71	0.027	10	7	0.16	0.69	0.317

10	8	0.19	0.71	0.022	10	8	0.16	0.69	0.437
10	9	0.19	0.71	0.035	10	9	0.16	0.69	0.232
10	10	0.19	0.71	0.091	10	10	0.16	0.69	0.372
10	11	0.19	0.71	0.18	10	11	0.16	0.69	0.224
10	12	0.19	0.71	0.241	10	12	0.16	0.69	0.06
11	1	0.19	0.71	0.095	11	1	0.16	0.69	0.104
11	2	0.19	0.71	0.249	11	2	0.16	0.69	0.284
11	3	0.19	0.71	0.188	11	3	0.16	0.69	0.376
11	4	0.19	0.71	0.159	11	4	0.16	0.69	0.314
11	5	0.19	0.71	0.113	11	5	0.16	0.69	0.144
11	6	0.19	0.71	0.052	11	6	0.16	0.69	0.018
11	7	0.19	0.71	0.027	11	7	0.16	0.69	0.317
11	8	0.19	0.71	0.022	11	8	0.16	0.69	0.437
11	9	0.19	0.71	0.035	11	9	0.16	0.69	0.232
11	10	0.19	0.71	0.091	11	10	0.16	0.69	0.372
11	11	0.19	0.71	0.18	11	11	0.16	0.69	0.224
11	12	0.19	0.71	0.241	11	12	0.16	0.69	0.06
12	1	0.17	0.72	0.024	12	1	0.16	0.72	0.101
12	2	0.17	0.72	0.057	12	2	0.16	0.72	0.279
12	3	0.17	0.72	0.038	12	3	0.16	0.72	0.356
12	4	0.17	0.72	0.025	12	4	0.16	0.72	0.258
12	5	0.17	0.72	0.022	12	5	0.16	0.72	0.122
12	6	0.17	0.72	0.022	12	6	0.16	0.72	0.015
12	7	0.17	0.72	0.021	12	7	0.16	0.72	0.216
12	8	0.17	0.72	0.014	12	8	0.16	0.72	0.338
12	9	0.17	0.72	0.018	12	9	0.16	0.72	0.214
12	10	0.17	0.72	0.021	12	10	0.16	0.72	0.355
12	11	0.17	0.72	0.024	12	11	0.16	0.72	0.22
12	12	0.17	0.72	0.034	12	12	0.16	0.72	0.057

Appendix C. Lead Emission Sources

Facility	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
CC Metals & Alloys LLC	380133.87	4101969.33	104.86	27.13	0.001965	422.04	2.130	10.300	Furnace #6
	380075.79	4102089.10	103.91	27.13	0.005938	449.82	3.960	10.300	Furnace #15
	380133.70	4102085.70	103.94	27.13	0.01201	449.82	3.960	10.300	Furnace #16
KY Utilities Co - Ghent Generation Station	670643.77	4290826.33	148.20	176.784	.009652396	324.82	7.0104	11.278	UNIT 1
	670498.06	4290762.85	150.51	201.168	.007007657	422.04	14.53896	9.144	UNIT 2/3
	670314.39	4290654.10	150.33	201.168	.001244702	422.04	15.27048	9.144	UNIT 4
Blue Grass Army Depot	746015.59	4172332.19	276.85	112.47	1.793E-06				OB/OD
	743418.91	4172931.61	307.32	10.668	5.160E-06	699.82	20.763	.823	Paint Booth
	745073.57	4172428.1	292.56	9.144	1.742E-05	309.82	29.66618	.610	Detonation Chamber
TVA Paradise	744499.92	4172664.62	301.03	14.630	1.260E-05	373.15	16.4531	.405	ISCWO
	501896.96	4123758.32	129.24	182.88	.01499899	340.93	22.12848	7.925	Stack1
	501743.11	4123601.17	128.61	243.84	.00623191	419.26	40.69080	8.169	Stack3
	501837.94	4123692.62	128.78	182.88	.01689054	340.93	22.12848	7.925	Stack2

Appendix D. Radial Plot Maps Figure 1.0 CC Metals & Alloys - TVA Shawnee (Nearby Lead Source)



Figure 2.0 Ghent Generation Station - Gallatin Steel and North American Stainless (Nearby Lead Sources)

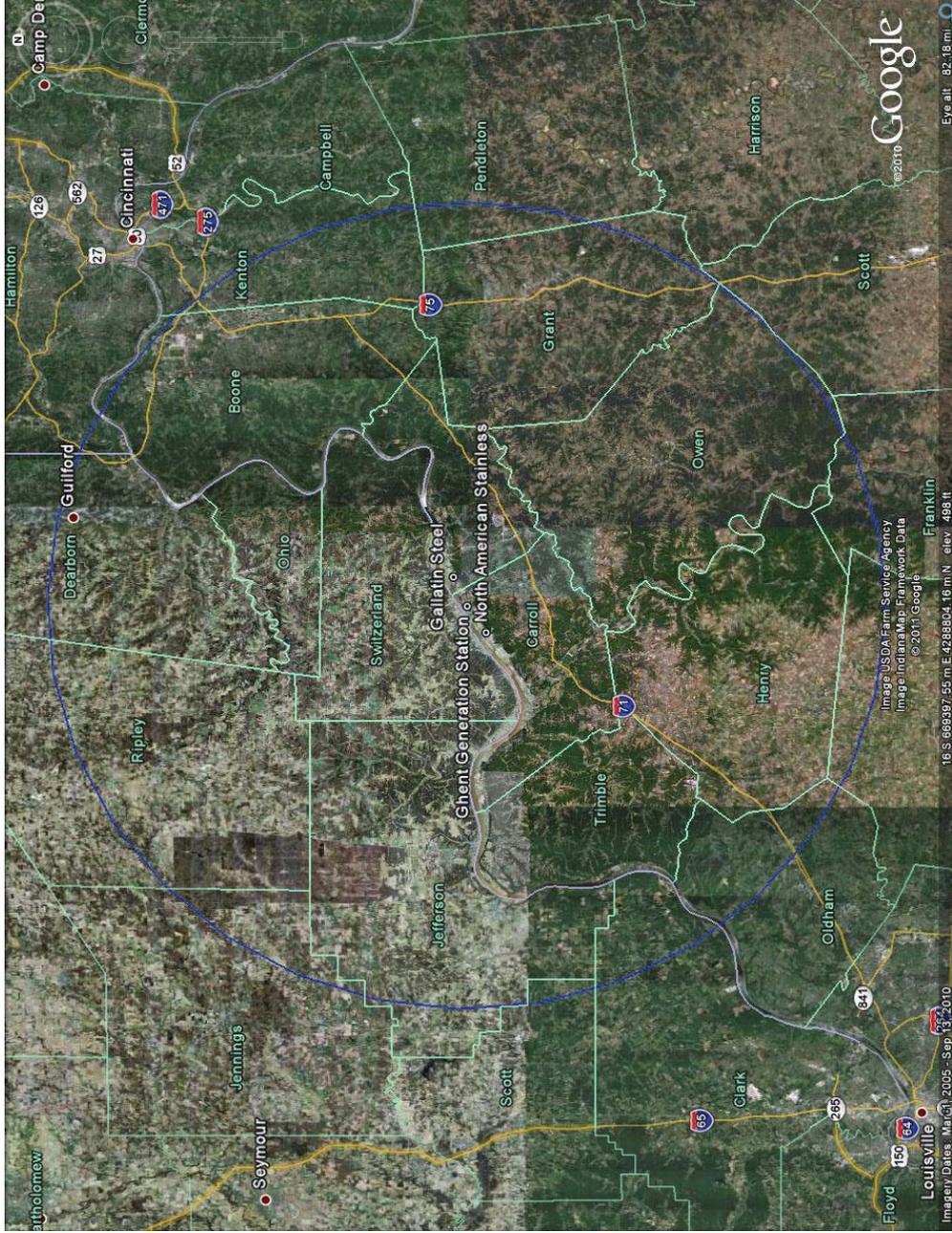
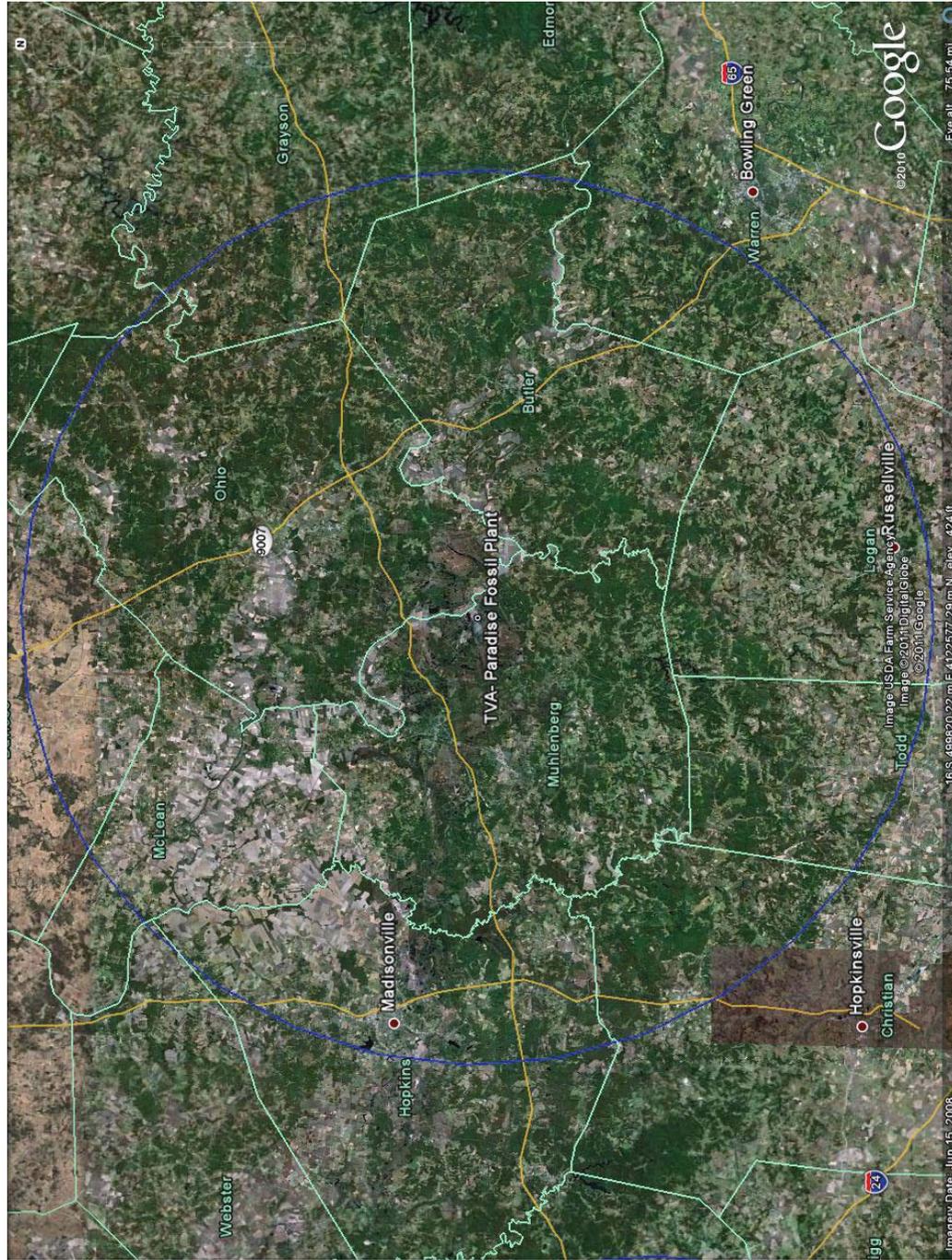


Figure 3.0 Blue Grass Army Depot – Enersys (Nearby Lead Source)



Figure 4.0 TVA Paradise (No Nearby Lead Source)



Appendix E. Modeled Impacts

Figure 1.0 CC Metals & Alloys - Airport, High 1st High Monthly Average Concentration, Entire Domain

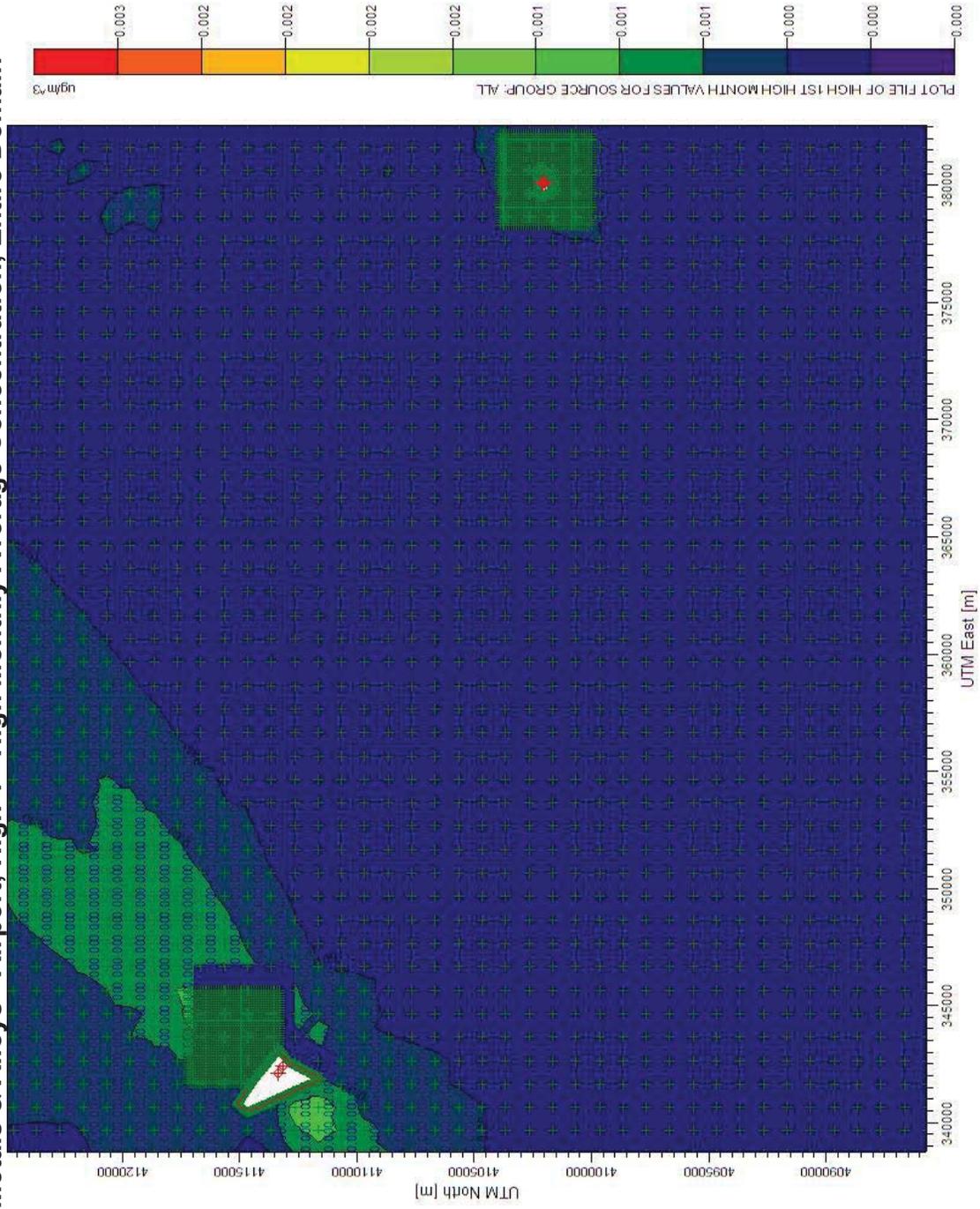


Figure 1.1 CC Metals & Alloys - Airport, High 1st High Monthly Average Concentration, Controlling Concentration

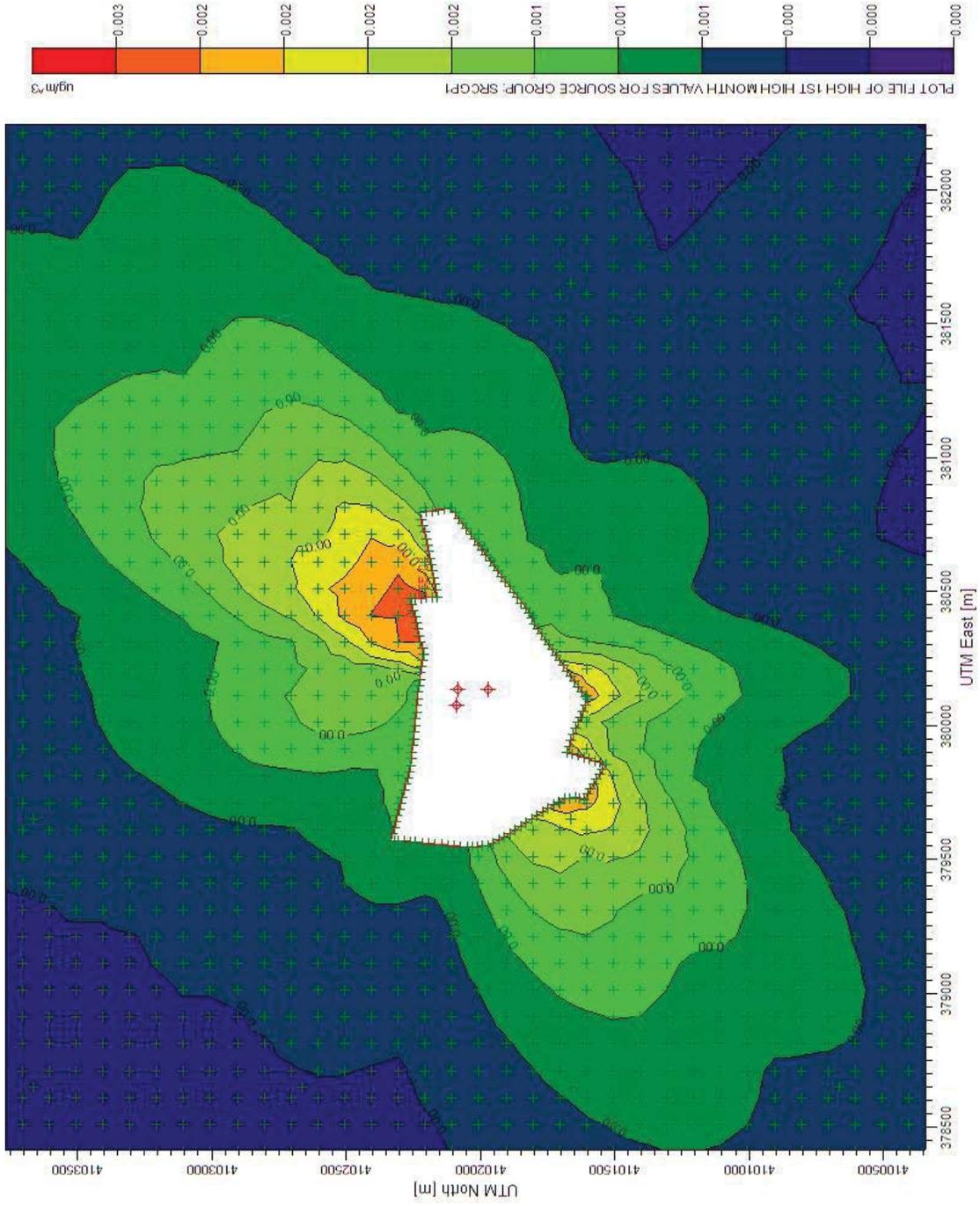


Figure 2.0 CC Metals & Alloys - Site, High 1st High Monthly Average Concentration, Entire Domain

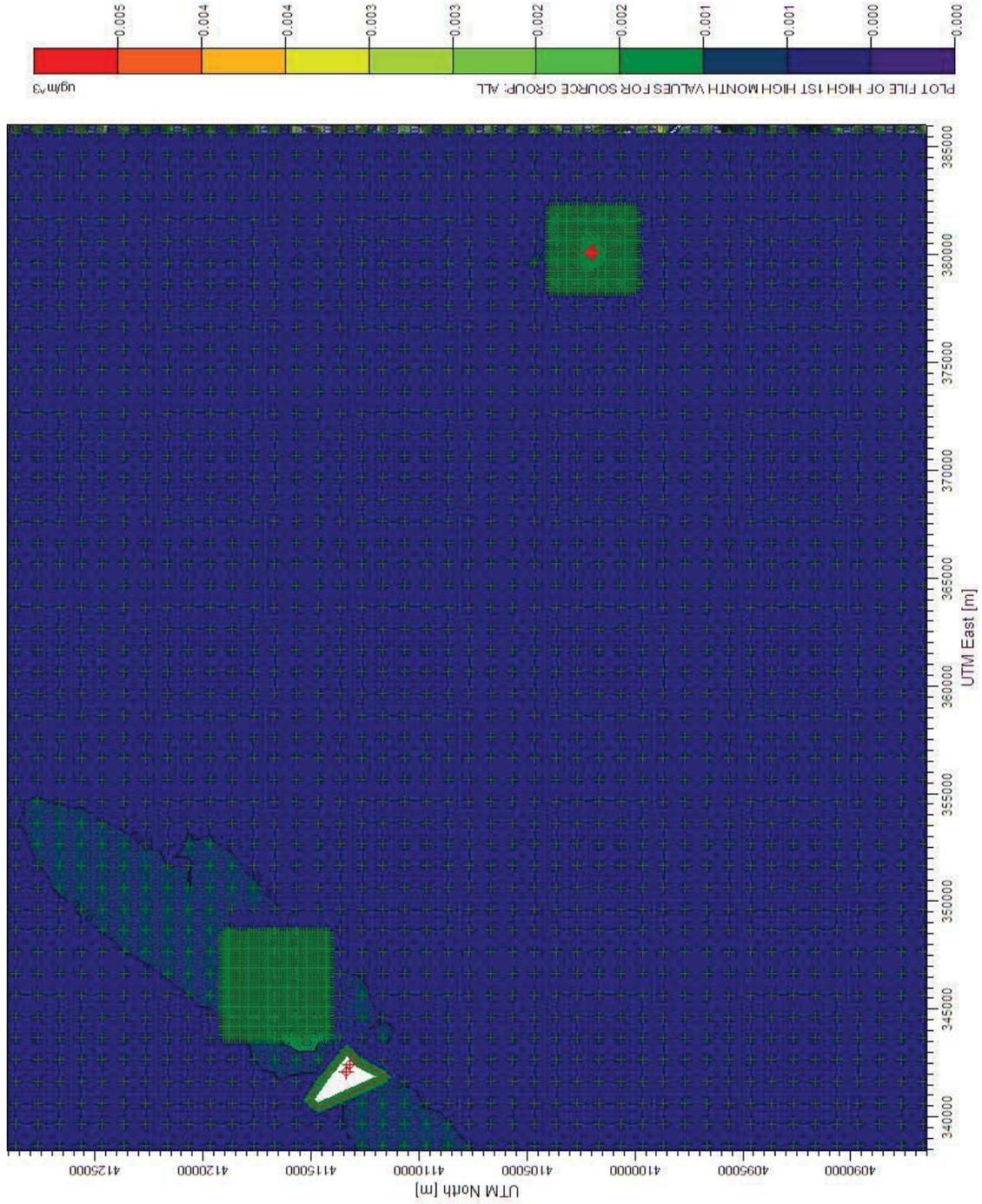


Figure 2.1 CC Metals & Alloys - Site, High 1st High Monthly Average Concentration, Controlling Concentration

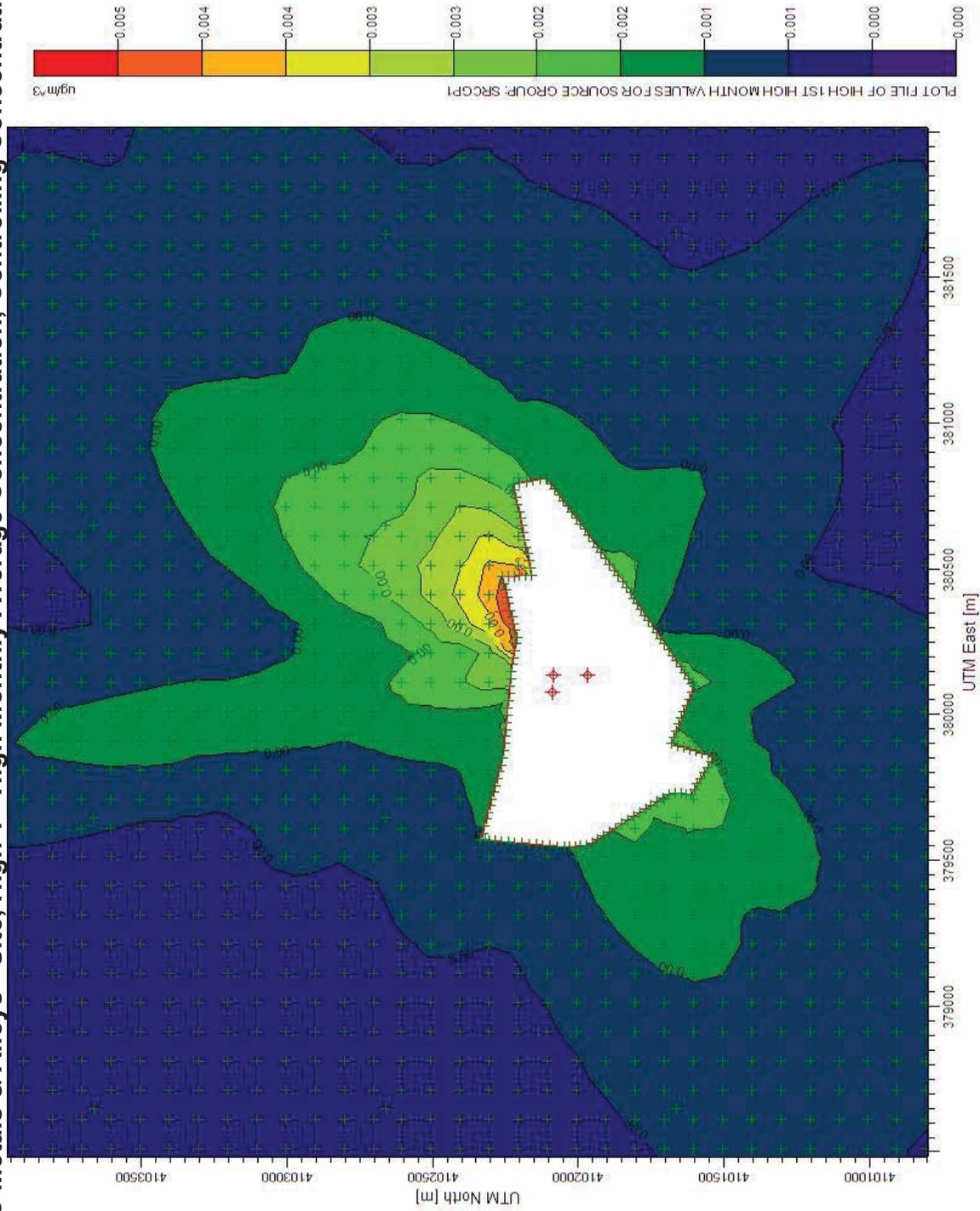


Figure 3.0 KY Utilities-Ghent - Airport, High 1st High Monthly Average Concentration, Entire Domain

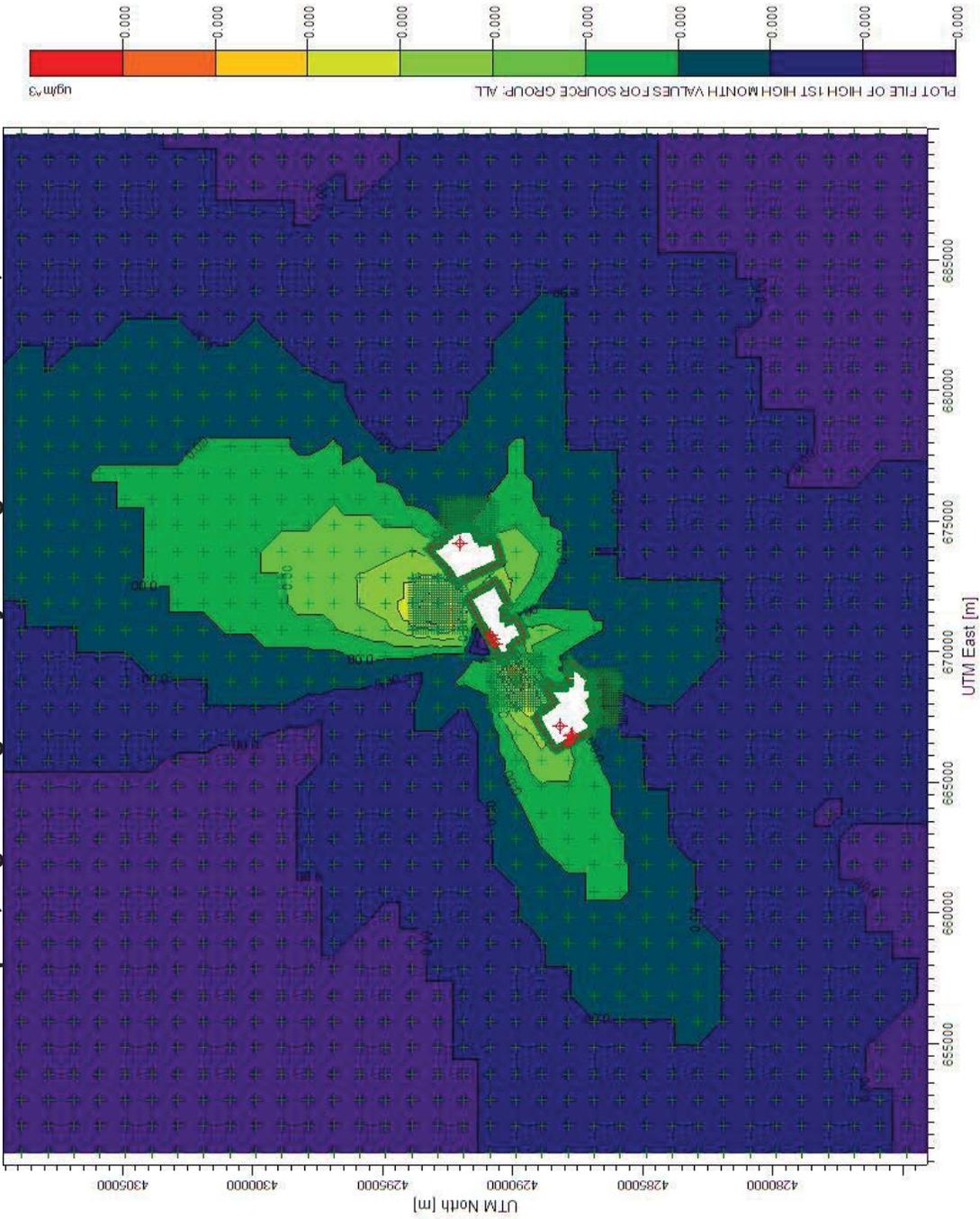


Figure 3.1 KY Utilities-Ghent - Airport, High 1st High Monthly Average Concentration, Controlling Concentration

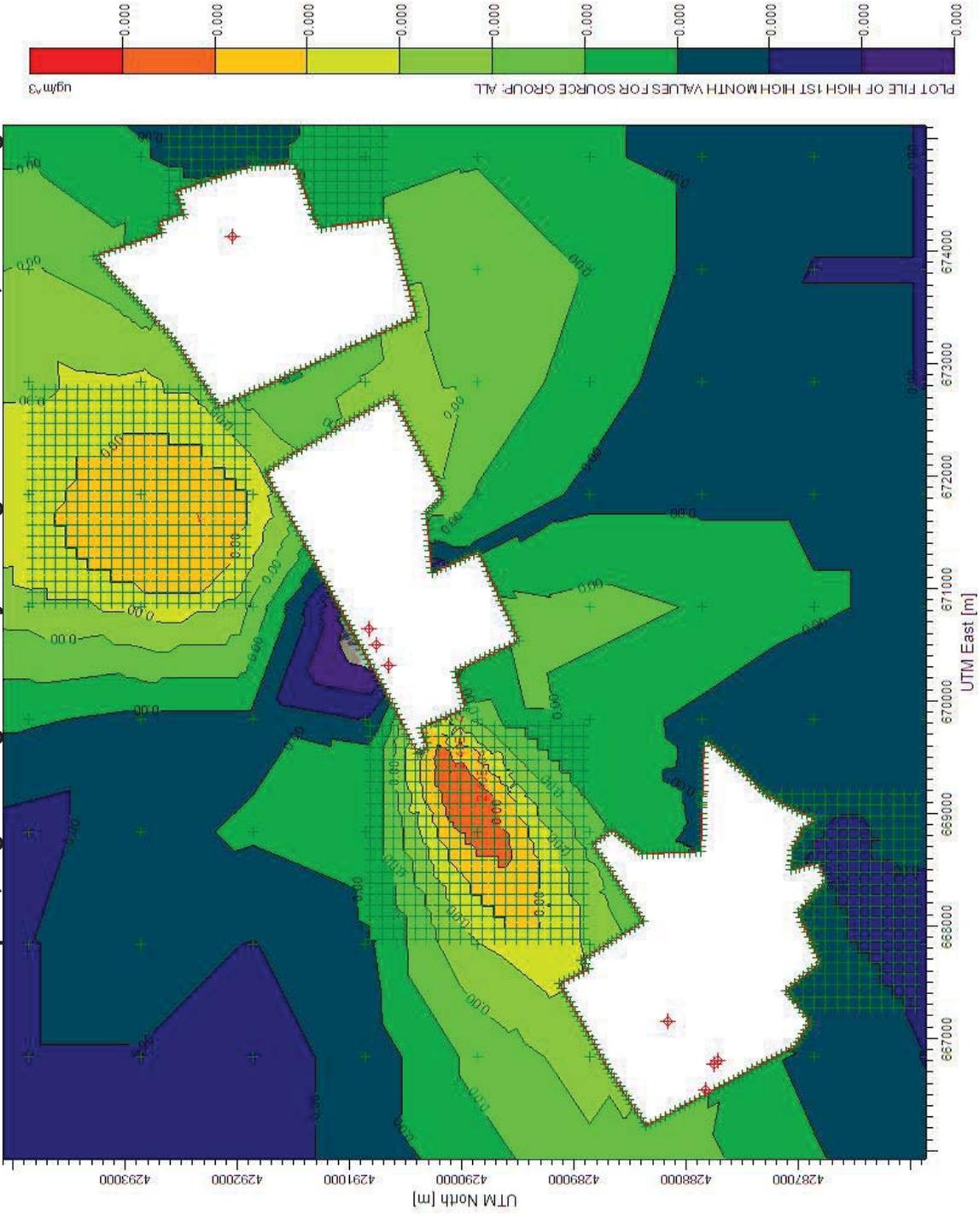


Figure 4.0 KY Utilities-Ghent -Site, High 1st High Monthly Average Concentration, Entire Domain

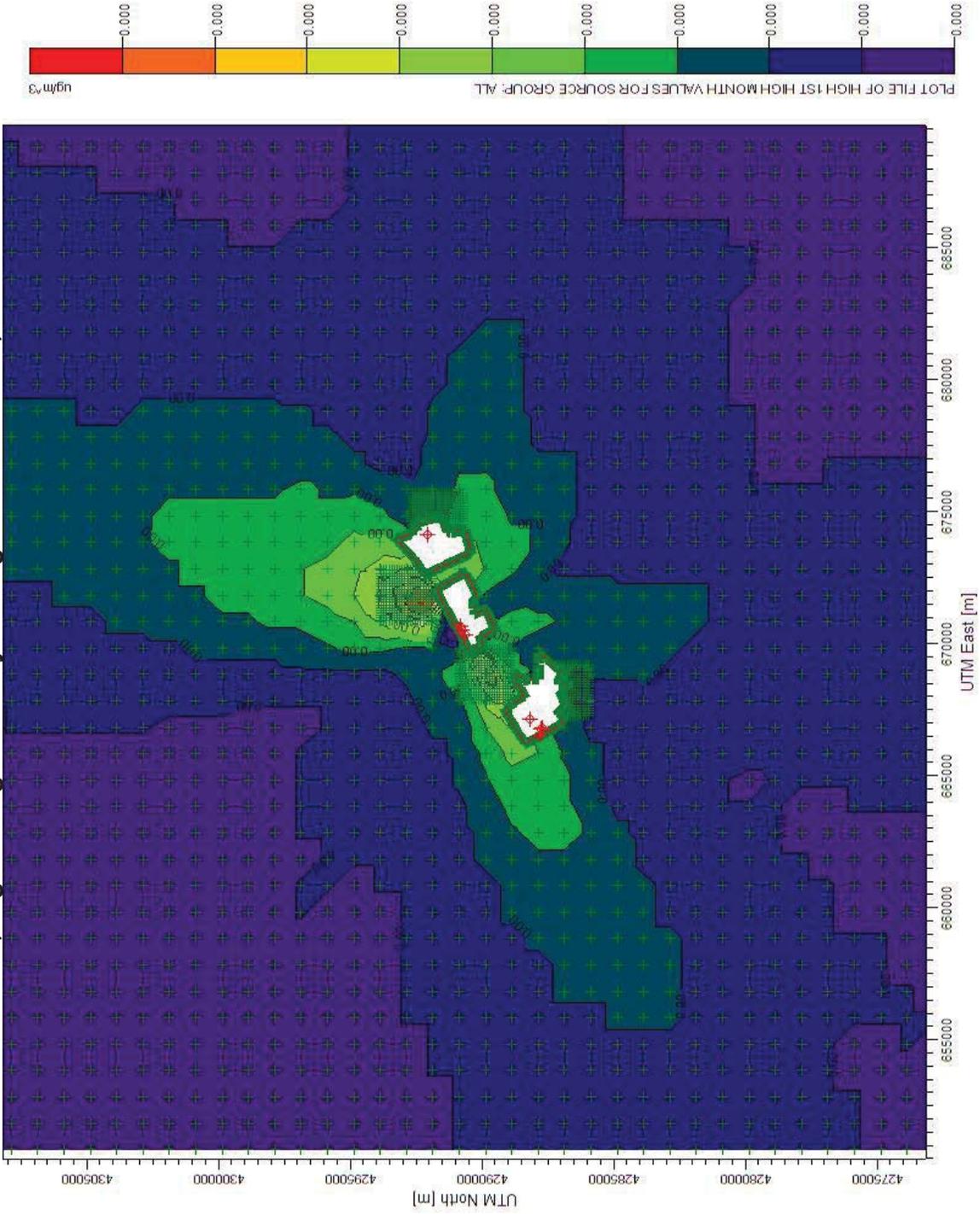


Figure 5.0 Blue Grass Army Depot - Airport, High 1st High Monthly Average Concentration, Entire Domain

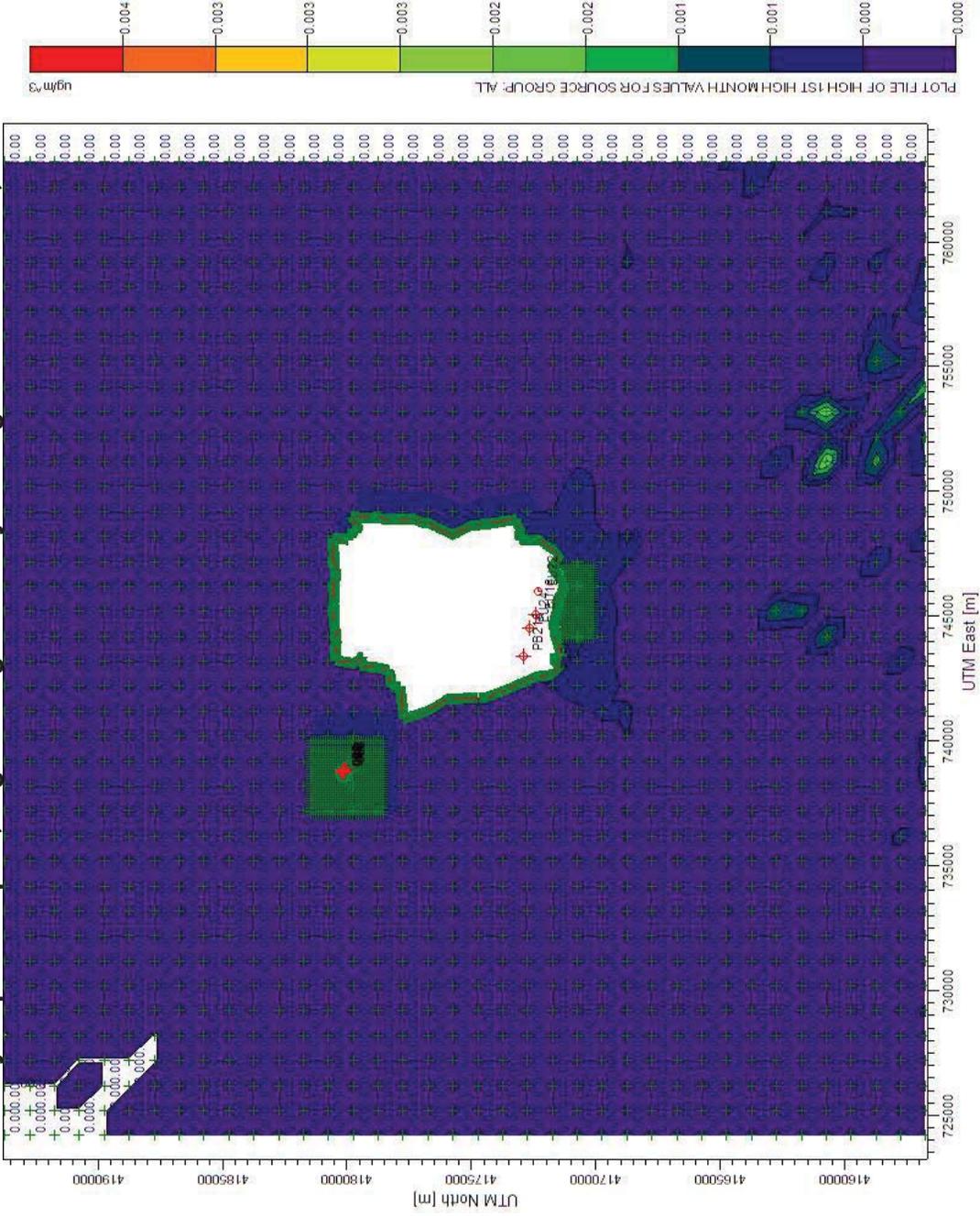


Figure 5.1 Blue Grass Army Depot - Airport, High 1st High Monthly Average Concentration, Controlling Concentration

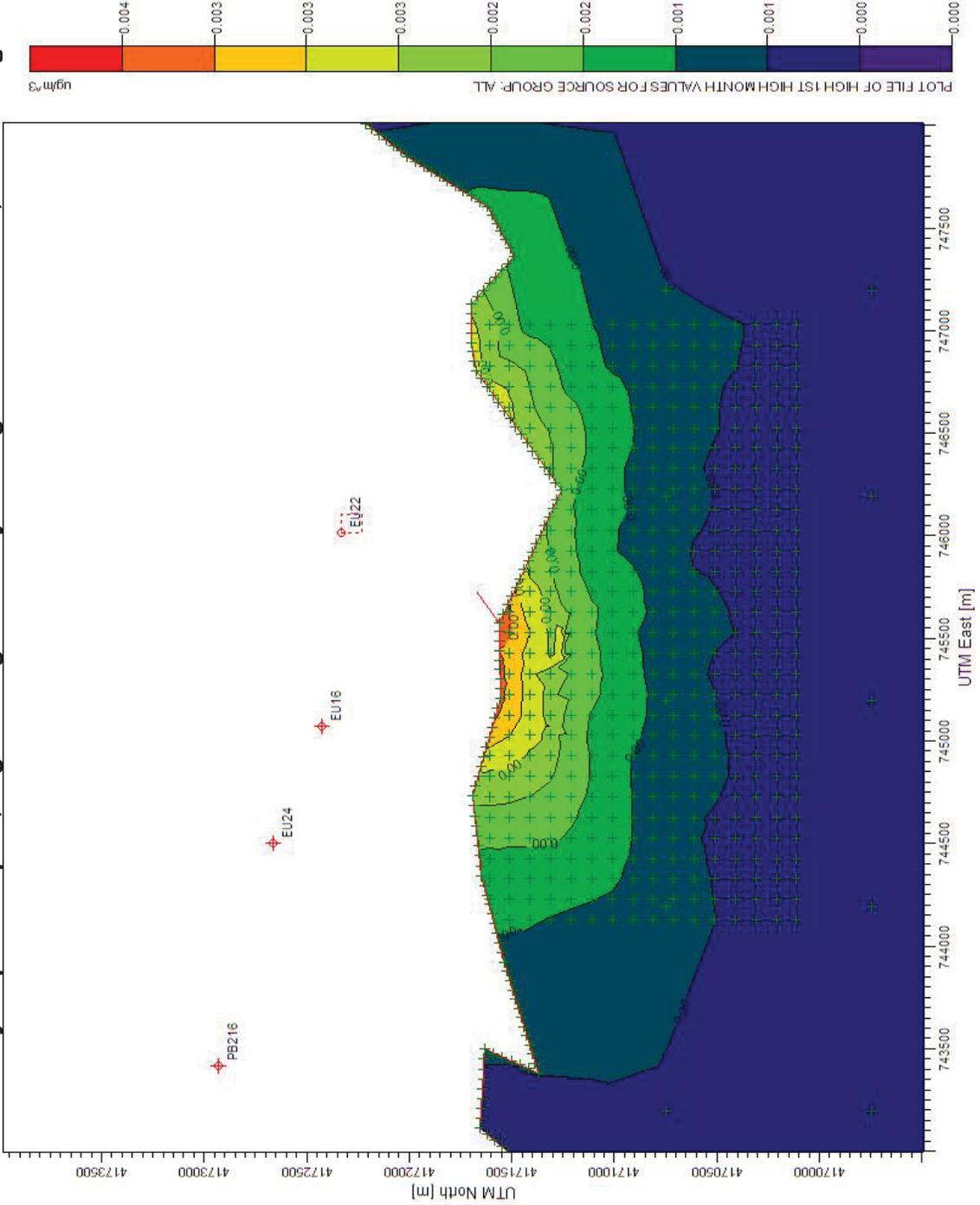


Figure 6.0 Blue Grass Army Depot - Site, High 1st High Monthly Average Concentration, Entire Domain

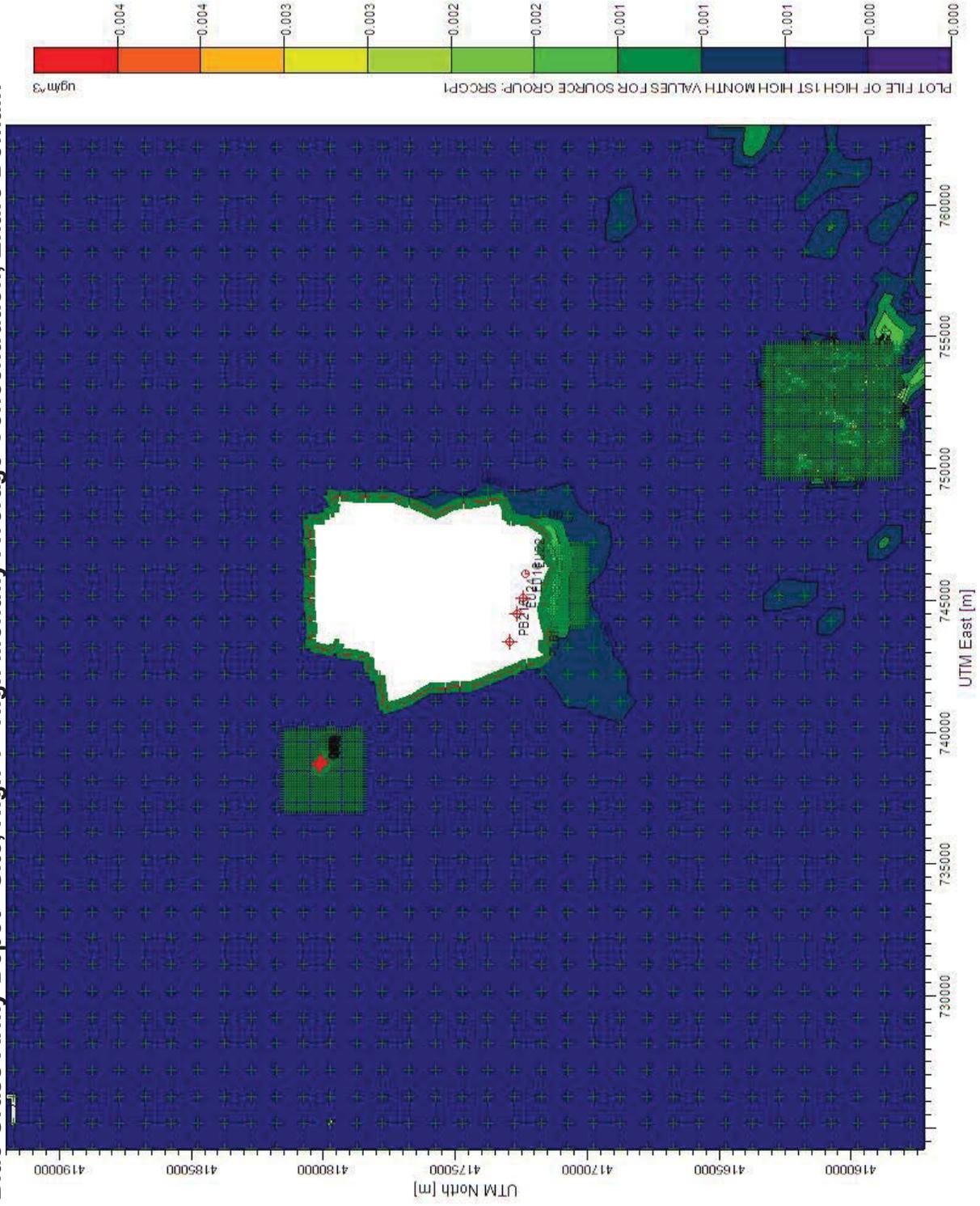


Figure 6.1 Blue Grass Army Depot - Site, High 1st High Monthly Average Concentration, Controlling Concentration

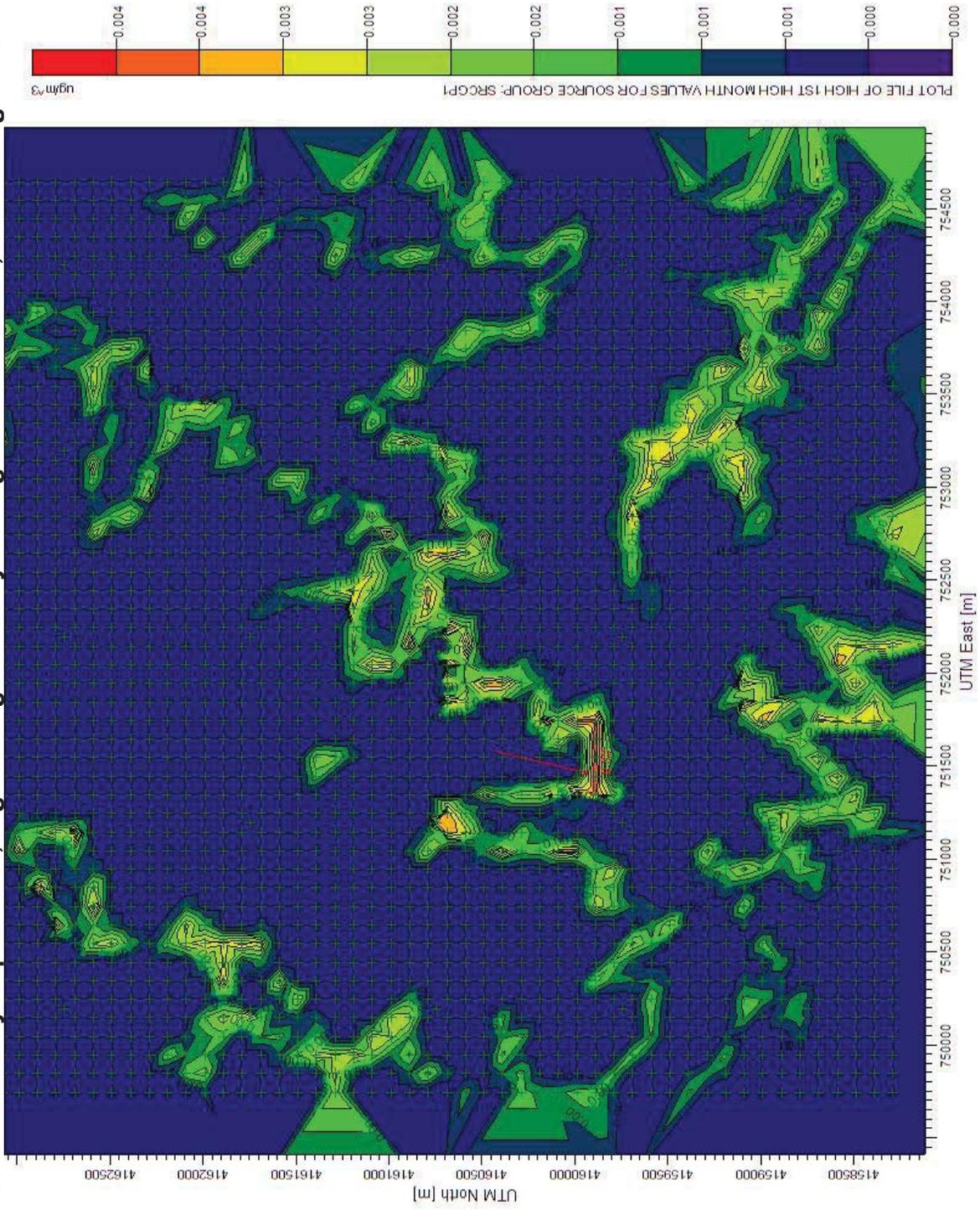


Figure 7.0 TVA Paradise - Airport, High 1st High Monthly Average Concentration, Entire Domain

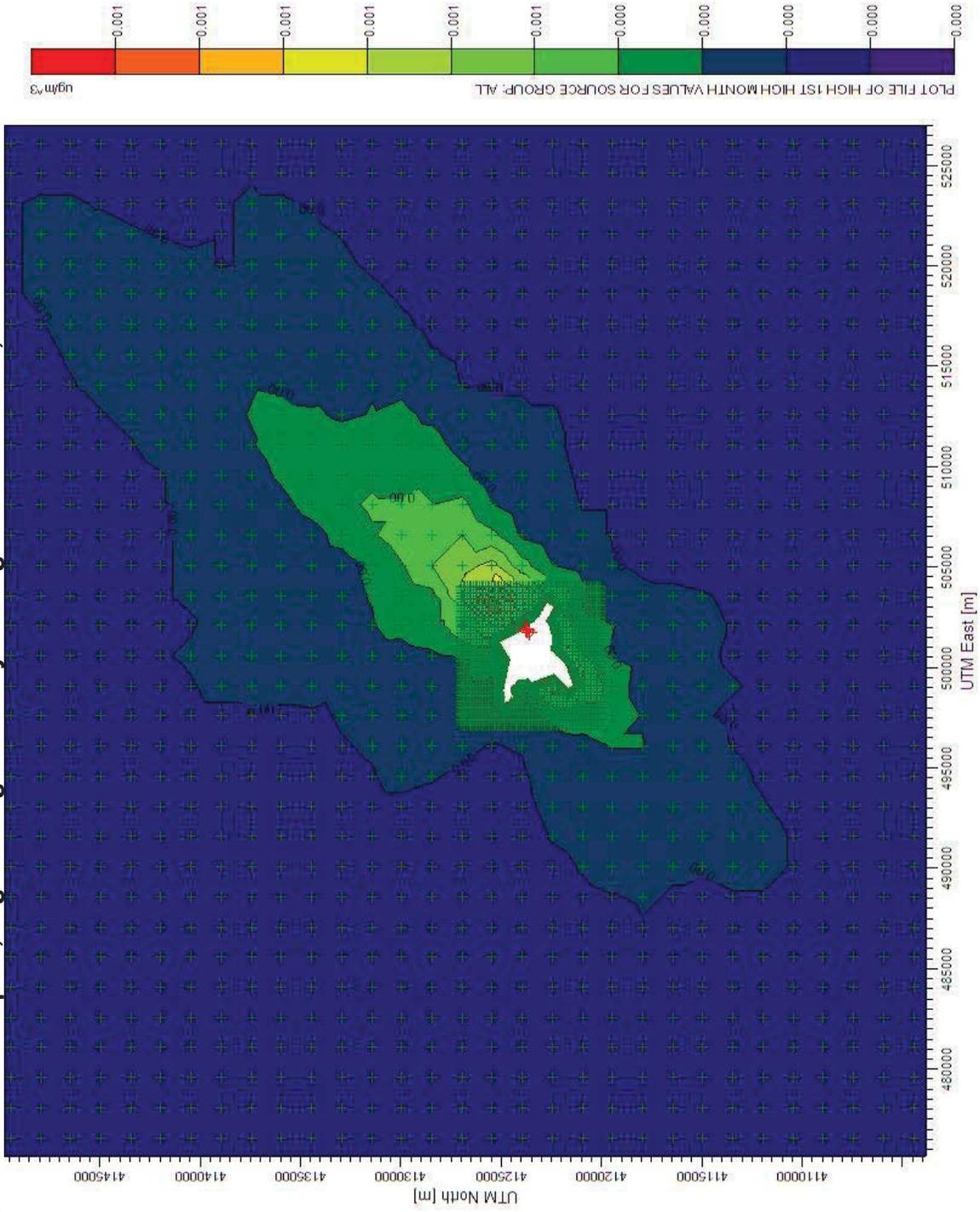


Figure 7.1 TVA Paradise - Airport, High 1st High Monthly Average Concentration, Controlling Concentration

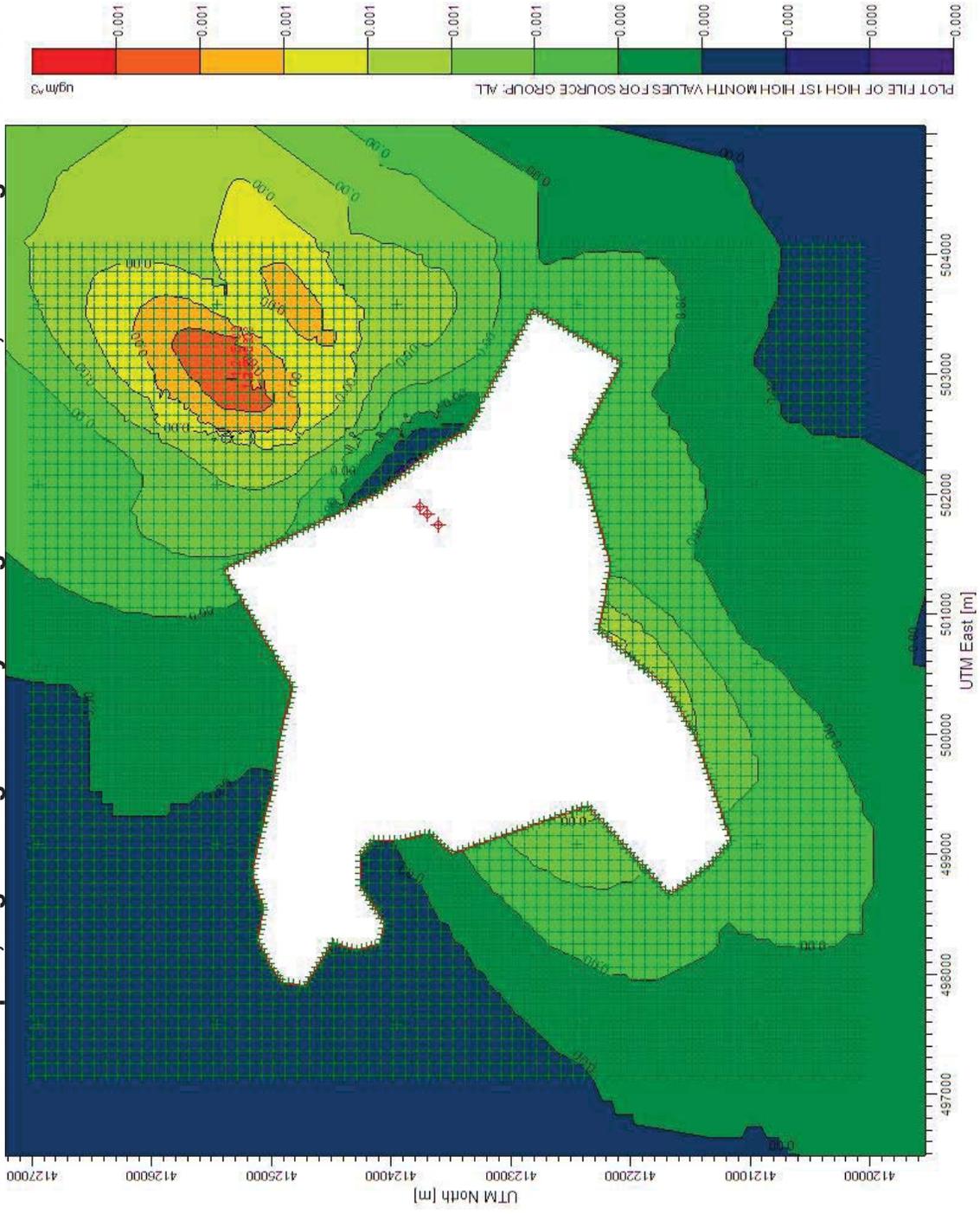
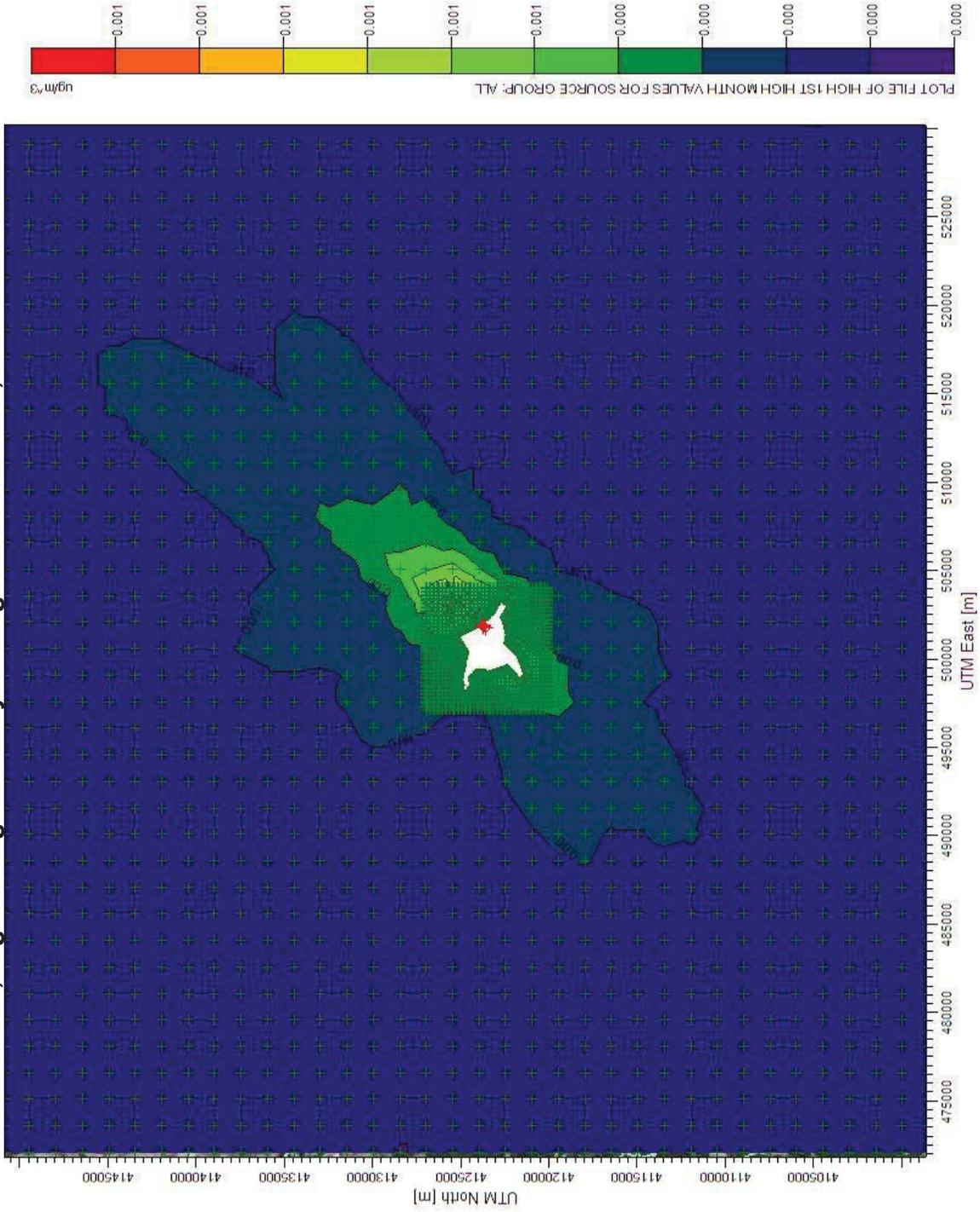


Figure 8.0 TVA Paradise - Site, High 1st High Monthly Average Concentration, Entire Domain



Appendix F. Files on CD

Table 1.0 CC Metals and Alloys

	AERMET	AERMOD	Post Processor
	CCMA_air.PFL		CCMA.POS
	CCMA_air.SFC	CCMA_a.ADI	CCMAa.out
	CCMA_air_Aersurface.log		CCMAaMOH1GALL.PLT
Airport	CCMA_air_Aersurface.OUT	CCMA_a.ADO	CCMAaMOH1G001.PLT
	CCMA_site.PFL		CCMAaMOH1G002.PLT
	CCMA_site.SFC	CCMA_s.ADI	CCMAAs.POS
Site	CCMA_site_Aersurface.log		CCMAAs.out
	CCMA_site_Aersurface.OUT	CCMA_s.ADO	CCMAAsMOH1GALL.PLT
			CCMAAsMOH1G001.PLT
			CCMAAsMOH1G002.PLT

Table 1.1 CC Metals and Alloys

KY-EIS Document
CC Metals and Alloys KY-EIS 2005-2009.pdf

Table 2.0 KY Utilities-Ghent

	AERMET		AERMOD	Post Processor
Airport	GHENT_air.PFL			GHENTA1.POS
	GHENT_air.SFC		GHENT_a1.ADI	GHENTA1.out
	GHENT_air_Aersurface.log			GHENTA1MOH1GALL.PLT
	GHENT_air_Aersurface.OUT		GHENT_a1.ADO	GHENTA1MOH1G001.PLT
Site	GHENT_site.PFL			GHEENTS1.POS
	GHENT_site.SFC		GHENT_s1.ADI	GHEENTS1.out
	GHENT_site_Aersurface.log			GHEENTS1MOH1GALL.PLT
	GHENT_site_Aersurface.OUT		GHENT_s1.ADO	GHEENTS1MOH1G001.PLT

Table 2.1 KY Utilities-Ghent

KY-EIS Document
KY Utilities-Ghent KY-EIS 2005-2009.pdf

Table 3.0 Blue Grass Army Depot

		AERMET		AERMOD		Post Processor	
Airport		BGAD_air.PFL			BGADA1.POS		
		BGAD_air.SFC		BGAD_a1.ADI	BGADA1.out		
		BGAD_air_Aersurface.log			BGADA1MOH1GALL.PLT		
		BGAD_air_Aersurface.OUT		BGAD_a1.ADO	BGADA1MOH1G001.PLT		
Site		BGAD_site.PFL			BGADS1.POS		
		BGAD_site.SFC		BGAD_s1.ADI	BGADS1.out		
		BGAD_site_Aersurface.log			BGADS1MOH1GALL.PLT		
		BGAD_site_Aersurface.OUT		BGAD_s1.ADO	BGADS1MOH1G001.PLT		

Table 3.1 Blue Grass Army Depot

KY-EIS Document
Blue Grass Army Depot-EIS 2005-2009.pdf

Table 4.0 TVA Paradise

	AERMET		AERMOD	Post Processor
Airport	PARA_air.PFL			PARAA.POS
	PARA_air.SFC		PARA_a.ADI	PARAA.out
	PARA_air_Aersurface.log			PARAA MOH1GALL.PLT
	PARA_air_Aersurface.OUT		PARA_a.ADO	PARAA MOH1G001.PLT
Site	PARA_site.PFL			PARAS.POS
	PARA_site.SFC		PARA_s.ADI	PARAS.out
	PARA_site_Aersurface.log			PARASMOH1GALL.PLT
	PARA_site_Aersurface.OUT		PARA_s.ADO	PARASMOH1G001.PLT

Table 4.1 TVA Paradise

KY-EIS Document
TVA Paradise KY-EIS 2005-2009.pdf

TABLE 5.0 Additional Background Modeling Files Blue Grass Army Depot

	AERMET	AERMOD	Post Processor
	BGAD_air.PFL	BGAD_a.ADI	BGADA.POS
	BGAD_air.SFC		BGADA.out
	BGAD_air_Aersurface.log	BGAD_a.ADO	BGADAMOH1GALL.PLT
	BGAD_air_Aersurface.OUT		BGADAMOH1G001.PLT
Airport			BGADA MOH1G002.PLT
	BGAD_site.PFL	BGAD_s.ADI	BGADS.POS
	BGAD_site.SFC		BGADS.out
	BGAD_site_Aersurface.log	BGAD_s.ADO	BGADSMOH1GALL.PLT
BGAD_site_Aersurface.OUT	BGADSMOH1G001.PLT		
Site			BGADSMOH1G002.PLT

TABLE 6.0 Additional Background Modeling Files KY Utilities-Ghent

		AERMET		AERMOD	Post Processor
		GHENT_air.PFL		GHENT_a.ADI	GHENTA.POS
		GHENT_air.SFC			GHENTA.out
	Airport		GHENT_air_Aersurface.log	GHENT_a.ADO	GHENTAMOH1GALL.PLT
			GHENT_air_Aersurface.OUT		GHENTAMOH1G001.PLT
			GHENTAMOH1G002.PLT		
			GHENTAMOH1G003.PLT		
		GHENT_site.PFL		GHENT_s.ADI	GHENTS.POS
		GHENT_site.SFC			GHENTS.out
	Site		GHENT_site_Aersurface.log	GHENT_s.ADO	GHENTSMOH1GALL.PLT
			GHENT_site_Aersurface.OUT		GHENTSMOH1G001.PLT
			GHENTSMOH1G002.PLT		
			GHENTSMOH1G003.PLT		
				GHENTSMOH1G004.PLT	

TABLE 7.0 3-Month Rolling Average and Applied Background Concentration

Source 3 - Month Rolling Conc.	Surface	Maximum impact Receptor UTM (X) coordinates	Maximum impact Receptor UTM (Y) coordinates	1/2 half Pb NAAQS (µg/m3)	Maximum impacted Modeled Facility receptor month conc. (µg/m3)	Rolling 3 month conc. (µg/m³)	Background conc. from Nearby Lead Source at Modeled Facility max. impact receptor (µg/m3)	Rolling 3 month conc. + Background Conc. (µg/m³)
CCMA	Airport	380427.19	4102249.32	0.075	0.0028	0.002	0.00012	0.002
	Site	380358.35	4102233.05	0.075	0.0047	0.003	0.00013	0.003
GHENT	Airport	669081.44	4289912.44	0.075	0.0002	0.000	0.00154	0.002
	Site	671468.34	4292324.87	0.075	0.0003	0.000	0.00164	0.002
BGAD	Airport	745577.14	4171560.32	0.075	0.0038	0.003	0.00464	0.008
	Site	751444.42	4159889.53	0.075	0.0042	0.002	0.00038	0.002
PARA	Airport	502953.69	4125282.28	0.075	0.0012	0.001	0.00000	0.001
	Site	502853.69	4125182.28	0.075	0.0013	0.001	0.00000	0.001

TABLE 8.0 Contribution Concentrations from Modeled Sources on Maximum Impact Receptors of Nearby Lead Sources

Impact on Nearby Lead Source	Nearby Lead Source (NLS)	Surface	Maximum impact Receptor UTM (X) coordinates	Maximum impact Receptor UTM (Y) coordinates	Modeled Facility impact on NLS max. impact receptor (µg/m3)	Approx. Distance between Modeled and Nearby Source Boundaries (km)
CCMA	TVA Shawnee	Airport	343707.27	4115295.27	0.00004	39.00
		Site	343657.27	4115245.27	0.00003	
GHENT	North American Stainless	Airport	668172.17	4286858.16	0.00007	2.67
		Site	668172.17	4286858.16	0.00007	
	Gallatin Steel	Airport	674768.52	4291663.9	0.00008	1.00
BGAD	Energys	Site	674331.13	4292485.56	0.00009	3.98
		Airport	738786.53	4180454.43	0.00014	
		Site	738786.53	4180354.43	0.00014	
PARA	No NLS				0.00	0.00
					0.00	



APPENDIX F

**KENTUCKY
SO₂ PWEI VALUES**

Appendix F
Kentucky SO₂ PWEI Values

On June 22, 2010, the EPA released a new SO₂ Final Rule and a new set of monitoring requirements. The new monitoring requirements use a Population Weighted Emissions Index (PWEI) that is calculated for each Core Based Statistical Area (CBSA). The PWEI is calculated by multiplying the population of each CBSA and the total amount of SO₂, in tons per year, that is emitted within the CBSA, based upon aggregated county level emissions data from the National Emissions Inventory (NEI). The result is then divided by one million to provide the PWEI value, which is expressed in a unit of million persons-tons per year.

The final rule requires:

- 3 monitors in CBSAs with index values of 1,000,000 or more;
- 2 monitors in CBSAs with index values less than 1,000,000 but greater than 100,000; and
- 1 monitor in CBSAs with index values greater than 5,000.

PWEI based monitors must be established in the 2011 Network Plan, which must be submitted to the EPA Regional Administrator no later than July 1, 2011. However, PWEI based monitors are not required to be operational until January 1, 2013.

Based upon Kentucky's calculated PWEI values, the following CBSAs require SO₂ monitors:

Kentucky CBSAs	PWEI (million persons- tons per year)	Number of SO ₂ Monitors Required	Number of SO ₂ Monitors Present	Kentucky Site Name	Kentucky AQS ID
Cincinnati-Middletown, OH-KY-IN	253,862	2	2*	Northern Kentucky University	21-037-3002
Louisville-Jefferson County, KY-IN	110,765	2	2	Firearms Training	21-111-1041
				Watson Lane	21-111-0051
Evansville, IN-KY	41,320	1	1	Baskett	21-101-0014
Lexington-Fayette, KY	6,401	1	1	Lexington Primary	21-067-0012
Paducah, KY-IL	6,607	1	1	Jackson Purchase	21-145-1024

* Monitoring requirement partially fulfilled via MOA



APPENDIX G

**WEST JEFFERSON COUNTY AIR TOXICS
MONITORING STATIONS**

APPENDIX G

West Jefferson County Air Toxics Monitoring Stations

Volatile Organic Compounds (Method TO-15)

AIRS ID	Established	Location	Purpose	Frequency of Sampling
21-111-1041	1999	4201 Algonquin Parkway	Maximum Impact	24-hrs every twelfth day
21-111-0054	1999	4211 Campground Road	Maximum Impact	24-hrs every twelfth day
21-111-0058	1999	Farnsley Middle School, 3400 Lees Lane	Neighborhood Exposure	24-hrs every twelfth day
21-111-0060	1999	Chickasaw Park	Neighborhood Exposure	24-hrs every twelfth day
21-111-0062	1999	Cane Run Elementary	Neighborhood Exposure	24-hrs every twelfth day
21-111-0067	2009	Cannons Lane	Neighborhood Exposure	24-hrs every twelfth day



APPENDIX H

PUBLIC COMMENT

**KENTUCKY DIVISION FOR AIR QUALITY
AMBIENT AIR MONITORING NETWORK
Comments Received 6/24/2011**

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 PLAN 2011 was held from May 25, 2011, through June 24, 2011.
- (2) The following individuals submitted comments during the public comment period:

Name

Mr. Dallas R. Armstrong

Summary of Comments

- (1) **Subject: South Central Nelson County Air Monitoring in Reference to Emissions from Distilleries**
 - (a) **Comment:** Mr. Dallas R. Armstrong commented “[...]south central Nelson County Ky. needs specialized Toxic air monitors installed to consistently monitor for caustic vapour’s and or gas’es along with toxic fugitive distillutes vapours and or gases [*sic*].”
 - (b) **Response:** The Division acknowledges the comment. Due to limited resources, the Division does not intend on siting and operating an air toxics monitor in Nelson County at this time. The Division’s ambient air monitoring network meets or exceeds all required minimum monitoring requirements, as established by 40 CFR Part 58.
- (2) **Subject: South Central Nelson County Air Monitoring in Reference to Emissions from Distilleries**
 - (a) **Comment:** Mr. Dallas R. Armstrong commented “Toxic chemicals and poisonous distillates verified by Ky. E.P.A. that are in question.

All Known Nero Toxins
Cleanout Chemicals all are server caustics
Ammonium Hydroxide (Anhydrous ammonia in atmosphere)
Known suficaniant and asphyxiant respiratory irritant
Sulfuric Acid (Battery acid) (Hydrogene sulfide in atmosphere)
Known suficaniant and asphyxiant respiratory irritant
Nitrogen dioxide
Known suficant and asphyxiant respiratory irritant
Sulfur dioxide
Known suficant and asphyxiant respiratory irritant
Sodium Hydroxide (Lye)
Known suficant asphyxiant respiratory irritant

Poisonous distillates

Acetone	Known respiratory irritant
Acidaldahyde	Known carcenogene and respiatory irritant
Ethanol	Known respiratory irritant
Fussol Oil	Known to cause blindness

All of these have strict O.S.H.A. regulations but what if you were to release higher levels late at night or very Early mornings or weekends [*sic*].”

- (b) **Response:** The Division does not have the authority to apply OSHA regulations or standards. As mentioned previously, the Division’s ambient air monitoring network meets or exceeds all required minimum monitoring requirements, as established by 40 CFR Part 58.

All public comments are maintained at the Kentucky Division for Air Quality headquarters in Frankfort, Kentucky. These documents are available for review upon request.

This page intentionally left blank



INDEX

**KY DAQ AIR MONITORING STATIONS
BY
REGIONAL OFFICE**

KY DAQ MONITORING STATIONS BY REGIONAL OFFICE

AQS ID	SITE NAME	COUNTY	PAGE NUMBER
Region 1 - Hazard Regional Office			
21-193-0003	Hazard	Perry	98
21-195-0002	Pikeville Primary	Pike	100
Region 2 - Frankfort Regional Office (Bluegrass Area)			
21-067-0012	Lexington Primary, Newtown	Fayette	42
21-113-0001	Nicholasville	Jessamine	44
21-151-0003	Richmond	Madison	83
Region 3 - Florence Regional Office			
21-015-0003	East Bend	Boone	19
21-037-3002	NKU	Campbell	21
Region 4 - Owensboro Regional Office			
21-059-0005	Owensboro	Daviess	68
21-091-0012	Lewisport	Hancock	70
21-101-0014	Baskett, Fire Dept.	Henderson	30
Region 5 - Ashland Regional Office			
21-019-0017	FIVCO, Ashland Primary	Boyd	37
21-019-0016	Lockwood	Boyd	35
21-019-0002	21st & Greenup, Ashland	Boyd	33
21-043-0500	Grayson Lake	Carter	88
21-089-0007	Worthington	Greenup	39
Region 7 - Frankfort Regional Office (North Central Area)			
21-029-0006	Shepherdsville	Bullitt	47
21-093-0006	Elizabethtown	Hardin	27
21-185-0004	Buckner	Oldham	49
Region 8 - Paducah Regional Office			
21-047-0006	Hopkinsville	Christian	24
21-139-0003	Smithland	Livingston	75
21-139-0004	Bloodworth Farm	Livingston	77
21-145-1004	Paducah Middle School	McCracken	79
21-145-1024	Jackson Purchase	McCracken	81
21-157-0018	Calvert City Elementary	Marshall	94
21-157-0014	TVA Substation	Marshall	90
21-157-0019	Lazy Daz RV Park	Marshall	96
21-157-0016	Atmos Energy	Marshall	92
Region 9 - Bowling Green Regional Office			
21-213-0004	Franklin, DOT Garage	Simpson	102
21-227-0009	TBD	Warren	16
Region 10 - London Regional Office			
21-013-0002	Middlesboro Airport	Bell	73
21-199-0003	Somerset Gas Warehouse	Pulaski	85
21-207-0001	Salem Elementary, Russell Springs	Russell	104