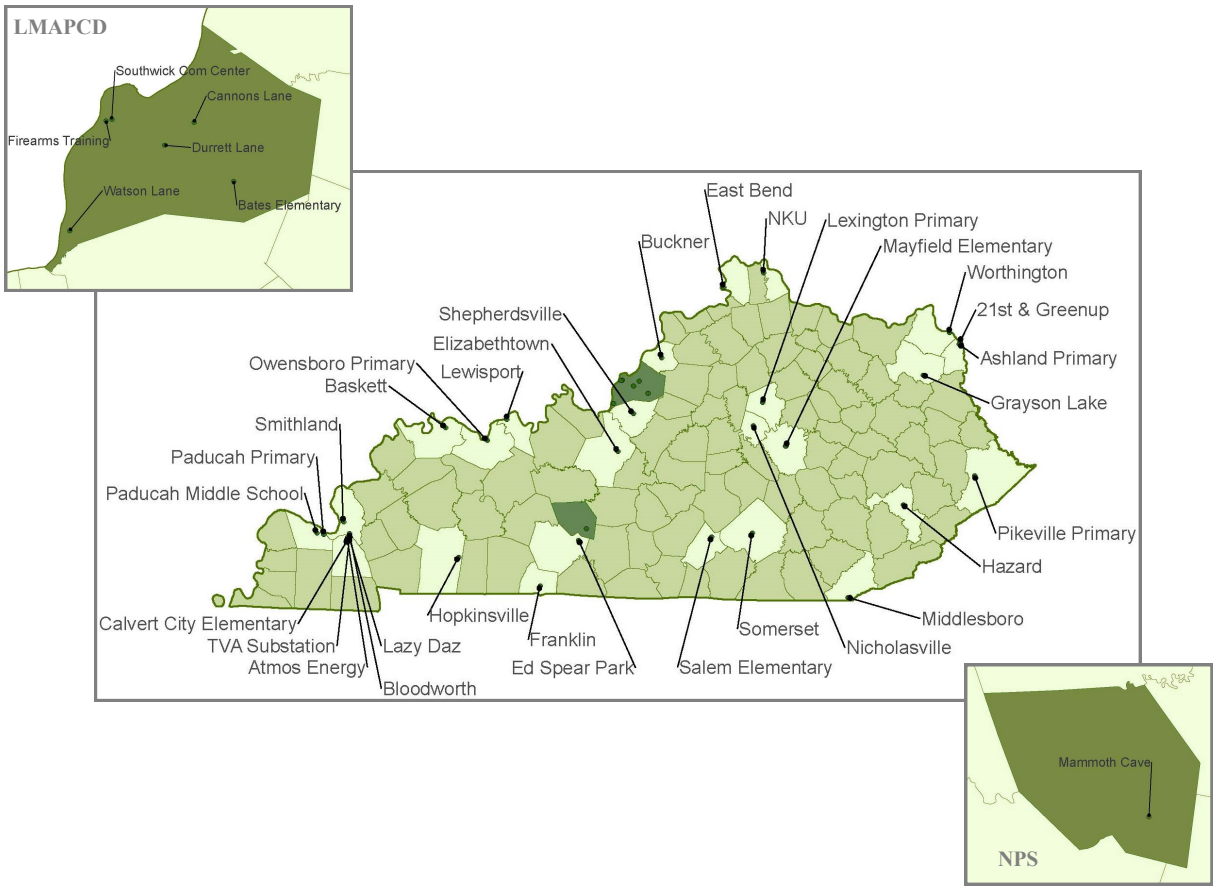
Kentucky
Annual Ambient Air Monitoring Network Plan 2013



Commonwealth of Kentucky Energy & Environment Cabinet
Department for Environmental Protection
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CERTIFICATION

By the signatures below, the Kentucky Division for Air Quality certifies that the information contained in this Surveillance Network document for sampling year 2013 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.

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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 (KDAQ), Louisville Metro Air Pollution Control District (LMAPCD), and the National Park Service (NPS).

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ACRONYMS

AEM – Automated Equivalent Method

AQI – Air Quality Index

AQS – Air Quality System

ARM – Automated Reference Method

BAM – Beta Attenuation Monitor

BC– Black Carbon

CBSA – Core-Based Statistical Area

CSA – Combined Statistical Area

CO – Carbon Monoxide

FAM – Federal Alternate Method

FEM – Federal Equivalent Method

FRM – Federal Reference Method

KDAQ – 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

NO_2 – Nitrogen Dioxide

NPS – National Park Service

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ACRONYMS (CONTINUED)

NR-SPM – Non-Regulatory Special Purpose Monitor

O_3 – Ozone

PAH – Polycyclic Aromatic Hydrocarbons

Pb – Lead

PM – Particulate Matter

PWEI – Population Weighted Emissions Index

RA-40 – Regional Administrator 40

SAMWG – Standing Air Monitoring Working Group

SLAMS – State and Local Air Monitoring Stations

SO_2 – Sulfur Dioxide

SPM – Special Purpose Monitors

TBD – To Be Determined

TEOM – Tapered Elemental Mass Transducer

U.S. EPA – United States Environmental Protection Agency

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 (KDAQ) 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 39 stations, operated by KDAQ, 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, KDAQ'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.

<u>Modification to the network as determined by an annual review process will be made each year to maintain a current network description document.</u>

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, the CBSA in which the site is located, the AQS identification number, the GPS coordinates, and the conformance of monitors and monitor-probes to siting criteria.

2. Date Established

The date that each existing monitoring station was established is shown in the description. For proposed air monitoring stations, the date that the station is expected be in operation is included in the annual Summary of Network Changes.

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

The Annual Network Surveillance document must describe the types of monitors that are used to collect ambient data. Most monitors described in the air quality surveillance network are designated as SLAMS, but some monitors fulfill other requirements.

State and Local Air Monitoring Stations (SLAMS): Requirements for air quality surveillance systems provide for the establishment of a network of monitoring stations designated as 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.

Population Weighted Emissions Index (PWEI): On June 22, 2010, the EPA released a new SO_2 Final Rule and a new set of monitoring requirements. The new 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 SO_2, in tons per year, that is emitted within the CBSA based upon county level 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. PWEI SO_2 monitors are designated as SLAMS monitors foremost.

Regional Administrator 40 (RA-40): On February 9, 2010, the EPA released a new NO_2 Final Rule and a new set of monitoring requirements. Under the new monitoring regulations, the EPA Regional Administrator must collaborate with agencies to establish or designate 40 NO_2 monitoring locations, with a primary focus on protecting susceptible and vulnerable populations. RA-40 NO_2 monitors are SLAMS monitors foremost.

Emergency Episode Monitoring (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, KDAQ 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. KDAQ prepares the index twice daily for release to the public from the pollutant data reported from the Field Offices.

Special Purpose (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.

NCore: NCore is a multi pollutant network that integrates several advanced measurement systems for particulates, pollutant gases and meteorology.

Non-EPA Federal: Monitors operated by Federal agencies outside of the EPA (such as the National Park Service) are designated as Non-EPA Federal monitors. These monitors are typically used for special studies and are not included in the minimum number of monitors required by CFR.

6. Monitoring Methods

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

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

All PM_{10} samplers operated by KDAQ 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 typically collect a 24-hour sample every sixth day on 46.2 mm PTFE filters. However, certain sites may collect samples more frequently to address local air quality concerns. Filters are weighed before and after a sample run. The gain in weight in relation to the volume of air sampled is calculated in micrograms per cubic meter (ug/m^3). The PTFE filters are to be equilibrated before each weighing for a minimum of 24 hours at a 20-23 degrees C mean temperature and a 30-40% mean relative humidity.

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

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

The Division currently operates continuous TEOM monitors, continuous BAM monitors, and manual intermittent samplers for monitoring particulate matter 2.5 microns in size ($PM_{2.5}$). With the exception of continuous TEOM monitors, all $PM_{2.5}$ samplers operated by the Division for Air Quality are certified as either FRM or FEM samplers. All FRM and FEM manual intermittent 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, with airflow maintained at 16.7 liters per minute. The flow rate must not vary more than +/-5% for five minutes over a 24-hour sample period at actual ambient temperature and pressure. Samples must be retrieved within 177 hours of the end of the sample run and must be kept cool (4 degrees C or cooler) during transit to meet the thirty-day limit for re-weighing. The PTFE filters are to be equilibrated before each weighing for a minimum of 24 hours at a controlled atmosphere of 20-23 degrees C mean temperature and 30-40% mean relative humidity. Filters must be used within thirty days of initial weighing. Filters must be re-weighed within thirty days of the end of the sample run and must be kept at 4 degrees C or cooler. The gain in weight in relation to the volume of air sampled is calculated in micrograms per cubic meter (ug/m^3).

Continuous FEM BAM monitors measure $PM_{2.5}$ 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 $PM_{2.5}$ BAMs provide 24-hour daily reporting for the AQI. The data obtained from $PM_{2.5}$ BAMs may or may not be used for comparison to the NAAQS; determination is based upon successful demonstration that BAM data accurately compares to the data obtained from manual FRM samplers. A full statement on the use of $PM_{2.5}$ BAMs is included in Appendix E.

Continuous $PM_{2.5}$ 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. While usable for the AQI, $PM_{2.5}$ TEOMs are not classified as either FRM or FEM monitors; and thus, are not eligible for comparison to the NAAQS.

(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, KDAQ 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.

Additionally, LMAPCD plans to operate an aethalometer, which samples specifically for black carbon. An aethalometer continuously collects aerosols (sub-micron particulates) onto a quartz-fiber filter and then measures the light-attenuation properties of the sample.

(d) **Sulfur Dioxide**

Instruments used to continuously monitor sulfur dioxide levels in the atmosphere employ the UV fluorescence method. 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.

LMAPCD also plans to utilize the photolysis method at its near-road site. In this method, an ambient sample stream passes through a cell and exposed to light from an LED array at a specific wavelength. The process causes nitrogen dioxide to be converted to nitrogen oxide.

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 onto 8x10 glass fiber filters. The 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 (m^3/min) over the course of 24 hours. 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), and carbonyls.

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

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 an EPA contract laboratory for gas chromatography/mass spectrometer analysis, with selective ion monitoring.

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.

Carbonyl samples are collected on a DPNH cartridge. An ambient air stream flows through the cartridge at a one-liter per minute flow rate for a 24-hour sampling period. The cartridge is packed on ice and shipped to an EPA contract laboratory for high-pressure liquid chromatography analysis.

(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.

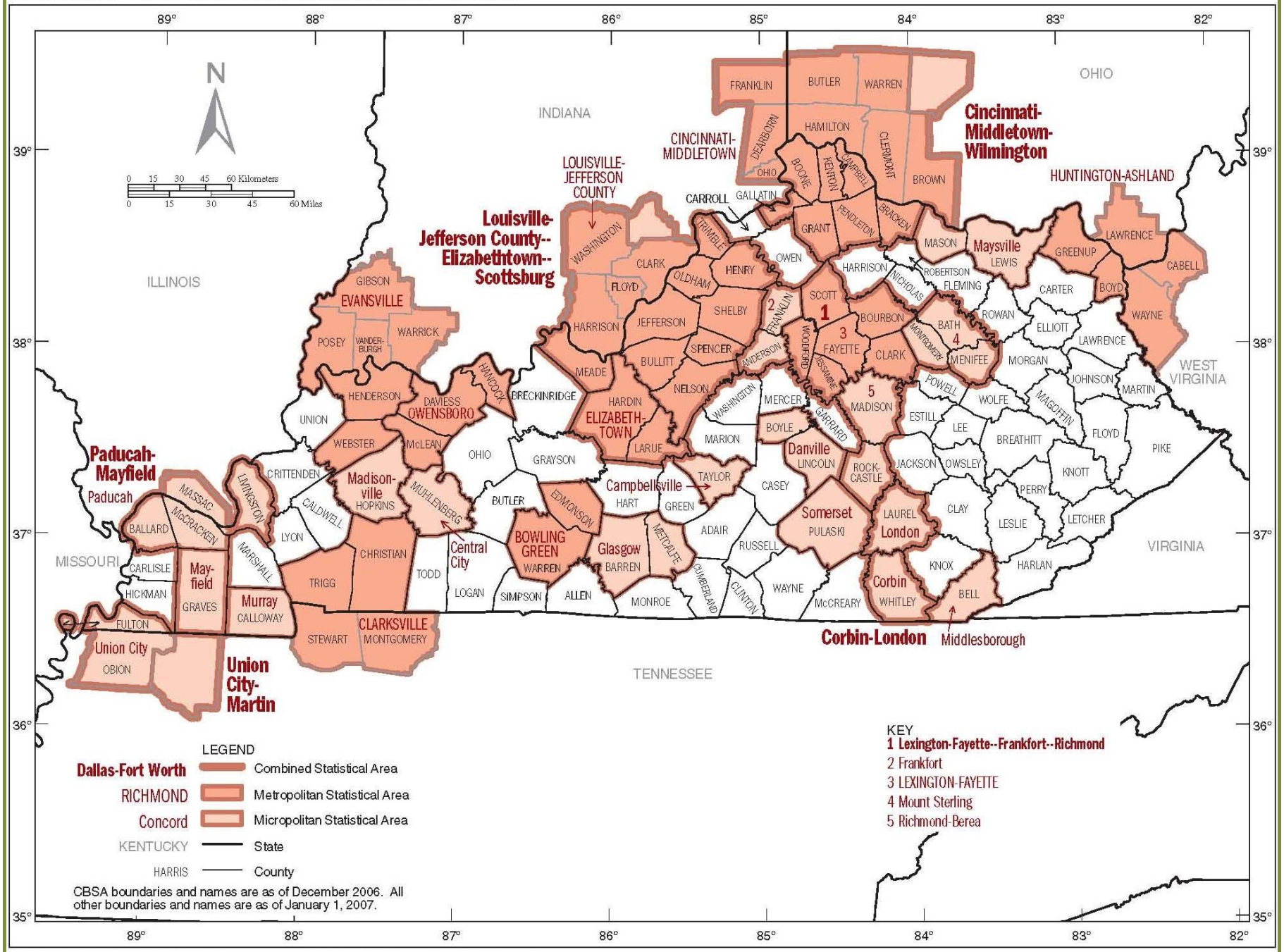
The design intent in siting stations is to correctly match the area dimensions represented by the sample of monitored air with the area dimensions most appropriate for the monitoring objective of the station. The following relationship of the four basic objectives and the area of representativeness are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

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

Data Processing and Reporting

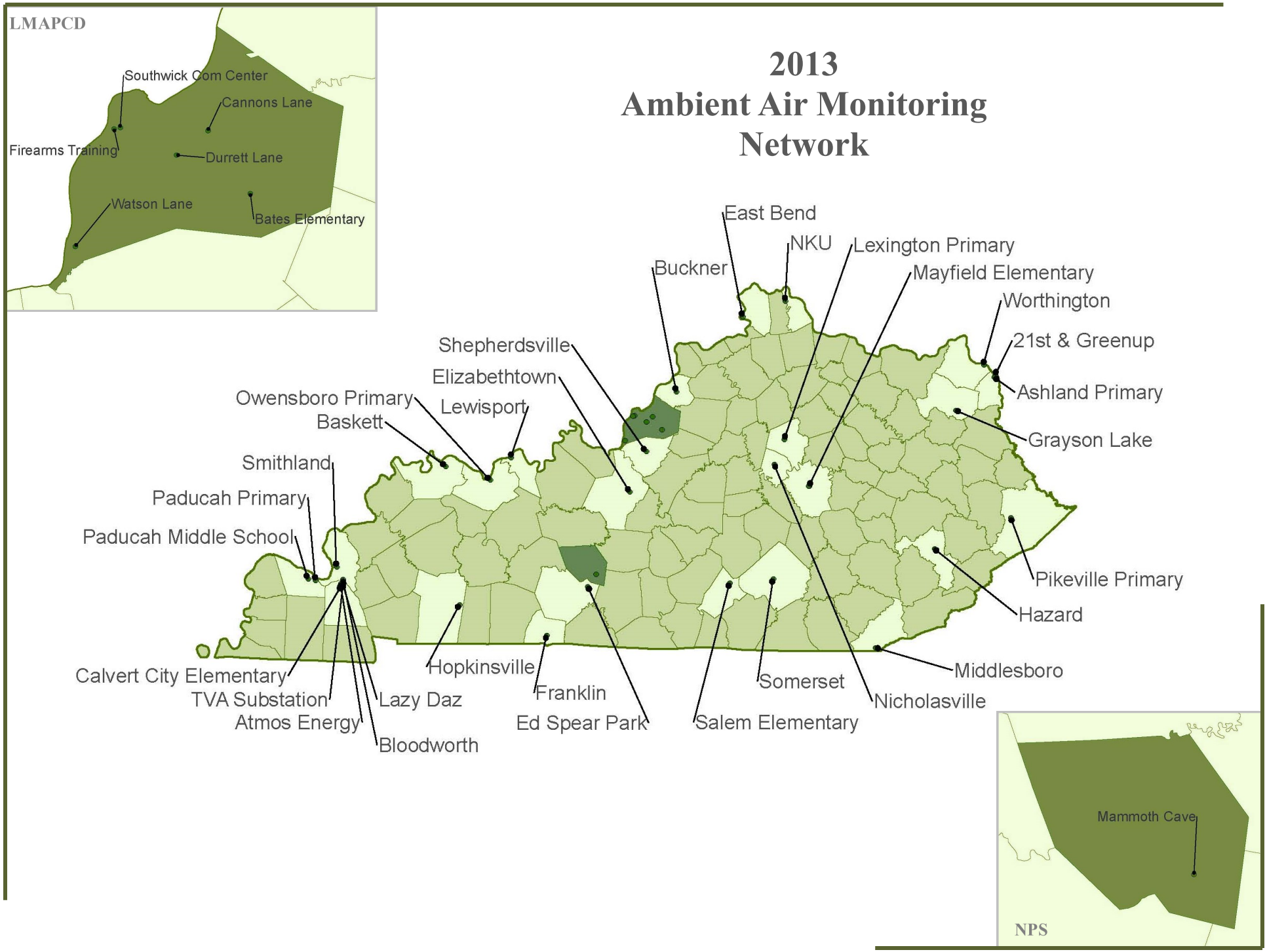
All ambient air quality data are stored in a centralized server located at the 14th floor of the Capital Plaza Tower, the Energy and Environment Cabinet (EEC) headquarters in Frankfort, Kentucky. The server is backed up on tape nightly, weekly, and monthly. The backup tape of the server is stored off 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 KDAQ website: http://air.ky.gov. The report is located under **Resources**.

KENTUCKY - Core Based Statistical Areas and Counties



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

2013
Ambient Air Monitoring Network



AIR MONITORING STATIONS SUMMARY

Metropolitan Statistical Area	Number of Sites	PM2.5	Continuous PM2.5	PM10	Continuous PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	PAH	PM2.5 Speciation	Carbon Speciation	RadNet	Met
Bowling Green, KY	2	2^{c}	2			1^{P}		1	1	2								1
Cincinnati-Middletown, OH-KY-IN (I)	2	1	1			1	1			2								1
Clarksville, TN-KY	1	1				1				1								
Elizabethtown, KY	1	2^{c}	1							1								
Evansville, IN-KY	1	1	1	1^{m}		1^{P}				1								
Huntington-Ashland, WV-KY-OH (I)	3	1	1	2^{cm}		2	1			2		1	1		1	1		1
Lexington-Fayette, KY (I)	2	1	1	1^{m}		2^{P}	1^{r40}			2		1	1		1	1	1	1
Louisville-Jefferson County, KY-IN (I)	8	5^{c}	4^{NR}	1^{Pb}	4^{cNR}	3^{P}	2	1	2	5					1	2^{BC}	1	5
Owensboro, KY	2	1	1			1	1			2								1
Micropolitan Statistical Area																		
Paducah, KY-IL	4	1	1	1		1^{P}	1			2		1						1
Somerset, KY	1	1								1								
Middlesboro, KY	1	1								1								1
Richmond-Berea, KY	2	1									3							
Not in a CBSA																		
Carter County	1	1		2^{cm}						1		2	2	1	1	1		1
Marshall County	4			1^{m}								5^{c}						1
Perry County	1	1	1							1								1
Pike County	1	2^{c}	1^{NR}							1								
Russell County	1										1							
Simpson County	1									1								1
KDAQ Totals	32	18	10	8	0	9	5	0	0	22	4	10	4	1	3	3	1	11
LMAPCD Totals	6	5	4	1	4	3	2	1	2	3	0	0	0	0	1	2	1	4
NPS Totals	1	0	1	0	0	1	0	1	1	1	0	0	0	0	0	0	0	1
TOTALS	**39**	**23**	**15**	**9**	**4**	**13**	**7**	**2**	**3**	**26**	**4**	**10**	**4**	**1**	**4**	**5**	**2**	**16**

Tallies are equal to the actual number of monitors present. Superscripts represent additional information about the network. P=PWEI Monitor; r40=Proposed RA-40 Monitor; NR=NR-SPM Continuous PM Monitor; I=AQI Monitors Required in CBSA; m= PM10 filter analyzed for metals; Pb=PM10 metals filter analyzed for lead; BC=Black Carbon; c=Collocated Monitors

SUMMARY OF KDAQ NETWORK CHANGES 2013

Metropolitan Statistical Area Summary:

Elizabethtown, KY- Elizabethtown (21-093-0006): Discontinue the continuous NR-SPM $PM_{2.5}$ BAM and establish a continuous SPM $PM_{2.5}$ TEOM by August 15, 2013. The BAM was originally established at the site on September 1, 2011, and is not eligible for comparison to the NAAQS.

Huntington-Ashland, WV-KY-OH– Lockwood (21-019-0016): Discontinue the lead site in August 2013. Lead monitors are required to operate for 38 months without an exceedance of the NAAQS. The Lockwood lead monitor began collecting data on April 14, 2010, and will have collected 38 months of data by June 14, 2013. KDAQ plans to discontinue the site in August 2013, providing that no exceedance of the lead NAAQS occurs.

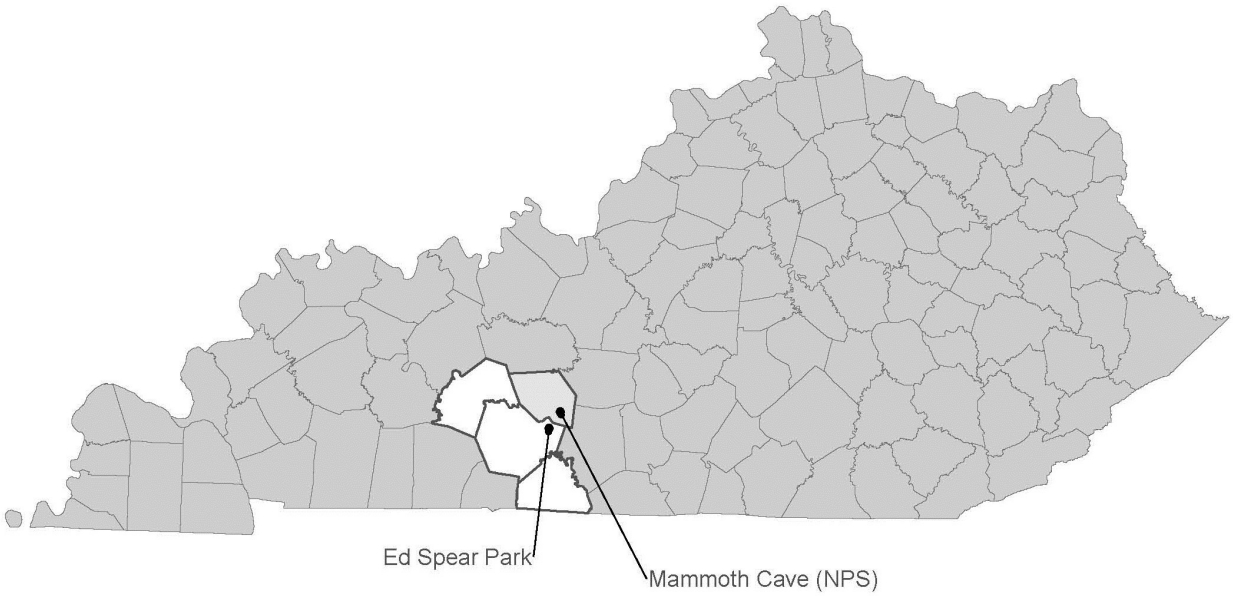
Huntington-Ashland, WV-KY-OH– 21st & Greenup (21-019-0002): KDAQ plans to return the primary PM_{10} sampler to a 1-in-6 day sample frequency starting October 1, 2013.

Not in a Metropolitan or Micropolitan Statistical Area Summary:

Hazard (21-193-0003): Establish a manual FRM $PM_{2.5}$ sampler. KDAQ intends to begin sampling for $PM_{2.5}$ in September 2013.

Grayson Lake (21-043-0500): Due to methodological uncertainties, hexavalent chromium has been removed as an analyte of interest from the NATTS program. KDAQ will discontinue sampling for hexavalent chromium on July 1, 2013.

Bowling Green, KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-061-0501	Alfred Cook Road	X(Ft)		X(F)		X(F)	X(F)	X(F)						X(F)
(NPS)	Mammoth Cave (Edmonson)													
21-227-0009	226 Sunset Street	X(ct)						X						
	Smiths Grove (Warren)													
	TOTAL	4	0	1	0	1	1	2	0	0	0	0	0	1

(c) Collocated Monitor
(F) Non-EPA Federal Monitor
(t) Continuous PM Monitor

(Rev. 5/01/13)

CSA/MSA: Bowling Green, KY MSA
401 KAR 50:020 Air Quality Region: South Central Kentucky Intrastate (105)
Site Name: Mammoth Cave National Park, Houchin Meadow
AQS Site ID: 21-061-0501
Location: Alfred Cook Road, Park City, KY 42160
County: Edmonson
GPS Coordinates: 37.131944, -86.14778 (NAD83)
Date Established: August 1, 1997
Inspection Date: August 7, 2012
Inspection By: Jennifer F. Miller & Ashley Ginn-Dillion

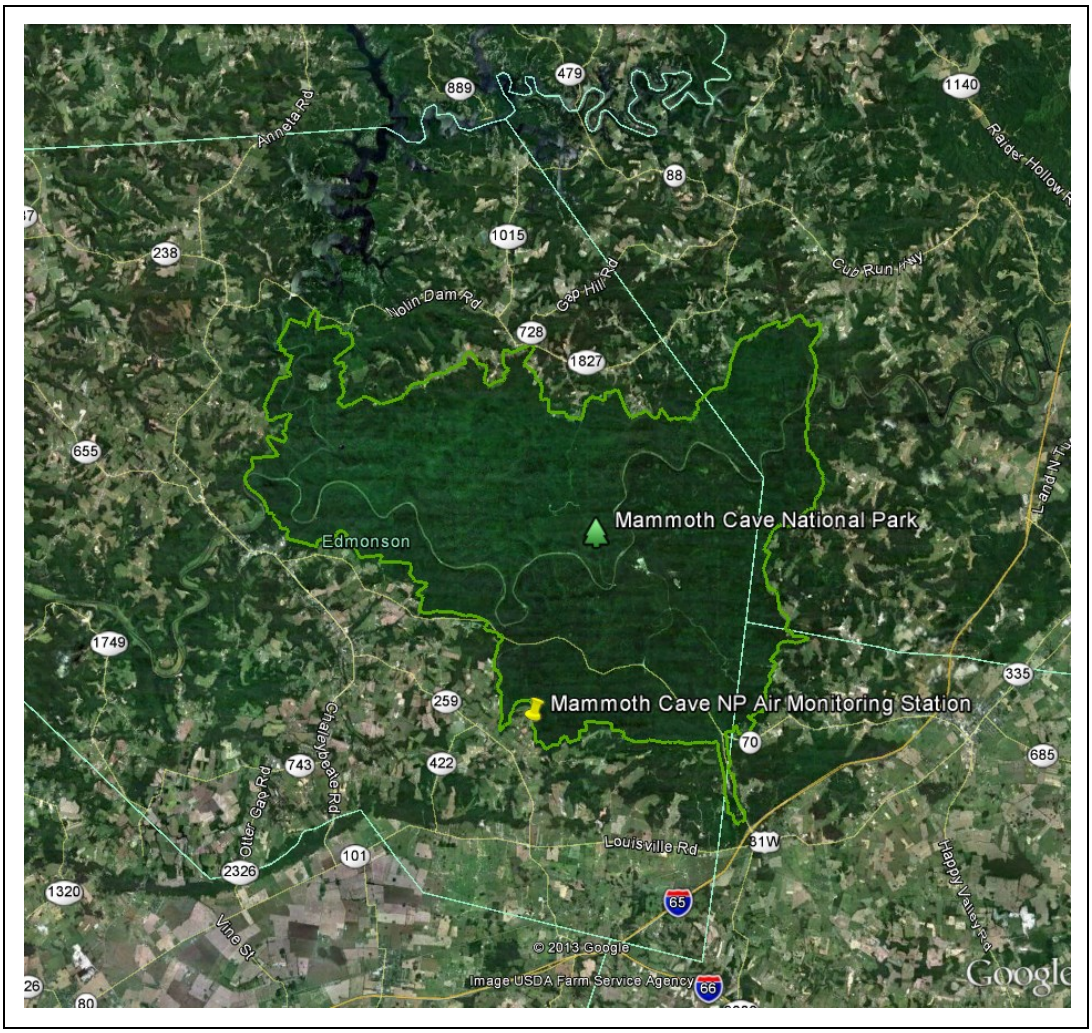
Mammoth Cave National Park was established as one of 156 mandatory Federal Class I Areas nationwide under the Clean Air Act Amendments of 1977. Class I Areas are imparted with the highest level of air quality protections, especially regarding visibility degradation (haze). The Division maintains a cooperative relationship with Mammoth Cave National Park and frequently includes the site's data in air quality analyses; however, the Division does not operate the site nor certify the annual data. While the park conducts a variety of air quality studies, only certain data is reported to the EPA's AQS database.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	10.0	Non-EPA Federal	Automated Equivalent Method utilizing UV photometry analysis	Continuously
Sulfur Dioxide	10.0	Non-EPA Federal	Automated Equivalent Method utilizing trace level UV fluorescence analysis	Continuously
Total Reactive Nitrogen (NO/NO_Y)	10.0	Non-EPA Federal	Automated method utilizing trace level chemiluminescence analysis	Continuously
Carbon Monoxide	10.0	Non-EPA Federal	Automated Reference Method utilizing trace level non-dispersive infrared analysis	Continuously

Monitors (Continued):

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
$PM_{2.5}$ TEOM	2.6	Non-EPA Federal AQI	Tapered element oscillating microbalance, gravimetric	Continuously
Meteorological	12.0	Non-EPA Federal	AQM grade instruments for wind speed, wind direction, solar radiation, precipitation, humidity, barometric pressure, and temperature	Continuously



CSA/MSA: Bowling Green, KY MSA
401 KAR 50:020 Air Quality Region: South Central Kentucky Intrastate (105)
Site Name: Ed Spear Park
AQS Site ID: 21-227-0009
Location: 226 Sunset Street, Smiths Grove, KY 42171
County: Warren
GPS Coordinates: 37.04926, -86. 21487 (NAD83)
Date Established: May 3, 2012
Inspection Date: August 7, 2012
Inspection By: Jennifer F. Miller & Ashley Ginn-Dillion
Site Approval Status: Siting and monitor design has been approved by the EPA.

This monitoring site was 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 sitting within the doline of a sinkhole and was discontinued. Monitoring was established at the new Ed Spear Park site in May 2012. Inspections found the sample lines and equipment to be in good condition. The sample inlets are 42 meters from the nearest road. 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. While not required for the CBSA, the site also provides levels of ozone and particulate matter for daily index reporting.

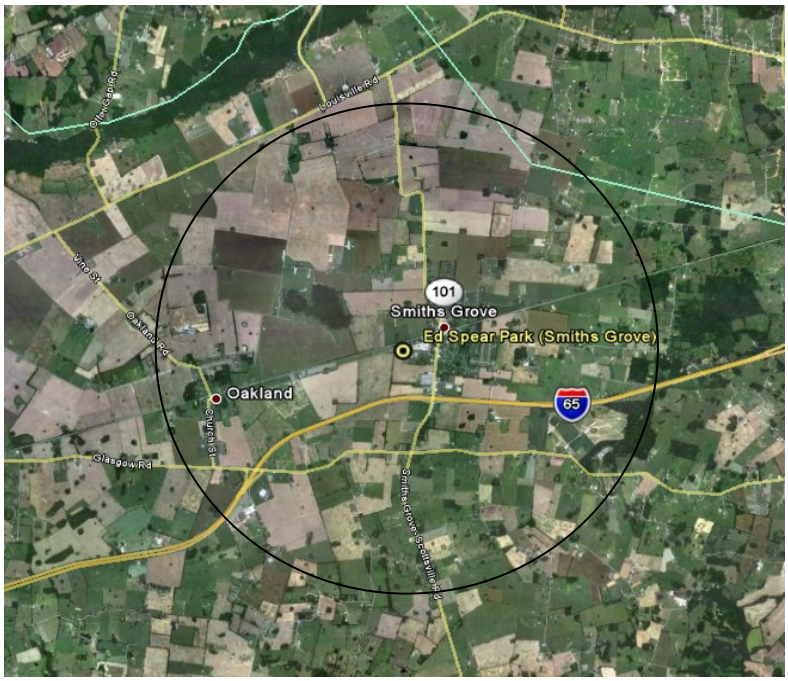
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.5	SLAMS AQI	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ TEOM	4.6	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
FEM $PM_{2.5}$	2.4	SLAMS	Gravimetric	24-hours every third day
Collocated FRM $PM_{2.5}$	2.4	SLAMS	Gravimetric	24-hours every sixth day

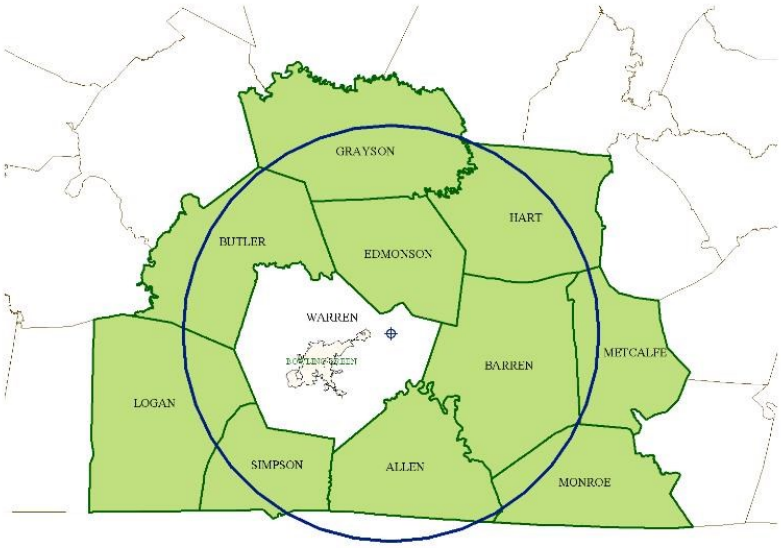
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

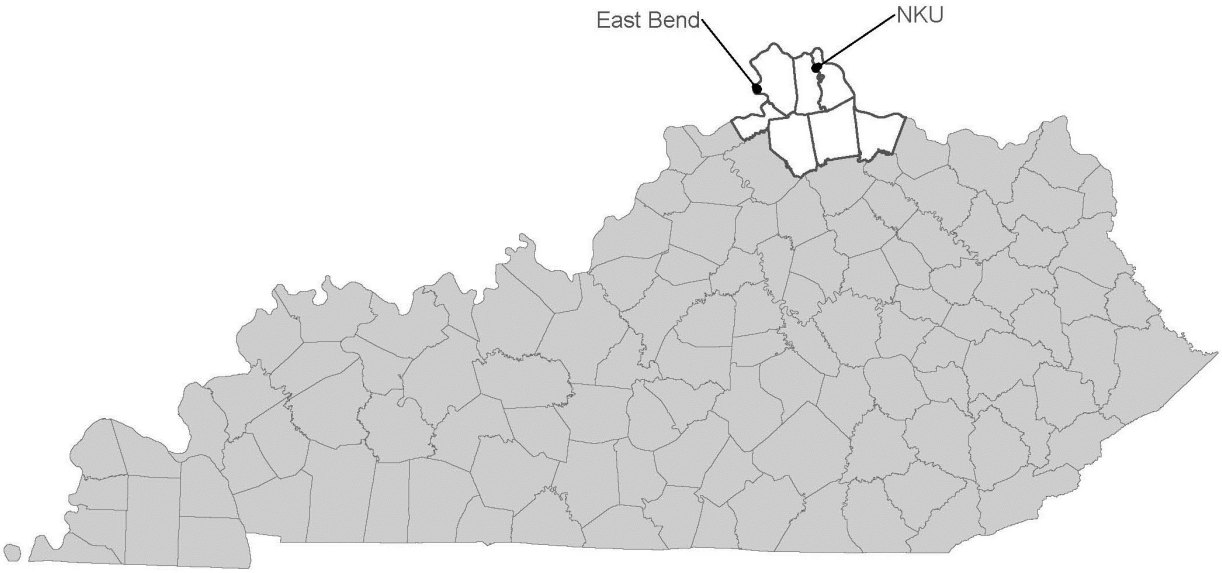
Neighborhood Scale: Particulates



Urban Scale: Ozone



Cincinnati-Middletown, OH-KY-IN



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-015-0003	KY338 & Lower River Road Union (Boone)							X(I)						X
21-037-3002	524A John's Hill Road Highland Heights (Campbell)	X(tI)		X(PI)	X(I)			X(eI)						
	TOTAL	2	0	1	1	0	0	2	0	0	0	0	0	1

(P) PWEI Monitor
(e) Emergency Episode Monitor
(I) Air Quality Index Required MSA
(t) Continuous PM Monitor

(Rev.5/5/13)

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, Union, KY 41091
County: Boone
GPS Coordinates: 38.918330, -84.852637 (NAD 83)
Date Established: July 1, 1977
Inspection Date: November 9, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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 near East Bend, Kentucky. The sample inlet is 15 meters from the nearest road. 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.

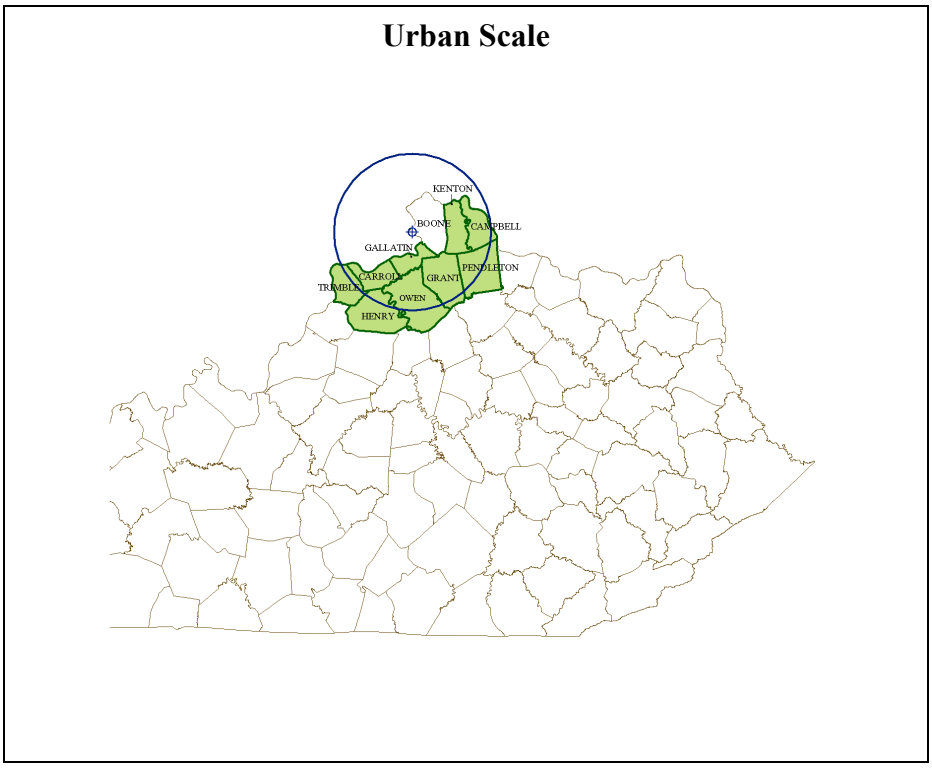
Monitoring Objective:
The monitoring objective is to determine compliance with National Ambient Air Quality Standards.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.5	SLAMS AQI	UV photometry	Continuously March 1 – October 31
Meteorological	7.1	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 the upwind 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 (NAD 83)
Date Established: August 1, 2007
Inspection Date: November 9, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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 23 meters from the nearest road, which is a gravel service-drive for a radio tower. 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.

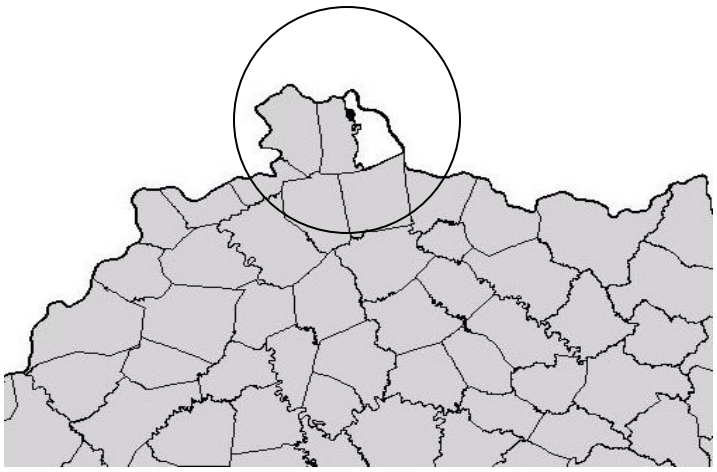
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.8	SLAMS AQI	Chemiluminescence	Continuously
AEM Ozone	3.8	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
FRM $PM_{2.5}$	4.6	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ TEOM	4.6	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
AEM Sulfur Dioxide	3.9	SLAMS (PWEI) AQI	UV fluorescence	Continuously

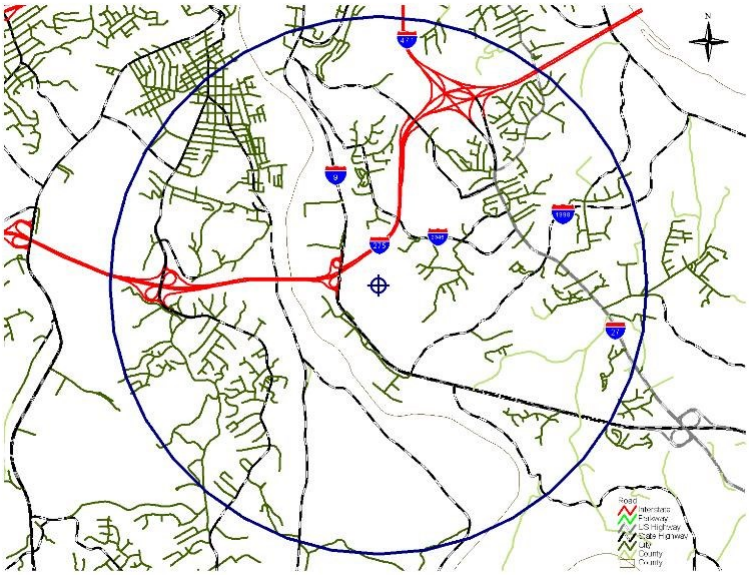
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

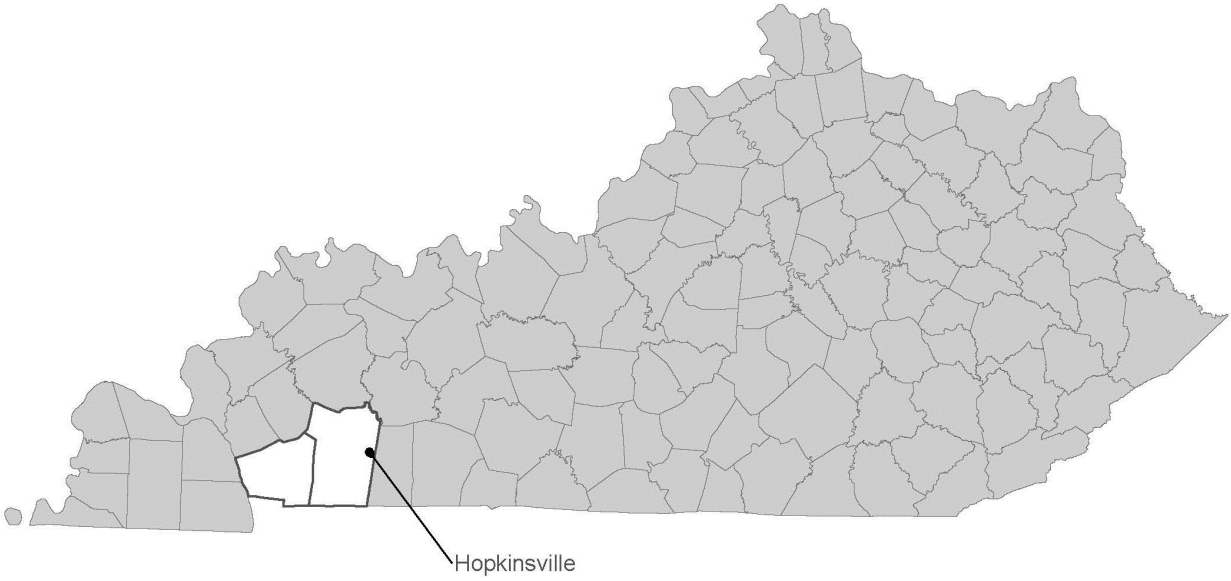
Urban Scale: Nitrogen Dioxide, Ozone, Sulfur Dioxide



Neighborhood Scale: Particulates



Clarksville, TN-KY



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

(Rev. 5/5/13)

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 (NAD 83)
Date Established: January 1, 1999
Inspection Date: October 25, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. Upon inspection, the sample inlets and monitors were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices C, D and E.

Monitoring Objective:

The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to determine levels of interstate regional transport of fine particulate matter and ozone. The objectives also include determining levels of regional transport for sulfur dioxide. While not required for the CBSA, the site also provides levels of ozone for daily index reporting.

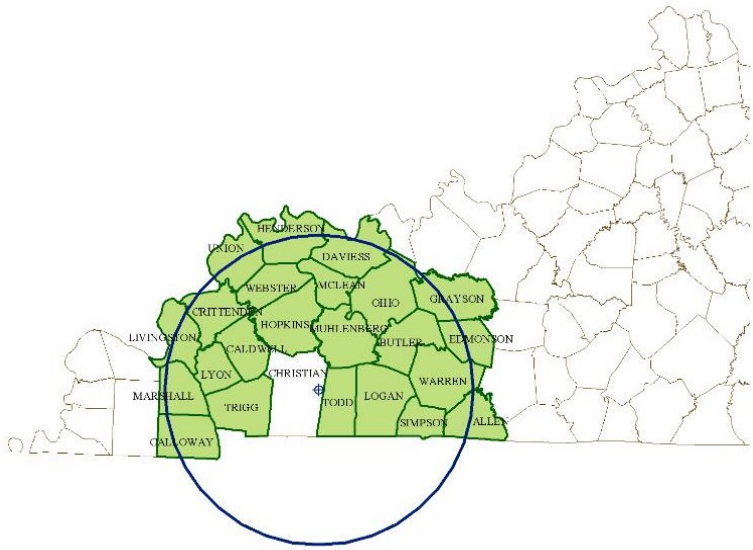
Monitors:

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	3.5	SPM	UV fluorescence	Continuously
FEM $PM_{2.5}$	3.3	SLAMS	Gravimetric	24-hours every third day

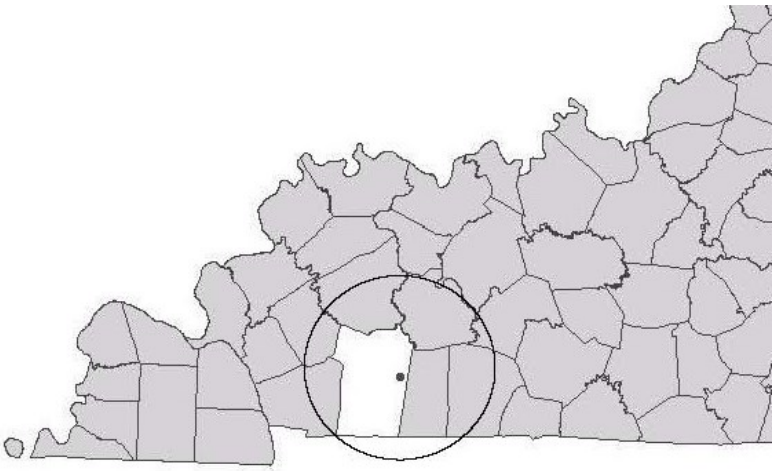
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

Regional Scale: Ozone, Particulates



Urban Scale: Sulfur Dioxide



Elizabethtown, KY

AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-093-0006	801 North Miles Street Elizabethtown (Hardin)	X(ct)						X						
	TOTAL	3	0	0	0	0	0	1	0	0	0	0	0	0

(c) Collocated Monitor

(t) Continuous PM Monitor

(Rev.5/5/13)

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: 37.705612, -85.852629 (NAD 83)
Date Established: February 24, 2000
Inspection Date: September 19, 2012
Inspection By: Jennifer F. Miller & Ashley Ginn-Dillion
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. In 2012, the site was moved approximately 23 meters due to potential expansion of a nearby park building. From the new location, the sample inlets are approximately 35 meters from the nearest road. 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. While not required for the CBSA, the site also provides ozone and particulate levels for daily index reporting.

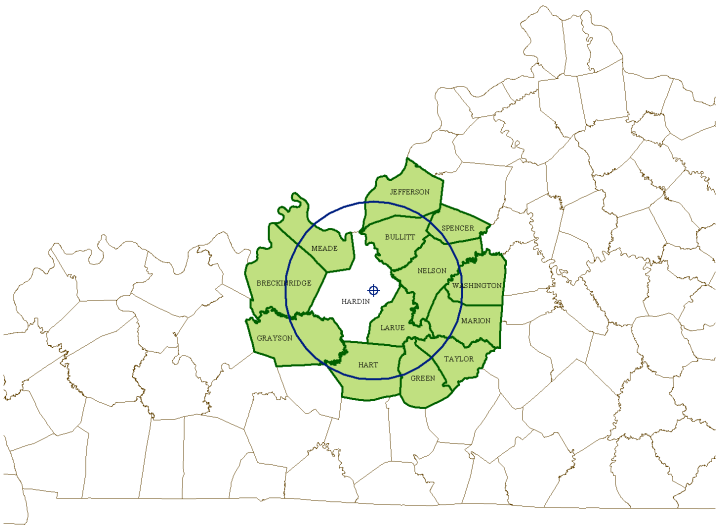
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.4	SLAMS AQI	UV photometry	Continuously March 1 – October 31
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
$PM_{2.5}$ TEOM	TBD	SPM AQI	Tapered elemental oscillating microbalance, gravimetric	Continuously

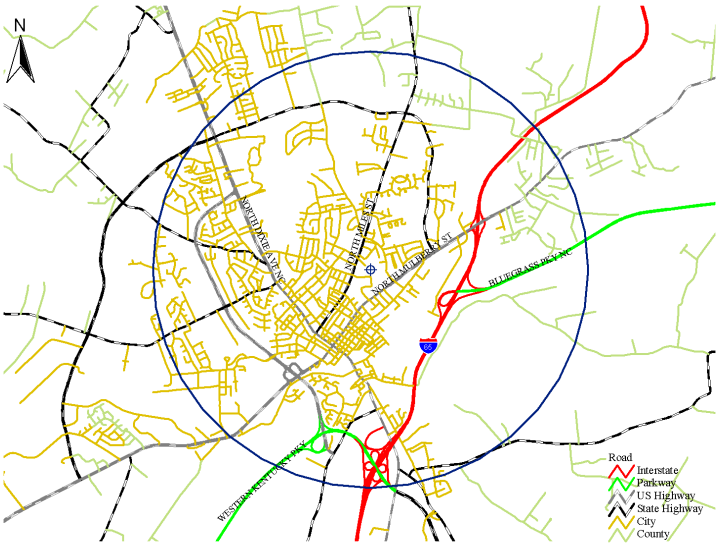
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

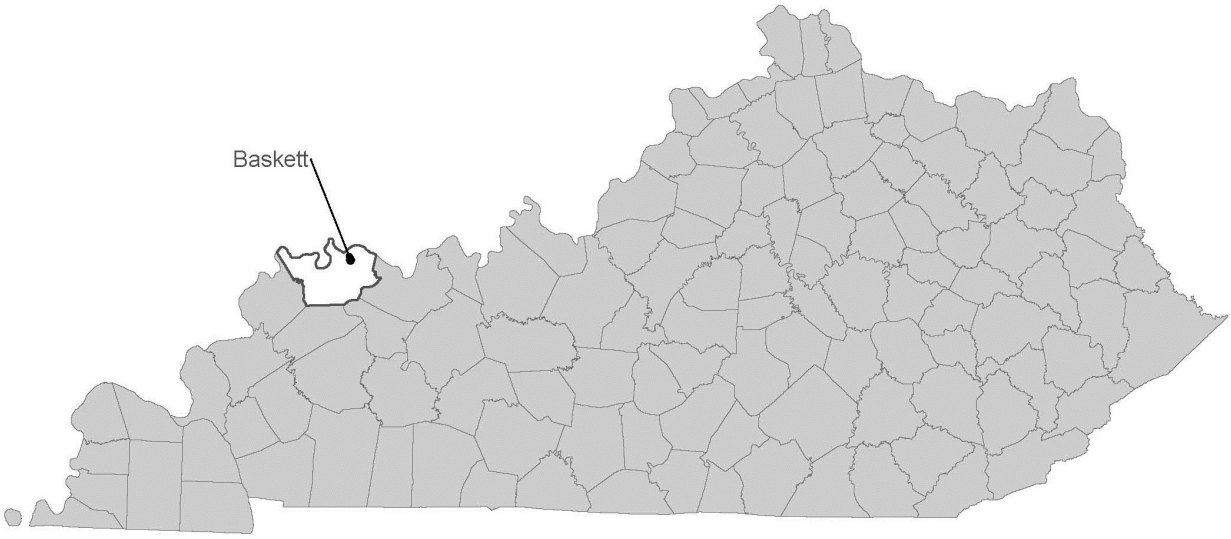
Urban Scale: Ozone



Neighborhood Scale: Particulates



Evansville, IN-KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-101-0014	7492 Dr. Hodge Road Baskett (Henderson)	X(t)	X(m)	X(P)				X						
	TOTAL	2	1	1	0	0	0	1	0	0	0	0	0	0

(P) PWEI Monitor
(t) Continuous PM Monitor
(m) PM10 filter analyzed for metals

(Rev. 5/5/13)

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, 7492 Dr. Hodge Road, Henderson, KY 42420
County: Henderson
GPS Coordinates: 37.87120, -87.46375 (NAD 83)
Date Established: February 27, 1992
Inspection Date: December 11, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
Site Approval Status: Site and monitors meet 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. Upon inspection, the sample lines and monitors were found to be in good condition. The sample inlets are 6.5 meters from the nearest road, which is closer than the allowable-distances stated by CFR. Due to the small traffic count of the street and the unlikely influence of vehicles on data, KDAQ has received EPA-approval for a waiver from the required road-distances stated by 40 CFR 58, Appendix E. Otherwise, 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. While not required for the CBSA, the sites provides ozone, particulate, and sulfur dioxide levels for daily index reporting.

Monitors:

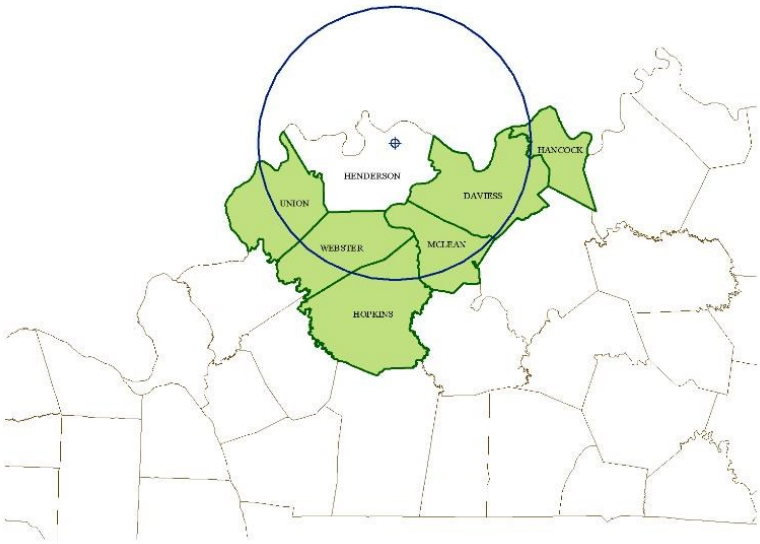
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.9	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	4.5	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ TEOM	4.7	SPM AQI	Tapered element oscillating microbalance, gravimetric	Continuously
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 (PWEI) AQI	UV fluorescence	Continuously

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

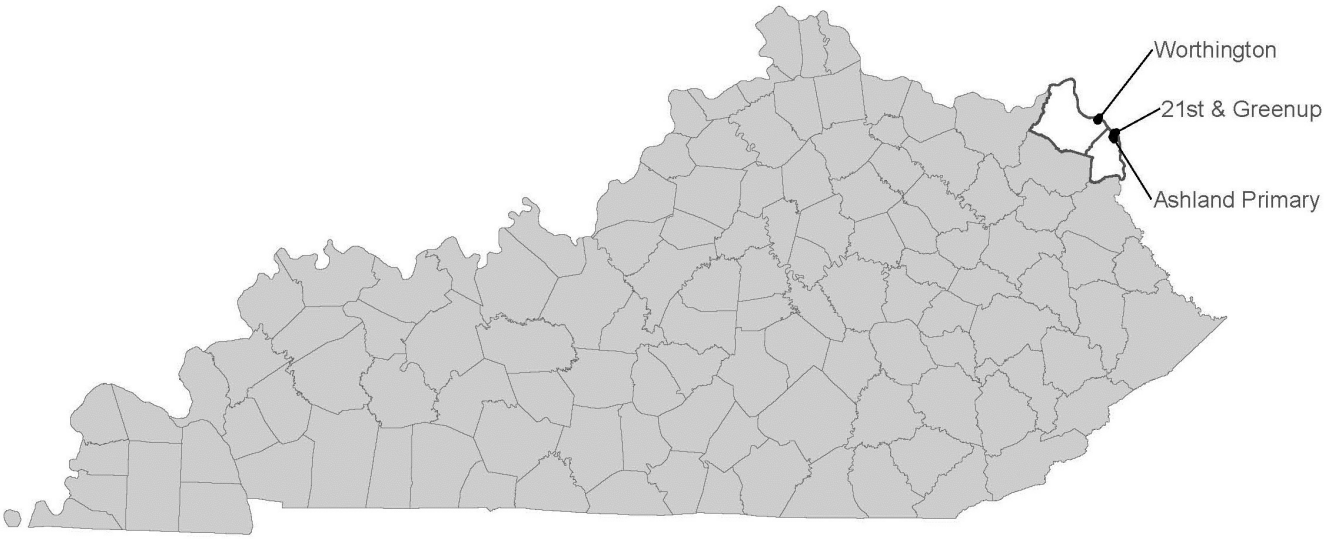
Area Representativeness:
This site represents maximum concentrations on an urban scale for ozone. This site also represents population exposure on a neighborhood scale for particulates and sulfur dioxide.

Neighborhood Scale: Particulates, Sulfur Dioxide

Urban Scale: Ozone



Huntington-Ashland, WV-KY-OH



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-019-0002	122 22nd Street Ashland (Boyd)		X(cm)											
21-019-0017	2924 Holt Street Ashland (Boyd)	X(tI)		X(eI)	X(e)			X(eI)		X	X	X		X
21-089-0007	Scott Street & Center Avenue Worthington (Greenup)			X(e)				X(eI)						
	TOTAL	2	2	2	1	0	0	2	0	1	1	1	0	1

(c) Collocated Monitor
(e) Emergency Episode Monitor
(I) Air Quality Index Required CBSA
(t) Continuous PM Monitor
(m) PM10 filter analyzed for metals

(Rev.5/5/13)

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: 21st and Greenup
AQS Site ID: 21-019-0002
Location: 122 22nd Street, Ashland, KY 41101
County: Boyd
GPS Coordinates: 38.47676, -82.63137 (NAD 83)
Date Established: April 2, 1978
Inspection Date: December 13, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
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 Valvoline Oil complex building in Ashland, Kentucky. The building is one story tall. The sample inlets are 20 meters from the nearest road. 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:

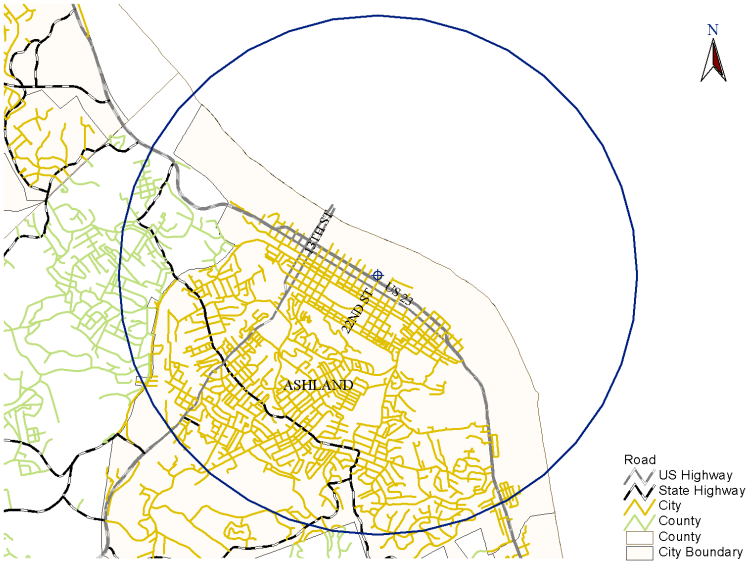
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM PM_{10}	6.4	SLAMS	Gravimetric	24-hours every sixth day
- Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.4	Same as PM_{10}
Collocated FRM PM_{10}	6.4	SLAMS	Gravimetric	24-hours every twelfth day
- Collocated Metals PM_{10}		SPM	Determined from the PM_{10} sample using EPA method IO 3.4	24-hours; six samples per year

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.

Middle Scale: Particulates

Neighborhood Scale: Air Toxics



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 (NAD 83)
Date Established: January 1, 1999
Inspection Date: December 13, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
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. 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:

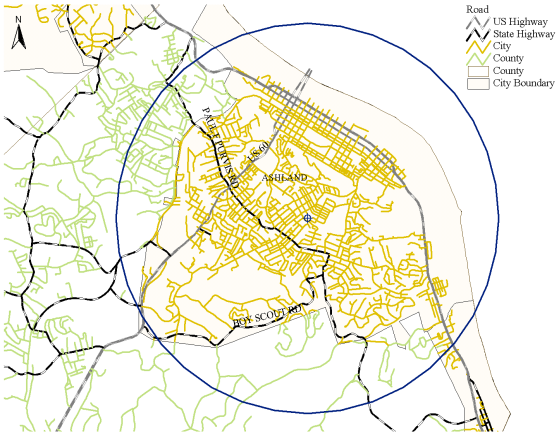
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	4.3	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Sulfur Dioxide	4.3	SLAMS AQI EPISODE	UV fluorescence	Continuously
AEM Ozone	4.3	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 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

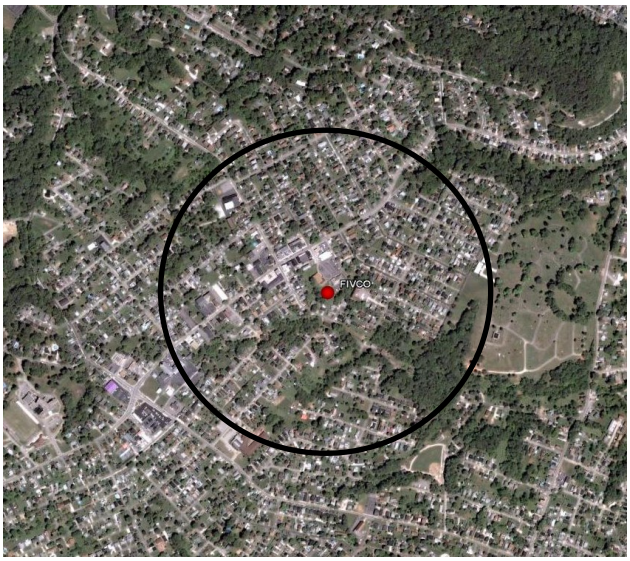
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

Area Representativeness:
This site 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.

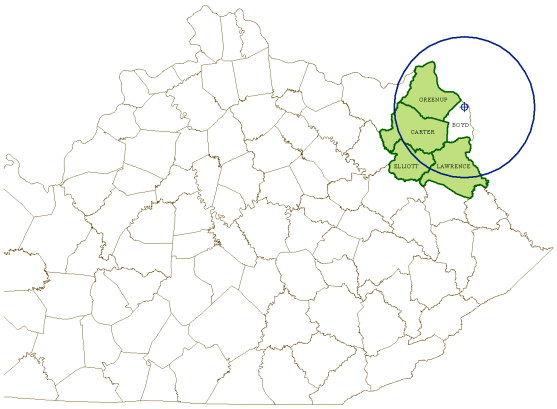
Neighborhood Scale: Air Toxics, Ozone, Sulfur Dioxide



Middle Scale: Particulates



Urban Scale: 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 & Center Avenue, Worthington, KY 41183
County: Greenup
GPS Coordinates: 38.548136, -82.731163 (NAD 83)
Date Established: October 12, 1980
Inspection Date: December 13, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
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. 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.

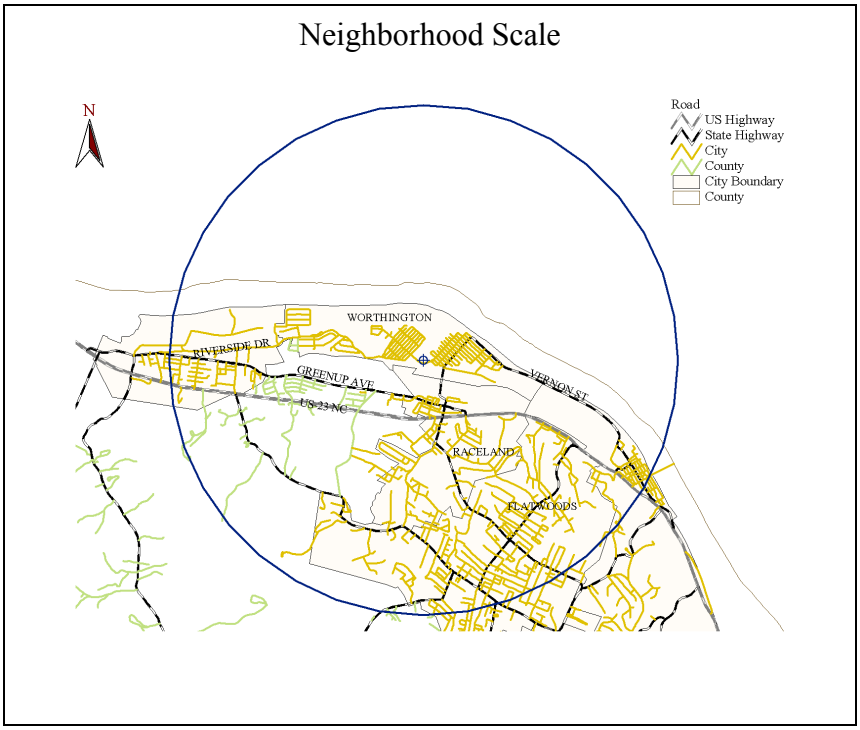
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards; to detect elevated pollutant levels for activation of emergency control procedures for ozone and sulfur dioxide; and to provide pollutant levels for daily air quality index reporting.

Monitors:

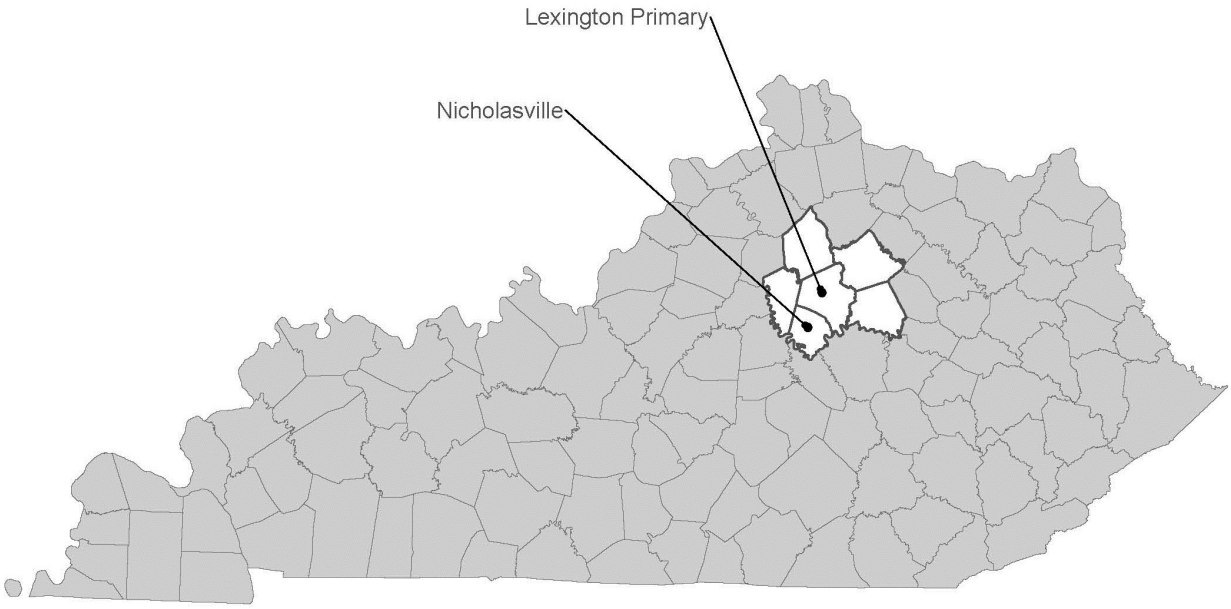
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.2	SLAMS EPISODE AQI	UV photometry	Continuously March 1 – October 31
AEM Sulfur Dioxide	4.2	SPM EPISODE	UV fluorescence	Continuously

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 and sulfur dioxide.



Lexington-Fayette, KY



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-067-0012	650 Newtown Pike	X(tI)	X(m)	X(PeI)	X(reI)			X(eI)		X	X	X	X	
	Lexington (Fayette)													
21-113-0001	260 Wilson Drive			X(I)				X(I)						X
	Nicholasville (Jessamine)													
	TOTAL	2	1	2	1	0	0	2	0	1	1	1	1	1

(P) PWEI Monitor
(r) Proposed RA-40 Monitor
(e) Emergency Episode Monitor
(I) Air Quality Index Required CBSA
(t) Continuous PM Monitor
(m) PM10 filter analyzed for metals

(Rev.5/5/13)

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 (NAD 83)
Date Established: November 8, 1979
Inspection Date: October 17, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. 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 reporting.

Additionally, the nitrogen dioxide monitor has been proposed as a RA-40 monitor. According to CFR, each EPA Regional Administrator is required to collaborate with agencies to establish or designate 40 NO_2 monitoring locations, with a primary focus on protecting susceptible and vulnerable populations.

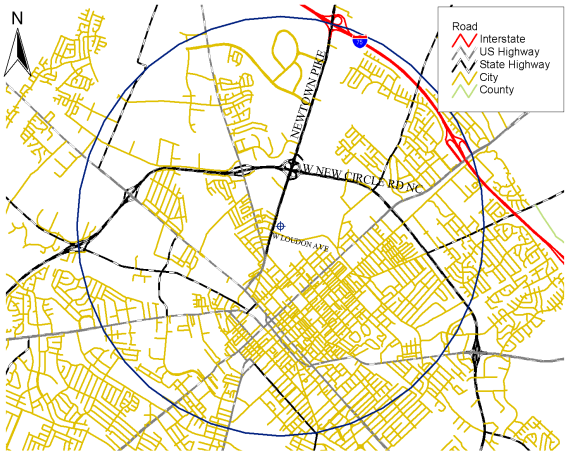
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
ARM Nitrogen Dioxide	4.1	SLAMS (RA-40) AQI 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	SPM	Ion chromatography and X-ray fluorescence	24-hours every sixth day

Carbon Speciation	2.4	SPM	Thermal-optical	24-hours every sixth day
AEM Sulfur Dioxide	3.6	SLAMS (PWEI) AQI EPISODE	UV fluorescence	Continuously
$PM_{2.5}$ TEOM	4.6	SPM AQI	Tapered element oscillating microbalance, gravimetric	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

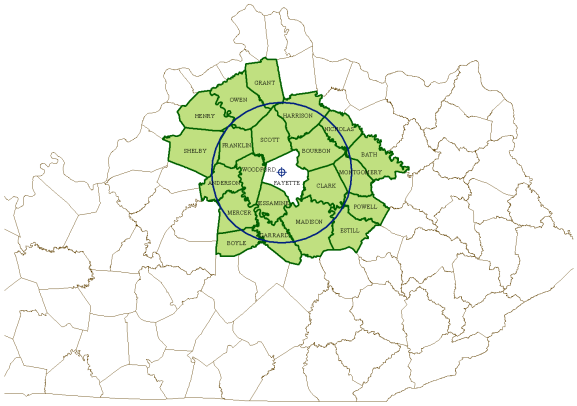
Quality Assurance Status: All quality assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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.



Neighborhood Scale: Particulates, Sulfur Dioxide, Ozone

Urban Scale: Nitrogen Dioxide, 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: KYTC Maintenance Garage, 260 Wilson Drive, Nicholasville, KY 40356
County: Jessamine
GPS Coordinates: 37.89147, -84.58825 (NAD 83)
Date Established: August 1, 1991
Inspection Date: October 17, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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 Transportation Cabinet garage in Nicholasville, Kentucky. The sample inlets are 110 meters from the nearest road. 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.

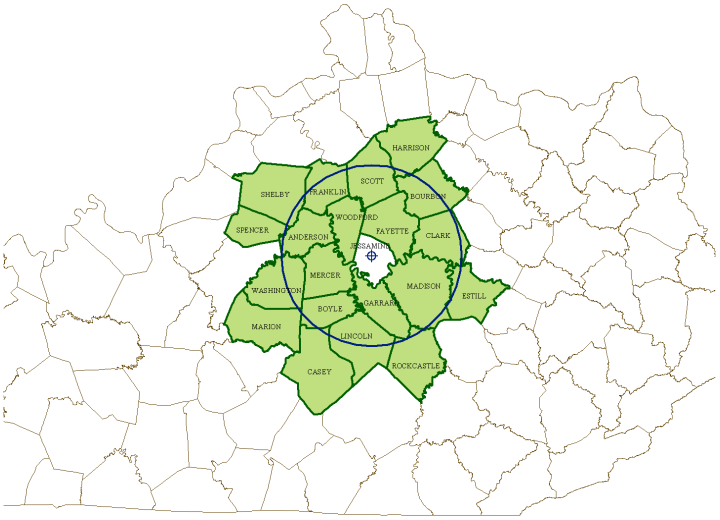
Monitors:

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

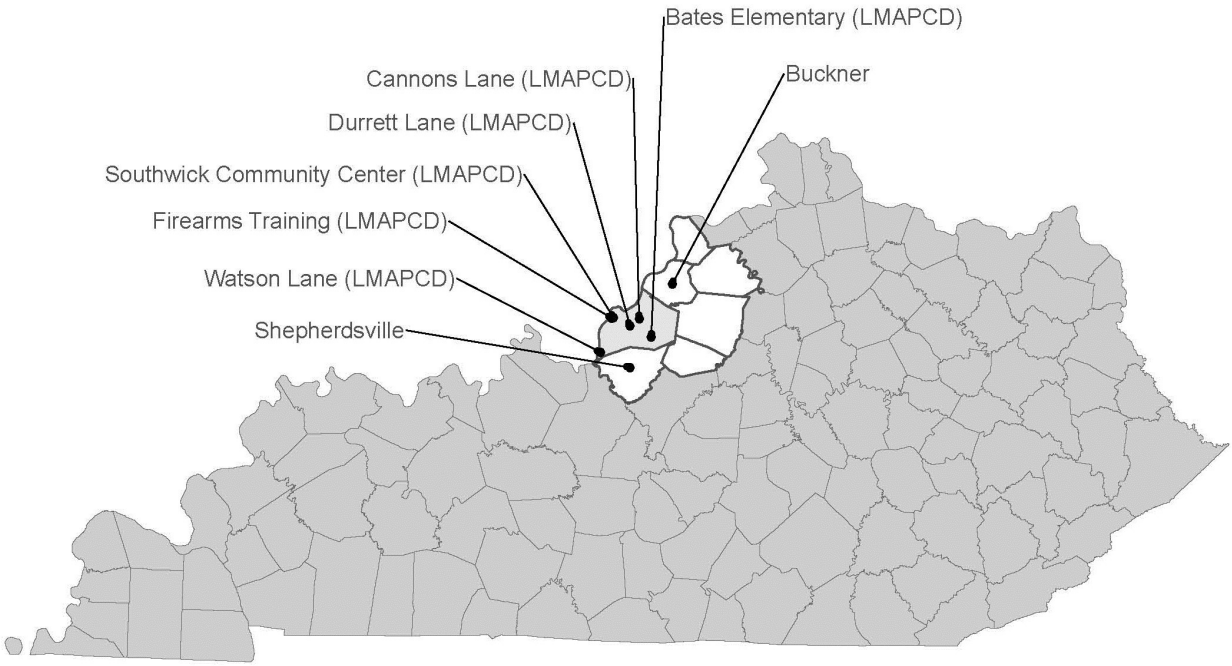
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

Urban Scale: Criteria, Air Toxics



Louisville-Jefferson County, KY-IN



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-029-0006	2nd & Carpenter Streets Shepherdsville (Bullitt)							X(I)						X
21-185-0004	1601 South Hwy 393 LaGrange (Oldham)							X(I)						
21-111-0027	7601 Bardstown Road Louisville (Jefferson)	X(tI)						X(I)						
21-111-0043	3621 Southern Avenue Louisville (Jefferson)	X(NRcI)	X(ctI)											X
21-111-0051	7201 Watson Lane Louisville (Jefferson)	X (INR)	X(It)	X(P)				X(I)						X
21-111-0067	2730 Cannons Lane Louisville (Jefferson)	X(INR)	X(INRL)	X(PI)	X(I)	X	X(I)	X(I)				X	X	X
21-111-0075	1517 Durrett Lane Louisville (Jefferson)	X			X		X					X(BC)		X
21-111-1041	4201 Algonquin Parkway Louisville (Jefferson)			X(e)										
	TOTAL	9	5	3	2	1	2	5	0	0	0	2	1	5

(P)	PWEI Monitor
(c)	Collocated Monitor
(e)	Emergency Episode Monitor
(I)	Air Quality Index Required CBSA
(t)	Continuous PM Monitor
(NR)	NR-SPM Continuous PM Monitor
(BC)	Black Carbon
(L)	PM10 metals filter analyzed for lead

(Rev. 5/20/13)

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 & Carpenter Streets, Shepherdsville, KY 40165
County: Bullitt
GPS Coordinates: 37.98629, -85.71192 (NAD 83)
Date Established: January 30, 1992
Inspection Date: September 19, 2012
Inspection By: Jennifer F. Miller & Ashley Ginn-Dillion
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. 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.

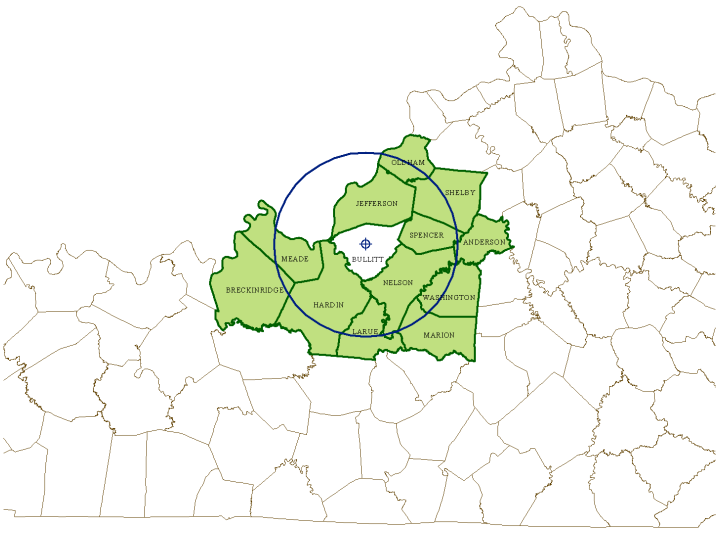
Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.0	SLAMS 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.

Urban Scale



CSA/MSA: Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN CSA / Louisville-Jefferson, KY-IN MSA
401 KAR 50:020 Air Quality Region: North Central Kentucky Intrastate (104)
Site Name: Buckner
AQS Site ID: 21-185-0004
Location: KYTC Maintenance Facility, 1601 South Hwy 393, LaGrange, KY 40031
County: Oldham
GPS Coordinates: 38.40020, -85.44428 (NAD 83)
Date Established: May 1, 1981
Inspection Date: September 19, 2012
Inspection By: Jennifer F. Miller & Ashley Ginn-Dillion
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. 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.

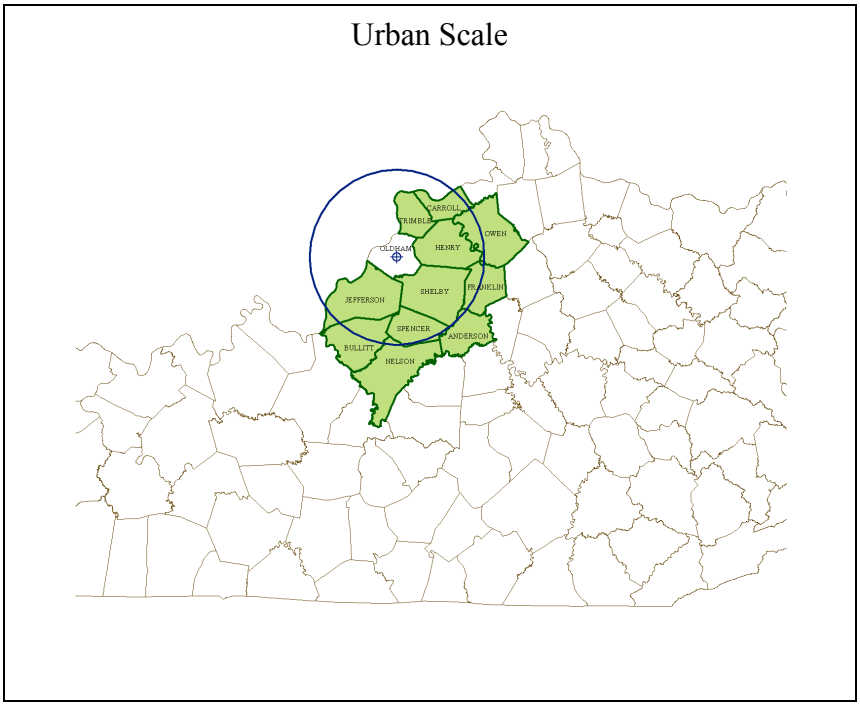
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide ozone levels for daily index reporting.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	3.8	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 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: 7601 Bardstown Road, Louisville, KY 40291
County: Jefferson
GPS Coordinates: 38.13784, -85.57648 (NAD 83)
Date Established: January 4, 1973
Inspection Date: December 6, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. Upon inspection, the sample inlets and monitors were found to be in good condition. The air monitoring site meets the criteria established in 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:

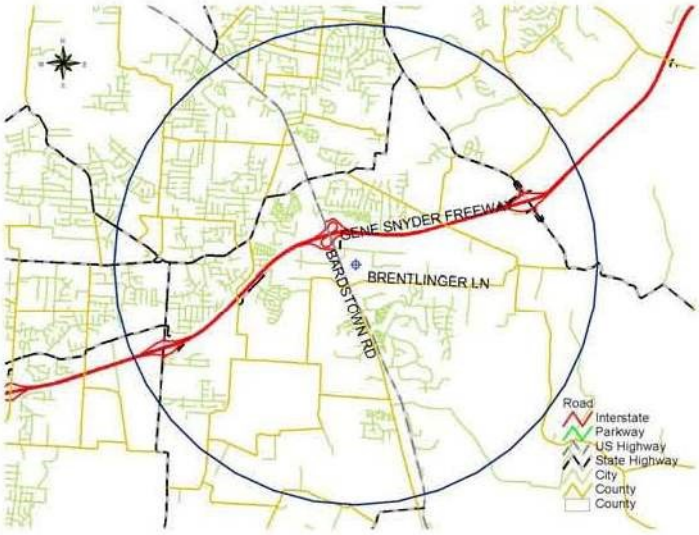
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.0	SLAMS AQI	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ TEOM	5.6	Other AQI	Tapered element oscillating microbalance, gravimetric	Continuously

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.

Urban Scale: Ozone

Neighborhood Scale: 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: Southwick Community Center
AQS Site ID: 21-111-0043
Location: 3621 Southern Avenue, Louisville, KY 40211
County: Jefferson
GPS Coordinates: 38.23319, -85.81566 (NAD 83)
Date Established: July 1, 1983
Inspection Date: December 6, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. Upon inspection, the sample inlets and monitors were found to be in good condition. The air monitoring site meets the criteria established in 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 every third day
Collocated FRM $PM_{2.5}$	6.0	SLAMS	Gravimetric	24-hours every sixth day
$PM_{2.5}$ BAM	6.0	NR-SPM AQI	Automated Equivalent Method utilizing Beta Attenuation.	Continuously
Meteorological	11.4	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure, and temperature	Continuously
-Rain Gauge	5.0	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.

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: 7201 Watson Lane, Louisville, KY 40272
County: Jefferson
GPS Coordinates: 38.06091, -85.89804 (NAD 83)
Date Established: July 16, 1992
Inspection Date: December 6, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. Upon inspection, the sample lines and monitors were found to be in good condition. The air monitoring site meets the criteria established by 40 CFR Part 58, Appendices C, D, E and G.

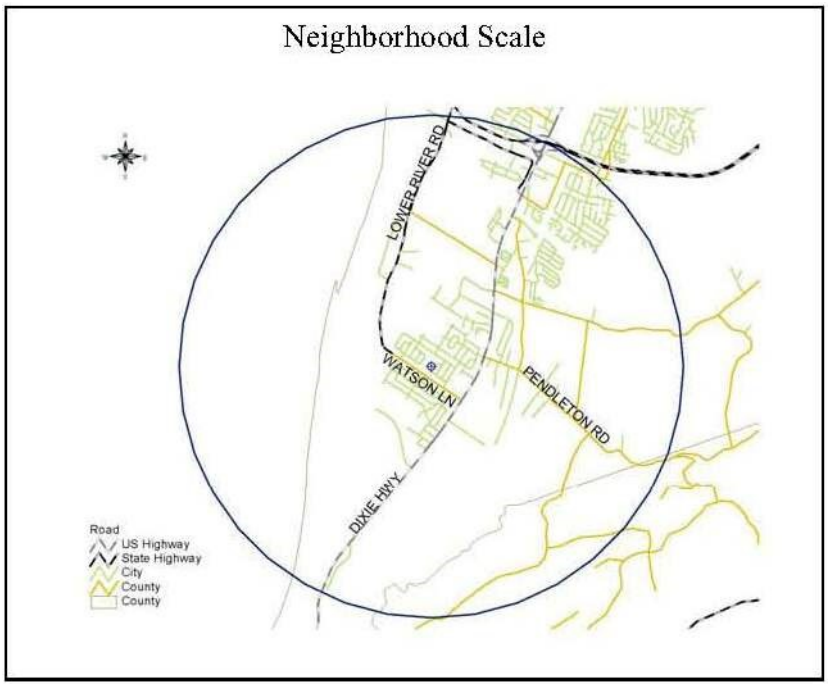
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide pollution levels for daily index reporting.

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 third day
$PM_{2.5}$ BAM	4.6	NR-SPM AQI	Automated Equivalent Method utilizing Beta Attenuation.	Continuously
PM_{10} TEOM	TBD	SPM AQI	Tapered element oscillating microbal-ance, gravimetric	Continuously
AEM Sulfur Dioxide	4.3	SLAMS (PWEI)	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 for ozone and particulates. This site also represents maximum concentrations on a neighborhood scale for SO_2.



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: Bowman Field, 2730 Cannons Lane, Louisville, KY 40204
County: Jefferson
GPS Coordinates: 38.2288760, -85.654520 (NAD 83)
Date Established: July 1, 2008
Inspection Date: December 6, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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 site is located in the NE quadrant of Jefferson County and is approximately 9 km from the urban core of Metro Louisville. The site was originally established as a SLAMS site in 2008 and became a NCore site in 2009. 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. Upon inspection, the sample lines and monitors were found to be in good condition. The air monitoring site meets the criteria of 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	4.6	NCore SLAMS AQI	Automated Reference Method utilizing trace level non-dispersive infrared analysis.	Continuously	06/01/2011
Nitrogen Oxide	4.6	NCore SLAMS AQI	Automated Reference Method utilizing chemiluminescence analysis.	Continuously	01/01/2010
Nitrogen Dioxide	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	4.6	NCore SLAMS AQI	Automated Equivalent Method utilizing UV photometry analysis.	Continuously	01/01/2010
Sulfur Dioxide	4.6	NCore SLAMS (PWEI) 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 - PM_{Coarse} (PM_{10}-$PM_{2.5}$) BAM	4.6	NCore NR-SPM AQI	Automated Equivalent Method utilizing Beta Attenuation. Differential Automated Equivalent Method utilizing Beta Attenuation.	Continuously Continuously	01/24/2011 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
PM_{10c} Filter - Lead	2.4	NCore SLAMS	Manual Reference Method PM_{10c} utilizing differential gravimetric analysis. Every other PM_{10c} Manual Reference Method filter analyzed via X-ray fluorescence.	1/3 days 1/6 days	01/01/2009 12/29/2011

Monitors (Continued):

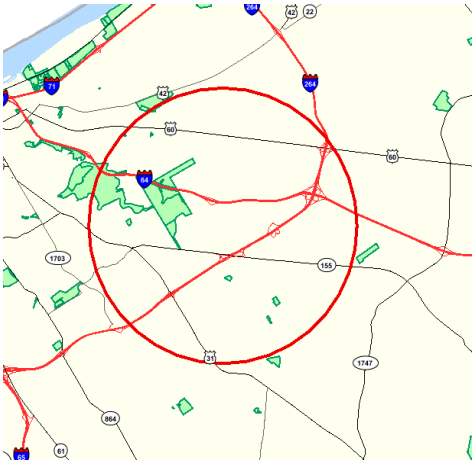
Monitor Type	Inlet Height (meters)	Designations	Analysis Method	Frequency of Sampling	Startup Date
FRM $PM_{2.5}$	2.4	NCore SLAMS	Manual Reference Method utilizing differential gravimetric analysis	1/3 days	01/01/2009
Meteoro-logical	9.3	NCore	Air Quality Measurements approved instrumentation for wind 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.

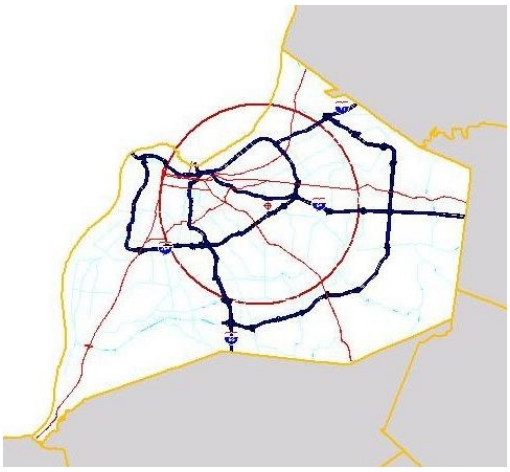
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A. The District's current Quality Assurance Project Plan covers trace-level O_3, NO_x, SO_2, and CO, as well as $PM_{2.5}$ speciation, lead, and meteorological measurements. Standard operating procedures for trace-level CO, NO_x, NO_y, SO_2, O_3, $PM_{2.5}$ BAM, and meteorological measurements 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	

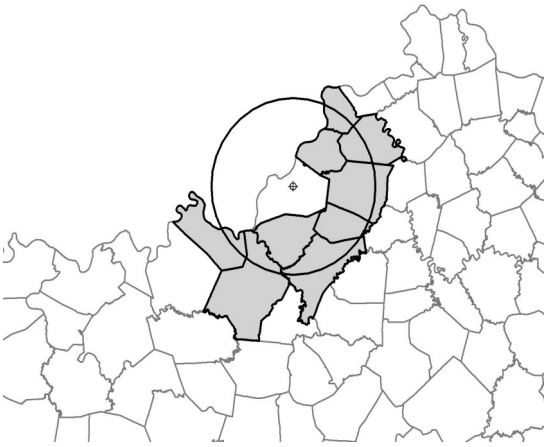
Neighborhood Scale (4 km): Carbon Monoxide, Sulfur Dioxide, and VOCs



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 County, KY-IN MSA
401 KAR 50:020 Air Quality Region: Louisville Interstate (078)
Site Name: Durrett Lane (Near-Road Site)
AQS Site ID: 21-111-0075
Location: 1517 Durrett Lane, Louisville, KY 40213
County: Jefferson
GPS Coordinates: 38.1935, -85.7121 (NAD 83)
Date Established: TBD
Inspection Date: TBD
Inspection By: TBD
Site Approval Status: TBD

On February 9, 2010, the EPA released a new NO_2 Final Rule and a new set of monitoring requirements. Under the new monitoring requirements, State and Local agencies are required to establish NO_2 near-road monitoring stations based upon core based statistical area (CBSA) populations and traffic metrics. Based upon population estimates and AADT counts, a near-road nitrogen dioxide monitor is required in the Louisville-Jefferson County, KY-IN MSA. LMAPCD intends to establish a multi-pollutant near-road site that includes instrumentation to not only measure nitrogen dioxide, but also $PM_{2.5}$, carbon monoxide, black carbon, and meteorology. As required, LMAPCD prepared a proposal document for the new near-road site, which was submitted for a 30-day public comment period. This proposal, along with the response to comments, is located in Appendix D of this Annual Network Surveillance document.

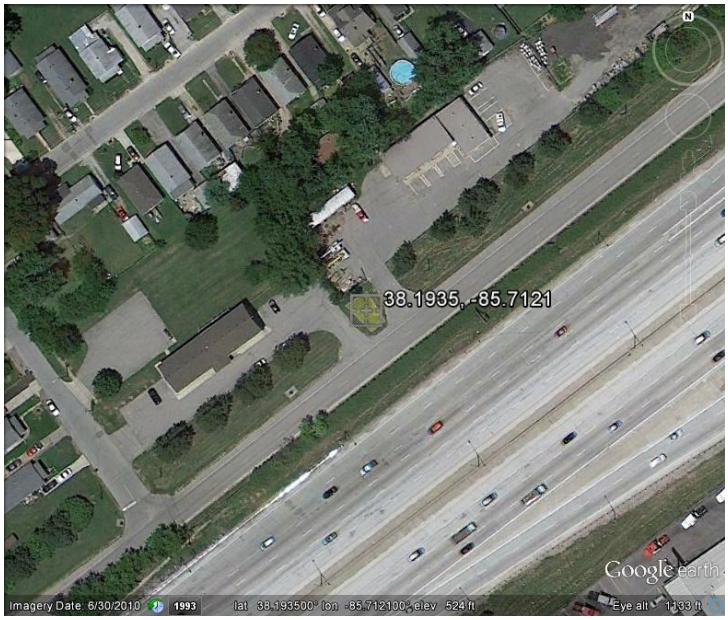
Monitoring Objective:
The monitoring objective will be to determine compliance with National Ambient Air Quality Standards for nitrogen dioxide and carbon monoxide, as well as to characterize black carbon in the near-road environment.

Monitors:

Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
Nitrogen Dioxide	TBD	SLAMS	Automated Equivalent Method utilizing photolysis	Continuously
Carbon Monoxide	TBD	SLAMS	Automated Reference Method utilizing non-dispersive infrared analysis	Continuously
FRM $PM_{2.5}$	TBD	SLAMS	Manual Reference Method utilizing differential gravimetric analysis	One sample every third day
Black Carbon	TBD	SPM	Aethalometer	Continuously
Meteorological	TBD	Other	AQM grade instruments for wind speed, wind direction, humidity, barometric pressure, and temperature	Continuously

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

Area Representativeness:
The site will represent maximum concentrations 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: Firearms Training
AQS Site ID: 21-111-1041
Location: 4201 Algonquin Parkway, Louisville, KY 40211
County: Jefferson
GPS Coordinates: 38.23158, -85.82675 (NAD 83)
Date Established: April 13, 1978
Inspection Date: December 6, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. Upon inspection, the sample lines and monitors were found to be in good condition. The air monitoring site meets the criteria established by 40 CFR Part 58, Appendices C, D, E and G.

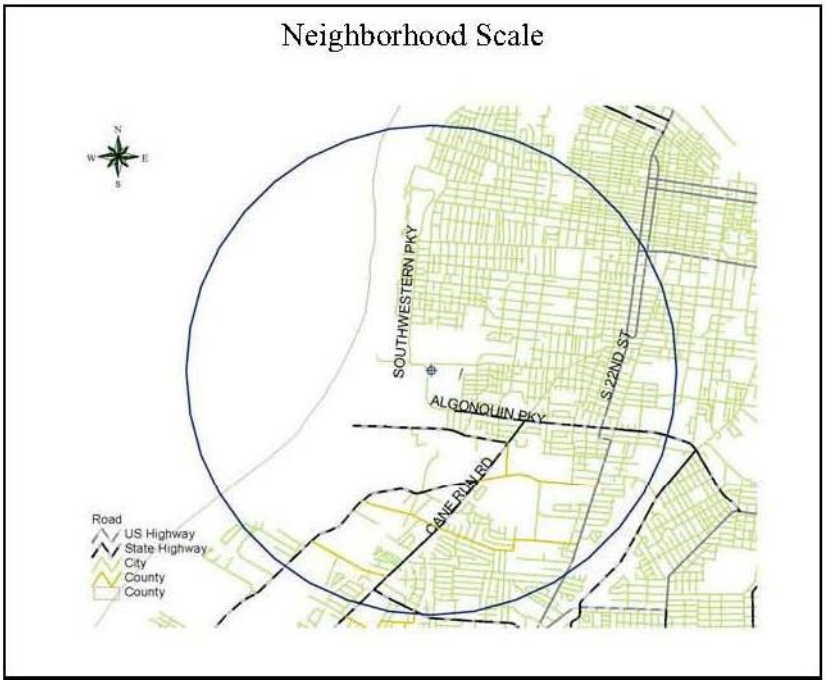
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to detect episode levels for the activation of emergency control procedures.

Monitors:

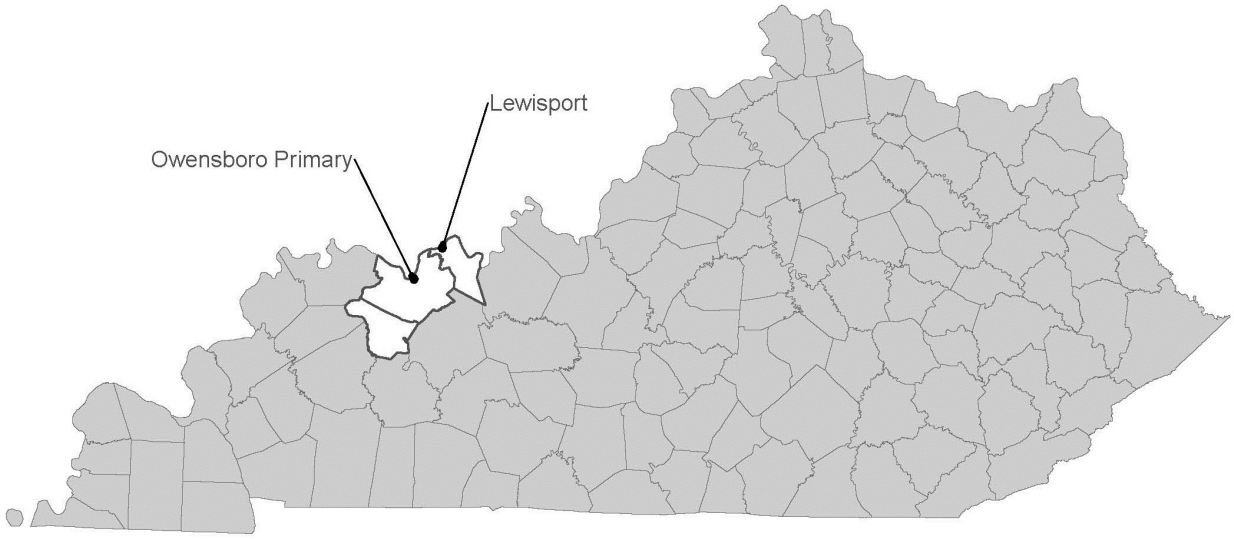
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Sulfur Dioxide	4.5	SLAMS EPISODE	UV fluorescence	Continuously

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	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-059-0005	716 Pleasant Valley Road Owensboro (Daviess)	X(te)		X(e)	X(e)			X(e)						X
21-091-0012	Second & Caroline Streets Lewisport (Hancock)							X						
	TOTAL	2	0	1	1	0	0	2	0	0	0	0	0	1

(e) Emergency Episode Monitor
(t) Continuous PM Monitor

(Rev. 5/5/13)

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: 37.780776, -87.075307 (NAD 83)
Date Established: December 1, 1970
Inspection Date: December 10, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
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. 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. While not required for the CBSA, the site also provide levels of pollutants for daily index reporting.

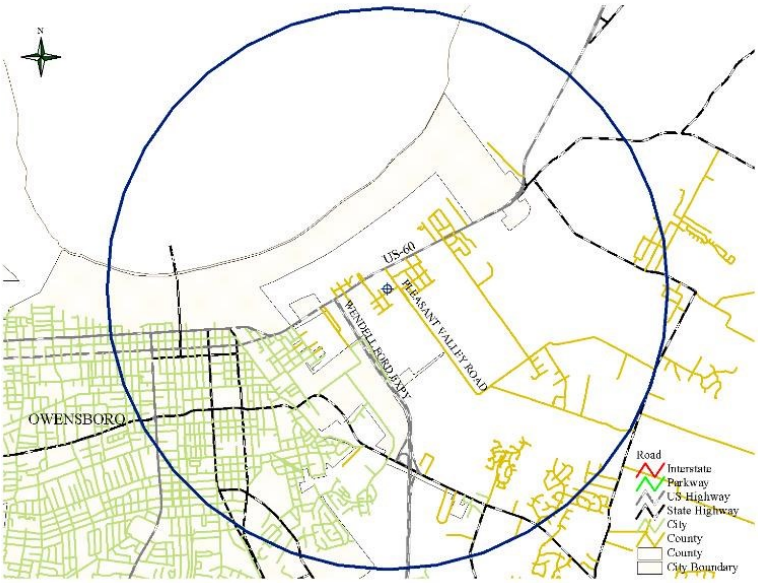
Monitors:

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

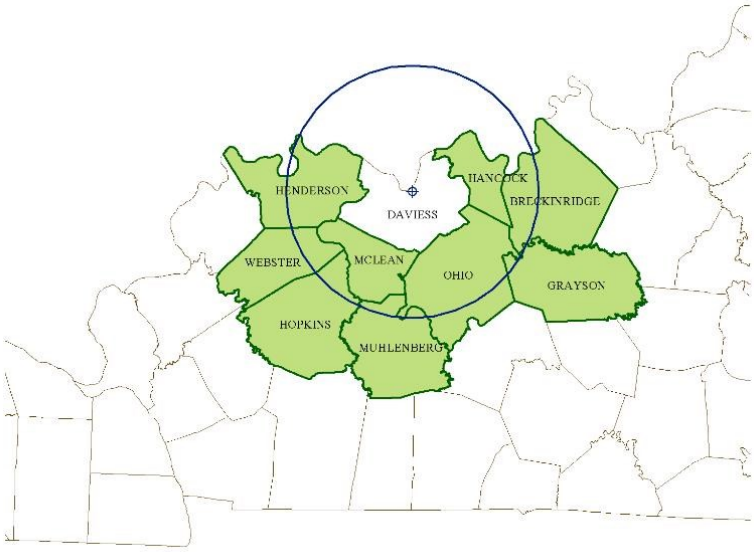
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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.

Neighborhood Scale: Ozone, Sulfur Dioxide, Particulates



Urban Scale: 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 & Caroline Streets, Lewisport, KY 42351
County: Hancock
GPS Coordinates: 37.93829, -86.89719 (NAD 83)
Date Established: September 5, 1980
Inspection Date: December 10, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
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 former Lewisport Elementary School in Lewisport, Kentucky. The sample inlet is 57 meters from the nearest road. 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.

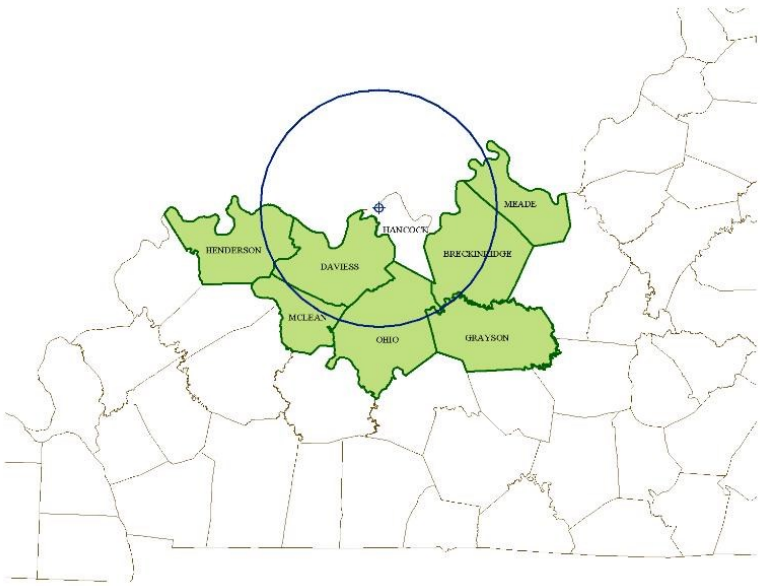
Monitors:

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

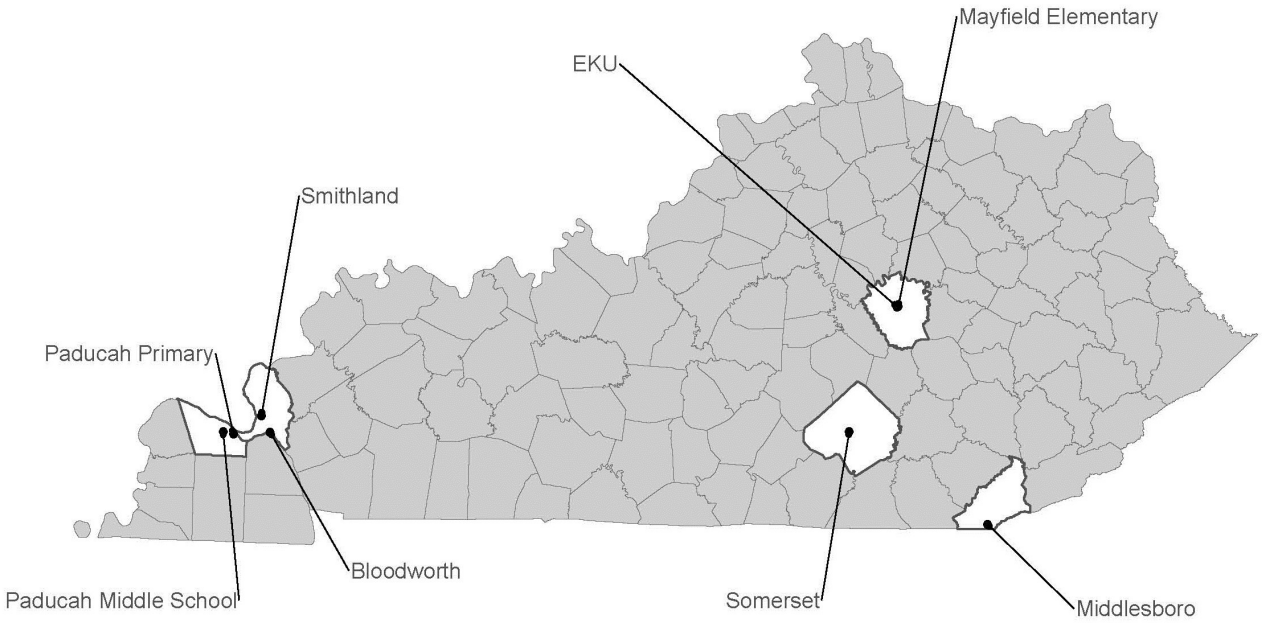
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

Urban Scale



Micropolitan Statistical Areas



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-013-0002	1420 Dorchester Avenue Middlesboro (Bell)	X						X						X
21-139-0003	706 State Drive Smithland (Livingston)							X						
21-139-0004	763 Bloodworth Road Smithland (Livingston)									X				X
21-145-1004	342 Lone Oak Road Paducah (McCracken)	X	X											
21-145-1024	2901 Powell Street Paducah (McCracken)	X(tI)		X(Pe)	X(eI)			X(eI)						
21-151-0003	300 Bond Street Richmond (Madison)	X							X(c)					
21-151-0005	Van Hoose Drive Richmond (Madison)								X					
21-199-0003	305 Clifty Street Somerset (Pulaski)	X						X(I)						
	TOTAL	5	1	1	1	0	0	4	3	1	0	0	0	2

(P) PWEI Monitor
(c) Collocated Monitor
(e) Emergency Episode Monitor
(t) Continuous PM Monitor

(Rev.5/5/13)

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, 1420 Dorchester Avenue, Middlesboro, KY 40965
County: Bell
GPS Coordinates: 36.60843, -83.73694 (NAD 83)
Date Established: February 14, 1992
Inspection Date: November 20, 2012
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. 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.

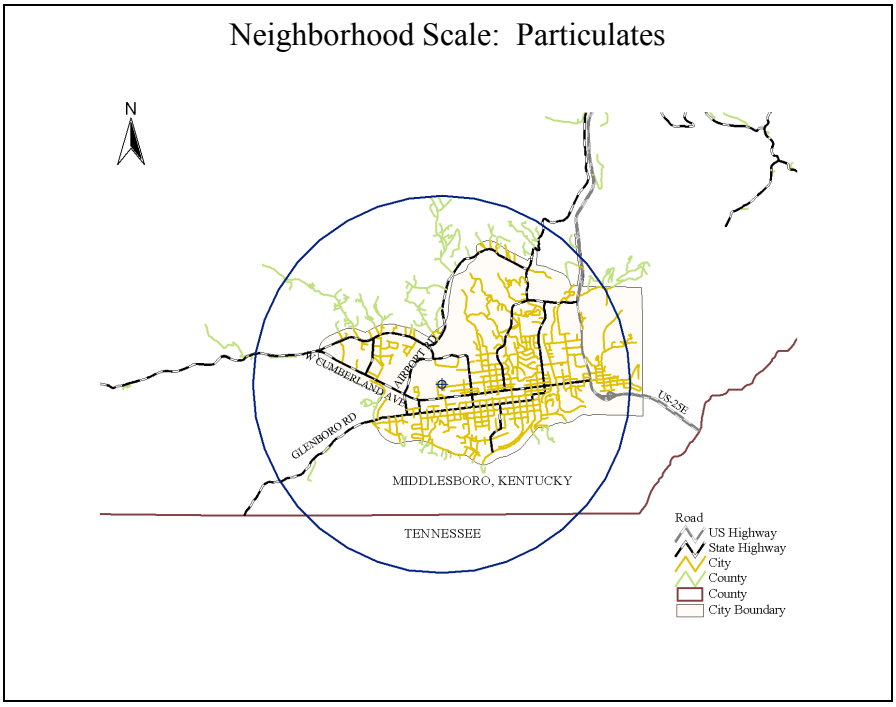
Monitoring Objective:
The monitoring objectives are to determine compliance with National Ambient Air Quality Standards and to provide information on the transport of ozone into the region. While not required for the CBSA, the site also provides pollutant levels for daily index reporting.

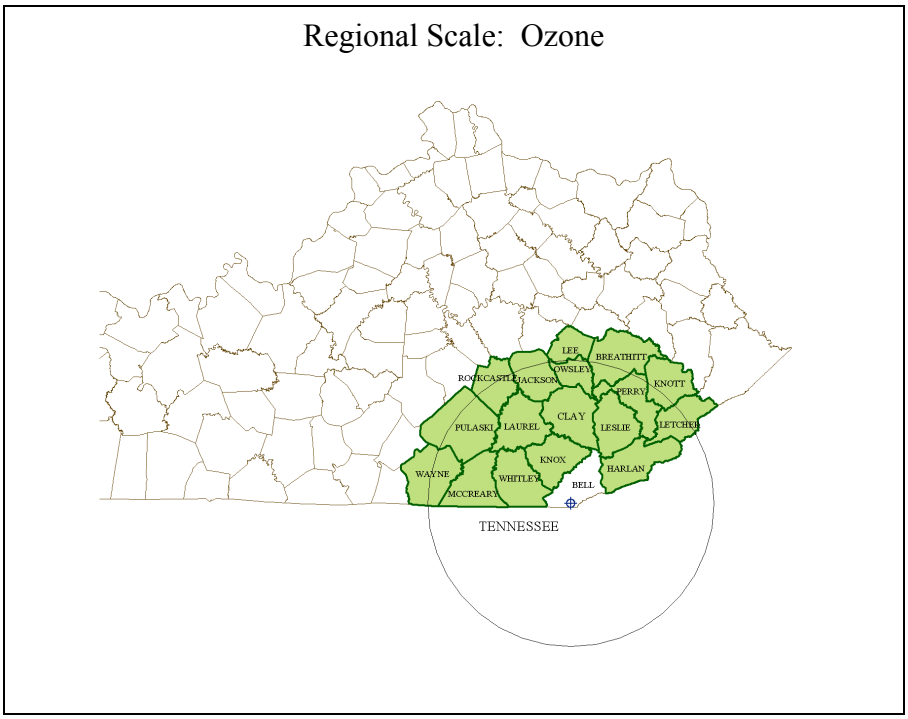
Monitors:

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: Livingston County Road Dept., 706 State Drive, Smithland, KY 42081
County: Livingston
GPS Coordinates: 37.155392, -88.394024 (NAD 83)
Date Established: April 1, 1988
Inspection Date: October 24, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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 Livingston County Road Dept. facility in Smithland, Kentucky. The sample inlets are 139 meters from the nearest road. 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. While not required for the CBSA, the site also provides ozone levels for daily index reporting.

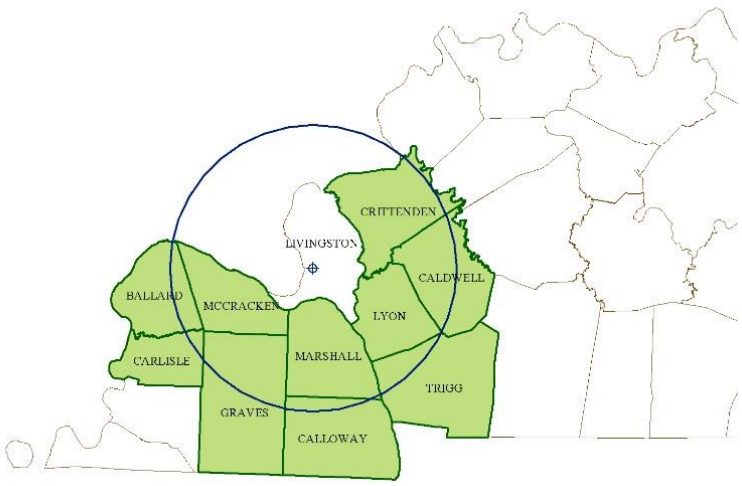
Monitors:

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.

Urban Scale



CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Bloodworth
AQS Site ID: 21-139-0004
Location: 763 Bloodworth Road, Smithland, KY 42081
County: Livingston
GPS Coordinates: 37.07151, -88.33389 (NAD 83)
Date Established: September 15, 1986
Inspection Date: December 1, 2011
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. Upon inspection, the inlet and sampler were found to be in good condition.

Monitoring Objective:
The monitoring objective is to detect and quantify volatile organic compounds in ambient air.

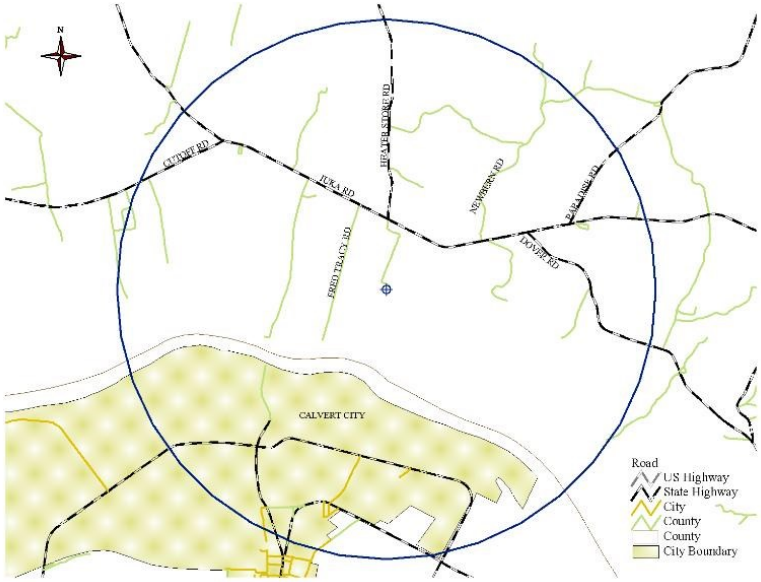
Monitors:

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.

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

Neighborhood Scale



CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Paducah Middle School
AQS Site ID: 21-145-1004
Location: 342 Lone Oak Road, Paducah, KY 42001
County: McCracken
GPS Coordinates: 37.06636, -88.63774 (NAD 83)
Date Established: July 1, 1969
Inspection Date: October 25, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. 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.

The Paducah Middle School has completed construction of a new building directly adjacent to the original school building. Since the original school building will be demolished, it was necessary to move the particulate samplers to the roof of the new building. The new location of the samplers is approximately 125 meters from the original location and, while siting criteria has not been evaluated, the change is not expected to impact monitoring objectives nor the monitoring scale. Samplers began operation at the new location in June 2013.

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

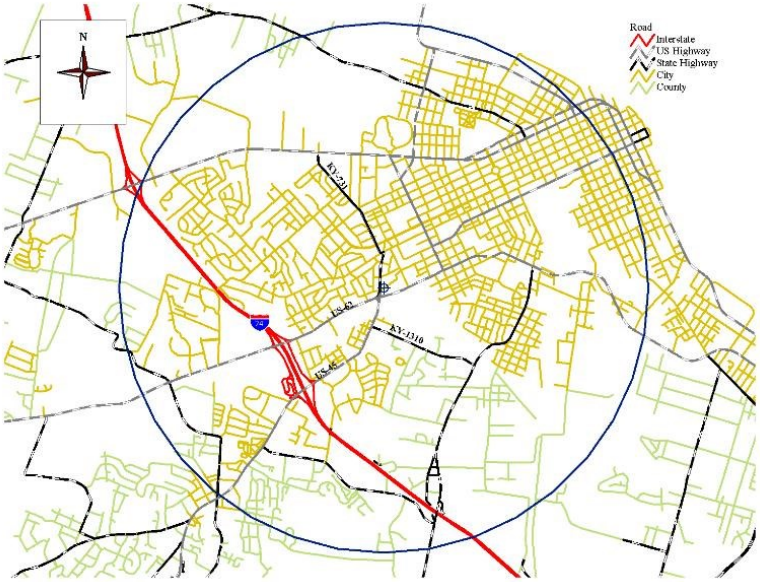
Monitors:

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

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

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

Neighborhood Scale



CSA/MSA: Paducah-Mayfield, KY-IL CSA / Paducah, KY-IL Micropolitan Statistical Area
401 KAR 50:020 Air Quality Region: Paducah-Cairo Interstate (072)
Site Name: Jackson Purchase-Paducah Primary
AQS Site ID: 21-145-1024
Location: Jackson Purchase RECC, 2901 Powell Street, Paducah, KY 42003
County: McCracken
GPS Coordinates: 37.05822, -88.57251 (NAD 83)
Date Established: August 15, 1980
Inspection Date: October 25, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
Site Approval Status: Site and monitors meet 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. Upon inspection, the sample inlets and monitors were found to be in good condition. The sample inlets are 9 meters from the nearest road, which is closer than the distances allowed by CFR. Due to the small traffic count of the street and the unlikely influence of vehicles on data, KDAQ has received EPA-approval for a waiver from the required road-distances stated by 40 CFR 58, Appendix E. Otherwise, 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 detect elevated pollutant levels for activation of emergency control procedures for nitrogen dioxide, ozone, and sulfur dioxide. The site also provides pollutant levels for daily air quality index reporting, but this is not required for the CBSA.

Monitors:

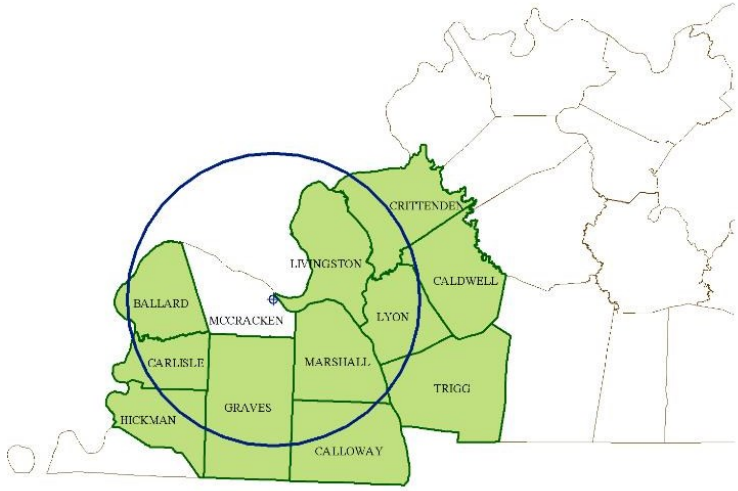
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Nitrogen Dioxide	3.7	SLAMS EPISODE	Chemiluminescence	Continuously
AEM Ozone	3.7	SLAMS AQI EPISODE	UV photometry	Continuously March 1 – October 31
$PM_{2.5}$ TEOM	4.8	SPM AQI	Tapered element oscillating microbalance,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

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

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

Neighborhood Scale: Ozone, Particulates, Sulfur Dioxide

Urban Scale: 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: Mayfield Elementary
AQS Site ID: 21-151-0003
Location: 300 Bond Street, Richmond, KY 40475
County: Madison
GPS Coordinates: 37.738458, -84.284952 (NAD 83)
Date Established: January 1, 1999
Inspection Date: October 17, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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.

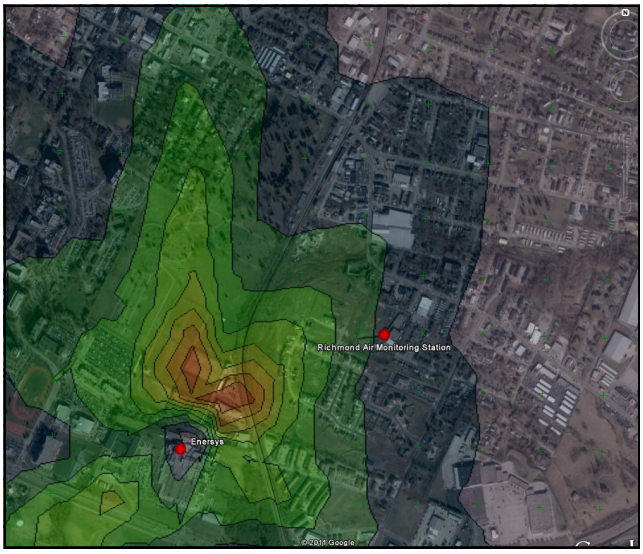
The monitoring site is located on the roof of the Mayfield Elementary School in Richmond, Kentucky. The sample inlets are 65 meters from the nearest road. Upon inspection, the sample inlet and monitor were found to be in good condition. The site meets the requirements of 40 CFR 58, Appendices A, C, D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

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

Monitors:

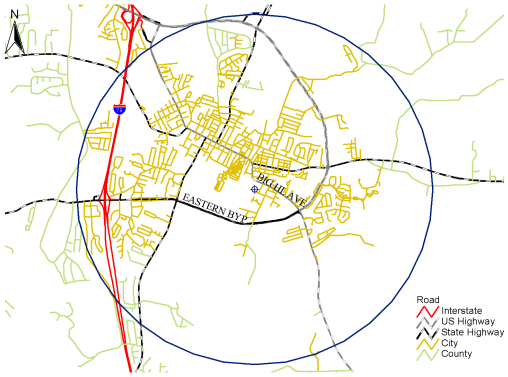
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM $PM_{2.5}$	5.5	SLAMS	Gravimetric	24-hours every third day
FRM Lead	4.5	SLAMS	High volume air sampler. Analysis via ICP-MS.	24-hours every sixth day
Collocated FRM Lead	4.5	SLAMS	High volume air sampler. Analysis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

Neighborhood Scale: Particulates



Neighborhood Scale: Lead (1 km)

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: EKU
AQS Site ID: 21-151-0005
Location: Eastern Kentucky University, Van Hoose Drive, Richmond, KY 40475
County: Madison
GPS Coordinates: 37.73635, -84.29169 (NAD 83)
Date Established: March 10, 2012
Inspection Date: October 17, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

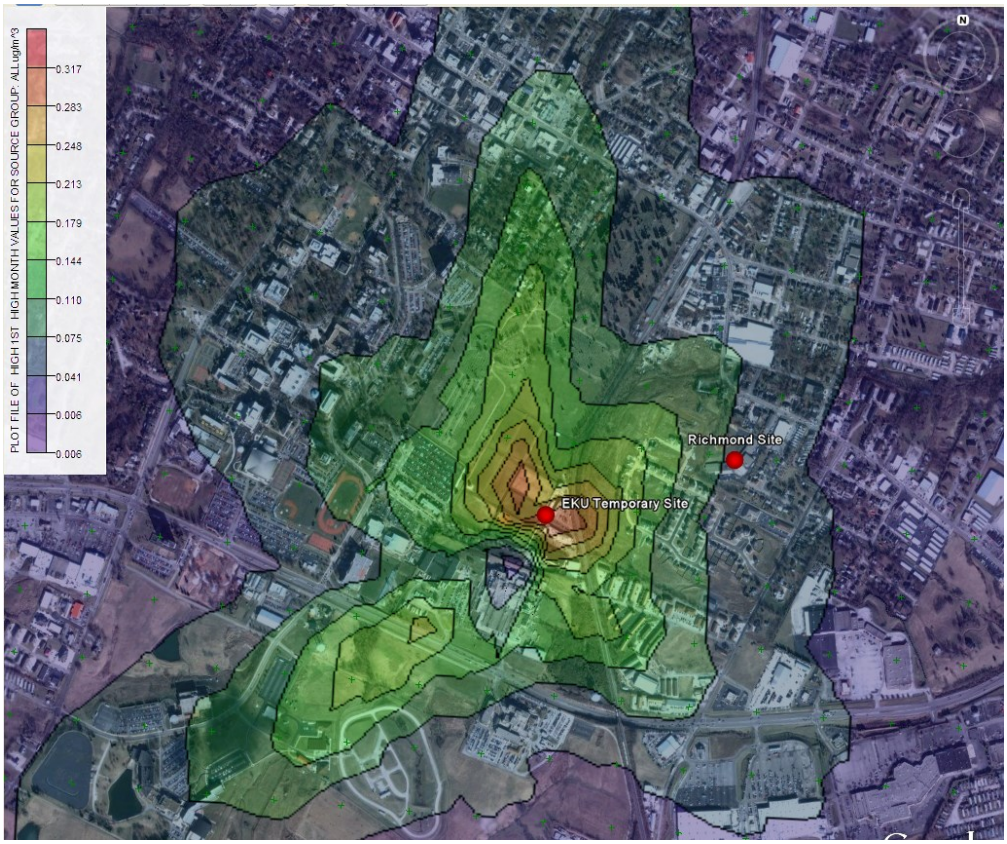
The EKU site was established as a temporary lead monitoring location to evaluate the adequacy of the Mayfield Elementary (21-151-0003) lead site, which is 0.64 km away. The monitoring site is located behind the Gentry Facilities Services building and is adjacent to Eastern Kentucky University's athletic fields. The sample inlets are 4.5 meters from the nearest road. 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:

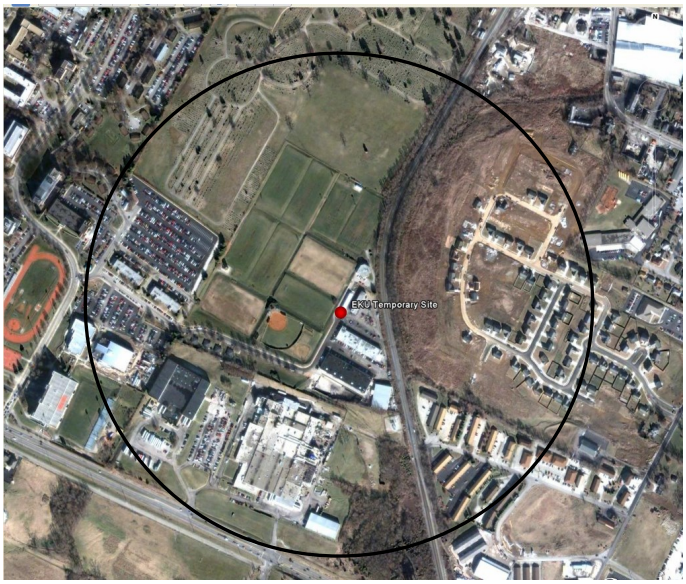
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
FRM Lead	2.3	SPM	High volume air sampler. Analysis via ICP-MS.	24-hours every sixth day

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



Area Representativeness:
This site represents source impacts on a middle scale for lead.

Middle Scale: Lead (0.5 km)



CSA/MSA: Somerset, KY Micropolitan Statistical Area
401 KAR 50:020 Air Quality Control Region: South Central Kentucky Intrastate (105)
Site Name: Somerset
AQS Site ID: 21-199-0003
Location: Somerset Gas Company Warehouse, 305 Clifty Street, Somerset, KY 42501
County: Pulaski
GPS Coordinates: 37.09798, -84.61152 (NAD 83)
Date Established: February 14, 1992
Inspection Date: November 16, 2012
Inspection By: Jennifer F. Miller, Ty Martin, & Anthony Bedel
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. 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. While not required for the CBSA, the site also provides levels of ozone for daily index reporting.

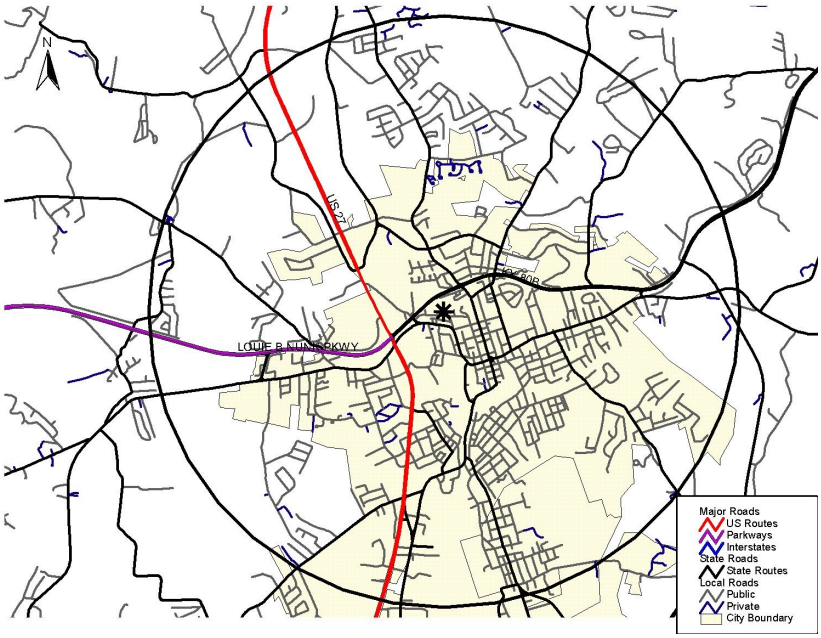
Monitors:

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

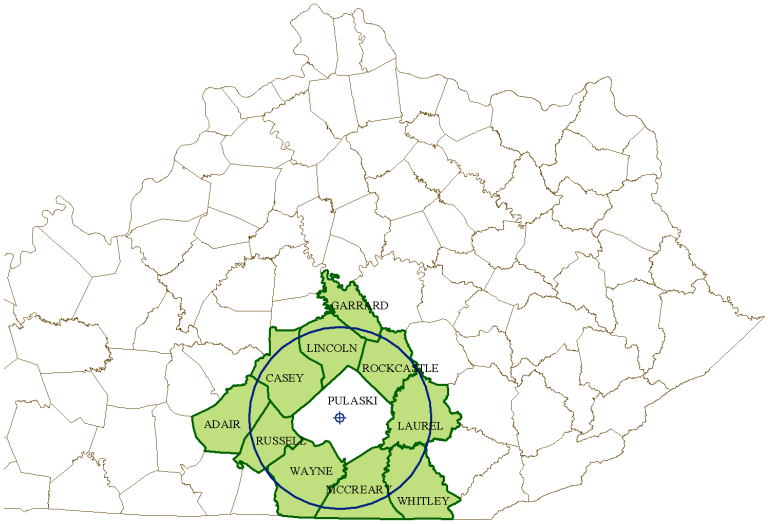
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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.

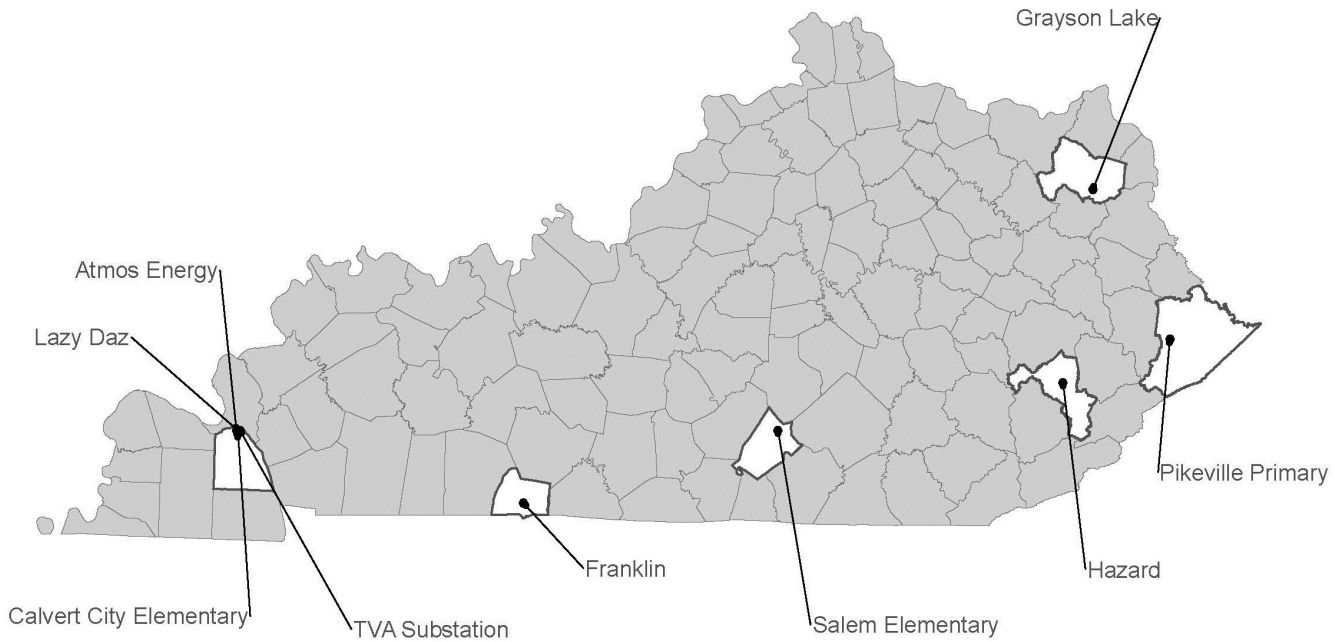
Neighborhood Scale: Particulates



Urban Scale: Ozone



Not in a Metropolitan or Micropolitan Statistical Area



AQS ID	ADDRESS	PM2.5	PM10	SO2	NO2	NOy	CO	O3	Pb	VOC	Carbonyl	Speciation	Radnet	Met
21-043-0500	1486 Camp Webb Road Grayson (Carter)	X	X(cm)					X		X(c)	X(c)	X		X
21-157-0014	Industrial Parkway Calvert City (Marshall)									X(c)				
21-157-0016	KY95 & Alabama Street Calvert City (Marshall)									X				
21-157-0018	563 East 5th Avenue Calvert City (Marshall)		X(m)							X				X
21-157-0019	4237 Gilbertsville Hwy Calvert City (Marshall)									X				
21-193-0003	354 Perry Park Road Hazard (Perry)	X(t)						X(eI)						X
21-195-0002	109 Loraine Street Pikeville (Pike)	X(cNR)						X						
21-213-0004	573 Harding Road (KY1008) Franklin (Simpson)							X						X
21-207-0001	1409 State Hwy 76 Russell Springs (Russell)								X					
	TOTAL	6	3	0	0	0	0	3	1	7	2	1	0	4

(c) Collocated Monitor
(s) Special Purpose Monitor
(t) Continuous PM Monitor
(NR) NR-SPM Continuous PM Monitor
(m) PM10 filter analyzed for metals

(Rev. 5/9/13)

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 Robert Webb, 1486 Camp Webb Road, Grayson Lake, KY 41143
County: Carter
GPS Coordinates: 38.23887, -82.98810 (NAD 83)
Date Established: May 13, 1981
Inspection Date: December 13, 2012
Inspection By: Jennifer F. Miller & Anthony Bedel
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. 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 PM_{10}; 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. While not required, the site also provides ozone levels for daily index reporting.

Monitors:

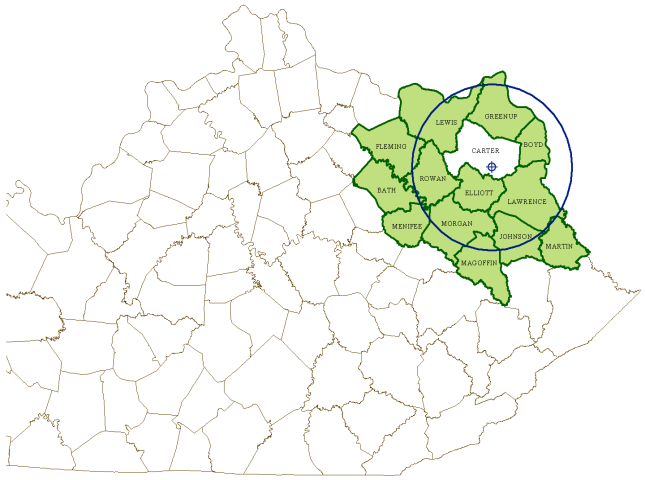
Monitor Type	Inlet Height (meters)	Designation	Analysis Method	Frequency of Sampling
AEM Ozone	4.0	SPM AQI	UV photometry	Continuously March 1 – October 31
FEM $PM_{2.5}$	3.2	SLAMS	Gravimetric	24-hours every third day
$PM_{2.5}$ Speciation	4.5	SLAMS	Ion chromatography and X-ray fluorescence	24-hours every 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
- Metals PM_{10}		NATTS	Determined from the PM_{10} samples using EPA method IO 3.5	Same as PM_{10}
Collocated PM_{10}	3.2	SLAMS	Gravimetric	24-hours every twelfth day
- Collocated metals PM_{10}		NATTS	Determined from the PM_{10} samples using EPA method IO 3.5	24-hours; six samples per year

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; six 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; six samples per year
Meteorological	7.5 4.7	Other	AQM grade instruments for wind speed, wind direction, relative humidity, and temperature Solar Radiation	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 air toxics. This site also represents upwind/background levels on an urban scale for ozone.

Urban Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: Paducah – Cairo Interstate (072)
Site Name: TVA Substation
AQS Site ID: 21-157-0014
Location: Plant Cutoff Road & Industrial Parkway, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.04520, -88.33087 (NAD 83)
Date Established: January 1, 2005
Inspection Date: October 25, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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 inlets are approximately 230 meters from the nearest road. Upon inspection, the sample inlets and monitors were found to be in good condition.

Due to plans to expand the compound of the TVA electrical substation, the samplers were relocated in June 2013. The new location is approximately 20 meters northwest from the original location and is still along the fence-line of the compound.

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

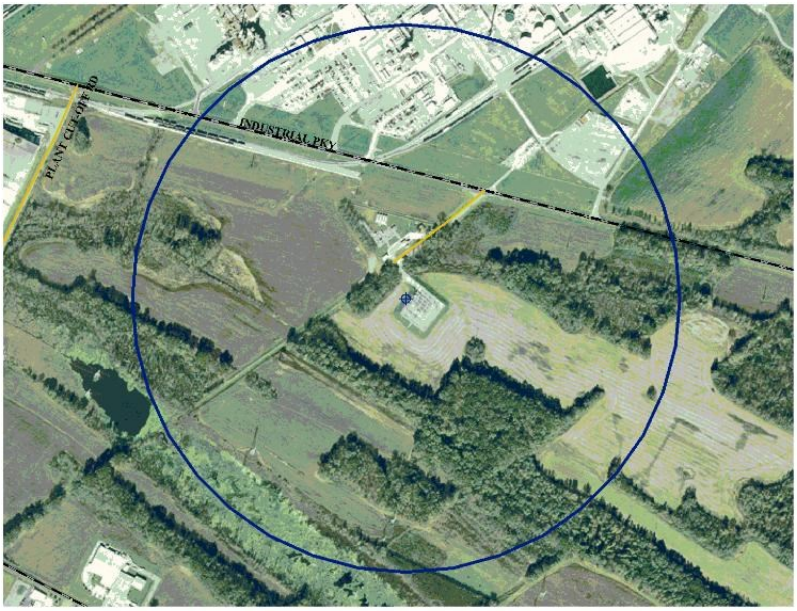
Monitors:

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 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 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 Energy
AQS Site ID: 21-157-0016
Location: KY95 & Alabama Street, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.04176, -88.35407 (NAD 83)
Date Established: January 1, 2005
Inspection Date: October 24, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
Site Approval Status: Site and monitor meet all design criteria for the monitoring network.

The monitoring site is an air toxics monitor location near the corner of Alabama Street and KY95 in Calvert City, Kentucky. The sample inlet is 2 meters above ground level and 43 meters from the nearest road. 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.

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: 563 East 5th Avenue, Calvert City, KY 42029
County: Marshall
GPS Coordinates: 37.02702, -88.34387(NAD 83)
Date Established: May 1, 2005
Inspection Date: October 24, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. 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.

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 (NAD 83)
Date Established: September 15, 2007
Inspection Date: October 24, 2012
Inspection By: Jennifer F. Miller & Shauna Switzer
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. Upon inspection, the sample inlet and monitor were found to be in good condition.

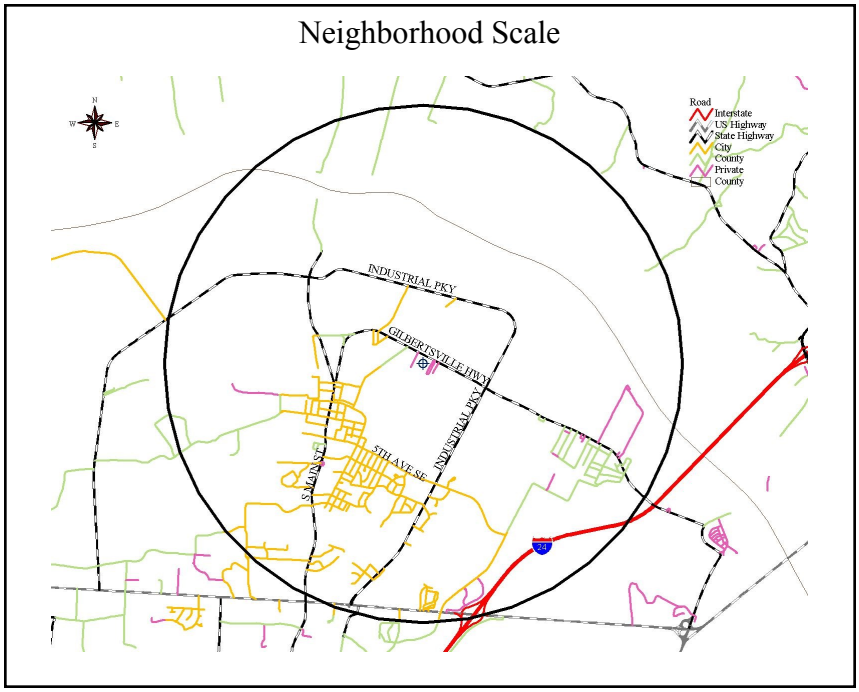
Monitoring Objectives:
The monitoring objectives are to detect and quantify air toxic pollutants.

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, 354 Perry Park Road, Hazard, KY 41701
County: Perry
GPS Coordinates: 37.28329, -83.20932 (NAD 83)
Date Established: April 1, 2000
Inspection Date: November 28, 2012
Inspection By: Jennifer F. Miller & Ty Martin
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. 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. While not required, the site also provides pollutant levels for daily index reporting.

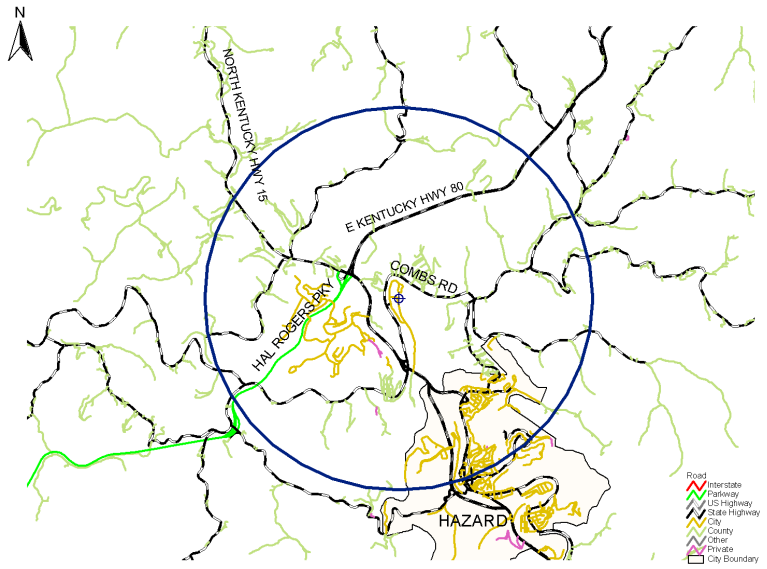
Monitors:

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
FRM $PM_{2.5}$	3.2	SPM	Gravimetric	24-hours every sixth day
$PM_{2.5}$ 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.

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: KYTC District Office, 109 Loraine Street, Pikeville, KY 41501
County: Pike
GPS Coordinates: 37.48260, -82.53532 (NAD 83)
Date Established: May 1, 1994
Inspection Date: November 28, 2012
Inspection By: Jennifer F. Miller & Ty Martin
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 KYTC District Office building in Pikeville, KY. The sample inlets are 88 meters from the nearest road. 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. While not required, the site also provides pollutant levels for daily index reporting.

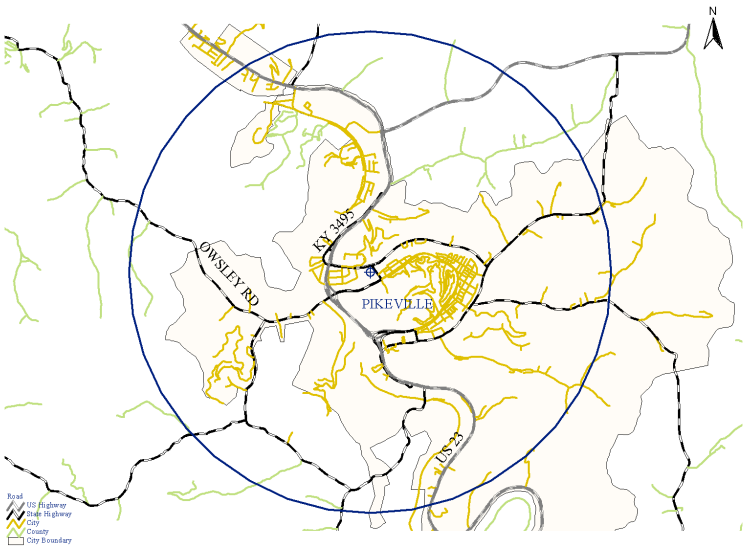
Monitors:

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 third day
Collocated FRM $PM_{2.5}$	4.7	SLAMS	Gravimetric	24-hours every sixth day
FEM $PM_{2.5}$ BAM	4.7	NR-SPM AQI	Beta Attenuation Mass Monitor	Continuously

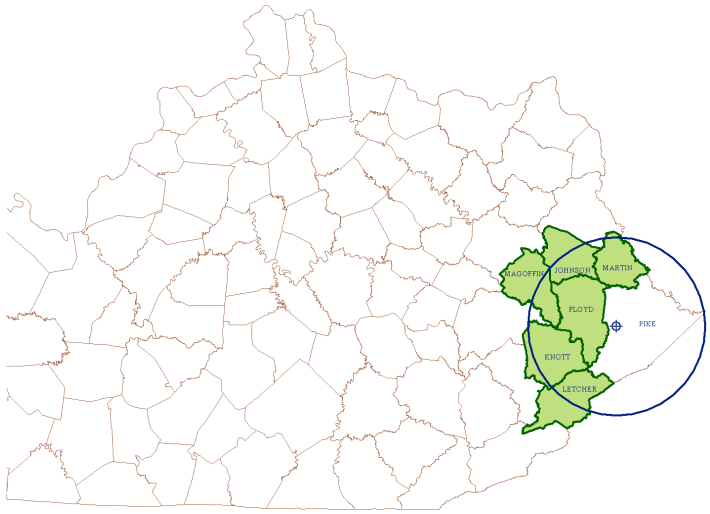
Quality Assurance Status:
All Quality Assurance procedures have been implemented in accordance with 40 CFR 58, Appendix A.

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

Neighborhood Scale: Particulates



Urban Scale: Ozone



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: KYTC Maintenance Facility, 573 Harding Road (KY1008), Franklin, KY 42134
County: Simpson
GPS Coordinates: 36.708607, -86.566284 (NAD 83)
Date Established: June 19, 1991
Inspection Date: August 7, 2012
Inspection By: Jennifer F. Miller & Ashley Ginn-Dillion
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 KYTC Garage on Harding Road (KY1008) in Franklin, Kentucky. The sample inlet is 39 meters from the nearest road. 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. While not required, the site also provides ozone levels for daily index reporting.

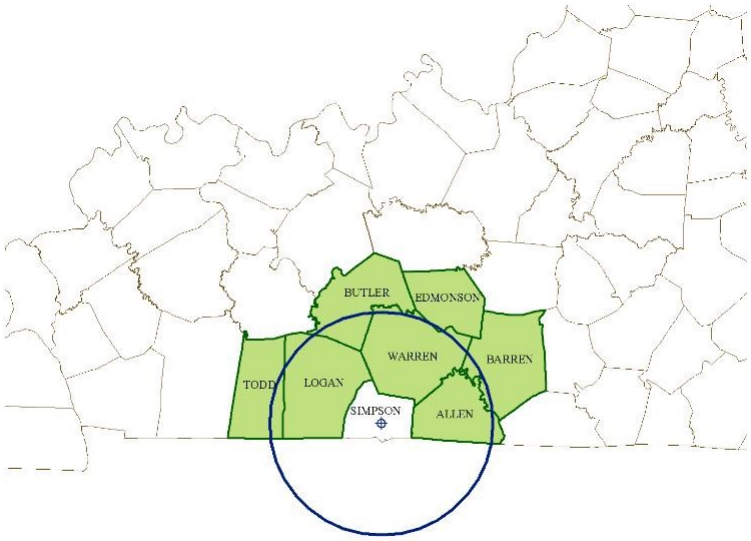
Monitors:

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

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

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

Urban Scale



CSA/MSA: Not in a MSA - Rural
401 KAR 50:020 Air Quality Control Region: South Central Kentucky Intrastate (105)
Site Name: Salem Elementary
AQS Site ID: 21-207-0001
Location: Salem Elementary School, 1409 State Highway 76, Russell Springs, KY 42642
County: Russell
GPS Coordinates: 37.06944; -84.98925 (NAD 83)
Date Established: January 1, 2010
Inspection Date: November 16, 2012
Inspection By: Jennifer F. Miller, Ty Martin, & Anthony Bedel
Site Approval Status: Site and monitors meet all design criteria for the monitoring network.

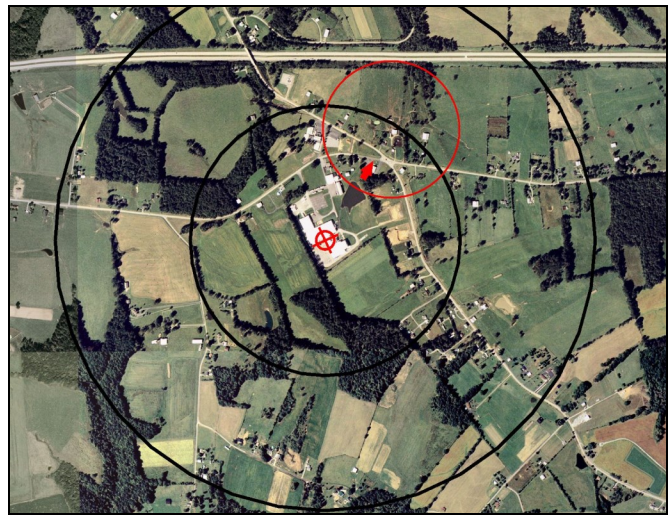
Superior Battery, located in Russell Springs, Kentucky, was identified as a lead source emitting over 1 tons per year of actual reported emissions in 2006. In accordance with 40 CFR Part 58 Appendix D, a lead source monitoring site is located at the Salem Elementary School in Russell Springs, Kentucky. 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 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 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 micro scale for lead.

Micro Scale

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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/NO2	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

RESPONSIBLITIES/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 HCDOES. 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 John S. Lyons

TITLE: Director, Division for Air Quality

DATE: 5/13/10

Hamilton County Department of Environmental Services

BY: Cory Chadwick Cory R. Chadwick

TITLE: Director

DATE: 5/13/10

Indiana Department of Environmental Management
Office of Air Quality

BY: Keith Baugues Keith Baugues

TITLE: Assistant Commissioner, Office of Air Quality

DATE: 5/14/10

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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

RESPONSIBLITIES/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

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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

RECEIVED
OCT 31 2007
DIRECTOR'S OFFICE
DIVISION FOR AIR QUALITY

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

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,

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

BRS/erb
cc: Beverly Banister, US EPA Region IV

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

RECEIVED
OCT 31 2007
DIRECTOR'S OFFICE
DIVISION FOR AIR QUALITY

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

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,

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

BRS/erb
cc: Beverly Banister, US EPA Region IV

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APPENDIX D

NEAR-ROAD MONITORING

Appendix D
Part A-Near-Road Monitoring

On February 9, 2010, the EPA released a new NO_2 Final Rule and a new set of monitoring requirements. Under the new monitoring requirements, State and Local agencies are required to establish NO_2 near-road monitoring stations based upon core based statistical area (CBSA) populations and traffic metrics.

Specifically, the final rule requires:

- 1 near-road monitor in CBSAs with populations greater than or equal to 500,000; and
- 2 near-road monitors in CBSAs with populations greater than or equal to 2,500,000.

Additionally, the final rule requires:

- 2 near-road monitors for any road segment that has an annual average daily traffic (AADT) count of 250,000 or more.

Based upon population estimates and AADT counts, near-road monitors are required in the following CBSAs:

CBSA Name (500,000 or more people)	2012 CBSA Population Estimate*	Highest Road Segment 2-Way AADT for CBSA**	Number of Monitors Required in CBSA
Cincinnati-Middletown, OH-KY-IN	2,128,603	163,000	1
Louisville-Jefferson County, KY-IN	1,251,351	171,000	1

*Source: US Census Bureau, 2012 Population Estimates (Last accessed: April 23, 2013)

**Sources: Ohio-Kentucky-Indiana Regional Council of Governments; Kentuckiana Regional Planning Development Agency (Analysis originally performed in 2012.)

In March 2013, the EPA finalized the use of a "phased" approach for establishing NO_2 near-road monitoring sites across the Nation. The phased approach necessitates:

- One required near-road monitor in CBSAs with a population of 1,000,000 or more must be established by January 1, 2014.
- Any second required near-road monitor in CBSAs that have a population greater than 2,500,000, or have a population of 500,000 or greater and have a traffic segment with an AADT of 250,000 or more, must be established by January 1, 2015.
- Required sites in remaining CBSAs with populations of 500,000 or more must be established by January 1, 2017.

Similarly, the EPA revised the $PM_{2.5}$ NAAQS and monitoring rule on December 14, 2012. The new rule requires $PM_{2.5}$ monitoring to be established at near-road sites for any CBSA with a population of one-million or greater. Required $PM_{2.5}$ monitors must be established for any CBSA with a population of 2,500,000 or more by January 1, 2015. CBSAs with a population between 1,000,000-2,500,000 must establish the required $PM_{2.5}$ monitors by January 1, 2017.

Ultimately, near-road sites are intended to be multi-pollutant sites. These sites will be used to characterize the impacts vehicle exhaust and traffic patterns on public health.

Determination of the final locations of near-road monitoring locations was a cooperative effort between multiple State and Local Agencies. Potential near-road sites were evaluated using the following additional criteria:

- Fleet mix
- Roadway design
- Traffic congestion patterns
- Local topography
- Meteorology
- Population exposure
- Employee and public safety
- Site logistics

The requirement for a near-road site in the Cincinnati-Middletown, OH-KY-IN will be fulfilled by a Memorandum of Agreement (MOA). The site will be located in Ohio and will be operated by the Southwest Ohio Air Quality Agency

The near-road site in the Louisville-Jefferson County, KY-IN MSA will be operated by the Louisville Metro Air Pollution Control District (LMAPCD). LMAPCD submitted their proposed site location for a 30-day public comment period on March 8, 2013. The full proposal, along with a response to comments, is included in Parts B & C of this Appendix.

Appendix D
Part B-LMAPCD Near-Road Proposal

Proposal for a New Ambient Air Monitoring Station for the Near-Road Environment Louisville, Kentucky

Louisville Metro Air Pollution Control District
Air Monitoring Unit
850 Barret Avenue
Louisville Kentucky 40204

Near-road Multi-pollutant Ambient Air Monitoring Station

On February 9, 2010, EPA promulgated new minimum monitoring requirements for the nitrogen dioxide (NO_2) monitoring network in support of a newly revised 1-hour NO_2 National Ambient Air Quality Standards (NAAQS) and the retained annual NAAQS. In the new monitoring requirements, state and local air monitoring agencies are required to install near-road NO_2 monitoring stations at locations where peak hourly NO_2 concentrations are expected to occur within the near-road environment in larger urban areas. State and local air agencies are required to consider traffic volumes, fleet mix, roadway design, traffic congestion patterns, local terrain or topography, and meteorology in determining where a required near-road NO_2 monitor should be placed. In addition to those required considerations listed above, there are other factors that impact the selection and implementation of a near-road monitoring station including satisfying siting criteria, site logistics (e.g., gaining access to property and safety), and population exposure. The establishment of near-road NO_2 monitoring stations will create an infrastructure that will likely be capable of housing other ambient air monitoring equipment. Considering placement of the near-road NO_2 monitoring stations for multi-pollutant monitoring, even though it may not be required, matches with the Environmental Protection Agency's multi-pollutant paradigm, presented in the *Ambient Air Monitoring Strategy for State, Local, and Tribal Air Agencies* *http://www.epa.gov/ttnamti1/files/ambient/monitorstrat/AAMS%20for%20SLTs%20%20-%20FINAL%20Dec%202008.pdf*d published in 2008, and has been noted within documents associated with the NO_2 NAAQS revision of 2010 and the carbon monoxide (CO) NAAQS review of 2011. The intent of the multi-pollutant paradigm is to encourage the integration of multiple individual pollutant monitoring networks to broaden the understanding of air quality conditions and pollutant interactions, furthering the ability to evaluate air quality models, develop emissions control strategies, and support long-term scientific studies (including health studies).

Site Selection Process:

The Louisville Metro Air Pollution Control District (LMAPCD) created comparison matrices for many potential locations for a near-road monitoring station based on the Near-Road NO_2 Monitoring Technical Assistance Document from the United States Environmental Protection Agency (EPA). Many locations were discarded due to unsafe conditions, obstructions, or inadequate infrastructure. Two ideal locations were selected and toured by EPA Region 4 and EPA Science and Ecosystems Support Division representatives. LMAPCD was denied permission to place the site at one these locations and thus has determined that a property currently owned by the Kentucky Department of Transportation (KYTC) is the most ideal placement of the near-road site. The property is part of the electrical maintenance facility operated by KYTC at 1517 Durrett Lane, Louisville, Kentucky 40213. This area is located directly along the north side of Interstate 264 at latitude 38.1935 and longitude -85.7121. (Images 1 & 2). The proposed location is a small frontage area between the electrical maintenance facility and Durrett Lane. Durrett Lane as well as the proposed site location is part of the federal right of way

of the interstate. Due to this, LMAPCD must obtain a permit before site implementation can occur. Also attached is the proposed work plan for site implementation. LMAPCD requests EPA approval to implement the near-road multi-pollutant ambient air monitoring station for Louisville, KY at this location.

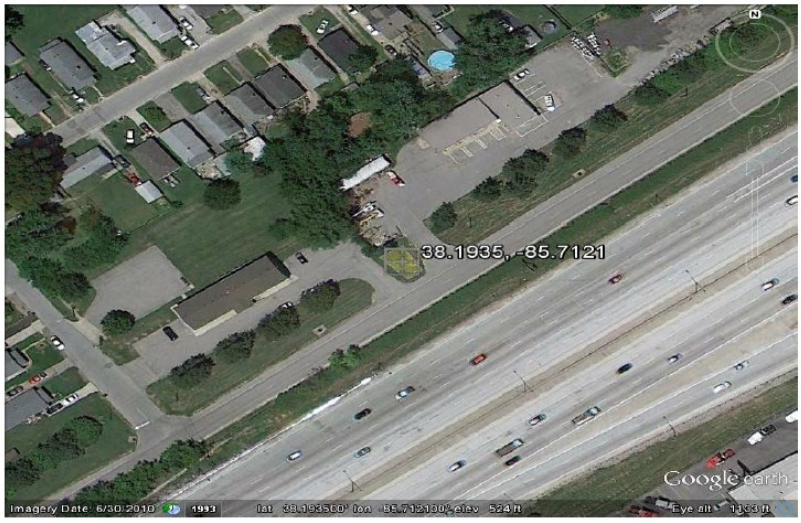


Image 1: Aerial photo of proposed site location – 1517 Durrett Lane, 0.90 miles north of the I-264/I-65 interchange.

Image 2: Zoomed aerial photo of proposed site location.

Near-Road Air Monitoring Station Site

- **Siting** - The site for this air monitoring station allows for conformity with siting requirements for ambient air monitors listed in 40 CFR Part 58 Appendix E including the following criteria listed as key to the Near-Road application:

Near-Road NO_2 Siting Criteria (per 40 CFR Part 58, Appendix E)	
Horizontal spacing	According to 40 CFR Part 58 Appendix E: "As near as practicable to the outside nearest edge of the traffic lanes of the target road segment; but shall not be located at a distance greater than 50 meters, in the horizontal, from the outside nearest edge of the traffic lanes of the target road segment." **This TAD recommends that the target distance for near-road NO_2 monitor probes be within 20 meters of the target road whenever possible.**
Vertical spacing	Microscale near-road NO_2 monitoring sites are required to have sampler inlets between 2 and 7 meters above ground level.
Spacing from supporting structures	The probe must be at least 1 meter vertically or horizontally away from any supporting structure, walls, parapets, penthouses, etc., and away from dusty or dirty areas.
Spacing from obstructions	For near-road NO_2 monitoring stations, the monitor probe shall have an unobstructed air flow between the monitor probe and the outside nearest edge of the traffic lanes of the target road segment, where no obstacles exist at or above the height of the monitor probe.

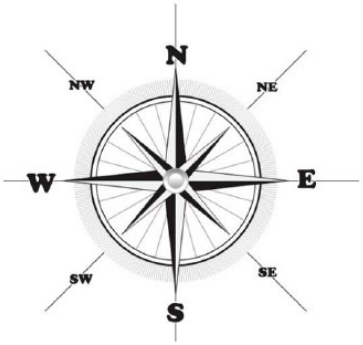
LMAPCD estimates that horizontal distance from the probes to the nearest edge of the target road segment to be 25 to 28 meters.

- **Proposed AQS Site ID**: 21-111-0075.

- **Street Address and Coordinates**: 1517 Durrett Lane, Louisville, KY. Latitude 38.1935 and Longitude -85.7121.

- **Target Road Segment**: Interstate 265 - from Interstate 65 to Poplar Level Rd.

- **Site Photos:**


N
NE
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W
NW

- **Distance from probe to edge of target road**: Approximately 27 meters.

- **Property Description**: Property owned by the Kentucky Department of Transportation. Proposed site location is a small flat grass lot in front of the KYTC electrical maintenance facility. Area would provide easy access and operator safety. Site implementation is contingent on approval by the United States Department of Transportation.

Image 3: Frontal view of the potential site plot.

- **Roadway Design**: Interstate 265 runs east/west. The proposed site location is on the north side of the interstate.

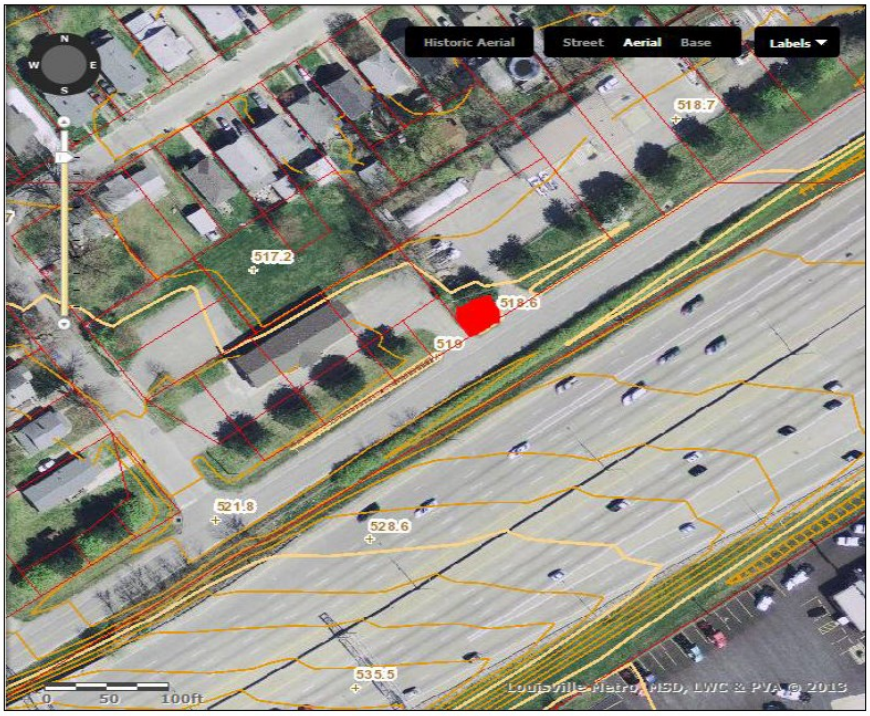


Image 4: Terrain and elevation of the roadway. The area shaded red is the proposed location.

- **Presence of roadside structures:** There are three small trees on the area where the site is proposed. These trees would be removed. Also, between the site location and the Interstate is a wire fence approximately 10 feet tall. Along this fence a hedge is growing to shield headlights from Durrett Lane. KYTC has given initial permission to trim and maintain this hedgerow at the height of the fence. Probe placement would be above the level of this hedgerow.

- **Windrose:**

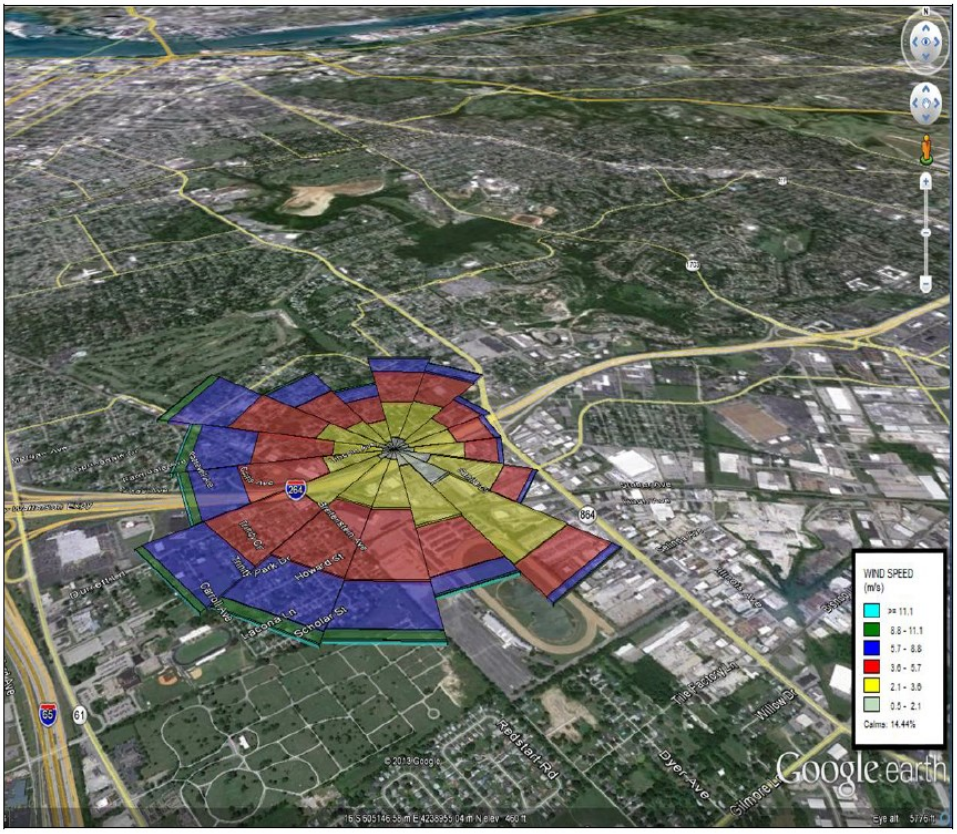


Image 5: Windrose is centered directly on proposed site location (38.1935, -85.7121). Surface wind data from Louisville International Airport 2007-2011.

- **Traffic Data/Ranking**:

TRAFFIC VOLUME / CHARACTERISTICS									
Roadway	From	To	AADT	AADT Rank	HDV AADT	HDV AADT Rank	FE-AADT	FE-AADT Rank	LOS
I-65	Grade Lane area	I-264	171000	1	25,000	1	396,000	1	F
I-65	KY 1631 (Fern Valley)	Grade Lane area	157000	4	22,126	3	356,134	2	D
I-65	KY 1065 (Outer Loop)	KY 1631 (Fern Valley)	149000	8	22,600	2	352,400	3	E
I-65	I-265	KY 1065 (Outer Loop)	129000	15	18,900	4	299,100	4	C
I-65	Eastern Parkway	Broadway overpass	130055	13	18,000	6	292,055	5	F
I-65	I- 64	Indiana State Line	121000	16	18,750	5	289,750	6	D
I-65	I-264	Eastern Parkway	130000	14	15,808	7	272,272	7	D
I-264	I- 65 / KY 61 (Preston Hwy)	KY 864 (Poplar Level Rd)	163,000	2	9,400	19	247,600	8	D
I-64	I-65	I-71	144,000	11	11,300	14	245,700	9	F
I-264	KY 864 (Poplar Level Rd)	KY 1703 (Newburg Rd)	158,000	3	9,200	20	240,800	10	E
I-65	Indiana State Line	10th Street	99700	20	15,450	8	238,750	11	D
I-264	KY 1703 (Newburg Rd)	US 31E / US 150 (Bardstown Rd)	155,069	5	9,190	21	237,779	12	D
I-264	KY 1932 (Breckenridge Ln)	I- 64	148,000	9	9,600	18	234,400	13	D
I-264	US 31E / US 150 (Bardstown Rd	KY 155 (Taylorsville Rd)	152,000	6	9,100	22	233,900	14	D
I-64	I-264	Hurstbourne Pkwy.	152,000	7	8,870	24	231,830	15	E
I-264	KY 1631 (Crittenden Dr)	I- 65 / KY 61 (Preston Hwy)	133,000	12	10,906	16	231,154	16	F
I-65	Bullitt Co. / Jefferson Co. Line	I-265	98100	22	14,450	9	228,150	17	C

Image 6: Traffic Data obtained from the Kentuckiana Regional Planning & Development Agency in 2012.

- **Sampling and Analysis Methods**:

  Nitrogen Dioxide - Teledyne - Advanced Pollution Instrumentation, Inc. Model 200EUP (Automated Equivalent Method: EQNA-0512-200) or equivalent.

  Carbon Monoxide - Teledyne Advanced Pollution Instrumentation, Inc. Model T300U (Automated Reference Method: RFCA-1093-093) or equivalent.

  Black Carbon – Teledyne Model 633 Aethalometer or equivalent.

  Meteorological Measurements – Wind direction and speed, temperature, humidity.

- **Operating Schedules** - All instrumentation initially installed at the Near Road Site will run continuously and produce hourly averages.

- **Monitoring Objective and Spatial Scale** - The monitoring objective for near-road monitoring is maximum concentration and representative of the neighborhood scale.

- **Area Represented –** The area represented by this near-road monitoring site would be the Louisville/Jefferson County, KY-IN Metropolitan Statistical Area.

Response to Public Comment on Proposed Near-Road Multi-Pollutant Monitoring Station

Friday April 26, 2013

Comment:

I live in St Regis Park & my property is adjacent to the ramp from I264E to I64E. I would welcome an air pollution monitor here! The Upper Highlands Swim Club parking lot is next to my property & would also be good, although slightly less sooty. The presence of two curves on the ramp results in engine acceleration & braking - conditions provoking more emissions. There is a prolonged 3/4 mile uphill grade on I64E leading to overpass at I264, followed by shorter downhill grade; there is a shorter uphill &downhill grade at I64W overpass at I264. These grades, esp. I64E definitely add to engine stress and emissions, most noticeable with tractor trailers, dump trucks, etc. It is inherent in the design of a diesel engine that anytime there is a load shift (change in speed, change in grade & resultant engine stress) -then there will be increased diesel emissions. This should definitely be considered in placement of air quality monitor. Less congested areas, flatter terrain allows for vehicles to travel at more even speed & thus emissions should be less. Hurstbourne Ln/I64 may also be good site as it is "downwind" from I64/I264 interchange, + has a lot of traffic idling at traffic lights. Further east on I64, or on I265 should have less emissions as there is less traffic and less acceleration/braking. Thank-you for allowing public input on this issue.

- Barbara Woerner

Response:

As required, LMAPCD exclusively used the Near-road NO2 Monitoring Technical Assistance Document (TAD) provided by the United States Environmental Protection Agency to systematically find a suitable placement for this monitoring site. The TAD methodically outlines a very detailed approach to find a location for the Near-road NO2 site. Selection criteria includes annual average daily traffic, heavy duty traffic, traffic congestion, road design, terrain, meteorology, population exposure, safety, and access.

- Louisville Metro Air Pollution Control District

APPENDIX E

INTENDED USE OF CONTINUOUS $PM_{2.5}$ FEMs

Appendix E
Part A-Intended Use of Continuous $PM_{2.5}$ FEMs

Historically, continuous $PM_{2.5}$ monitors that are designated as Federal Equivalent Methods (FEMs) have been excluded from comparisons to the $PM_{2.5}$ NAAQS, as long as these monitors were specified as non-regulatory special-purpose monitors (NR-SPMs). Data from these monitors was used for reporting of the AQI. Monitors could remain designated as NR-SPMs for a period of two years of operation at each site. However, after that two-year period, the data was eligible for comparison to the NAAQS, regardless of monitor-type designation.

In December 2012, a new PM NAAQS and set of monitoring rules were finalized. These new monitoring rules amended the previous requirement to compare all data from FEMs collected after a period of two-years to the NAAQS. Instead, agencies could operate a continuous $PM_{2.5}$ FEM for longer than two years and could elect to exclude the data from NAAQS-comparisons, provided that the monitor did not meet certain performance specifications. Data from monitors established for less than two years and designated as NR-SPM remain ineligible for attainment decisions. Specifically, the final rule allows certain continuous $PM_{2.5}$ FEM data to be excluded if:

- the monitor does not meet performance criteria when compared to the data collected from collocated Federal Reference Methods (FRMs);
- the monitoring agency requests exclusion of data; and,
- the EPA Regional Office approves exclusion of the data.

Regardless of whether an exclusion is sought, each agency must address the use of all continuous $PM_{2.5}$ FEMs in the network. Additionally, each monitor must be properly referenced by a set of parameter codes, primary monitor designations, and monitor-types.

At the time of publication, KDAQ operated two Met-One BAM 1020 continuous $PM_{2.5}$ FEMs located at the Pikeville Primary (21-195-0002) and Elizabethtown sites (21-093-0006). However, KDAQ plans to discontinue the Elizabethtown monitor by August 30, 2013. All data collected from KDAQ monitors are designated as NR-SPM and are not operated for a period longer than two years. LMAPCD operates three Met-One BAM 1020 continuous $PM_{2.5}$ FEMs at the Southwick Community Center (21-111-0043), Watson Lane (21-111-0051), and Cannons Lane (21-111-0067) sites. While all of these monitors are also designated as NR-SPMs, the Cannons Lane monitor has been operating for a period longer than two years. Thus, LMAPCD has prepared an application for the exclusion of this data from comparison to the NAAQS. This application is included in Part B of this Appendix. Until the time of approval, the Cannons Lane monitor will continue to be designated as an NR-SPM and will use the same parameter code. Thus, all continuous $PM_{2.5}$ FEMs operated by KDAQ and LMAPCD are classified as follows:

Scenario	Parameter Name	Parameter Code	Pollution Occurrence Code (POC)	Monitor Type	Primary Monitor (Collocation)	Used for substitutions of missing primary data?	Used for NAAQS Comparisons?	Eligible for AQI?
$PM_{2.5}$ Continuous FEM is being tested and is less than 24 months old; FRM is retained as the Primary Monitor.	PM2.5 Local Conditions	88101	3	SPM and Non-Regulatory	FRM	No	No, if discontinued within 24 months of start-up	Yes

Appendix E

Part B-LMAPCD Application for Exclusion of Certain $PM_{2.5}$ Continuous FEM Data from Comparison to the NAAQS

APPLICATION FOR EXCLUSION OF CERTAIN $PM_{2.5}$ CONTINUOUS FEM DATA FROM COMPARISON TO THE NAAQS:

Introduction:

The monitoring program of the Louisville Metro Air Pollution District has historically operated $PM_{2.5}$ continuous monitors primarily to support forecasting and reporting of the Air Quality Index (AQI). These monitors supply data every hour to update the AQI on our web site as well as on national web sites such as AIRNow (www.airnow.gov). With awards of an EMPACT grant and additional $PM_{2.5}$ monies, we have been using these monitors since the early part of the last decade as we implemented the $PM_{2.5}$ monitoring program. Over the last few years, a number of $PM_{2.5}$ continuous monitors have been approved as Federal Equivalent Methods (FEMs). By utilizing an approved FEM, any subsequent data produced from the method may be eligible for comparison to EPA's health based standards known as the NAAQS. The primary advantage of operating a $PM_{2.5}$ continuous FEM is that it can support both the AQI, while also supplying data that are eligible for comparison to the NAAQS. Thus, a network utilizing $PM_{2.5}$ continuous FEMs can minimize the number of filter-based FRMs operated in the network, which are primarily used for comparison to the NAAQS. These filter-based FRMs are resource intensive in that they require field operations as well as pre- and post-sampling laboratory analysis which results in data not being available for approximately 2-4 weeks after sample collection.

Our monitoring program has been working with $PM_{2.5}$ continuous FEMs including deployment at three sites to evaluate their performance. Although the $PM_{2.5}$ continuous FEMs are automated methods, these methods still require careful attention in their set-up, operation, and validation of data. Once we were able to collect enough data we began to evaluate the performance of these methods compared to collocated FRMs. That evaluation is explained further below and includes our recommendations on the use of the data from these methods.

Request for Exclusion of $PM_{2.5}$ Continuous FEM data from Comparison to the NAAQS:

In accordance with the PM NAAQS rule published on January 15th, 2013 (78 FR 3086) and specific to the provisions detailed in §58.10 (b)(13) and §58.11 (e) we are requesting that data from the following monitor be set aside for comparison to the NAAQS. While our agency is working to optimize the monitoring instrumentation we use to meet all of our monitoring objectives, we are not yet at a point where the comparability of one of the $PM_{2.5}$ continuous FEMs operated in our network compared to a collocated FRM

is acceptable such that we are comfortable using the continuous FEM data for comparison to the NAAQS. After assessing the comparability of the $PM_{2.5}$ FEM to the collocated FRM for our network, we have determined that the site listed below does not meet the comparability requirements. A detailed one-page assessment from which the information described below was obtained and is included at the end of this section.

Table 1 – Request for Exclusion of $PM_{2.5}$ Continuous FEM Data

Site Name	City	Site ID	Cont POC	Method Description	$PM_{2.5}$ Cont. Begin Date	$PM_{2.5}$ Cont. End Date	Continuous/ FRM Sampler pairs per season	Slope (m)	Intercept (y)	Meets bias requirement	Correlation (R)
Site with $PM_{2.5}$ continuous FEM is collocated with FRM:											
Cannon's Lane	Louisville	21-111-0067	3	Met-One BAM 1020 w/VSCC FEM	01/25/11	Current	Winter = 62 Spring = 63 Summer = 57 Fall = 59 Total = 241	1.03	1.97	No	0.95

Period of Exclusion of Data from the $PM_{2.5}$ Continuous FEMs:

The above table details the period of available data by monitor for which we are basing our recommendation to exclude $PM_{2.5}$ continuous FEM data. Per EPA Regional Office approval, we will load or move as necessary these data to EPA's AQS database in a manner where the data are only used for the appropriate monitoring objective (i.e., just the AQI). Additionally, we will continue to load any new data generated for the next 18 months (intended to represent the period until December 31 of 2014) in the same manner or until such time as we request and receive approval from the EPA Regional Office to change the monitoring objectives that the data from the $PM_{2.5}$ continuous FEMs can support.

$PM_{2.5}$ Continuous FEM data for Reporting the AQI:

While we are requesting the monitors above not be used for comparison to the NAAQS, we do believe that the data are of sufficient comparability to collocated FRMs that they be used in AQI reporting. Therefore, with EPA Regional Office approval we will report these data on our web site and to AIRNow (www.airnow.gov). Additionally, we intend to store the data in EPA's AQS

database that is used for "acceptable AQI" reporting (i.e., parameter code 88502) so that data users will know that these data are appropriate for use in AQI calculations.

Continued Operation of $PM_{2.5}$ Monitors to Support NAAQS and AQI Reporting

While we are requesting that data from the monitors listed above be set aside for comparison to the NAAQS, we will continue to operate $PM_{2.5}$ FRMs to support the objective of comparison to the NAAQS. We will also operate our $PM_{2.5}$ continuous monitors for use in AQI reporting. Each of these FRM and $PM_{2.5}$ continuous monitors will be operated at the locations previously described in this plan and at the locations that meet the objectives of the Network Design Criteria for Ambient Air Quality Monitoring described in Appendix D to Part 58.

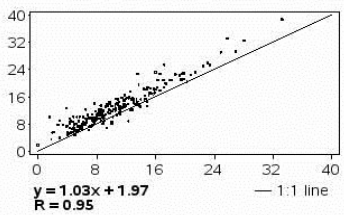
Assessments on next page

PM 2.5 Continuous Monitor Comparability Assessment

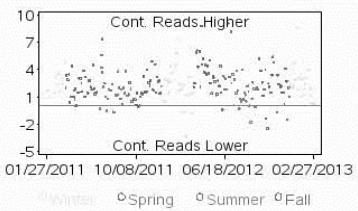
Site 21-111-0067: Louisville/Jefferson County, KY-IN

FRM: R & P Model 2025 PM2.5 Sequential w/WINS-GRAVIMETRIC (118), PM2.5 - Local Conditions (88101), POC=1
Cont: Met One BAM-1020 Mass Monitor w/VSCC-Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=3

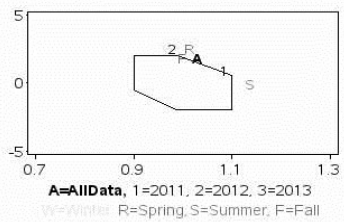
Cont. (y) vs. FRM (x) $PM_{2.5}$ ($\mu g/m^3$)



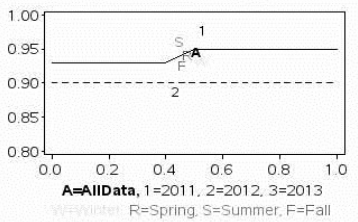
Cont. minus FRM $PM_{2.5}$ ($\mu g/m^3$)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean $PM_{2.5}$ ($\mu g/m^3$)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**241**	**10.4**	**12.7**	**1.22**
Winter	62	9.6	12.0	1.26
Spring	63	9.9	12.6	1.28
Summer	57	13.5	15.4	1.14
Fall	59	8.8	10.7	1.22
2011	106	11.2	13.2	1.18
2012	115	9.7	12.2	1.26
2013	20	10.1	12.8	1.26

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**241**	**30.9**	**234**	**26.4**
Winter	62	40.3	59	29.0
Spring	63	36.8	63	36.8
Summer	57	15.0	57	15.0
Fall	59	30.1	55	23.6
2011	106	21.5	105	20.8
2012	115	34.6	112	32.1
2013	20	60.3	17	23.4

Data Source: EPA AQS Data Mart

Generated on: May 3, 2013

Determining if the bias criteria has been met:

In most cases determining whether the combination of the multiplicative (slope) and additive (intercept) bias is inside or outside the required test specification can be done simply by inspecting the Additive (y) vs. Multiplicative (x) Bias figure on the middle left side of the one-page assessment. Use the "**A**" from the chart as it represents all data. In this case **A** appears to be just outside the box, which indicates that this bias does not meet the acceptance criteria.

To ensure that the combination of the multiplicative (slope) and additive (intercept) bias is outside the required test specifications, we provide the following information.

From Part 53, Table C-4:

Does the Slope of regression relationship meet the test specification of 1+/- 0.10

Yes, the slope of 1.03 is within 1 +/- 0.10

Does the Intercept ($\mu g/m^3$) of the regression relationship meet the test specification of between: 15.05 – (17.32 x slope), but not less than -2.0; and 15.05 – (13.20 x slope), but not more than + 2.0.

15.05-(17.32 x 1.03) = -2.79, which is more negative than -2.0. Therefore use -2.0 as the most negative the intercept can be with a slope of 1.03.

15.05 – (13.20 x 1.03) = 1.454, which is within the maximum +2.0. Therefore use 1.454 (rounded to 1.45) as the most positive the intercept can be with a slope of 1.03.

No, the intercept of +1.97 is outside the bounds of -2.0 to +1.45 that is allowed for a slope of 1.03 and therefore this confirms that the overall bias has not been met.

APPENDIX F

WEST JEFFERSON COUNTY AIR TOXICS MONITORING STATIONS

Appendix F
West Jefferson County Air Toxics Monitoring Stations

West Jefferson County Air Toxics Monitoring Stations
Volatile Organic Compounds (Method TO-15)

Site 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 G

PUBLIC COMMENT

KENTUCKY DIVISION FOR AIR QUALITY
AMBIENT AIR MONITORING NETWORK
Comments Received 6/22/13

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 2013 was held from May 23, 2013, through June 22, 2013.

(2) No comments were received during the public comment period.

(2) While no individuals or groups provided comments on the KENTUCKY DIVISION FOR AIR QUALITY AMBIENT AIR MONITORING NETWORK PLAN 2013 during the public comment period, Louisville Metro Air Pollution Control District (LMAPCD) did receive comments on its intent to establish a near-road site in Jefferson County. The complete plan, and subsequent comments, are located in Appendix D.

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

INDEX

KDAQ AIR MONITORING STATIONS
BY
REGIONAL OFFICE

KDAQ 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	Fayette	42
21-113-0001	Nicholasville	Jessamine	44
21-151-0003	Mayfield Elementary	Madison	81
21-151-0005	EKU	Madison	83
Region 3 - Florence Regional Office			
21-015-0003	East Bend	Boone	21
21-037-3002	NKU	Campbell	23
Region 4 - Owensboro Regional Office			
21-059-0005	Owensboro Primary	Daviess	66
21-091-0012	Lewisport	Hancock	68
21-101-0014	Baskett	Henderson	32
Region 5 - Ashland Regional Office			
21-019-0017	Ashland Primary (FIVCO)	Boyd	37
21-019-0002	21st & Greenup	Boyd	35
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	29
21-185-0004	Buckner	Oldham	49
Region 8 - Paducah Regional Office			
21-047-0006	Hopkinsville	Christian	26
21-139-0003	Smithland	Livingston	73
21-139-0004	Bloodworth	Livingston	75
21-145-1004	Paducah Middle School	McCracken	77
21-145-1024	Paducah Primary (Jackson Purchase)	McCracken	79
21-157-0018	Calvert City Elementary	Marshall	94
21-157-0014	TVA Substation	Marshall	90
21-157-0019	Lazy Daz	Marshall	96
21-157-0016	Atmos Energy	Marshall	92
Region 9 - Bowling Green Regional Office			
21-213-0004	Franklin	Simpson	102
21-227-0009	Ed Spear Park (Smiths Grove)	Warren	18
Region 10 - London Regional Office			
21-013-0002	Middlesboro	Bell	71
21-199-0003	Somerset	Pulaski	85
21-207-0001	Salem Elementary (Russell Springs)	Russell	104