Ambient Air Monitoring Plan

Tennessee Dept. of Environment and Conservation

Air Pollution Control Division

Final Plan

June 30, 2015

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Introduction to the 2015 Ambient Air Monitoring Plan for Tennessee

The draft plan that is presented in the following pages will address each of the requirements specified in the CFR. An overview of the geography, general climate, wind patterns and population trends are included to provide background information that will assist the reader in understanding the current air monitoring network and reasons for placement of the existing monitoring sites. The actual regulatory requirements that specify the number and placement of air monitoring sites are found in 40 CFR 58. The sections that provide this guidance are also included in the report as a reference to help better understand the actual monitoring needs in a given area.

In many instances, the "areas" for which monitoring is required are based on population criteria in which population must be considered to allow for monitoring in the areas where populations may be affected or exposed to the various criteria pollutants of concern. Additional monitoring sites are needed to address areas where source related emission density may be elevated and also impact communities in the same area. Other considerations must also be addressed when selecting and operating air monitoring sites. The local influences of some types of sources (roadway dust or emissions) may be factors that require monitoring sites to be spaced certain distances from those sources or in the case or near-road or roadway monitoring activities, the monitors must be located very close to the potential sources of mobile emissions.

The principal areas in Tennessee with air monitoring sites are depicted with a graphic showing the locations for each of the monitoring sites. The sites are further identified with a site number, an Air Quality Site Identification (AQSID) and the types of pollutants being monitored for at each location. Tables containing the relevant information for each site are also included. The tables are provided in two sections following the location graphic and have been condensed and combined from the previous year's format so that all relevant information can be found within each area's section of the report and relieves the reader from searching tables at the end of the report for information about a given site.

Each of the four local programs operating an air monitoring network in Tennessee has also provided a separate annual review which has been included with this report. Where revisions were noted in the local networks, similar revisions were added to the state's overall plan.

The recent changes in the NAAQS (National Ambient Air Quality Standards) have resulted in a need to evaluate additional air monitoring in order to comply with the new standards. In some cases; (SO_2 and NO_2), the revisions to the standard were augmented with revisions to the monitoring requirements. Some of the necessary changes to the monitoring networks have been completed while others are being planned for implementation.

The State of Tennessee is required to evaluate the ambient air monitoring network each year in accordance with the requirements specified in 40 CFR Subpart B 58.10. The requirements that must be met in the annual evaluation are included as follows:

Proposed Revisions to Tennessee's Ambient Air Monitoring Network

$PM_{2.5}$ Monitoring:

The state of Tennessee does not propose to shut down any of the current PM2.5 monitoring sites currently in operation but will propose adding to the sites an FEM continuous monitor so that eventually all pf the PM2.5 sites are equipped with an FEM/FRM continuous monitor. The following table details the proposed modifications to this network, Once the FEM/FRM monitors are received and properly installed, a period of correlation testing will be performed with the FRM and FEM/FRM samplers both operating at the same time. After suitable amounts of data are generated, the selected FRM samplers will be evaluated for possible shutdown. Adequate colocation for the new FEM/FRM samplers will be implemented and the need for meeting colocation requirements for the remaining filter based FRM's will

be addressed based on the remaining network and minimum requirements for colocation. Tennessee is considering removal of the elevated platforms that are a part of the sampling network for safety related concerns and is proposing to place the Clarksville PM2.5 monitoring site on the ground near the existing location the elevated platform now occupies. If a suitable location is not available in the immediate area, Tennessee proposes to relocate the site as close as possible to the previous location. This proposed change is anticipated over the next calendar year and will be preceded by a formal written request to EPA with the relocation details. There are no Source Oriented PM2.5 network monitoring requirements.

County	PM 2.5 FRM Site ID	STREET ADDRESS	Existing TEOM Site	Proposed BAM FEM/FRM 1020/1022	PM 2.5 FRM Filter Based Sampler to Remain	Change Out Schedule
Blount	470090011	2007 SEQUOYAH AVENUE MARYVILLE tn 37803	Yes	Yes	No	7/1/2015 to 6/30/2016
Dyer	470450004	175-B GREENWOOD STREET, DYERSBURG TN 38024	Yes	Yes	No	7/1/2015 to 6/30/2016
Lawrence	470990002	355 BUSBY RD	Yes	Yes	No	7/1/2015 to 6/30/2016
Loudon	471050108	130 WEBB DRIVE Loudon TN 37774	No	Yes	No	7/1/2015 to 6/30/2016
McMinn	471071002	SAINT MARK AME ZION CHURCH, 707 NORTH JACKSON ST. Athens TN 37303	Yes	Yes	No	7/1/2015 to 6/30/2016
Madison	471130006	1371-A NORTH PARKWAY JACKSON, TN 38301	Yes	Yes	No	7/1/2015 to 6/30/2016
Maury	471192007	1600 NASHVILLE HWY Columbia TN	No	Yes	No	7/1/2015 to 6/30/2016
Montgomery	471251009	1514-C GOLF CLUB LANE Clarksville TN 37040	Yes	Yes	TBD	TBD
Putnam	471410005	630 EAST 20TH STREET Cookeville TN 38501	No	Yes	No	7/1/2015 to 6/30/2016
Roane	471450004	HARRIMAN HIGH 1002 N. ROAN ST Harriman TN 37748	Yes	Yes	No	7/1/2015 to 6/30/2016
Sullivan	471631007	1649 D STREET Kingsport TN 37664	Yes	Yes	No	7/1/2015 to 6/30/2016
Sumner	471650007	ROCKLAND RECREATION AREA-OLD HICKORY DAM Army Corp of Engineer Property	Yes	Yes	TBD	TBD

PM_{10} Monitoring:

Except for the current continuous PM10 monitor operating in Luttrell, Tennessee, there are no plans to operate additional PM10 continuous or manual samplers in Tennessee.

Ozone Monitoring:

There are no plans to shut down the current network of ozone monitoring sites. The Loudon Pope ozone site is proposed to be relocated to the former Loudon Middle School location and restarted there. This is proposed to be completed during the 2015 monitoring season in conjunction with the installation of the new SO2 monitoring site in Kingsport, TN. If the site installation/relocation is delayed because of issues involved in selection of a new SO2 site in Sullivan County, the relocation will be postponed until after the end of the current ozone season (November 1, 2015 or later).

Carbon Monoxide Monitoring:

The state of Tennessee does not operate any CO monitors as a part of the state network.

Nitrogen Dioxide Monitoring:

The state of Tennessee does not operate any NO2 monitors as a part of the state network.

Community Wide Monitors

An NO2 monitoring site that meets the community wide monitoring requirement is already in operation in Nashville (AQS 47-037-0011). The NO2 monitor AQS ID 47-037-0011, located on Trinity Lane in Nashville, Tennessee is identified in AQS as a SLAMS monitor. In the Memphis CBSA the State of Arkansas currently operates an NO2 monitor at its Marion site, (AQS 05-035-0005). Memphis-Shelby County Air Pollution Control has requested EPA approve this site to meet minimum community-wide NO2 monitoring requirements in the Memphis CBSA.

Near-Road Monitors

There are currently 2 Near Road sites in Tennessee, both located and operated in local program counties (Davidson and Shelby).

Lead Monitoring:

The state operates a single lead monitoring site in Sullivan County, Tennessee in the vicinity of the Exide facility. This site is located within the boundary of the current Bristol lead nonattainment area. A redesignation request was submitted to EPA to classify the area as attainment based on clean data previously submitted for the state site. There are three (3) lead monitoring sites operating in Knox county.

Sulfur Dioxide Monitoring:

The state of Tennessee proposes to establish another SO2 monitoring site in the area currently named as nonattainment by EPA in Sullivan County, Tennessee. The draft documentation will provide the proposed site information and a detailed explanation of the characteristics of this proposed site, including the necessary elements as found in 40 CFR 58.10 and following to show that the proposed sites meet the required criteria. Because the site selection process includes the use of modeling to assist with the selection and ranking of proposed sites, There will also be a narrative that describes the modeling performed, the location of the highest identified receptors, the ranking of the receptors, the property parcels in which the receptors are found and finally the listing of the parcels with the highest ranked receptors and their suitability for use as a potential monitoring site. This documentation will be included as a separate section at the end of this report. EPA's current guidance on SO2 monitoring and the use of modeling for attainment/nonattainment designations under the new 1 hour SO2 standard is not yet finalized. Tennessee currently meets the requirements for PWEI required monitors stipulated in 40 CFR 58 Subpart G, Appendix D to Part 58 (2014). The Round 2 EGU's potentially subject to the monitoring requirements are not yet required to declare how they will prove attainment with the 1 Hr SO2 standard.

The Purpose of Tennessee's Ambient Air Monitoring Network

There are several criteria used to determine the need for ambient air quality monitoring. Some of the criteria are as follows:

EPA National Ambient Air Quality Standards (NAAQS) Criteria pollutant monitoring network requirements for the NCore (National Core) formally NAMS (National Air Monitoring Site), SLAMS (State and Local Air Monitoring Site) and SPM (Special Purpose Monitoring) monitoring networks.

The Code of Federal Regulations (CFR) sets forth as regulations the requirements for air quality monitoring to be implemented by the states and EPA. These requirements are primarily organized around population and emission density in a given area with the number of required monitors and the distribution of the monitors within the networks specified by these regulations. Additionally 40CFR, Part 58, Appendix D specifies criteria that must be followed in designing the NCore and SLAMS networks. The EPA must approve design and/or modifications to these networks.

Additional federal regulations also specify requirements for Prevention of Significant Deterioration (PSD) monitoring networks. This monitoring is addressed at new facilities to be constructed in a given area or around certain types of existing industry such as large coal fired power plants or facilities that release toxic heavy metals such as lead to the environment.

Air quality monitoring is required to be conducted to alert citizens in given areas to elevated levels of air pollutants in cities or communities of designated population levels that are required to provide Air Quality Index (AQI) reports to the general public.

Air quality monitoring is conducted to address the need for background air quality data and to provide needed air quality data that is used in industrial recruitment efforts with the monitoring areas periodically rotated to new locations throughout the state on a routine basis.

Special air quality monitoring studies are conducted based on identified needs for monitoring data in a given area.

Citizen complaints and enforcement investigations related to air quality are other reasons for air quality monitoring usually in or around a specific area related to the complaint or investigation.

Requests from citizens for special air monitoring studies are also a reason for air monitoring activities.

The federal regulations also specify the frequency, method, location requirements, equipment, quality assurance procedures and reporting of data collected from the ambient air monitoring networks.

MSA Monitoring Configuration for 2015

MSA Monitor Requirements

Monitoring Program	Census Area Identification and Population			14129 Lead		42101 CO		42401 SO2		42602 NO2		44201 Ozone			81102 PM10		88101 PM2.5				88502 PM2.5 Speciation		88101 or 88501 PM2.5 Cont.	
State / PQAO	CBSA Code	Census 2010 / 2014	CBSA Title (MS Areas)	Operating	Required	Operating	Required	Operating	Required	Operating	Required	Operating	2012 2014 8 Hr DV	Required	Operating	Required	Operating	2012 2014* Annual DV ug/m3	2012 2014* 24 Hr DV ug/m3	Required	Operating	Required	Operating	Required
GA 0437																	1							
TN 0170	16860	528143 / 544559	Chattanooga, TN-GA	0	0	0	0	0	0	0	1(b)	2	0.069	2	0	0	3	9.6	19	2	0	1(a)	1	1
TN 1025																								
KY 0584												1												
TN 0953	17300	260625 / 278353	Clarksville, TN-KY	0	0	0	0	2	0	0	0		0.067	1	1	0		9.2	21	0	0	0		1
TN 1025																	1						1	
TN 0112	17420	115788 / 119705	Cleveland, TN	0	0	0	0	1	0	0	0	0		0	0	0	0			0	0	0	0	0
TN 1025																								
TN 1025	27180	130011 / 130225	Jackson, TN	0	0	0	0	0	0	0	0	0		0	0	0	1	8.6	18	0	0	0	1	1
TN 1025	27740	198716 / 201091	Johnson City, TN	0	0	0	0	0	0	0	0	0		0	0	0	0			0	0	0	0	0
TN 0375				3																				
TN 1025	28700	309544 / 308079	Kingsport-Bristol-Bristol, TN-VA	1	1		0		1		0	2	0.068	1	0	0	1	8.6	15	0	0	0	1	0
TN 1026						1		1		1														
VA 1127																								
TN 0581				3								2			1		4						1	
TN 0921															2									
NPS 0745	28940	837571 / 857585	Knoxville, TN		1	1	0	1	1	0	1(b)	2	.069	2		1		10.2	19	2	0	0	1	1
TN 1025								1				2			1		3						1	
TN 1027															1									
AR 0055										1		1												
MS 073	32820	1324829 / 1343230	Memphis, TN-MS-AR		1		1		1		2	1	0.073	2		2		9.5	21	2		1		1
TN 0673				1		3		1		1		3			2		2				1		1	
TN 1025																								
TN 1025	34100	113951 / 115713	Morristow n, TN	0	0	0	0	0	0	0	0	1	0.071	1	0	0	0			0	0	0	0	0
TN 0682	34980	1670890 / 1792649	Nashville-Davidson--Murfreesboro, TN			1	1	1	1	2	2	2	0.072	2	2	2	2	10.3	20	3	0	1(a)	1	1
TN 1025												3					1						1	

*The PM2.5 statistic presented represents the 2013 to 2014 DV except for the Chattanooga MSA.

Micropolitan Monitor Requirements

Monitoring Program	Census Area Identification and Population			14129 Lead		42101 CO		42401 SO2		42602 NO2		44201 Ozone			81102 PM10		88101 PM2.5				88502 PM2.5 Speciation		88101 or 88501 PM2.5	
State / PQAO	CBSA Code	Census 2010 / 2014	CBSA Title (MicroS Areas)	Operating	Required	Operating	Required	Operating	Required	Operating	Required	Operating	2012 2014 8 Hr DV	Required	Operating	Required	Operating	2012 2014* Annual DV ug/m3	2012 2014* 24 Hr DV ug/m3	Required	Operating	Required	Operating	Required
TN 0112	11940	52266 / 52626	Athens. TN					1												0				0
TN 1025																	1	8.9	17				1	

*The PM2.5 statistic presented represents the 2013 to 2014 DV except for the Chattanooga MSA.

(a) EPA has defunded the required speciation sampling in these areas. The CFR requirement has not been revised.

(b) This monitor is the rear road site that may not be funded. The CFR requirement has not been revised.

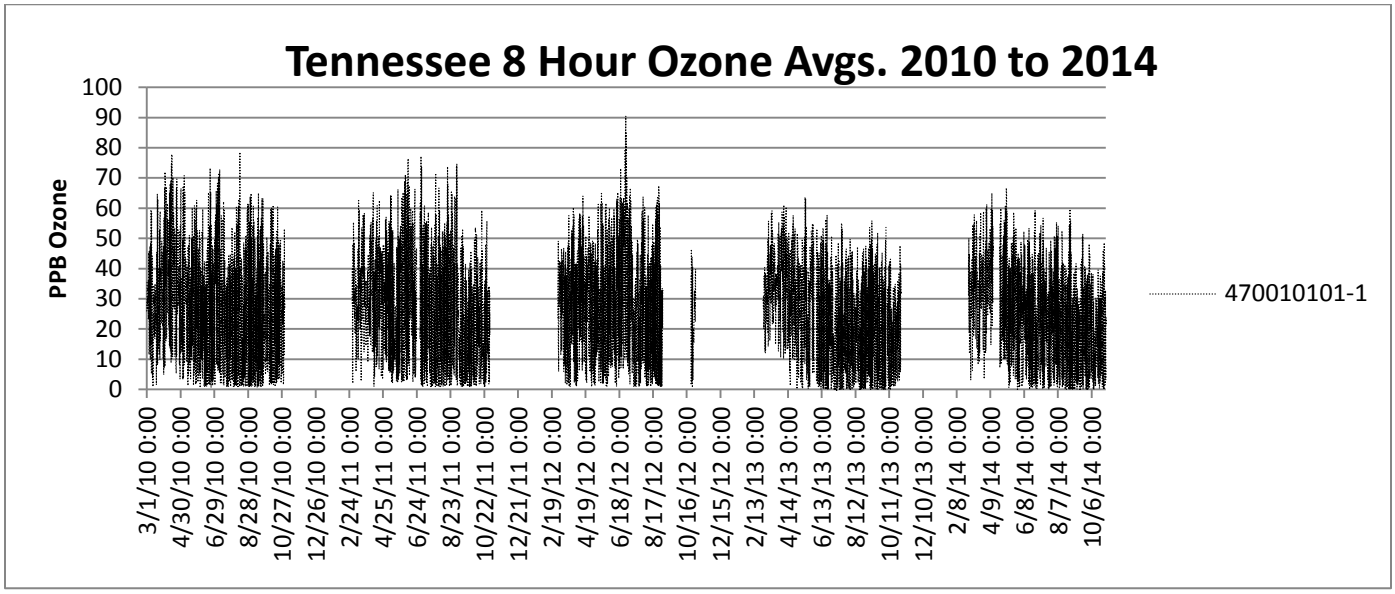
Monitoring Sites and Discussion

Freels Bend 2013 Anderson County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	FREELS BEND_STUDY AREA MELTON LAKE Oak R	
AQSID	470010101	
County Name	Anderson	
CBSA	28940	
Lat	35.965220000000002	
Lon	-84.223159999999993	
Parameter Code	42401	44201
Parameter Name	SO2	O3
Monitor Type	SLAMS	SLAMS
POC	1	1
Int	1	W
Year	2014	2014
Collection Frequency	Hourly	Hourly
Method	100	087
FRM/FEM Monitoring Instrument	API MODEL 100 A SO2 ANALYZER	MODEL 400 OZONE ANALYZER
Analysis	ULTRAVIOLET FLUORESCENCE	ULTRA VIOLET ABSORPTION
Ref Mtd ID	EQSA-0495-100	EQOA-0992-087
Monitor Objective Type	POPULATION EXPOSURE	POPULATION EXPOSURE
Dominant Source	AREA	AREA
Measurement Scale	URBAN SCALE	URBAN SCALE
Land Use Type	FOREST	FOREST
Location Setting	RURAL	RURAL
Date Site Established	19920401	19920401

Site Background and Discussion
East Tennessee

The Freels Bend site is located in Anderson County, Tennessee and currently supports monitoring for ozone and sulfur dioxide. The site was initially established in 1992 and is expected to operate during CY's 2015 and 2016. This site is located west of Knoxville and southeast of Oak Ridge, Tennessee. This site is an upwind site from the core Knoxville MSA area.
Sulfur dioxide monitoring began 03/01/2013 to assess emission impacts from the Bull Run FP.
Because of the importance this site serves in assessing both the upwind ozone levels entering the Knoxville area and the ongoing need to continue to collect SO2 data to assess area impacts near the TVA facility, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020). The Knoxville MSA has 6 operating ozone sites and is required to have only 2. This MSA is also required to have 1 SO2 site which this site provides for.
This site is also employed in the AQI forecasting program and currently is attaining the standards for both ozone and SO2.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
470010101-1	
Mean	**26.17056343**
Standard Error	**0.096662337**
Median	**25.85714286**
Standard Deviation	**16.01447276**
Sample Variance	**256.4633378**
Range	**90.78571429**
Minimum	**-0.285714286**
Maximum	**90.5**
Count	**27448**

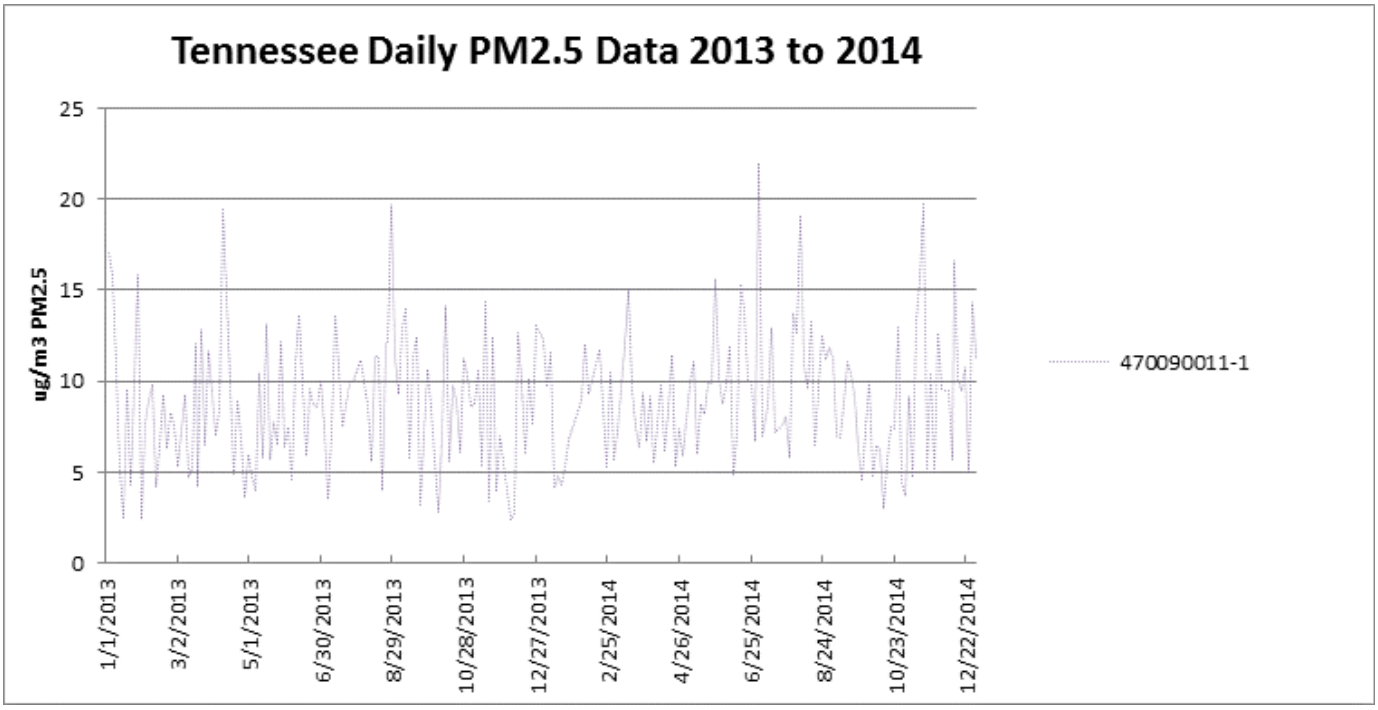
County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
001	470010101-1	2012 - 2014	FREELS BEND_STUDY AREA MELTON LAKE Oak Ridge National Lab Reservation	89	64

Maryville 2014 Blount County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	2007 SEQUOYAH AVENUE MARYVILLE tn 37803	
AQSID	470090011	
County Name	Blount	
CBSA	28940	
Lat	35.768847000000001	
Lon	-83.942151999999993	
Parameter Code	88101	PM2.5 Cont
Parameter Name	PM2.5	SPM
Monitor Type	SPM	3
POC	1	1
Int	7	2014
Year	2014	Hourly
Collection Frequency	1 in 3	716
Method	118	None
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	TEOM Gravimetric 50 deg C
Analysis	GRAVIMETRIC	None
Ref Mtd ID	RFPS-0498-118	POPULATION EXPOSURE
Monitor Objective Type	POPULATION EXPOSURE	AREA
Dominant Source	AREA	NEIGHBORHOOD
Measurement Scale	NEIGHBORHOOD	RESIDENTIAL
Land Use Type	RESIDENTIAL	SUBURBAN
Location Setting	SUBURBAN	20000501
Date Site Established	20000501	

Site Background and Discussion
East Tennessee

The Maryville site is located in Blount County, Tennessee and currently supports monitoring for fine particulate matter. The site was initially established in 2000 and is expected to operate during CY's 2015 and 2016. This site is located south of Knoxville and northwest of the GSMNP. Tennessee. This site is an upwind site from the core Knoxville MSA area.
PM2.5 monitoring began 05/01/2000 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added later to assist with the PM Fine AQI forecasting program.
Because of the importance this site serves in assessing the upwind PM2.5 levels entering the Knoxville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020). The Knoxville MSA has 6 PM2.5 FRM sites and is only required to have 2 to meet the minimum requirements. This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.
This site is also employed in the AQI forecasting program and is used to help assess impacts from precursor transport into Tennessee from Georgia and North Carolina.



470090011-1	
Mean	**8.945205479**
Standard Error	**0.245119188**
Median	**8.8**
Standard Deviation	**3.627432727**
Sample Variance	**13.15826819**
Range	**19.6**
Minimum	**2.4**
Maximum	**22**
Count	**219**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Blount	470090011	2007 SEQUOYAH AVENUE MARYVILLE tn 37803	9	18

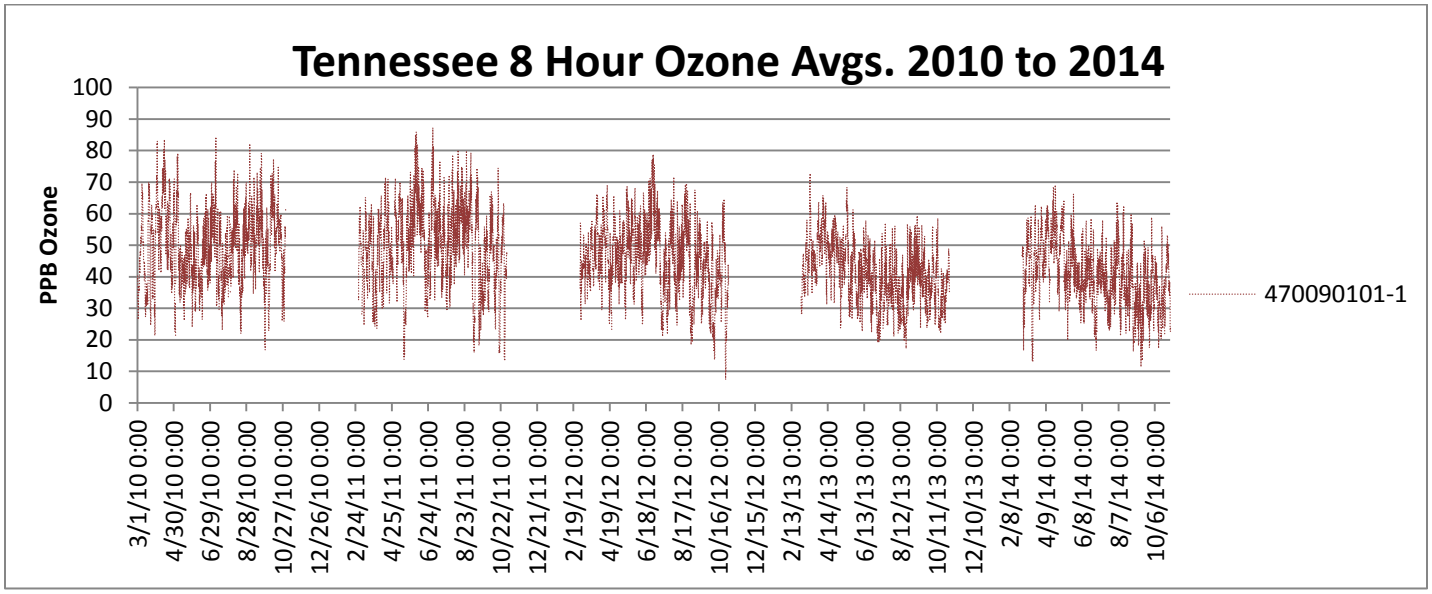
Look Rock Blount County

Rep Org Name	National Park Service
PQAO	745
Address	GREAT SMOKY MOUNTAINS NP LOOK ROCK
AQSID	470090101
County Name	Blount
CBSA	28940
Lat	35.633479999999999
Lon	-83.941605999999993
Parameter Code	44201
Parameter Name	O3
Monitor Type	SLAMS
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	053
FRM/FEM Monitoring Instrument	MONITOR LABS 8810
Analysis	ULTRA VIOLET
Ref Mtd ID	EQOA-0881-053
Monitor Objective Type	UNKNOWN
Dominant Source	0
Measurement Scale	0
Land Use Type	FOREST
Location Setting	RURAL
Date Site Established	19800101

Site Background and Discussion
East Tennessee

The Look Rock site is located in Blount County, Tennessee and currently supports monitoring for ozone and other pollutants. The site was initially established in 1980 and is expected to operate during CY's 2015 and 2016. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is within and southeast of the Knoxville MSA area. Ozone monitoring began 07/23/1998 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area.

This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
470090101-1	
Mean	**45.53069332**
Standard Error	**0.070757948**
Median	**45.33333333**
Standard Deviation	**12.02323078**
Sample Variance	**144.5580785**
Range	**79.75**
Minimum	**7.375**
Maximum	**87.125**
Count	**28873**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
009	470090101-1	2012 - 2014	GREAT SMOKY MOUNTAINS NP LOOK ROCK	98	67

Look Rock Blount County

See previous photo.

Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	GREAT SMOKY MOUNTAINS NP LOOK ROCK
AQSID	470090101
County Name	Blount
CBSA	28940
Lat	35.633479999999999
Lon	-83.941605999999993
Parameter Code	88501
Parameter Name	PM2.5 Cont
Monitor Type	SPM
POC	3
Int	1
Year	2014
Collection Frequency	Hourly
Method	716
FRM/FEM Monitoring Instrument	None
Analysis	TEOM Gravimetric 50 deg C
Ref Mtd ID	None
Monitor Objective Type	UNKNOWN
Dominant Source	0
Measurement Scale	0
Land Use Type	FOREST
Location Setting	RURAL
Date Site Established	19800101

Site Background and Discussion
East Tennessee

The Look Rock site is located in Blount County, Tennessee and currently supports monitoring for PM2.5 and other pollutants. The site was initially established in 1980 and is expected to operate during CY's 2015 and 2016. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is inside and southeast of the Knoxville MSA area. PM2.5 monitoring began 05/01/2002 and this site is used with the PM Fine AQI forecasting program for verification and to help address fine particulate levels found in the GSMNP area. TDEC APCD reports the TEOM PM2.5 data for this site to AQS. TDEC APCD reports the PM2.5 data for this site to AQS.
This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.

Cades Cove Blount County

Rep Org Name	National Park Service
PQAO	1025
Address	GREAT SMOKY MOUNTAINS NP - CADES COVE
AQSID	470090102
County Name	Blount
CBSA	28940
Lat	35.603056000000002
Lon	-83.783610999999993
Parameter Code	44201
Parameter Name	O3
Monitor Type	NON-EPA FEDERAL
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	053
FRM/FEM Monitoring Instrument	MONITOR LABS 8810
Analysis	ULTRA VIOLET
Ref Mtd ID	EQOA-0881-053
Monitor Objective Type	HIGHEST CONCENTRATION
Dominant Source	0
Measurement Scale	REGIONAL SCALE
Land Use Type	FOREST
Location Setting	RURAL
Date Site Established	19940501

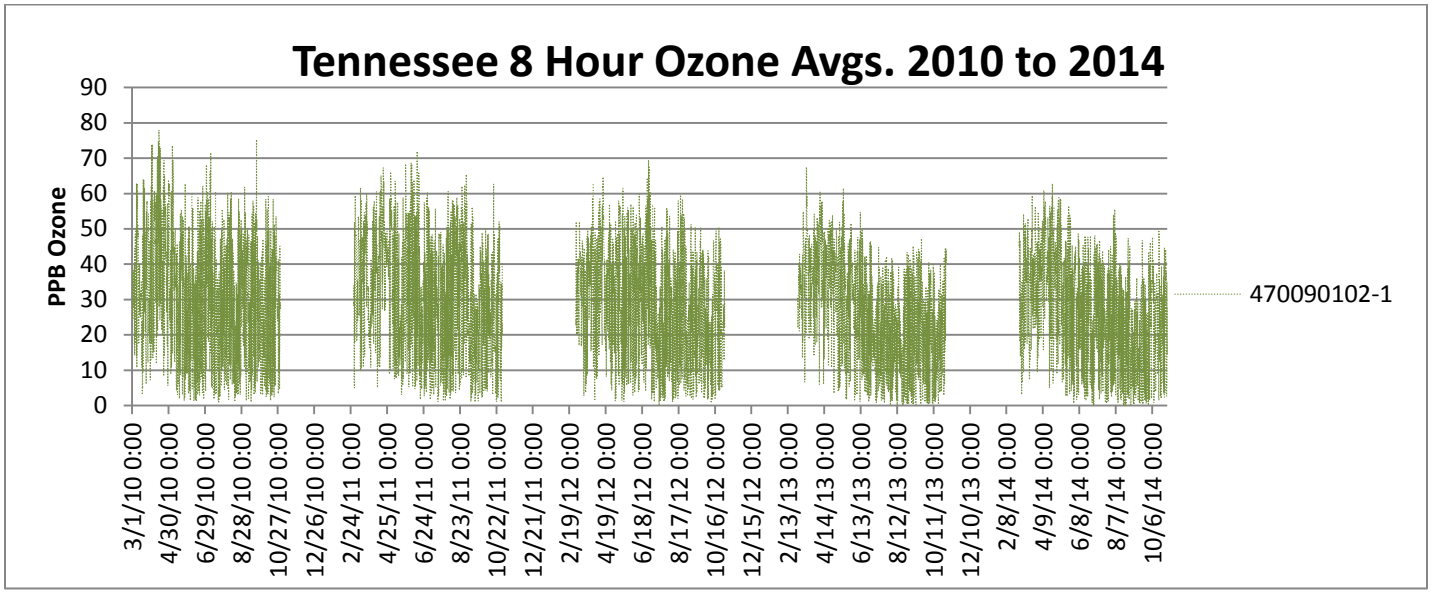
Site Background and Discussion
East Tennessee

The Cades Cove site is located in Blount County, Tennessee and currently supports monitoring for ozone and meteorological parameters. The site was initially established in 05/01/1994 and is expected to operate during CY's 2015 and 2016. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is within and southeast of the Knoxville MSA area.

Ozone monitoring began 05/01/1994 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area and

TDEC APCD reports the ozone data for this site to AQS.

This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
470090102-1	
Mean	**28.09612078**
Standard Error	**0.087463036**
Median	**27.75**
Standard Deviation	**14.92135798**
Sample Variance	**222.646924**
Range	**78**
Minimum	**0**
Maximum	**78**
Count	**29105**

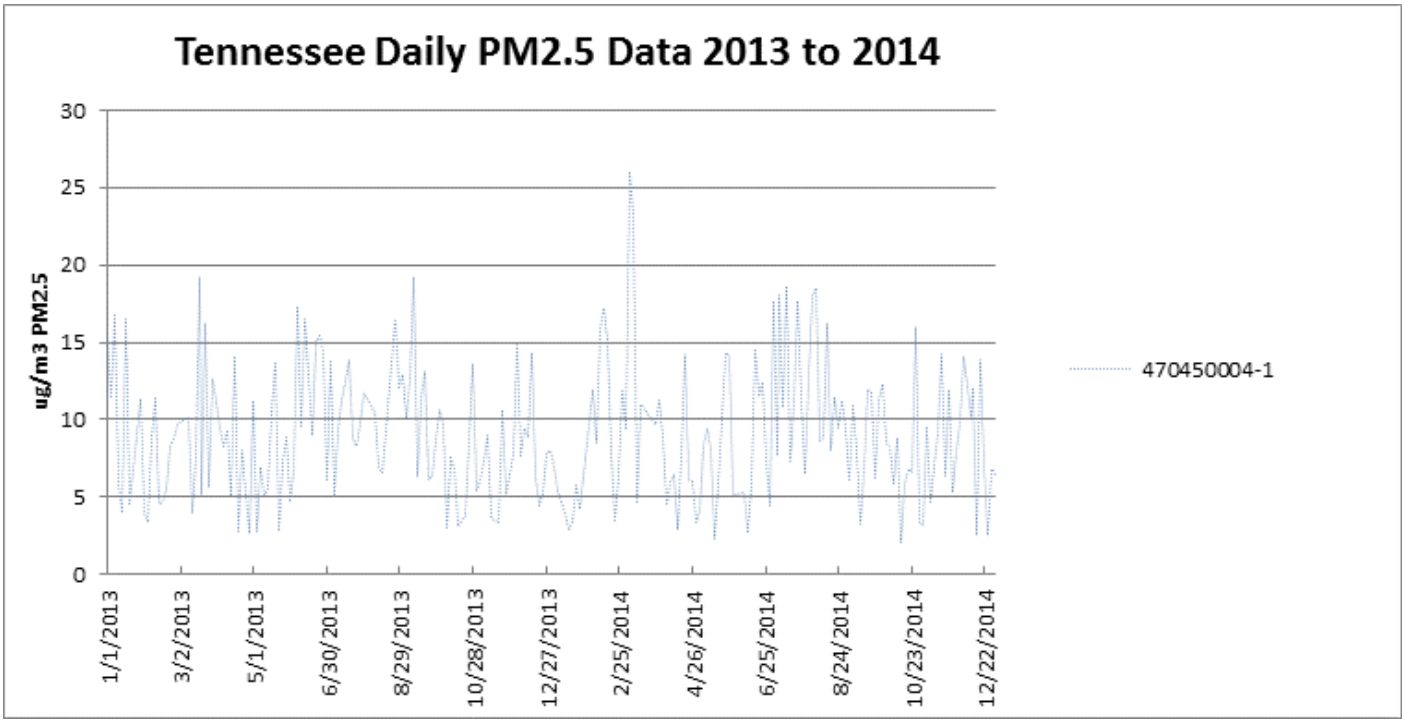
County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
009	470090102-1	2012 - 2014	GREAT SMOKY MOUNTAINS NP - CADES COVE	99	60

Dyersburg 2014 Dyer County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	175-B GREENWOOD STREET, DYERSBURG TN 38	
AQSID	470450004	
County Name	Dyer	
CBSA	20540	
Lat	36.038924000000002	
Lon	-89.382126	
Parameter Code	88101	88501
Parameter Name	PM2.5	PM2.5 Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Year	2014	2014
Collection Frequency	1 in 3	Hourly
Method	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective Type	POPULATION EXPOSURE	POPULATION EXPOSURE
Dominant Source	AREA	AREA
Measurement Scale	NEIGHBORHOOD	NEIGHBORHOOD
Land Use Type	RESIDENTIAL	RESIDENTIAL
Location Setting	SUBURBAN	SUBURBAN
Date Site Established	19990822	19990822

Site Background and Discussion
West Tennessee

The Dyersburg site is located in Dyer County, Tennessee and currently supports monitoring for fine particulate matter. The site was initially established in 1999 and is expected to operate during CY's 2015 and 2016. This site is located northwest of Jackson and north north east of Memphis, Tennessee. This site is downwind from the core Memphis MSA area.
PM2.5 monitoring began 08/22/1998 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added later to assist with the PM Fine AQI forecasting program. Because of the importance this site serves in assessing the area PM2.5 levels outside of the Memphis area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).
This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.
This site is also employed in the AQI forecasting program and is used to help assess impacts from precursor transport into Tennessee from adjacent states..



	470450004-1
Mean	**8.985454545**
Standard Error	**0.298388277**
Median	**8.3**
Standard Deviation	**4.425813371**
Sample Variance	**19.58782399**
Range	**23.9**
Minimum	**2.1**
Maximum	**26**
Count	**220**

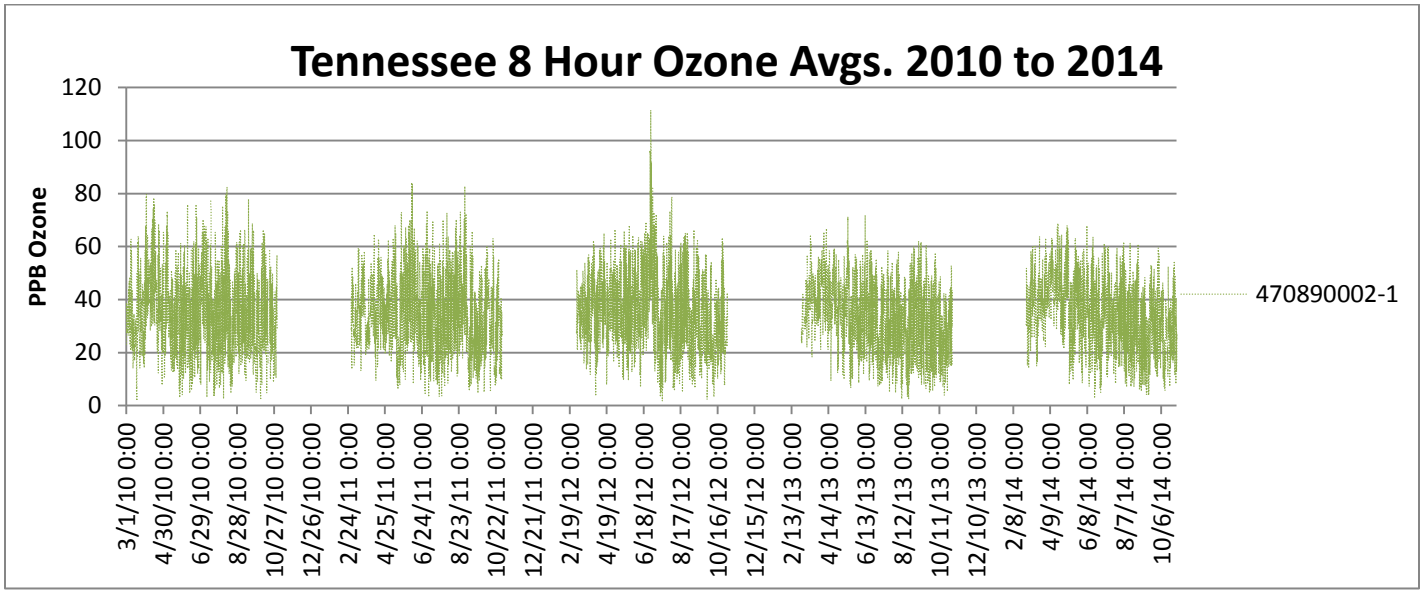
2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Dyer	470450004	175-B GREENWOOD STREET, DYERSBURG TN 38024	9	18

New Market 2014 Jefferson County

Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	2393 Forrester Road, New Market TN 37820
AQSID	470890002
County Name	Jefferson
CBSA	34100
Lat	36.105629
Lon	-83.602076999999994
Parameter Code	44201
Parameter Name	O3
Monitor Type	SLAMS
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	087
FRM/FEM Monitoring Instrument	MODEL 400 OZONE ANALYZER
Analysis	ULTRA VIOLET ABSORPTION
Ref Mtd ID	EQOA-0992-087
Monitor Objective Type	MAX OZONE CONCENTRATION
Dominant Source	0
Measurement Scale	0
Land Use Type	AGRICULTURAL
Location Setting	RURAL
Date Site Established	19990301

Site Background and Discussion
East Tennessee

The New Market site is located in Jefferson County, Tennessee and currently supports monitoring for ozone. The site was initially established in 1999 and is expected to operate during CY's 2015 and 2016. This site is located east northeast of Knoxville and west northwest of Morristown, Tennessee. This site is downwind from the core Knoxville MSA area.
Ozone monitoring began 03/01/1999 and this site is used with the ozone AQI forecasting program for verification and to help address transport wind patterns opposite of the predominate area directions. This MSA is required to have 1 ozone site and this site meets that requirement. Because of the importance this site serves in assessing the area ozone levels outside and downwind of the Knoxville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
470890002-1	
Mean	**35.30965756**
Standard Error	**0.082047739**
Median	**35.14285714**
Standard Deviation	**14.01912329**
Sample Variance	**196.5358178**
Range	**109.8333333**
Minimum	**1.666666667**
Maximum	**111.5**
Count	**29195**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
089	470890002-1	2012 - 2014	2393 Forrester Road, New Market TN 37820	99	71

Lawrence Co 2014 Lawrence County

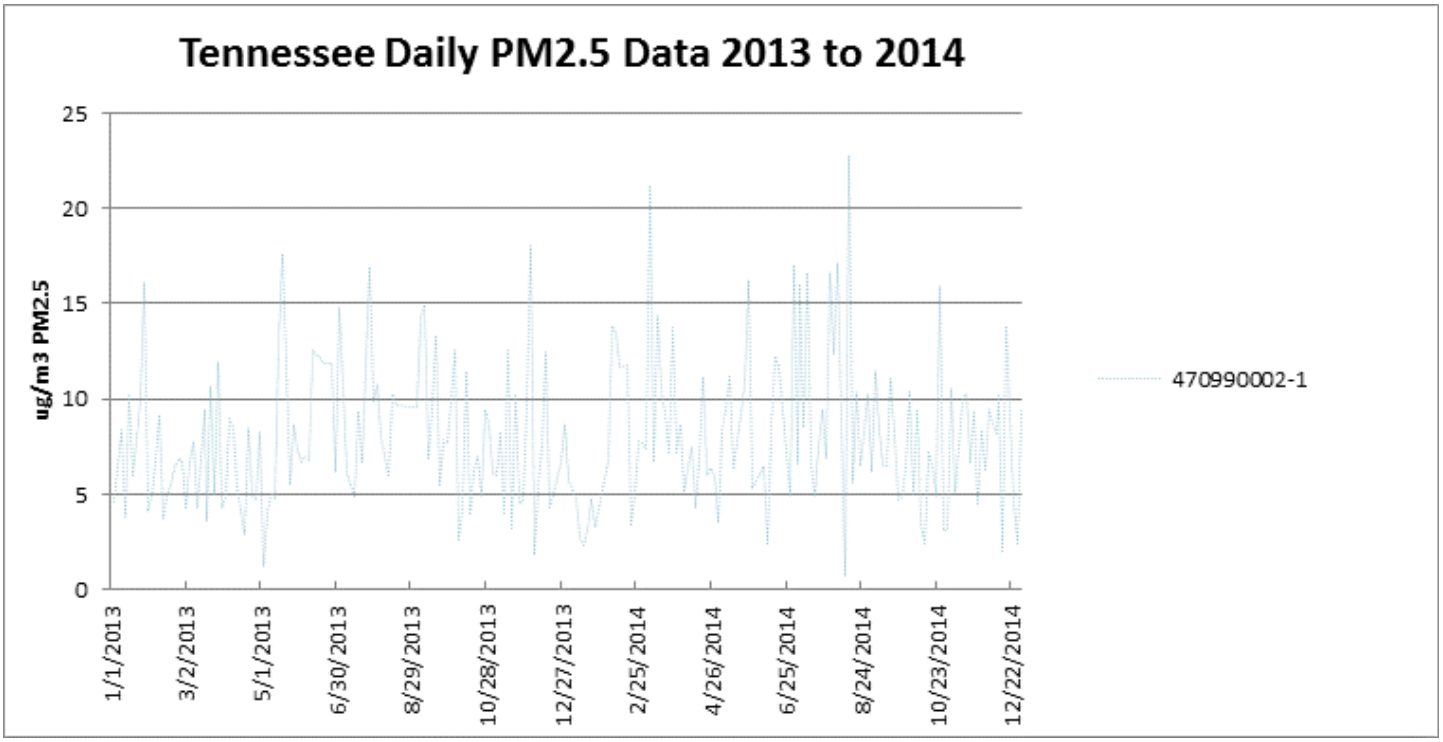
Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	355 BUSBY RD	
AQSID	470990002	
County Name	Lawrence	
CBSA	29980	
Lat	35.115968000000002	
Lon	-87.469954000000001	
Parameter Code	88101	88501
Parameter Name	PM2.5	PM2.5 Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Year	2014	2014
Collection Frequency	1 in 3	Hourly
Method	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective Type	MAX OZONE CONCENTRATION	Background
Dominant Source	0	0
Measurement Scale	REGIONAL SCALE	REGIONAL SCALE
Land Use Type	AGRICULTURAL	AGRICULTURAL
Location Setting	RURAL	RURAL
Date Site Established	19970401	19970401

Site Background and Discussion
Middle Tennessee

The Lawrence Co. site is located in Lawrence County, Tennessee and currently supports monitoring for PM2.5. This site is located on the southern border of Tennessee north of Alabama. The site is south west of Nashville and south east of Jackson, Tennessee. This site is not located near any MSA area in Tennessee.

PM2.5 monitoring began 12/24/1998 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2003 to assist with the PM Fine AQI forecasting program. This site also supported a PM2.5 Speciation and URG sampler from 12/03/2001 to 09/26/2014. This site has also supported ozone monitoring in the past. This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.

Because this site serves as a background PM2.5 site it is proposed to remain in operation over the next 5 years (2015 thru 2020).



470990002-1	
Mean	**8.013023256**
Standard Error	**0.263260099**
Median	**7.1**
Standard Deviation	**3.860150798**
Sample Variance	**14.90076418**
Range	**22.1**
Minimum	**0.7**
Maximum	**22.8**
Count	**215**

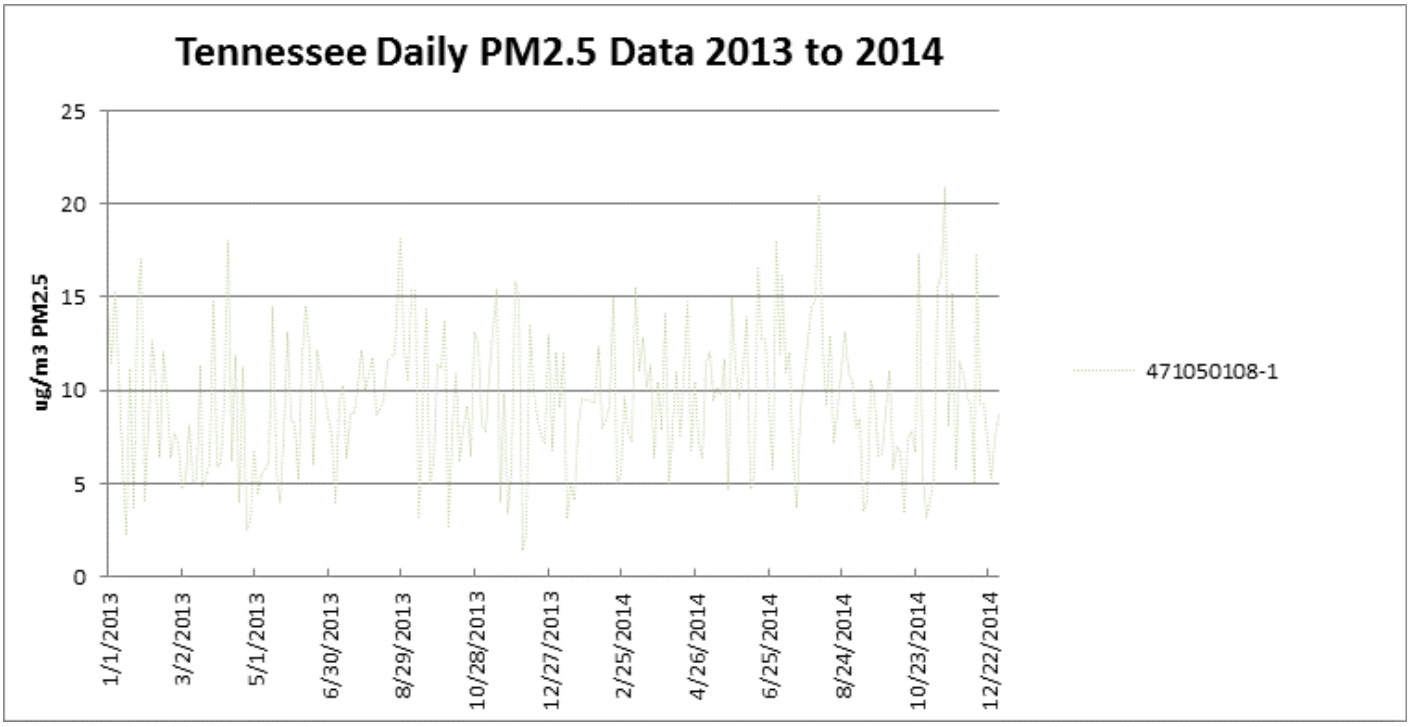
2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Lawrence	470990002	355 BUSBY RD	8	17

Loudon 2014 Loudon County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	130 WEBB DRIVE Loudon TN 37774	
AQSID	471050108	
County Name	Loudon	
CBSA	28940	
Lat	35.744539000000003	
Lon	-84.317057000000005	
Parameter Code	44201	88101
Parameter Name	O3	PM2.5
Monitor Type	SLAMS	SPM
POC	1	1
Int	W	7
Year	2014	2014
Collection Frequency	1 in 3	1 in 3
Method	087	118
FRM/FEM Monitoring Instrument	MODEL 400 OZONE ANALYZER	R & P CO PLUS MODEL 2025PM SEQ
Analysis	ULTRA VIOLET ABSORPTION	GRAVIMETRIC
Ref Mtd ID	EQOA-0992-087	RFPS-0498-118
Monitor Objective Type	MAX OZONE CONCENTRATION	MAX OZONE CONCENTRATION
Dominant Source	AREA	AREA
Measurement Scale	NEIGHBORHOOD	NEIGHBORHOOD
Land Use Type	RESIDENTIAL	RESIDENTIAL
Location Setting	SUBURBAN	SUBURBAN
Date Site Established	20030801	20030801

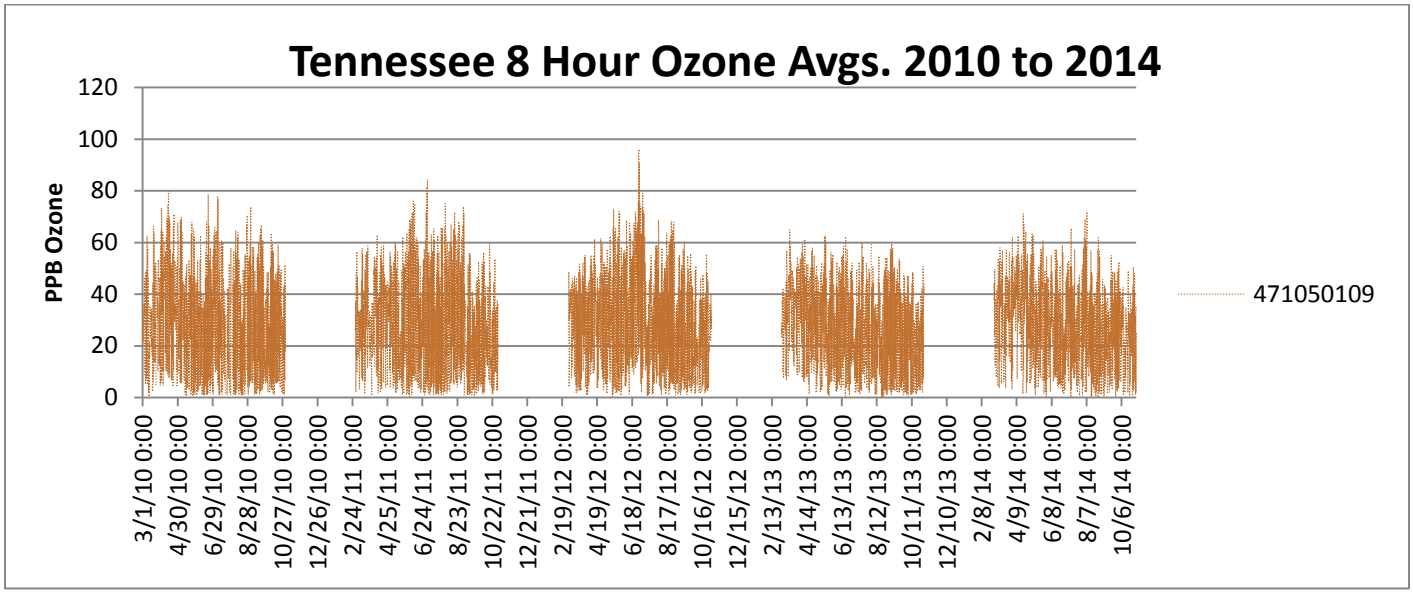
Site Background and Discussion
East Tennessee

The Loudon Pope site is located in Loudon County, Tennessee and currently supports monitoring for PM2.5 and ozone. This site is located southwest of Knoxville and northeast of Chattanooga, Tennessee. This site is upwind of the Knoxville Core MSA area and downwind from the Chattanooga MSA area. Ozone monitoring began 03/01/2014 and this site is used with the ozone AQI forecasting program for verification and to help address Knoxville MSA area. The ozone monitor is scheduled to be relocated to the Loudon Middle School site during 2015. PM2.5 monitoring began 08/01/2003 as a part of the Loudon air quality study and complaint investigation. This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired. This sampler will also be relocated at the time of the ozone move. This site serves in assessing the area ozone levels upwind of the Knoxville area. This site will be recommended to remain in operation over the next 5 years (2015 thru 2020). The Knoxville MSA has 6 operating ozone sites and is required to have only 2 The Knoxville MSA has 6 operating PM2.5 FRM sites and is required to have only 2



471050108-1	
Mean	**9.393333333**
Standard Error	**0.258257285**
Median	**9.2**
Standard Deviation	**3.873859279**
Sample Variance	**15.00678571**
Range	**19.5**
Minimum	**1.4**
Maximum	**20.9**
Count	**225**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Loudon	471050108	130 WEBB DRIVE Loudon TN 37774	9.4	18



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471050109	
Mean	**28.12783986**
Standard Error	**0.093472658**
Median	**27.71428571**
Standard Deviation	**15.92138748**
Sample Variance	**253.4905793**
Range	**96.125**
Minimum	**0**
Maximum	**96.125**
Count	**29013**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
105	471050108-1	2012 - 2014	130 WEBB DRIVE Loudon TN 37774	33	67
105	471050109-1	2012 - 2014	1703 ROBERTS RD Loudon TN 37774	66	68

Athens 2014 McMinn County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	SAINT MARK AME ZION CHURCH, 707 NORTH JA	
AQSID	471071002	
County Name	McMinn	
CBSA	11940	
Lat	35.450114999999997	
Lon	-84.596194999999994	
Parameter Code	88101	88501
Parameter Name	PM2.5	PM2.5 Cont
Monitor Type	SPM	SPM
POC	1	3
Int	7	1
Year	2014	2014
Collection Frequency	1 in 3	Hourly
Method	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective Type	POPULATION EXPOSURE	POPULATION EXPOSURE
Dominant Source	AREA	AREA
Measurement Scale	NEIGHBORHOOD	NEIGHBORHOOD
Land Use Type	COMMERCIAL	COMMERCIAL
Location Setting	URBAN AND CENTER CITY	URBAN AND CENTER CITY
Date Site Established	19860701	19860701

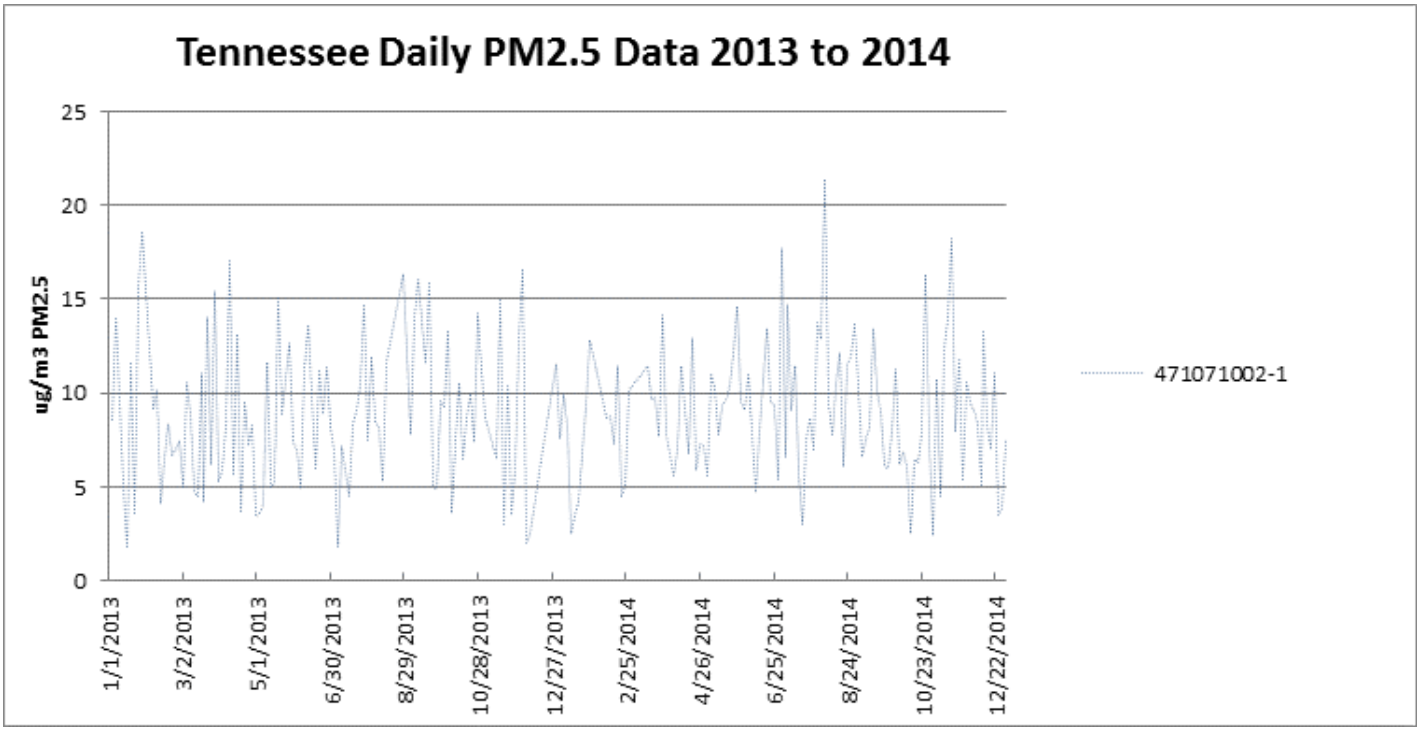
Site Background and Discussion
East Tennessee

The Athens site is located in McMinn County, Tennessee and currently supports monitoring for PM2.5. This site is located northeast of Chattanooga and southwest of Knoxville, Tennessee. This site is downwind from the Chattanooga MSA area and located in the Athens, Micropolitan area.

PM2.5 monitoring began 02/03/2000 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program.

This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.

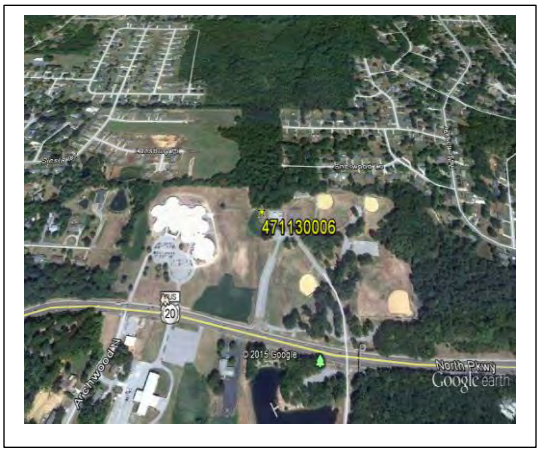
This site will be recommended to remain in operation over the next 5 years (2015 thru 2020). This site serves to help quantify air quality in this developing area of the state.



471071002-1	
Mean	**8.874418605**
Standard Error	**0.252041838**
Median	**8.4**
Standard Deviation	**3.695658796**
Sample Variance	**13.65789394**
Range	**19.7**
Minimum	**1.7**
Maximum	**21.4**
Count	**215**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
McMinn	471071002	SAINT MARK AME ZION CHURCH, 707 NORTH JACKSON ST. Athens TN 37303	8.9	17

Jackson 2014 Madison County



Rep Org Name	Tennessee Division Of Air Pollution Control		
PQAO	1025		
Address	1371-A NORTH PARKWAY JACKSON, TN 38301		
AQSID	471130006		
County Name	Madison		
CBSA	27180		
Lat	35.651348999999999		
Lon	-88.809578000000002		
Parameter Code	88101	88101	88501
Parameter Name	PM2.5	PM2.5	PM2.5 Cont
Monitor Type	SLAMS	SLAMS	SPM
POC	1	2	3
Int	7	7	1
Year	2014	2014	2014
Collection Frequency	1 in 3	1 in 3	Hourly
Method	118	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	RFPS-0498-118	None
Monitor Objective Type	POPULATION EXPOSURE	POPULATION EXPOSURE	POPULATION EXPOSURE
Dominant Source	AREA	AREA	AREA
Measurement Scale	NEIGHBORHOOD	NEIGHBORHOOD	NEIGHBORHOOD
Land Use Type	RESIDENTIAL	RESIDENTIAL	RESIDENTIAL
Location Setting	SUBURBAN	SUBURBAN	SUBURBAN
Date Site Established	20041117	20041117	20041117

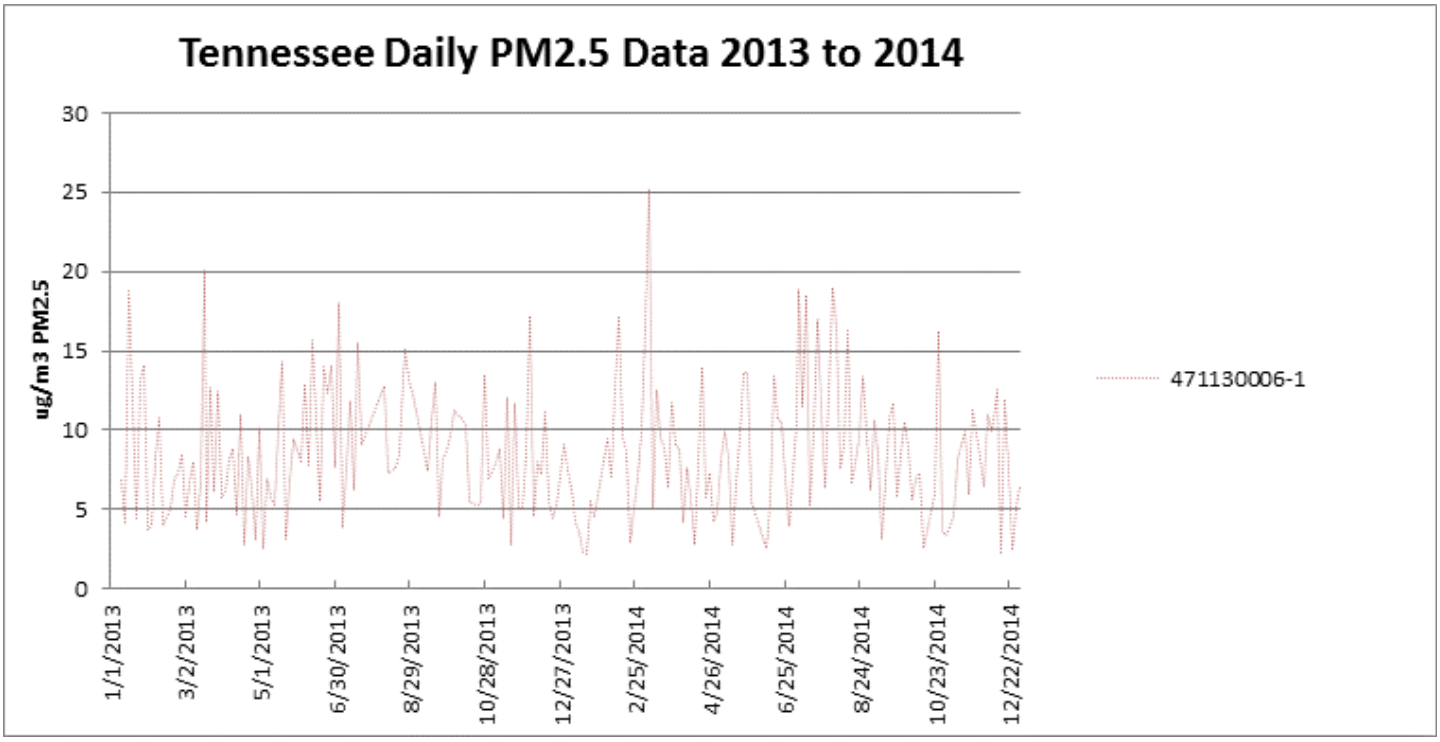
Site Background and Discussion
West Tennessee

The Jackson site is located in Madison County, Tennessee and currently supports monitoring for PM2.5. This site is located northeast of Memphis, Tennessee and southeast of Dyersburg, Tennessee. This site is located in the Jackson, TN MSA area.

PM2.5 monitoring began 11/17/2004 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program.

This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired. The Jackson MSA area has a single FRM PM2.5 sampler and is not required to operate any PM2.5 sites.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only PM2.5 site in this region.



471130006-1	
Mean	**8.579439252**
Standard Error	**0.281076861**
Median	**7.95**
Standard Deviation	**4.111799997**
Sample Variance	**16.90689921**
Range	**23**
Minimum	**2.2**
Maximum	**25.2**
Count	**214**

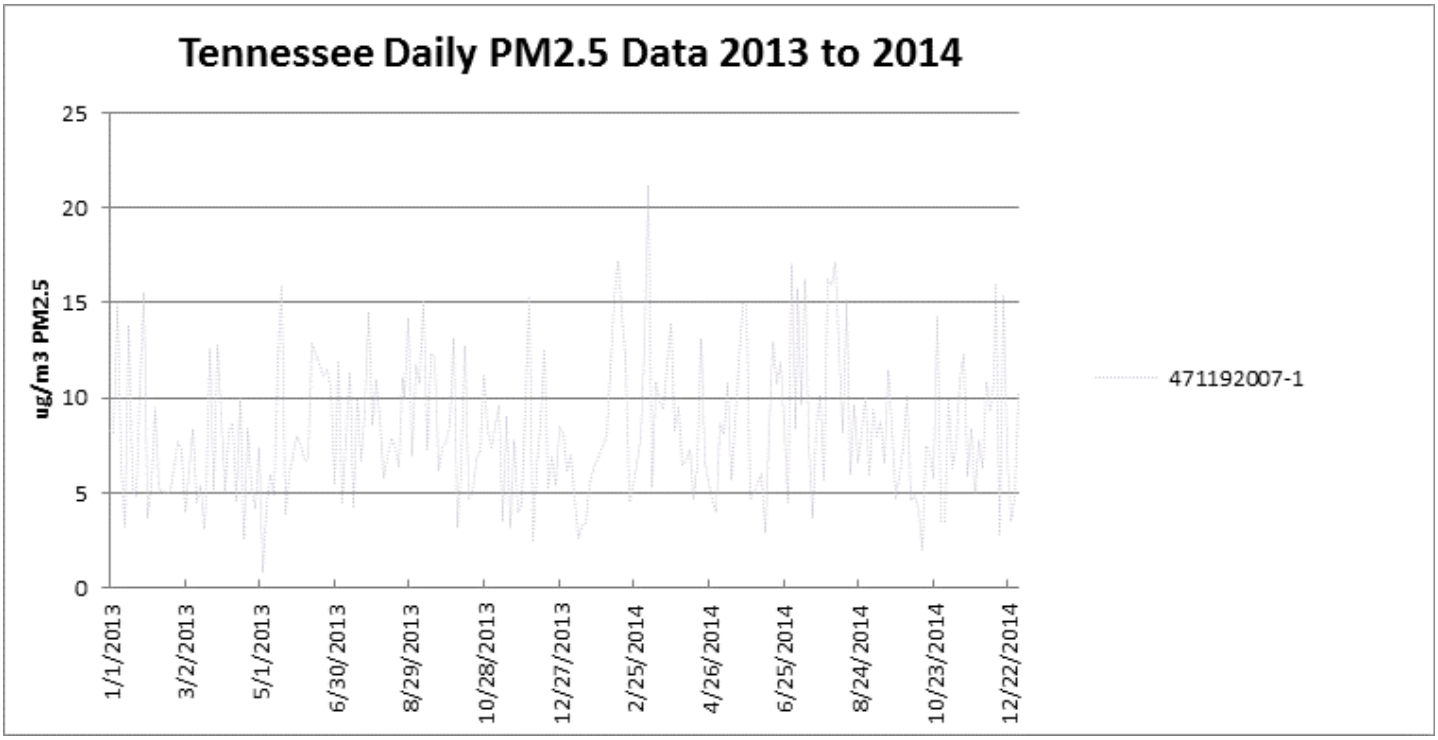
2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Madison	471130006	1371-A NORTH PARKWAY JACKSON, TN 38301	8.6	18

Columbia 2014 Maury County

Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	1600 NASHVILLE HWY Columbia TN
AQSID	471192007
County Name	Maury
CBSA	17940
Lat	35.651879999999998
Lon	-87.009600000000006
Parameter Code	88101
Parameter Name	PM2.5
Monitor Type	SPM
POC	1
Int	7
Year	2014
Collection Frequency	1 in 3
Method	118
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ
Analysis	GRAVIMETRIC
Ref Mtd ID	RFPS-0498-118
Monitor Objective Type	POPULATION EXPOSURE
Dominant Source	AREA
Measurement Scale	MIDDLE SCALE
Land Use Type	COMMERCIAL
Location Setting	URBAN AND CENTER CITY
Date Site Established	19981225

Site Background and Discussion
Middle Tennessee

The Columbia site is located in Maury County, Tennessee and currently supports monitoring for PM2. This site is located south southwest of Nashville and northwest of Lewisburg, Tennessee. This site is up wind from the Nashville MSA area.
PM2.5 monitoring began 12/25/1998 as a part of the original PM 2.5 state network
This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.
This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only PM2.5 site in this region.



	471192007-1
Mean	**8.22735426**
Standard Error	**0.248143559**
Median	**7.6**
Standard Deviation	**3.705573559**
Sample Variance	**13.7312754**
Range	**20.4**
Minimum	**0.8**
Maximum	**21.2**
Count	**223**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Maury	471192007	1600 NASHVILLE HWY Columbia TN	8.2	16

Clarksville 2014 Montgomery County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	1514-C GOLF CLUB LANE Clarksville TN 37	
AQSID	471251009	
County Name	Montgomery	
CBSA	17300	
Lat	36.514712000000003	
Lon	-87.328046999999998	
Parameter Code	88101	88501
Parameter Name	PM2.5	PM2.5 Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Year	2014	2014
Collection Frequency	Daily	Hourly
Method	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective Type	UNKNOWN	UNKNOWN
Dominant Source	0	0
Measurement Scale	NEIGHBORHOOD	NEIGHBORHOOD
Land Use Type	RESIDENTIAL	RESIDENTIAL
Location Setting	SUBURBAN	SUBURBAN
Date Site Established	19970504	19970504

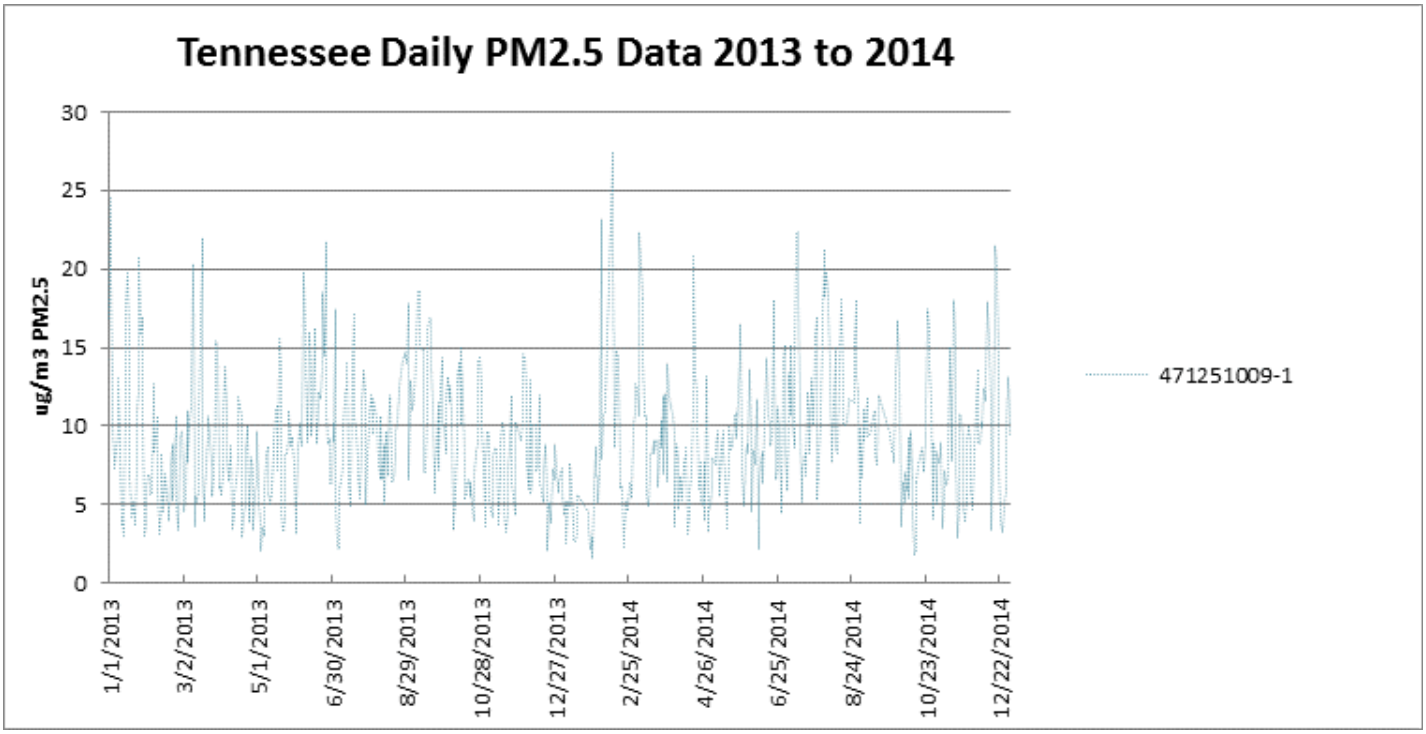
Site Background and Discussion
Middle Tennessee

The Clarksville site is located in Montgomery County, Tennessee and currently supports monitoring for PM2.5. This site is located northwest of Nashville, Tennessee and is located near the Tennessee/Kentucky border. This site is upwind from the Clarksville, TN-KY MSA area. This site is suitable for use in meeting the MSA monitoring requirement for PM2.5 for both Tennessee and Kentucky.

PM2.5 monitoring began 01/01/1998 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 03/10/2008 to assist with the PM Fine AQI forecasting program. The Clarksville MSA area has a single FRM PM2.5 sampler and is not required to operate a PM2.5 site for the MSA.

This site is a candidate site to receive an FEM continuous PM2.5 sampler. This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only PM2.5 site in this region.

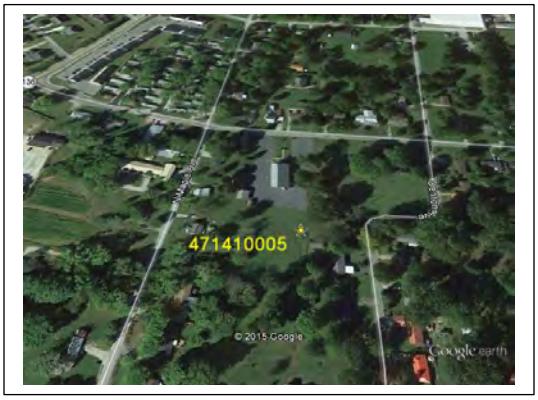
Tennessee is considering removal of the elevated platforms that are a part of the sampling network for safety related concerns and is proposing to place the Clarksville PM2.5 monitoring site on the ground near the existing location the elevated platform now occupies. If a suitable location is not available in the immediate area, Tennessee proposes to relocate the site as close as possible to the previous location. This proposed change is anticipated over the next calendar year and will be preceded by a formal written request to EPA with the relocation details.



471251009-1	
Mean	**9.205162242**
Standard Error	**0.16516545**
Median	**8.6**
Standard Deviation	**4.300649522**
Sample Variance	**18.49558631**
Range	**25.9**
Minimum	**1.6**
Maximum	**27.5**
Count	**678**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Montgomery	471251009	1514-C GOLF CLUB LANE Clarksville TN 37040	9.2	21

Cookeville 2014 Putnam County



Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	630 EAST 20TH STREET Cookeville TN 385
AQSID	471410005
County Name	Putnam
CBSA	18260
Lat	36.185701999999999
Lon	-85.492107000000004
Parameter Code	88101
Parameter Name	PM2.5
Monitor Type	SPM
POC	1
Int	7
Year	2014
Collection Frequency	1 in 3
Method	118
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ
Analysis	GRAVIMETRIC
Ref Mtd ID	RFPS-0498-118
Monitor Objective Type	POPULATION EXPOSURE
Dominant Source	AREA
Measurement Scale	NEIGHBORHOOD
Land Use Type	RESIDENTIAL
Location Setting	SUBURBAN
Date Site Established	20060815

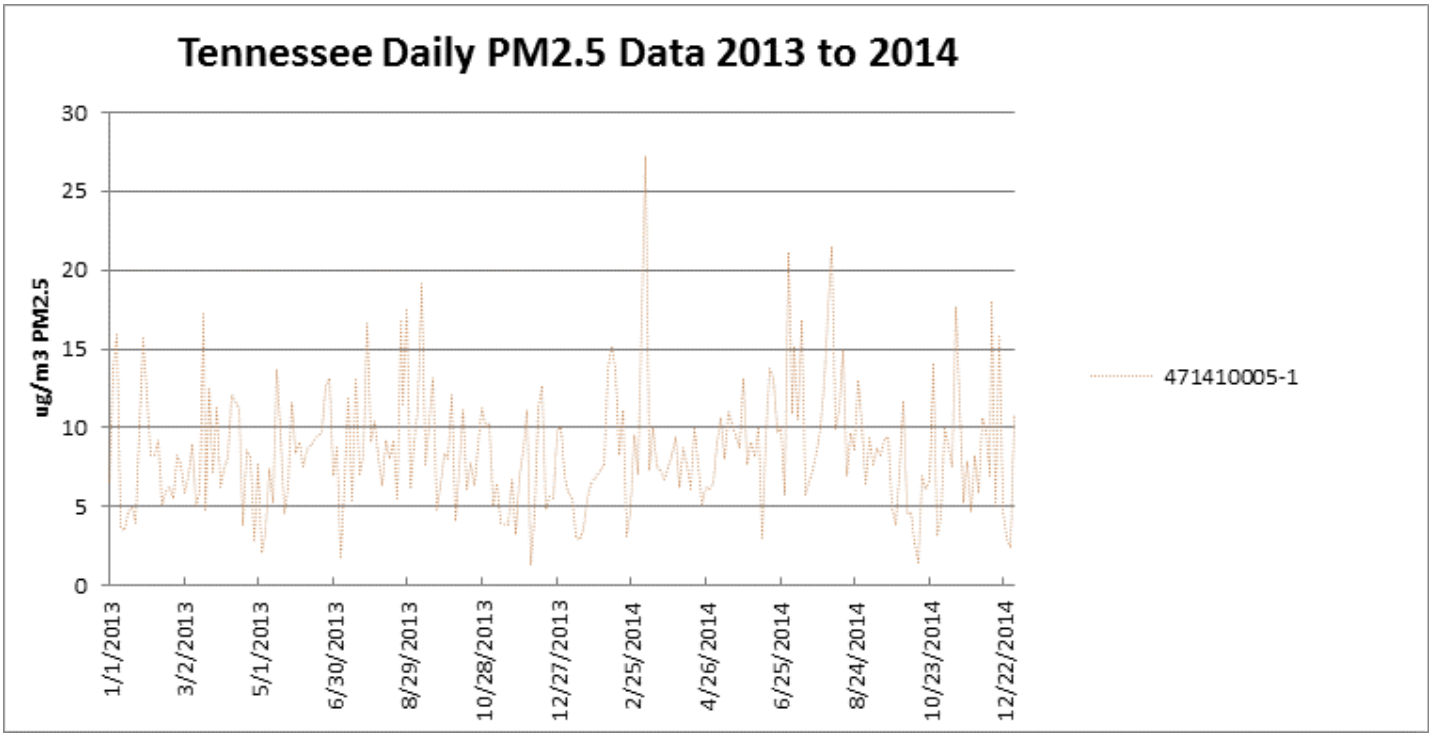
Site Background and Discussion
Middle Tennessee

The Cookeville site is located in Putnam County, Tennessee and currently supports monitoring for PM2. This site is located east of Nashville and northeast of Chattanooga, Tennessee. This site is not located in or near an MSA area.

PM2.5 monitoring began 08/15/2006 after the site was relocated.

This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only PM2.5 site in this region.



471410005-1	
Mean	**8.540707965**
Standard Error	**0.264189285**
Median	**8.05**
Standard Deviation	**3.971635816**
Sample Variance	**15.77389105**
Range	**25.9**
Minimum	**1.3**
Maximum	**27.2**
Count	**226**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Putnam	471410005	630 EAST 20TH STREET Cookeville TN 38501	8.5	19

Harriman 2013 Roane County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	HARRIMAN HIGH 1002 N. ROAN ST Harriman	
AQSID	471450004	
County Name	Roane	
CBSA	25340	
Lat	35.939078000000002	
Lon	-84.542801999999995	
Parameter Code	88101	88501
Parameter Name	PM2.5	PM2.5 Cont
Monitor Type	SPM	SPM
POC	1	3
Int	7	1
Year	2014	2014
Collection Frequency	1 in 3	Hourly
Method	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective Type	UNKNOWN	UNKNOWN
Dominant Source	AREA	AREA
Measurement Scale	0	0
Land Use Type	INDUSTRIAL	INDUSTRIAL
Location Setting	SUBURBAN	SUBURBAN
Date Site Established	19800101	19800101

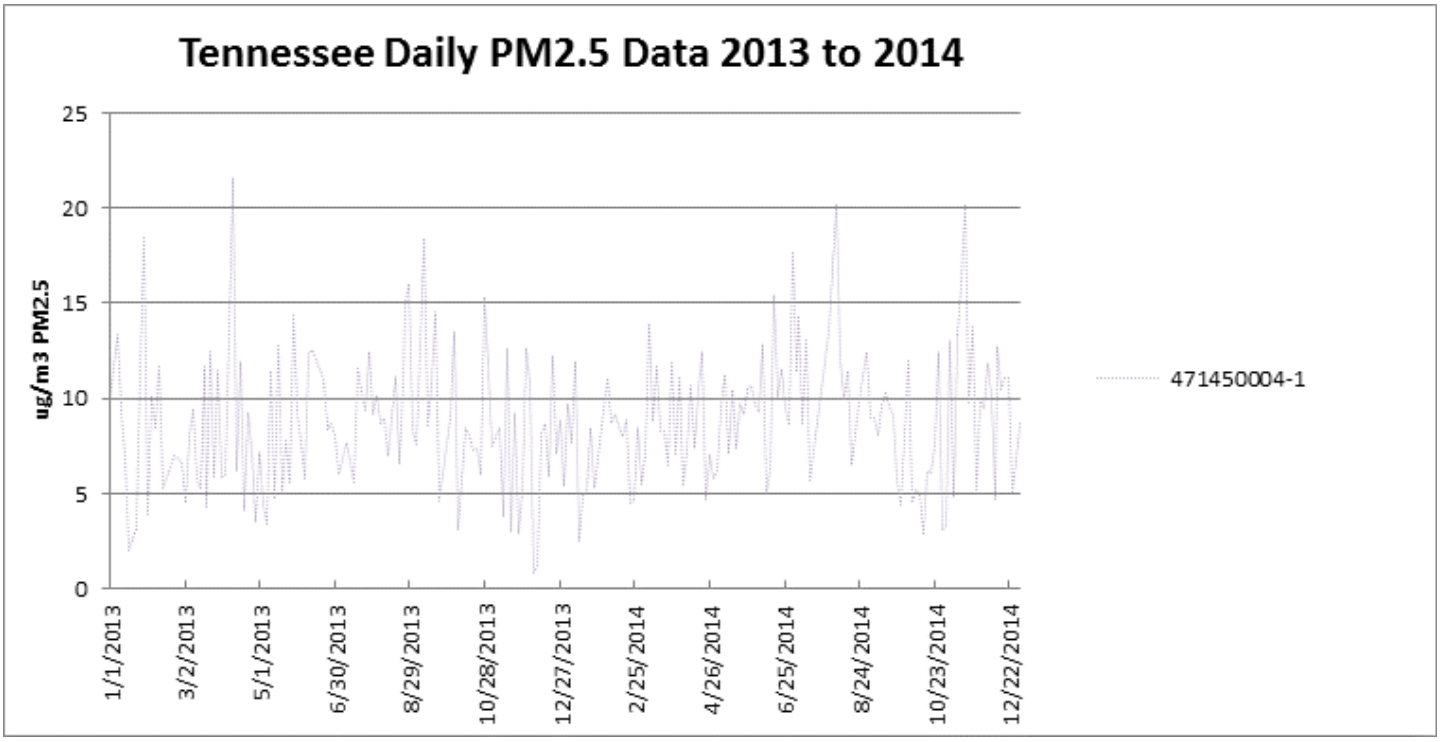
Site Background and Discussion
East Tennessee

The Harriman site is located in Roane County, Tennessee and currently supports monitoring for PM2.5. This site is located west of Knoxville and west southwest of Oak Ridge, Tennessee. This site is upwind from the Knoxville MSA area.

PM2.5 monitoring began 01/01/1998 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program.

This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is in a county containing a partial PM2.5 nonattainment area. The Knoxville MSA has 6 operating PM2.5 FRM sites and is required to have only 2.



471410005-1	
Mean	**8.540707965**
Standard Error	**0.264189285**
Median	**8.05**
Standard Deviation	**3.971635816**
Sample Variance	**15.77389105**
Range	**25.9**
Minimum	**1.3**
Maximum	**27.2**
Count	**226**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Roane	471450004	HARRIMAN HIGH 1002 N. ROAN ST Harriman TN 37748	8.9	18

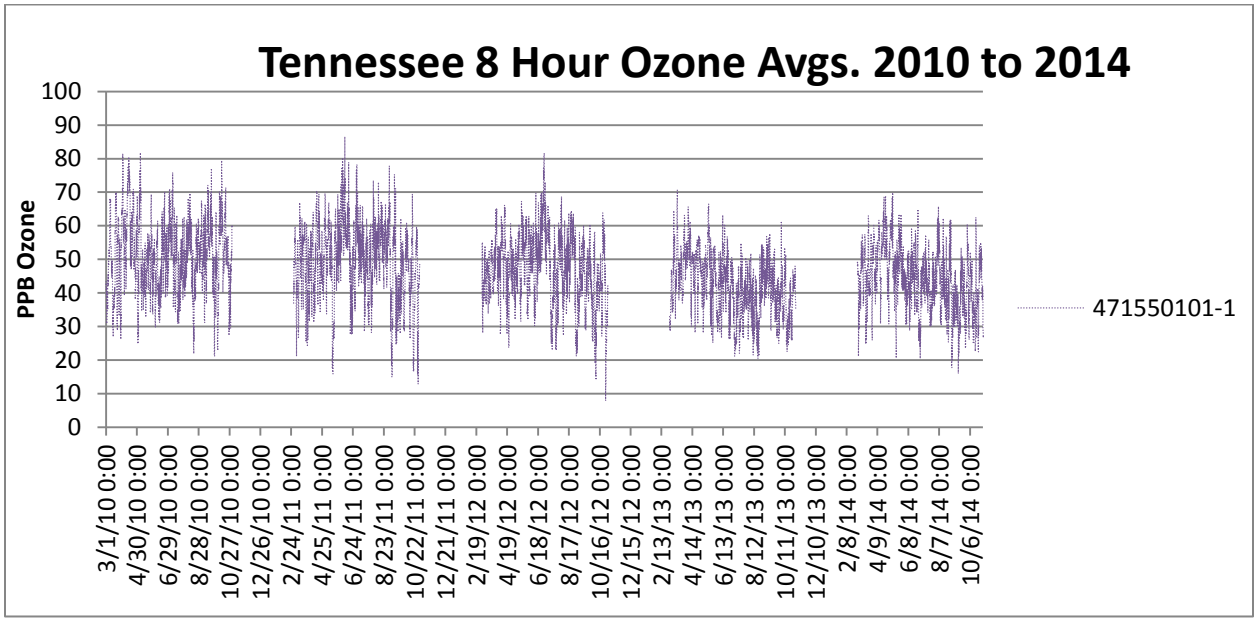
Cove Mountain Sevier County

Rep Org Name	National Park Service
PQAO	745
Address	GREAT SMOKY MOUNTAIN NP COVE MOUNTAIN
AQSID	471550101
County Name	Sevier
CBSA	42940
Lat	35.696666999999998
Lon	-83.609722000000005
Parameter Code	44201
Parameter Name	O3
Monitor Type	NON-EPA FEDERAL
POC	1
Int	W
Year	2014
Collection Frequency	1 in 6
Method	047
FRM/FEM Monitoring Instrument	THERMO ELECTRON 49
Analysis	ULTRA VIOLET
Ref Mtd ID	EQOA-0880-047
Monitor Objective Type	GENERAL/BACKGROUND
Dominant Source	AREA
Measurement Scale	NEIGHBORHOOD
Land Use Type	FOREST
Location Setting	RURAL
Date Site Established	19880701

Site Background and Discussion
East Tennessee

The Cove Mt. site is located in Sevier County, Tennessee and currently supports monitoring for ozone and meteorological parameters. This site is located within the Tennessee portion of the Great Smoky Mtns. National Park. This site is outside and southeast of the Knoxville MSA area. Ozone monitoring began 07/01/1988 and this site is used with the ozone AQI forecasting program for verification and to help address ozone levels found in the GSMNP area.

This site is operated and maintained by the NPS and will likely remain in operation over the next 5 years (2015 thru 2020), subject to funding support from the NPS.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471550101-1	
Mean	**46.84535951**
Standard Error	**0.062857535**
Median	**47**
Standard Deviation	**10.73558125**
Sample Variance	**115.2527049**
Range	**78.625**
Minimum	**7.875**
Maximum	**86.5**
Count	**29170**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
155	471550101-1	2012 - 2014	GREAT SMOKY MOUNTAIN NP COVE MOUNTAIN	98	68

Kingsport 2014 Sullivan County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	1649 D STREET Kingsport TN 37664	
AQSID	471631007	
County Name	Sullivan	
CBSA	28700	
Lat	36.538761999999998	
Lon	-82.521564999999995	
Parameter Code	88101	88501
Parameter Name	PM2.5	PM2.5 Cont
Monitor Type	SLAMS	SPM
POC	1	3
Int	7	1
Year	2014	2014
Collection Frequency	1 in 3	Hourly
Method	118	716
FRM/FEM Monitoring Instrument	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	RFPS-0498-118	None
Monitor Objective Type	POPULATION EXPOSURE	POPULATION EXPOSURE
Dominant Source	0	0
Measurement Scale	URBAN SCALE	URBAN SCALE
Land Use Type	RESIDENTIAL	RESIDENTIAL
Location Setting	SUBURBAN	SUBURBAN
Date Site Established	19981001	19981001

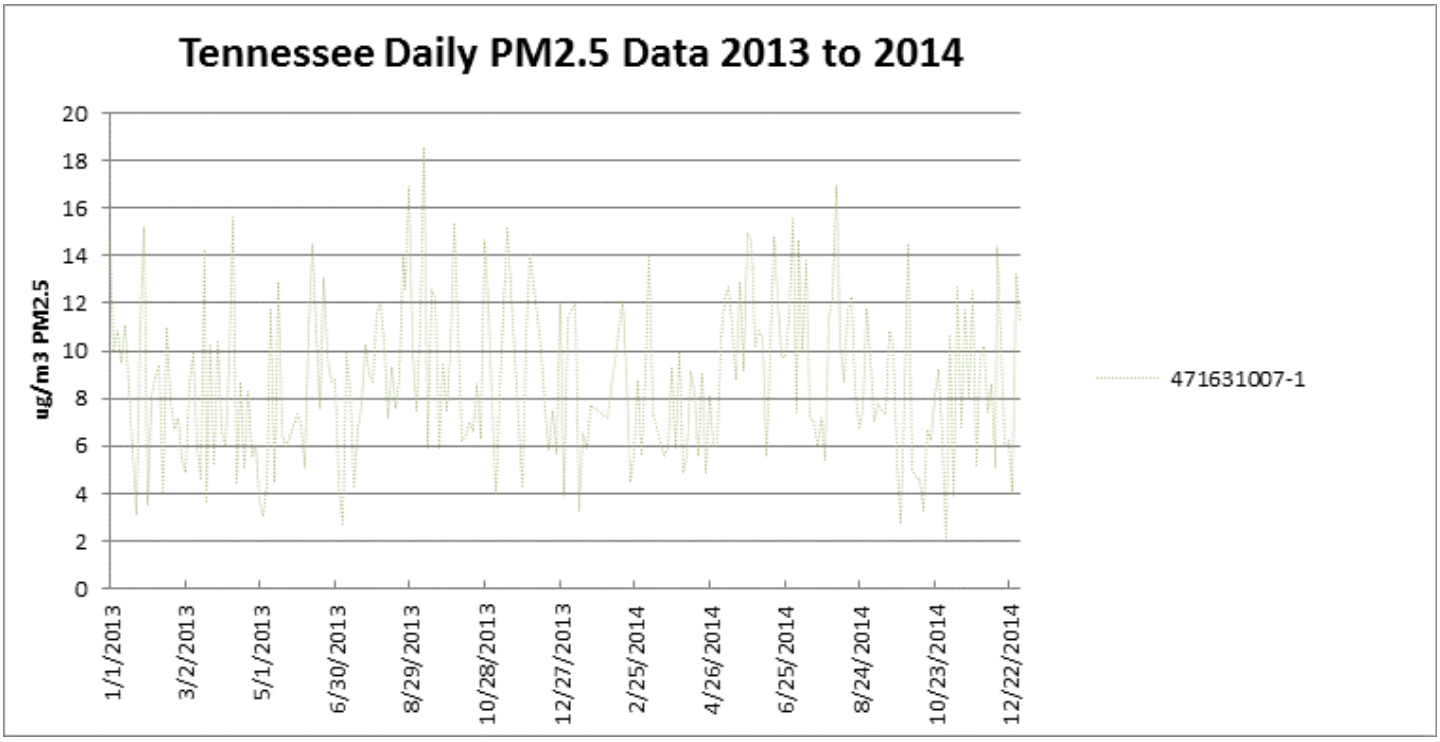
Site Background and Discussion
East Tennessee

The Kingsport site is located in Sullivan County, Tennessee and currently supports monitoring for PM2.5. This site is located in the far northeast corner of the state and is south of the state of Virginia on the Tennessee Virginia line. This site is upwind of Gate City, VA and downwind from the Johnson City MSA area. Kingsport is also a part of the Kingsport Bristol MSA.

PM2.5 monitoring began 10/01/1998 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2005 to assist with the PM Fine AQI forecasting program. The Kingsport MSA area has a single FRM PM2.5 sampler and is not required to operate a PM2.5 site for the MSA.

This site is a candidate site to receive an FEM continuous PM2.5 sampler (2016/2017) and at such time the FRM sampler will be retired.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the only PM2.5 site in this region.



471631007-1	
Mean	**8.706756757**
Standard Error	**0.222792225**
Median	**8.45**
Standard Deviation	**3.319529395**
Sample Variance	**11.01927541**
Range	**16.5**
Minimum	**2.1**
Maximum	**18.6**
Count	**222**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Sullivan	471631007	1649 D STREET Kingsport TN 37664	8.6	15

Blountville 2014 Sullivan County

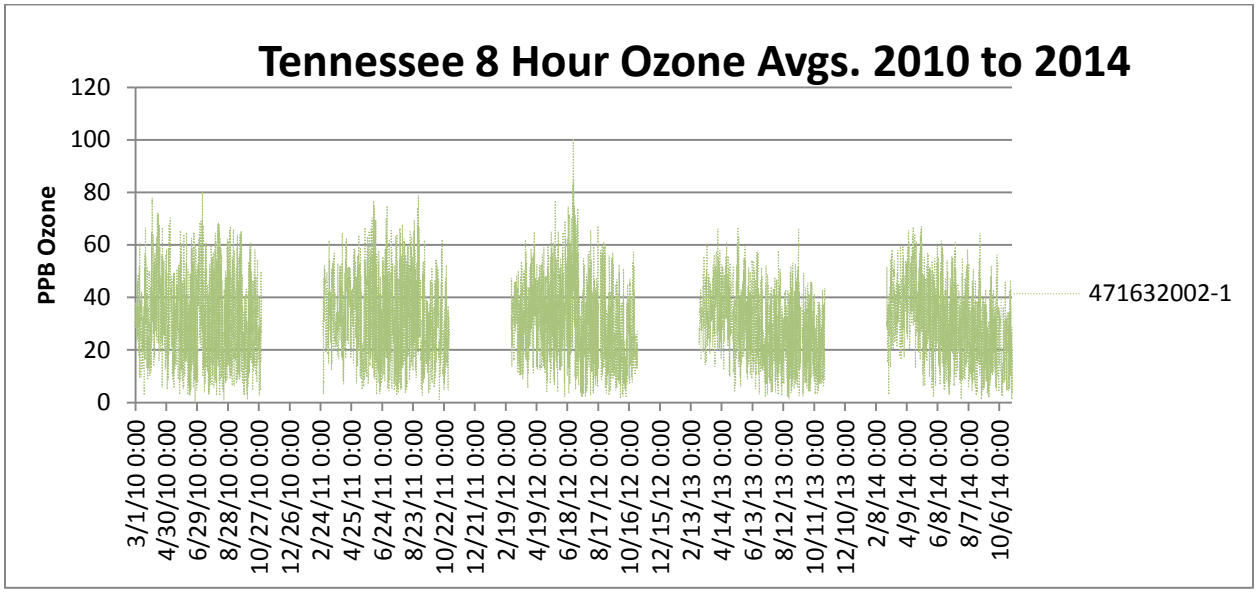
Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	Indian Springs School Shawnee Ave Bloun
AQSID	471632002
County Name	Sullivan
CBSA	28700
Lat	36.541438999999997
Lon	-82.424824000000001
Parameter Code	44201
Parameter Name	O3
Monitor Type	SLAMS
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	087
FRM/FEM Monitoring Instrument	MODEL 400 OZONE ANALYZER
Analysis	ULTRA VIOLET ABSORPTION
Ref Mtd ID	EQOA-0992-087
Monitor Objective Type	POPULATION EXPOSURE
Dominant Source	AREA
Measurement Scale	NEIGHBORHOOD
Land Use Type	RESIDENTIAL
Location Setting	RURAL
Date Site Established	19800101

Site Background and Discussion
East Tennessee

The Blountville site is located in Sullivan County, Tennessee and currently supports monitoring for ozone. This site is located east of Kingsport and near the Virginia state line. This site is downwind from the Johnson City MSA area.

Ozone monitoring began 01/01/1980 and this site is used with the ozone AQI forecasting program for verification and to help address the ozone impacts in the Kingsport - Bristol and Johnson City MSA area. The Kingsport MSA has 2 ozone site operating and is required to have only 1 ozone site.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is located in a downwind area near Kingsport.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471632002-1	
Mean	**31.06466472**
Standard Error	**0.084555465**
Median	**30.625**
Standard Deviation	**14.39654574**
Sample Variance	**207.2605293**
Range	**100.2142857**
Minimum	**0.285714286**
Maximum	**100.5**
Count	**28989**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
163	471632002-1	2012 - 2014	Indian Springs School Shawnee Ave Blountville TN	97	68

Kingsport 2014 Sullivan County

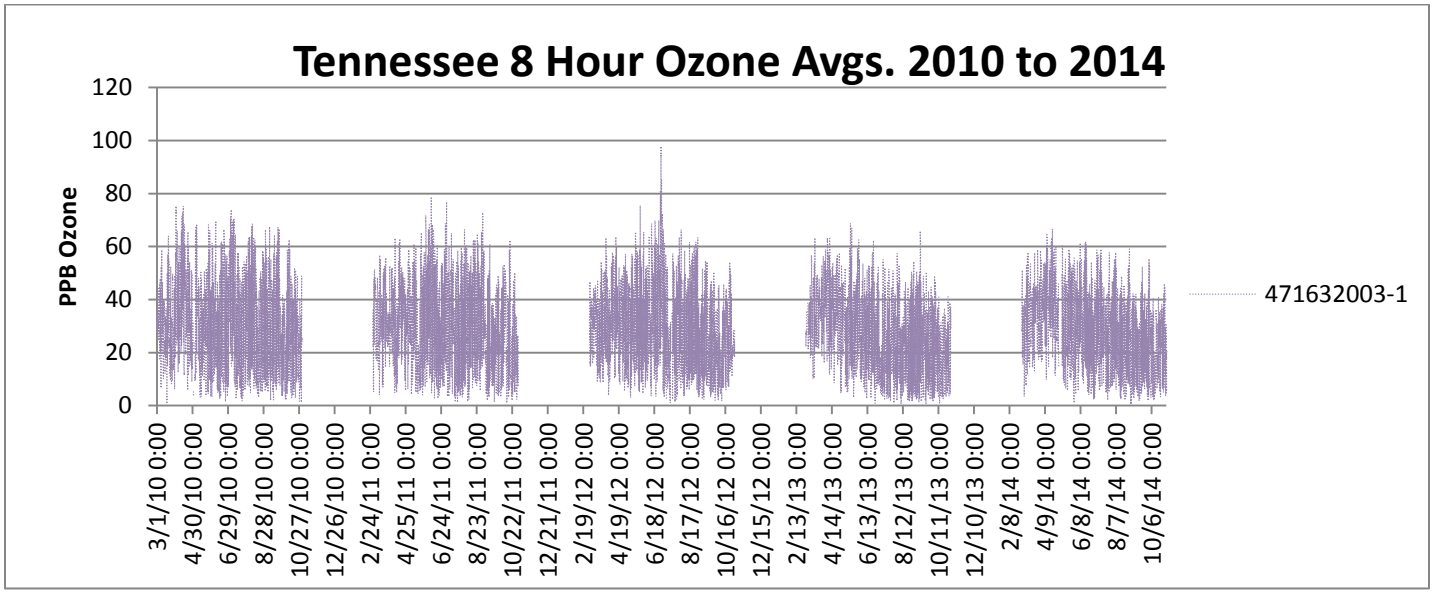
Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	3301 BLOOMINGDALE RD. Kingsport TN 3762
AQSID	471632003
County Name	Sullivan
CBSA	28700
Lat	36.58211
Lon	-82.485742000000002
Parameter Code	44201
Parameter Name	O3
Monitor Type	SLAMS
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	087
FRM/FEM Monitoring Instrument	MODEL 400 OZONE ANALYZER
Analysis	ULTRA VIOLET ABSORPTION
Ref Mtd ID	EQOA-0992-087
Monitor Objective Type	POPULATION EXPOSURE
Dominant Source	0
Measurement Scale	NEIGHBORHOOD
Land Use Type	RESIDENTIAL
Location Setting	SUBURBAN
Date Site Established	19950401

Site Background and Discussion
East Tennessee

The Kingsport site is located in Sullivan County, Tennessee and currently supports monitoring for ozone. This site is located in the far northeast corner of the state and is south of the state of Virginia on the Tennessee Virginia line. This site is upwind of Gate City, VA and downwind from the Johnson City MSA area. Kingsport is also a part of the Kingsport Bristol MSA

Ozone monitoring began 04/01/1995 and this site is used with the ozone AQI forecasting program for verification and to help address the Kingsport Bristol MSA area. The Kingsport MSA has 2 ozone site operating and is required to have only 1 ozone site.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is located in the Kingsport area.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471632003-1	
Mean	**29.01110389**
Standard Error	**0.087013842**
Median	**28.28571429**
Standard Deviation	**14.81255728**
Sample Variance	**219.4118533**
Range	**97.4047619**
Minimum	**0.428571429**
Maximum	**97.83333333**
Count	**28979**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
163	471632003-1	2012 - 2014	3301 BLOOMINGDALE RD. Kingsport TN 37620	98	66

Exide 2013 Sullivan County

Rep Org Name	Tennessee Division Of Air Pollution Control	
PQAO	1025	
Address	364 Exide Dr Bristol TN 37620	
AQSID	471633004	
County Name	Sullivan	
CBSA	28700	
Lat	36.524433000000002	
Lon	-82.27261	
Parameter Code	14129	14129
Parameter Name	Pb	Pb
Monitor Type	SLAMS	SLAMS
POC	1	2
Int	7	7
Year	2014	2014
Collection Frequency	1 in 6	1 in 6
Method	192	192
FRM/FEM Monitoring Instrument	Pb-TSP/ICP SPECTRA (ICP-MS)	Pb-TSP/ICP SPECTRA (ICP-MS)
Analysis	Inductively Coupled Plasma-Mass Spectrometry Acid filter extract with hot nitric acid	Inductively Coupled Plasma-Mass Spectrometry Acid filter extract with hot nitric acid
Ref Mtd ID	EQL-0710-192	EQL-0710-192
Monitor Objective Type	SOURCE ORIENTED	SOURCE ORIENTED
Dominant Source	POINT	POINT
Measurement Scale	URBAN SCALE	URBAN SCALE
Land Use Type	INDUSTRIAL	INDUSTRIAL
Location Setting	URBAN AND CENTER CITY	URBAN AND CENTER CITY
Date Site Established	20100101	20100101

Site Background and Discussion
East Tennessee

The Exide site is located in Sullivan County, Tennessee and currently supports monitoring for lead. This site is located east of Kingsport and northeast of Blountville on the Tennessee Virginia state lines. This site is downwind from Johnson City and Blountville and is located in the Kingsport Bristol MSA area. Lead monitoring began 01/01/2010 and this site is used to verify lead NAAQS compliance at a now shutdown lead battery plant. This site is an industrial oriented site helping to define the lead air quality in the Kingsport Sullivan county lead nonattainment area.
This site will be recommended to remain in operation over the next 2 years (2015 thru 2017) primarily to demonstrate lead NAAQS compliance.

Hendersonville 2014 Sumner County

Rep Org Name	Tennessee Division Of Air Pollution Control			
PQAO	1025			
Address	ROCKLAND RECREATION AREA-OLD HICKORY DAM			
AQSID	471650007			
County Name	Sumner			
CBSA	34980			
Lat	36.297559999999997			
Lon	-86.653137000000001			
Parameter Code	44201	88101	88101	88501
Parameter Name	O3	PM2.5	PM2.5	PM2.5 Cont
Monitor Type	SLAMS	SLAMS	SLAMS	SPM
POC	1	1	2	3
Int	W	7	7	1
Year	2014	2014	2014	2014
Collection Frequency	Hourly	1 in 3	1 in 3	Hourly
Method	047	118	118	716
FRM/FEM Monitoring Instrument	THERMO ELECTRON 49	R & P CO PLUS MODEL 2025PM SEQ	R & P CO PLUS MODEL 2025PM SEQ	None
Analysis	ULTRA VIOLET	GRAVIMETRIC	GRAVIMETRIC	TEOM Gravimetric 50 deg C
Ref Mtd ID	EQOA-0880-047	RFPS-0498-118	RFPS-0498-118	None
Monitor Objective Type	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Dominant Source	AREA	AREA	AREA	AREA
Measurement Scale	NEIGHBORHOOD	NEIGHBORHOOD	NEIGHBORHOOD	NEIGHBORHOOD
Land Use Type	INDUSTRIAL	INDUSTRIAL	INDUSTRIAL	INDUSTRIAL
Location Setting	RURAL	RURAL	RURAL	RURAL
Date Site Established	19730101	19730101	19730101	19730101

Site Background and Discussion
Middle Tennessee

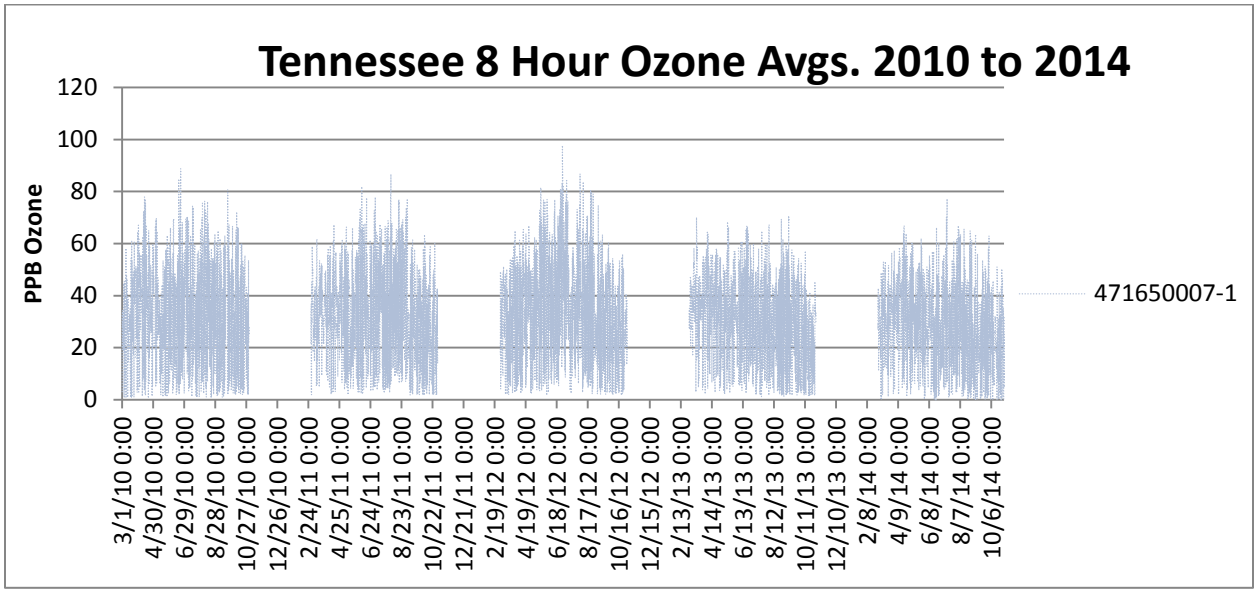
The Hendersonville site is located in Sumner County, Tennessee and currently supports monitoring for ozone and PM2.5. This site is located northeast of Nashville and west southwest of Gallatin, Tennessee. This site is downwind from the core Nashville MSA area.

Ozone monitoring began 01/01/1973 and this site is used with the ozone AQI forecasting program for verification and to help address NAAQS compliance in the Nashville MSA area. Sumner county is part of the Nashville MSA.

PM2.5 monitoring began 10/01/1998 as a part of the original PM 2.5 state network. Continuous PM2.5 monitoring using a non FRM/FEM method was added 01/01/2003 to assist with the PM Fine AQI forecasting program.

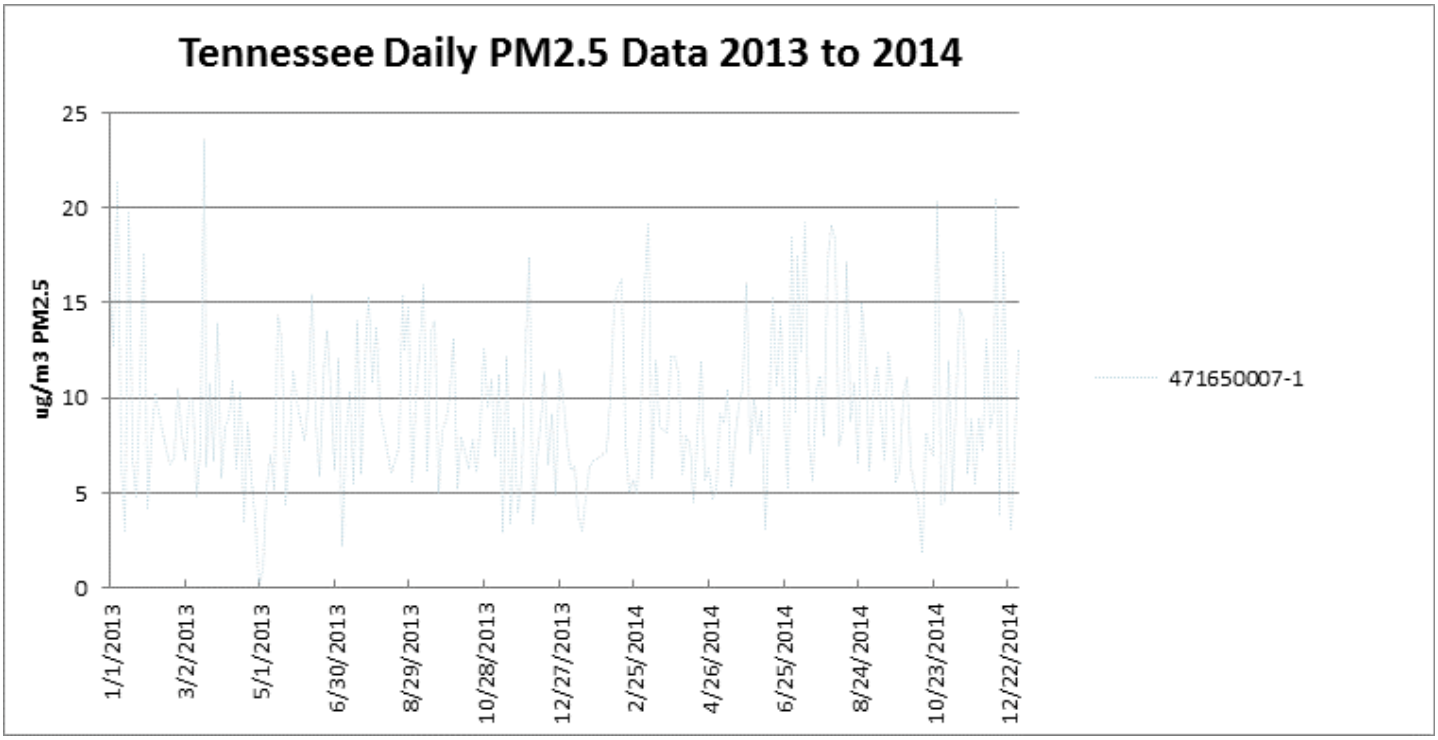
This site is a candidate site to receive an FEM continuous PM2.5 sampler.

This site will be recommended to remain in operation over the next 5 years (2015 thru 2020) primarily because it is the ozone DV site for the Nashville MSA area and is downwind from the Nashville fine particulate precursor sources. The Nashville MSA has 5 ozone monitors operating and is only required to have 2.



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471650007-1	
Mean	**31.46773485**
Standard Error	**0.09583767**
Median	**31.42857143**
Standard Deviation	**16.35345657**
Sample Variance	**267.4355417**
Range	**97.75**
Minimum	**0**
Maximum	**97.75**
Count	**29117**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
165	471650007-1	2012 - 2014	ROCKLAND RECREATION AREA-OLD HICKORY DAM Army Corp of Engineer Property	99	72



471650007-1	
Mean	**9.322746781**
Standard Error	**0.276985528**
Median	**8.6**
Standard Deviation	**4.228000588**
Sample Variance	**17.87598897**
Range	**23.5**
Minimum	**0.1**
Maximum	**23.6**
Count	**233**

2013 to 2014 Preliminary PM2.5 Design Values for Consideration in Nonattainment Briefings			Annual Standard Design Values	24-hour Design Values
County	**Site ID**	**STREET ADDRESS**	**(2013 - 2014)**	**(2013 - 2014)**
Sumner	471650007	ROCKLAND RECREATION AREA-OLD HICKORY DAM Army Corp of Engineer Property	9.3	20

Luttrell 2013 Union County

Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	640 DONAHUE ROAD Luttrell 37779
AQSID	471730107
County Name	Union
CBSA	28940
Lat	36.224024
Lon	-83.714841000000007
Parameter Code	81102
Parameter Name	PM10
Monitor Type	SPM
POC	1
Int	X
Year	2014
Collection Frequency	Hourly
Method	079
FRM/FEM Monitoring Instrument	RUPRCHT&PATSHNCK TEOM SER 1400
Analysis	TEOM-GRAVIMETRIC
Ref Mtd ID	EQPM-1090-079
Monitor Objective Type	UNKNOWN
Dominant Source	0
Measurement Scale	0
Land Use Type	AGRICULTURAL
Location Setting	RURAL
Date Site Established	19961025

Site Background and Discussion
East Tennessee

The Luttrell site is located in Union County, Tennessee and currently supports monitoring for PM10. This site is located north of Knoxville and west southwest of Morristown, Tennessee. This site is downwind wind from the Knoxville MSA area. This site was established initially as a complaint monitoring site near the Luttrell Lime facility in 1996 and provided with a continuous TEOM particulate monitor in 1997.

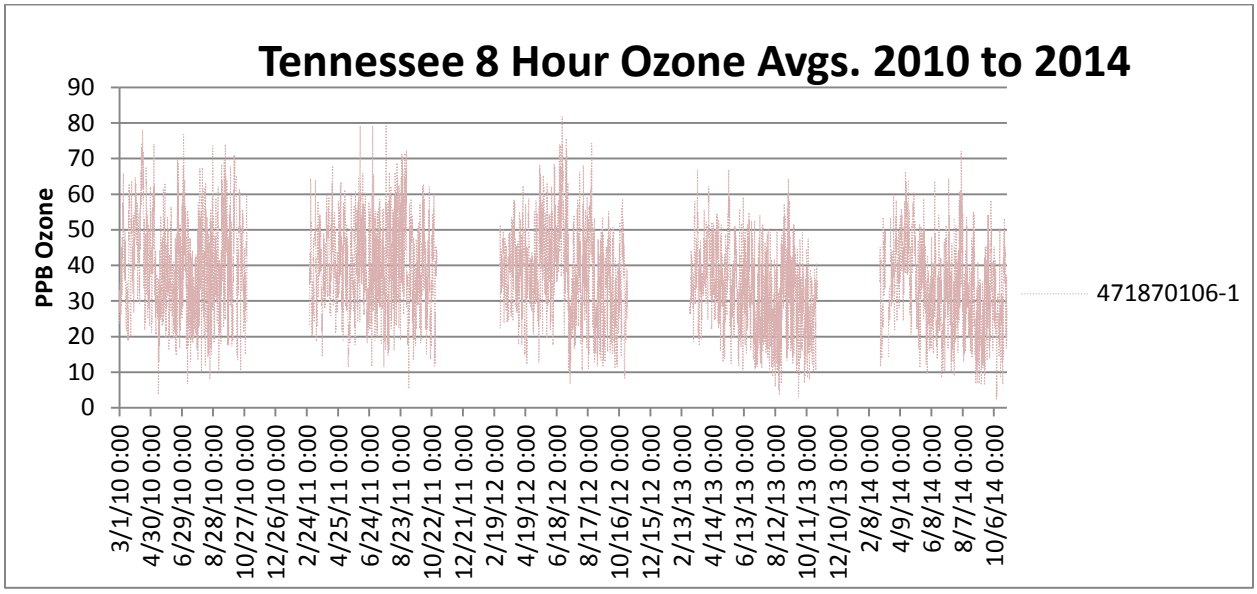
This site will be recommended to not remain in operation over the next 5 years (2015 thru 2020) primarily because the area is attaining the PM10 NAAQS and has historically met the revised 24 hour level over the past 3 years of operation.

Fairview 2014 Williamson County

Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	FAIRVIEW MIDDLE SCHOOL CROW CUT ROAD F
AQSID	471870106
County Name	Williamson
CBSA	34980
Lat	35.951534000000002
Lon	-87.137005000000002
Parameter Code	44201
Parameter Name	O3
Monitor Type	SLAMS
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	047
FRM/FEM Monitoring Instrument	THERMO ELECTRON 49
Analysis	ULTRA VIOLET
Ref Mtd ID	EQOA-0880-047
Monitor Objective Type	POPULATION EXPOSURE
Dominant Source	AREA
Measurement Scale	URBAN SCALE
Land Use Type	AGRICULTURAL
Location Setting	RURAL
Date Site Established	19970411

Site Background and Discussion
Middle Tennessee

The Fairview site is located in Williamson County, Tennessee and currently supports monitoring for ozone. This site is located southwest of Nashville and northwest of Franklin, Tennessee. This site is upwind from the core Nashville MSA area.
Ozone monitoring began 10/30/2001 and this site is used by the ozone AQI forecasting program for verification and to help address upwind ozone concentrations entering the Nashville MSA area. The Nashville MSA has 5 ozone sites operating and is only required to have 2.
Because of the importance this site serves in assessing the area ozone levels outside and upwind of the Nashville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471650007-1	
Mean	**31.46773485**
Standard Error	**0.09583767**
Median	**31.42857143**
Standard Deviation	**16.35345657**
Sample Variance	**267.4355417**
Range	**97.75**
Minimum	**0**
Maximum	**97.75**
Count	**29117**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
187	471870106-1	2012 - 2014	FAIRVIEW MIDDLE SCHOOL CROW CUT ROAD Fairview TN 37062	98	66

Cedars of Lebanon 2013 Wilson County

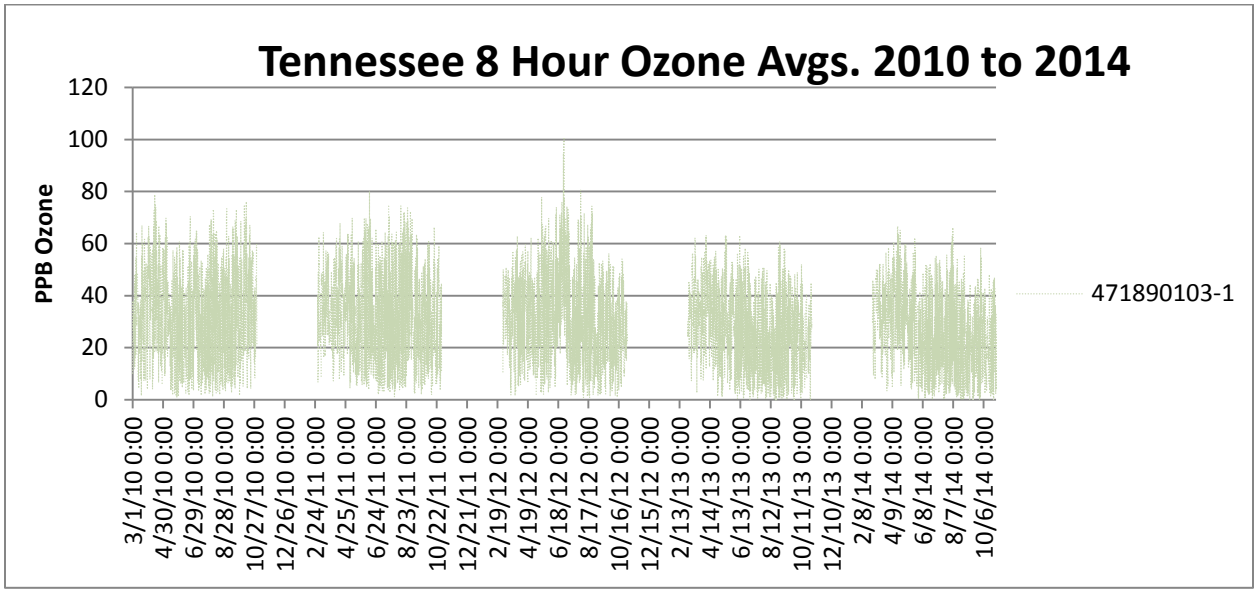
Rep Org Name	Tennessee Division Of Air Pollution Control
PQAO	1025
Address	CEDARS OF LEBANON STATE PARK
AQSID	471890103
County Name	Wilson
CBSA	34980
Lat	36.060833000000002
Lon	-86.286260999999996
Parameter Code	44201
Parameter Name	O3
Monitor Type	SLAMS
POC	1
Int	W
Year	2014
Collection Frequency	Hourly
Method	047
FRM/FEM Monitoring Instrument	THERMO ELECTRON 49
Analysis	ULTRA VIOLET
Ref Mtd ID	EQOA-0880-047
Monitor Objective Type	UNKNOWN
Dominant Source	AREA
Measurement Scale	URBAN SCALE
Land Use Type	FOREST
Location Setting	RURAL
Date Site Established	19880501

Site Background and Discussion
Middle Tennessee

The Cedars site is located in Wilson County, Tennessee and currently supports monitoring for ozone. This site is located east of Nashville and north of Murfreesboro, Tennessee. This site is downwind from Franklin and is located within the Nashville MSA area.

Ozone monitoring began 05/01/1988 and this site is used with the ozone AQI forecasting program for verification and to help address downwind ozone levels in the Nashville MSA area. The Nashville MSA has 5 ozone sites operating and is only required to have 2.

Because of the importance this site serves in assessing the area ozone levels outside and downwind of the Nashville area, this site will be recommended to remain in operation over the next 5 years (2015 thru 2020).



Tennessee 8 Hour Ozone Statistics 2010 to 2014 Datasets	
471890103-1	
Mean	**30.2061755**
Standard Error	**0.091370002**
Median	**29.75**
Standard Deviation	**15.48337413**
Sample Variance	**239.7348744**
Range	**100.375**
Minimum	**0**
Maximum	**100.375**
Count	**28716**

County Code	AQS ID	Design Value Year	STREET ADDRESS	3-Year Percent Complete	3-Year Design Value
189	471890103-1	2012 - 2014	CEDARS OF LEBANON STATE PARK	96	67

Tennessee Geographic Regions, Descriptions and Climate

Climate of Tennessee

Topographic Features - The topography of Tennessee is quite varied, stretching from the lowlands of the Mississippi Valley to the mountain peaks in the east. The westernmost part of the State, between the bluffs overlooking the Mississippi River and western valley of the Tennessee River, is a region of gently rolling plains sloping gradually from 200 to 250 feet in the west to about 600 feet above sea level in the hills overlooking the Tennessee River. The hilly Highland Rim, in a wide circle touching the Tennessee River Valley in the west and the Cumberland Plateau in the east, together with the enclosed Central Basin make up the whole of Middle Tennessee. The Highland Rim ranges from about 600 feet in elevation along the Tennessee River to 1,000 feet in the east and rises 300 to 400 feet above the Central Basin which is a rolling plain of about 600 feet average elevation, but with a crescent of hills reaching to over 1,000 feet south of Nashville. The Cumberland Plateau, with an average elevation of 2,000 feet extends roughly northeast-southwest across the State in a belt 30 to 50 miles wide, being bounded on the west by the Highland Rim and overlooking the Great Valley of East Tennessee on the east. The Great Valley, paralleling the Plateau to the west and the Great Smoky Mountains to the east, is a funnel shaped valley varying in width from about 30 miles in the south to about 90 miles in the north. Within the valley, which slopes from 1,500 feet in the north to 700 feet in the south, is a series of northeast-southwest ridges. Along the Tennessee-North Carolina border lie the Great Smoky Mountains, the most rugged and elevated portion of Tennessee, with numerous peaks from 4,000 to 6,000 feet.

Tennessee, except for a small area east of Chattanooga, lies entirely within the drainage of the Mississippi River system. The extreme western section of the State is drained through several relatively small rivers directly into the Mississippi River. Otherwise, drainage is into either the Cumberland or Tennessee Rivers, both of which flow northward near the end of their courses to join the Ohio River along the Kentucky-Illinois border. The Cumberland River, which drains north-central portions of Tennessee rises in the Cumberland Mountains in Kentucky, flows southwestward, then south into Tennessee reaching the Nashville area before tuning northward to re-enter Kentucky. The Tennessee River is formed by the juncture of the Holston and French Broad rivers at Knoxville. It flows southwesterly along the Alabama-Mississippi line, and then flows northward across the State into Kentucky. Besides the headwater streams, other important tributaries include the: Clinch, Little Tennessee, Hiawassee, Elk and Duck Rivers.

Temperature - Most aspects of the State's climate are related to the widely varying topography within its borders. The decrease of temperature with elevation is quite apparent, amounting to, on the average, three degrees Fahrenheit (°F) per 1,000 feet increase in elevation. Thus higher portions of the State, such as the Cumberland Plateau and the mountains of the east, have lower average temperature than the Great Valley of East Tennessee, which they flank, and other lower parts of the State. In the Great Valley temperature increases from north to south, reaching a value at the south end comparable to that of Middle and West Tennessee where elevation variations are a generally minor consideration. Across the State, the average annual temperature varies from over 62° F in the extreme southwest to near 45 degrees atop the highest peaks of the east. It is of interest to note that average January temperature atop a 6,000 foot peak in the Great Smokies is equivalent to that in Central Ohio, while average July temperature is duplicated along the southern edge of the Hudson Bay in Canada. While most of the State can be described as having warm, humid summers and mild winters, this must be qualified to include variations with elevation. Thus with increasing elevation, summers become cooler and more pleasant while winters become colder and more blustery.

This dependence of temperature on elevation is of considerable importance to a variety of interests. Temperature, together with precipitation, plays an important role in determination what plant and animal life are adaptable to the area. In the Great Smoky Mountains, forexample, the variations in elevation from 1,000 to 6,000 feet with attendant variations in temperature contribute to a remarkable variety of plant life. The relative coolness of the mountains also contributes to the popularity of that area during the warmer part of the year.

Length of growing season is linked to topography in a way similar to temperature, varying from an average of 237 days at low-lying Memphis to a near 130 days on the highest mountains in the east. Most of the State is included in the range of 180 to 220 days. Shorter growing seasons than this are confined to the mountains forming the State's eastern border and to the northern part of the Cumberland Plateau. Longer growing seasons are found in counties bordering the Mississippi River, parts of the Central Basin of the Middle Tennessee, and the southern end of the Great Valley of East Tennessee.

Precipitation - Since the principal source of moist air for this area is the Gulf of Mexico, there exists a gradual decrease of average precipitation from south to north. This effect is largely obscured however, by the overruling influence of topography. Air forced to ascend, cools and condenses out a portion of its moisture. Thus, average precipitation ranges from 46 to 54 inches, increasing from Mississippi bottomlands to the slight hills farther east. In Middle Tennessee the variation is from a minimum of 45 inches in the Central Basin to 50 to 55 inches in the surrounding hilly Highland Rim. Over the elevated Cumberland Plateau average annual precipitation is generally from 50 to 55 inches. In contrast, average annual precipitation in the Great Valley of East Tennessee increases from near 40 inches in northern portions to over 50 inches in the south. The northern minimum, lowest for the entire State, results from the shielding influence of the Great Smoky Mountains to the southeast and the Cumberland Plateau to the northwest. The mountainous eastern border of the State is the wettest, having average annual precipitation ranging up to 80 inches on the higher, and well-exposed peaks of the Smokies.

Over most of the State, the greatest precipitation occurs during the winter and early spring due to the more frequent passage of large-scale storms over and near the State during those months. A secondary maximum of precipitation occurs in midsummer in response to thunderstorm activity. This is especially pronounced in the mountains of the east where July rainfall exceeds the precipitation of any other month. Lightest precipitation, observed in the fall, is brought about by the maximum occurrence of slow moving, rain suppressing high pressure areas. Although all parts of Tennessee are generally well supplied with precipitation, there occurs on the average one or more prolonged dry spells each year during summer and fall. Studies illustrate the beneficial effects of supplemental irrigation of crops, despite usually bountiful annual precipitation.

Average annual snowfall varies from four to six inches in the southern and western parts of the State and in most of the Great Valley of East Tennessee to more than 10 inches over the northern Cumberland Plateau and the mountains of the east. Over most of the State, due to relatively mild winter temperatures, snow cover rarely persists for more than a few days.

The most important flood season is during the winter and early spring when the frequent migratory storms bring general rains of high intensity. During this period both widespread flooding and local flash floods can occur. During the summer, heavy thunderstorm rains frequently result in local flash flooding. In the fall, while flood producing rains are rare, a decadent tropical system on occasion causes serious floods. The numerous dams constructed along the Tennessee and Cumberland rivers are major features in the control of flood waters in the State.

The dams of the Tennessee and Cumberland River systems and the lakes so formed, in addition to vastly reducing flood damage have: facilitated water transportation, provided abundant low cost hydroelectric power and created extensive recreation areas. Fishing, boating, swimming and camping along the many lakes, together with the several state and national parks, have made tourism one of the major industries in the State.

Climate and the Economy - Water resources of Tennessee have been a major factor in the State's industrial growth. The bountiful and good quality water supply has influenced the location of industry, especially chemical processing plants. Three major waterways, the Mississippi, Cumberland and Tennessee Rivers, are suitable for commercial traffic. Finally, the availability of low cost hydroelectric power from the multipurpose dams of the Cumberland and Tennessee rivers and tributaries has been stimulus to industry of all types. The principal types of manufacturing products are: textile mill products, primary metals, fabricated metals and lumber products.

Although surpassed in monetary value by industrial activity, agriculture remains a vital feature of Tennessee's economic life. The wide range of climates in Tennessee, from river bottom to mountaintop, coupled with a wide range of soils, has resulted in a large number of crops which thrive in the State.

Forests represent an additional important segment of Tennessee's natural resources related to the climate of the State. Timberland, containing principally hardwood types, covers approximately one-half of the total area of Tennessee. This has led to a highly diversified woodworking industry and made the area around Memphis the center of production for wood flooring. The temperate climate of the State is very favorable for logging operations, allowing full-scale activity during nine months of the year and to a lesser extent during the winter months.

Climate descriptions of Tennessee

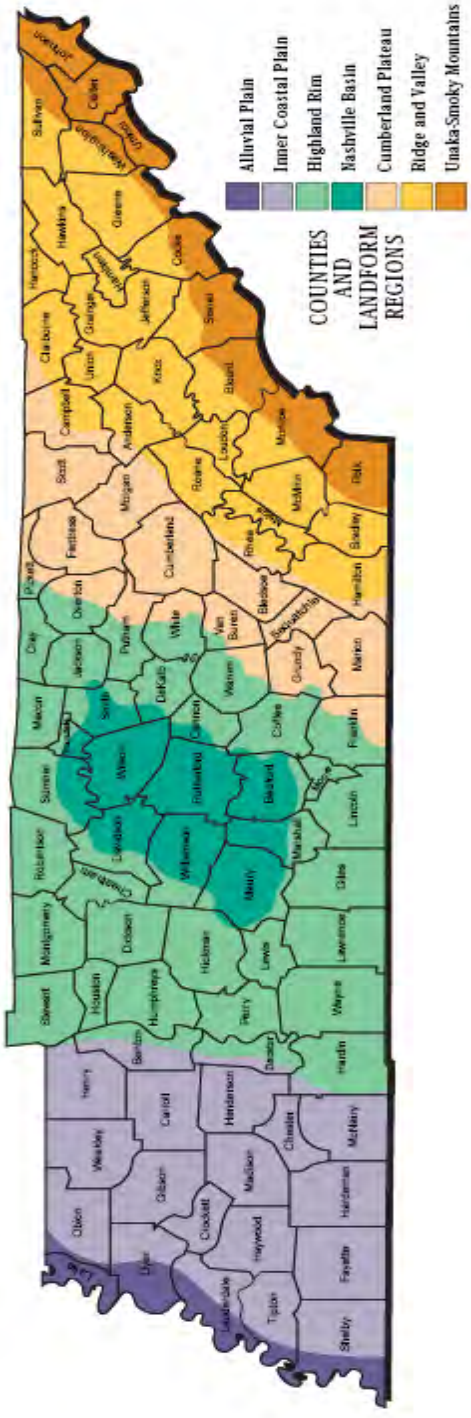
Generally, Tennessee has a temperate climate, with warm summers and mild winters. However, the state's varied topography leads to a wide range of climatic conditions.

The warmest parts of the state, with the longest growing season, are the Gulf Coastal Plain, the Central Basin, and the Sequatchie Valley. In the Memphis area in the southwest, the average date of the last killing frost is 20 March, and the growing season is about 235 days. Memphis has an annual mean temperature of 62°F (17°C), 40°F (4°C) in January, and 83°F (28°C) in July. In the Nashville area, the growing season lasts about 225 days. Nashville has an annual mean of 59°F (15°C), ranging from 36°F (2°C) in January to 79°F (26°C) in July. The Knoxville area has a growing season of 220 days. The city's annual mean temperature is 60°F (16°C), with averages of 41°F (5°C) in January and 78°F (26°C) in July. In some parts of the mountainous east, where the temperatures are considerably lower, the growing season is as short as 130 days. The record high temperature for the state is 113°F (45°C), set at Perryville on 9 August 1930; the record low, –32°F (–36°C), was registered at Mountain City on 30 December 1917.

Severe storms occur infrequently. The greatest rainfall occurs in the winter and early spring, especially March; the early fall months, particularly September and October, are the driest. Average annual precipitation (1971–2000) was 54.7 in (138.9 cm) in Memphis and 48 in (122 cm) in Nashville. Snowfall varies and is more prevalent in East Tennessee than in the western section; Nashville gets about 10 in (25.4 cm) a year, Memphis only 5 in (12.7 cm).

UT Institute of Agriculture > Tennessee Climatological Service > Climate Data for Tennessee

Tennessee Geographic Regions



Climate Synopsis for Tennessee

The highly varied topography of Tennessee has a significant impact on the state's climate. The landscape varies generally from west to east, starting with the gently rolling lowlands (200-600' above sea level) in the west, rising to the Highland Rim (600-1000') enclosing the Central Basin, and on up to the Cumberland Plateau (~2000') which trends northeast-southwest across the state in a belt 30-50 miles wide. East of the Plateau is the Great Valley of East Tennessee (elevations ranging from 1500' in the north down to 700' in the south) containing a series of northeast-southwest ridges. The eastern border of the state is dominated by the Great Smoky Mountains, with numerous peaks rising 4000' to 6000' above sea level.

Average annual temperatures across the state range from around 57°F to 60°F (1981-2010). Winter mean temperatures are near 39°F (1981-2010) over most of the state, while summer temperatures average between 74°F and 78°F (1981-2010). Of course, these general patterns are affected by topography: the higher mountain areas tend to have milder summers as well as colder, more blustery winters. The length of the growing season is also linked to topography: most of the state has a growing season between 180 and 220 days, but this stretches to over 235 days in the lowlands around Memphis and drops to near 130 days in the highest mountains to the east.

The principal source of moisture for the state is the Gulf of Mexico to the south, which results in a gradual decrease of precipitation from south to north. This gradient is largely obscured, however, by orographic effects. In West Tennessee, annual precipitation amounts range from 46 inches to 54 inches, increasing from the Mississippi bottomlands to the slight hills farther east. In Middle Tennessee, the variation is from around 45 inches in the Central Basin to 50-55 inches in the surrounding Highland Rim. The Cumberland Plateau also averages 50-55 inches per year. In the Great Valley of Eastern Tennessee, annual precipitation rises from a minimum of 40 inches in the north (the driest part of the state due to the rain shadow effect of the Great Smoky Mountains and the Cumberland Plateau) to over 50 inches in the south. The mountainous eastern border of the state is the wettest part, with annual totals of up to 80 inches in the higher, well-exposed peaks.

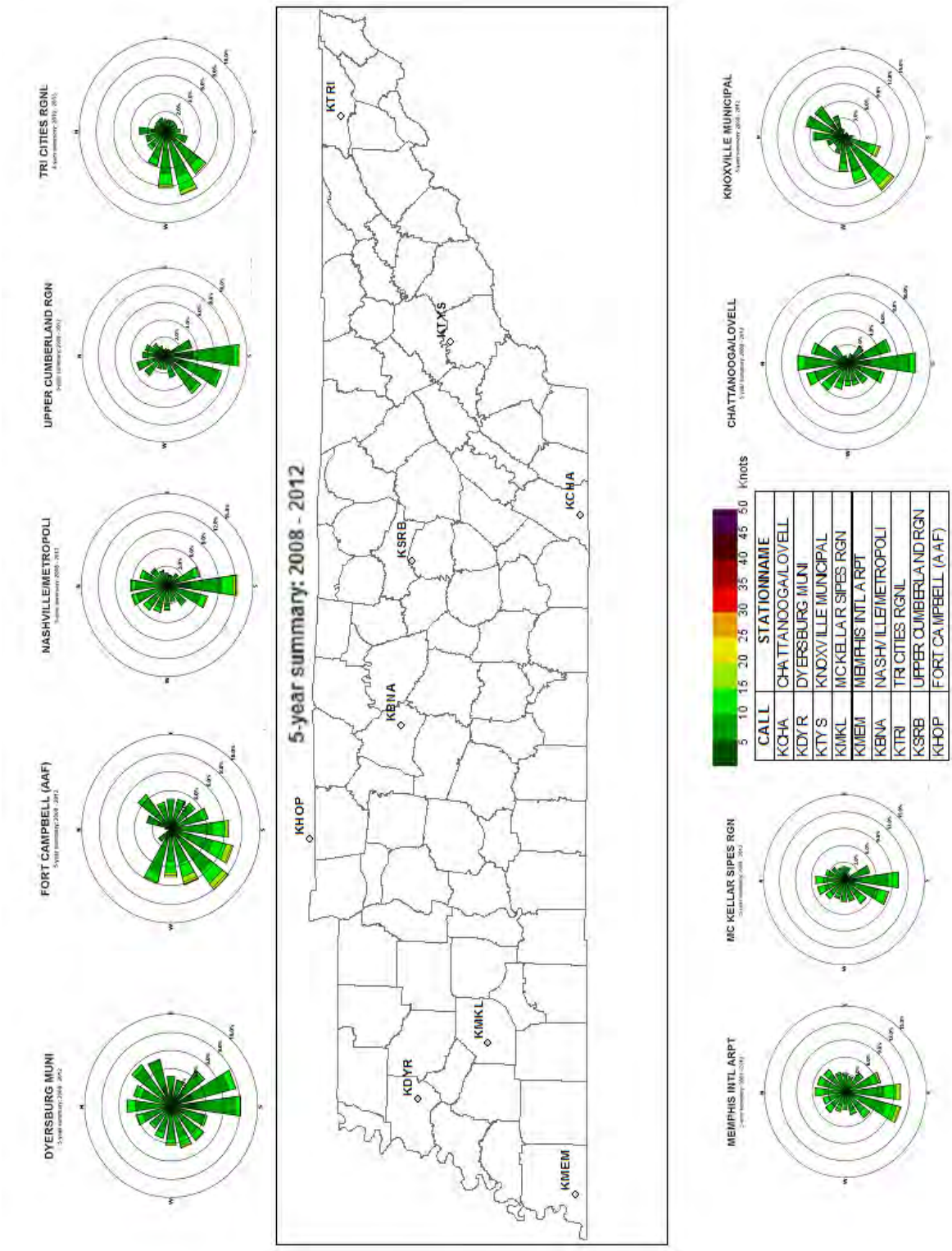
Over most of the state, the greatest precipitation occurs in winter and early spring owing to the more frequent passage of large-scale (frontal) storms over the region. A secondary maximum of precipitation occurs in midsummer in response to shower and thunderstorm activity, especially in July in the mountains of the east. Fall tends to be the dry season for the state, due to the higher frequency of slow-moving high pressure areas during this season. Average annual snowfall ranges from 4-6 inches in the south and west to over 10 inches in the east. Due to the relatively mild winter conditions over most of the state, snow cover rarely persists for more than a few days.

Severe storms are relatively infrequent in the state, being east of the center of tornado activity, south of most blizzard conditions, and too far inland to be often affected by hurricanes. An average of 26 (1991-2011) tornadoes are observed in the state each year, mostly confined to areas west of the Cumberland Plateau. Hailstorms (>1”) at a given location are observed 3 to 6 (2003-2012) times a year, and damaging glaze storms occur in the state every 3 or 4 years (1996-2013). Thunderstorms are frequent in the warm season, and severe thunderstorms with damaging winds are experienced at scattered locations throughout the state each year.

Adapted from: Climatography of the United States, No. 60, National Climatic Data Center
Updated 2/26/2014 by TDAPC using data from NCDC

Windrose Data for Tennessee

Windrose Data for Tennessee



Tennessee Metropolitan Statistical Areas and Population Estimates 2010 to 2014

CBSA	ST COU	NAME	LSAD	CENSUS 2010 POP	POP ESTIMATE 2014
16860		**Chattanooga, TN-GA**	**Metropolitan Statistical Area**	**528143**	**544559**
16860	13047	Catoosa County, GA	County or equivalent	63942	65621
16860	13083	Dade County, GA	County or equivalent	16633	16389
16860	13295	Walker County, GA	County or equivalent	68756	68218
16860	47065	Hamilton County, TN	County or equivalent	336463	351220
16860	47115	Marion County, TN	County or equivalent	28237	28407
16860	47153	Sequatchie County, TN	County or equivalent	14112	14704
17300		**Clarksville, TN-KY**	**Metropolitan Statistical Area**	**260625**	**278353**
17300	21047	Christian County, KY	County or equivalent	73955	74250
17300	21221	Trigg County, KY	County or equivalent	14339	14142
17300	47125	Montgomery County, TN	County or equivalent	172331	189961
17420		**Cleveland, TN**	**Metropolitan Statistical Area**	**115788**	**119705**
17420	47011	Bradley County, TN	County or equivalent	98963	102975
17420	47139	Polk County, TN	County or equivalent	16825	16730
27180		**Jackson, TN**	**Metropolitan Statistical Area**	**130011**	**130225**
27180	47023	Chester County, TN	County or equivalent	17131	17379
27180	47033	Crockett County, TN	County or equivalent	14586	14668
27180	47113	Madison County, TN	County or equivalent	98294	98178
27740		**Johnson City, TN**	**Metropolitan Statistical Area**	**198716**	**201091**
27740	47019	Carter County, TN	County or equivalent	57424	56886
27740	47171	Unicoi County, TN	County or equivalent	18313	17963
27740	47179	Washington County, TN	County or equivalent	122979	126242
28700		**Kingsport-Bristol-Bristol, TN-VA**	**Metropolitan Statistical Area**	**309544**	**308079**
28700	47073	Hawkins County, TN	County or equivalent	56833	56735
28700	47163	Sullivan County, TN	County or equivalent	156823	157047
28700	51169	Scott County, VA	County or equivalent	23177	22384
28700	51191	Washington County, VA	County or equivalent	54876	54729
28700	51520	Bristol city, VA	County or equivalent	17835	17184
28940		**Knoxville, TN**	**Metropolitan Statistical Area**	**837571**	**857585**
28940	47001	Anderson County, TN	County or equivalent	75129	75528
28940	47009	Blount County, TN	County or equivalent	123010	126339
28940	47013	Campbell County, TN	County or equivalent	40716	39918
28940	47057	Grainger County, TN	County or equivalent	22657	22864
28940	47093	Knox County, TN	County or equivalent	432226	448644
28940	47105	Loudon County, TN	County or equivalent	48556	50771
28940	47129	Morgan County, TN	County or equivalent	21987	21660
28940	47145	Roane County, TN	County or equivalent	54181	52748
28940	47173	Union County, TN	County or equivalent	19109	19113
32820		**Memphis, TN-MS-AR**	**Metropolitan Statistical Area**	**1324829**	**1343230**
32820	5035	Crittenden County, AR	County or equivalent	50902	49548
32820	28009	Benton County, MS	County or equivalent	8729	8296
32820	28033	DeSoto County, MS	County or equivalent	161252	170913
32820	28093	Marshall County, MS	County or equivalent	37144	36234
32820	28137	Tate County, MS	County or equivalent	28886	28204
32820	28143	Tunica County, MS	County or equivalent	10778	10598
32820	47047	Fayette County, TN	County or equivalent	38413	39011
32820	47157	Shelby County, TN	County or equivalent	927644	938803
32820	47167	Tipton County, TN	County or equivalent	61081	61623
34100		**Morristown, TN**	**Metropolitan Statistical Area**	**113951**	**115713**
34100	47063	Hamblen County, TN	County or equivalent	62544	63036
34100	47089	Jefferson County, TN	County or equivalent	51407	52677
34980		**Nashville-Davidson--Murfreesboro--Franklin, TN**	**Metropolitan Statistical Area**	**1670890**	**1792649**
34980	47015	Cannon County, TN	County or equivalent	13801	13757
34980	47021	Cheatham County, TN	County or equivalent	39105	39764
34980	47037	Davidson County, TN	County or equivalent	626681	668347
34980	47043	Dickson County, TN	County or equivalent	49666	50575
34980	47081	Hickman County, TN	County or equivalent	24690	24384
34980	47111	Macon County, TN	County or equivalent	22248	23003
34980	47119	Maury County, TN	County or equivalent	80956	85515
34980	47147	Robertson County, TN	County or equivalent	66283	68079
34980	47149	Rutherford County, TN	County or equivalent	262604	288906
34980	47159	Smith County, TN	County or equivalent	19166	19009
34980	47165	Sumner County, TN	County or equivalent	160645	172706
34980	47169	Trousdale County, TN	County or equivalent	7870	8002
34980	47187	Williamson County, TN	County or equivalent	183182	205226
34980	47189	Wilson County, TN	County or equivalent	113993	125376

Tennessee Micropolitan Statistical Areas and Population Estimates 2010 to 2014

CBSA	STCOU	NAME	LSAD	CENSUS 2010 POP	POP ESTIMATE 2014
11940		**Athens, TN**	**Micropolitan Statistical Area**	**52266**	**52626**
11940	47107	McMinn County, TN	County or equivalent	52266	52626
18260		**Cookeville, TN**	**Micropolitan Statistical Area**	**106042**	**107761**
18260	47087	Jackson County, TN	County or equivalent	11638	11568
18260	47133	Overton County, TN	County or equivalent	22083	22028
18260	47141	Putnam County, TN	County or equivalent	72321	74165
18900		**Crossville, TN**	**Micropolitan Statistical Area**	**56053**	**57985**
18900	47035	Cumberland County, TN	County or equivalent	56053	57985
19420		**Dayton, TN**	**Micropolitan Statistical Area**	**31809**	**32641**
19420	47143	Rhea County, TN	County or equivalent	31809	32641
20540		**Dyersburg, TN**	**Micropolitan Statistical Area**	**38335**	**37935**
20540	47045	Dyer County, TN	County or equivalent	38335	37935
24620		**Greeneville, TN**	**Micropolitan Statistical Area**	**68831**	**68335**
24620	47059	Greene County, TN	County or equivalent	68831	68335
29980		**Lawrenceburg, TN**	**Micropolitan Statistical Area**	**41869**	**42274**
29980	47099	Lawrence County, TN	County or equivalent	41869	42274
30280		**Lewisburg, TN**	**Micropolitan Statistical Area**	**30617**	**31269**
30280	47117	Marshall County, TN	County or equivalent	30617	31269
32280		**Martin, TN**	**Micropolitan Statistical Area**	**35021**	**34373**
32280	47183	Weakley County, TN	County or equivalent	35021	34373
32660		**McMinnville, TN**	**Micropolitan Statistical Area**	**39839**	**39969**
32660	47177	Warren County, TN	County or equivalent	39839	39969
35460		**Newport, TN**	**Micropolitan Statistical Area**	**35662**	**35374**
35460	47029	Cocke County, TN	County or equivalent	35662	35374
37540		**Paris, TN**	**Micropolitan Statistical Area**	**32330**	**32204**
37540	47079	Henry County, TN	County or equivalent	32330	32204
42940		**Sevierville, TN**	**Micropolitan Statistical Area**	**89889**	**95110**
42940	47155	Sevier County, TN	County or equivalent	89889	95110
43180		**Shelbyville, TN**	**Micropolitan Statistical Area**	**45058**	**46627**
43180	47003	Bedford County, TN	County or equivalent	45058	46627
46100		**Tullahoma-Manchester, TN**	**Micropolitan Statistical Area**	**100210**	**101344**
46100	47031	Coffee County, TN	County or equivalent	52796	53623
46100	47051	Franklin County, TN	County or equivalent	41052	41402
46100	47127	Moore County, TN	County or equivalent	6362	6319
46460		**Union City, TN-KY**	**Micropolitan Statistical Area**	**38620**	**37206**
46460	47131	Obion County, TN	County or equivalent	31807	30941

Tennessee County Population Data Trends

(2010 Census and Estimates to 2014 by US Census Bureau)

Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014
2014 Population Estimates

Geography	April 1, 2010		Population Estimate (as of July 1)				
	Census	Estimate	2010	2011	2012	2013	2014
Anderson	75,129	75,126	75,146	75,212	75,349	75,494	75,528
Bedford	45,058	45,058	45,112	45,313	45,400	45,849	46,627
Benton	16,489	16,489	16,500	16,428	16,369	16,282	16,145
Bledsoe	12,876	12,869	12,866	12,834	12,781	13,786	13,931
Blount	123,010	123,016	123,151	123,625	124,016	125,045	126,339
Bradley	98,963	98,963	99,142	99,911	101,117	101,873	102,975
Campbell	40,716	40,716	40,704	40,559	40,429	40,195	39,918
Cannon	13,801	13,801	13,793	13,742	13,842	13,797	13,757
Carroll	28,522	28,505	28,479	28,587	28,623	28,496	28,370
Carter	57,424	57,424	57,384	57,511	57,376	57,331	56,886
Cheatham	39,105	39,107	39,116	39,009	39,275	39,457	39,764
Chester	17,131	17,131	17,174	17,216	17,225	17,354	17,379
Claiborne	32,213	32,213	32,230	32,074	31,716	31,593	31,592
Clay	7,861	7,860	7,848	7,823	7,800	7,775	7,765
Cocke	35,662	35,662	35,653	35,394	35,488	35,354	35,374
Coffee	52,796	52,795	52,787	52,894	53,137	53,316	53,623
Crockett	14,586	14,584	14,571	14,543	14,602	14,613	14,668
Cumberland	56,053	56,053	56,206	56,600	57,037	57,492	57,985
Davidson	626,681	626,663	628,045	635,663	649,142	659,042	668,347
Decatur	11,757	11,750	11,721	11,673	11,648	11,665	11,666
DeKalb	18,723	18,723	18,727	18,802	18,920	19,123	19,268
Dickson	49,666	49,654	49,708	49,944	50,167	50,183	50,575
Dyer	38,335	38,337	38,321	38,139	38,223	38,160	37,935
Fayette	38,413	38,413	38,404	38,525	38,609	38,772	39,011
Fentress	17,959	17,959	17,915	18,009	17,911	17,919	17,855
Franklin	41,052	41,052	40,989	40,871	40,785	41,297	41,402
Gibson	49,683	49,683	49,726	49,859	49,670	49,434	49,472
Giles	29,485	29,485	29,403	29,332	28,948	28,783	28,853
Grainger	22,657	22,652	22,702	22,722	22,640	22,694	22,864
Greene	68,831	68,831	68,812	68,962	68,634	68,235	68,335
Grundy	13,703	13,708	13,721	13,630	13,630	13,466	13,425
Hamblen	62,544	62,541	62,607	62,862	62,733	63,078	63,036
Hamilton	336,463	336,465	337,197	340,755	345,657	349,030	351,220
Hancock	6,819	6,819	6,817	6,715	6,679	6,662	6,657
Hardeman	27,253	27,253	27,167	26,851	26,532	26,287	25,965
Hardin	26,026	26,025	26,052	25,890	26,025	26,006	25,870
Hawkins	56,833	56,836	56,883	56,657	56,601	56,831	56,735
Haywood	18,787	18,787	18,764	18,533	18,243	18,218	18,185
Henderson	27,769	27,793	27,789	28,023	28,019	27,973	28,009
Henry	32,330	32,330	32,354	32,333	32,334	32,171	32,204
Hickman	24,690	24,699	24,669	24,359	24,152	24,207	24,384
Houston	8,426	8,426	8,450	8,346	8,423	8,295	8,267
Humphreys	18,538	18,538	18,563	18,388	18,280	18,245	18,135
Jackson	11,638	11,638	11,607	11,518	11,529	11,551	11,568
Jefferson	51,407	51,570	51,610	51,938	52,309	52,296	52,677
Johnson	18,244	18,244	18,281	18,207	18,119	17,977	17,859
Knox	432,226	432,234	433,005	436,523	441,136	444,350	448,644

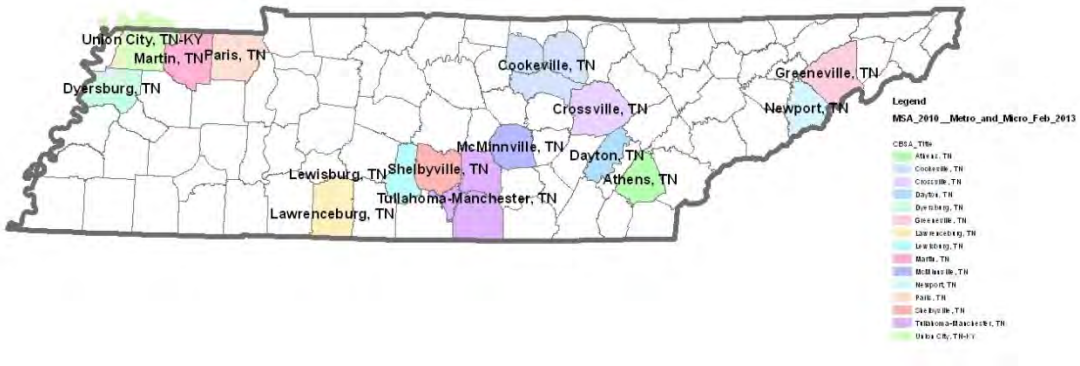
Geography	April 1, 2010		Population Estimate (as of July 1)				
	Census	Estimate	2010	2011	2012	2013	2014
Lake	7,832	7,832	7,817	7,770	7,703	7,706	7,631
Lauderdale	27,815	27,815	27,760	27,703	27,681	27,571	27,382
Lawrence	41,869	41,869	41,990	42,053	42,129	41,973	42,274
Lewis	12,161	12,161	12,152	12,136	11,899	11,956	11,906
Lincoln	33,361	33,361	33,414	33,407	33,436	33,596	33,637
Loudon	48,556	48,559	48,735	49,059	49,743	50,438	50,771
McMinn	52,266	52,266	52,224	52,378	52,452	52,363	52,626
McNairy	26,075	26,076	26,052	26,042	26,171	26,160	26,267
Macon	22,248	22,248	22,260	22,477	22,512	22,658	23,003
Madison	98,294	98,294	98,298	98,044	98,551	98,751	98,178
Marion	28,237	28,232	28,236	28,082	28,227	28,353	28,407
Marshall	30,617	30,617	30,682	30,900	30,934	31,098	31,269
Maury	80,956	80,959	81,191	81,395	81,944	83,600	85,515
Meigs	11,753	11,753	11,778	11,664	11,678	11,650	11,701
Monroe	44,519	44,517	44,605	44,895	45,108	45,169	45,233
Montgomery	172,331	172,337	173,255	176,769	185,360	184,729	189,961
Moore	6,362	6,362	6,350	6,412	6,348	6,313	6,319
Morgan	21,987	21,987	21,995	22,056	21,945	21,672	21,660
Obion	31,807	31,807	31,814	31,685	31,351	31,100	30,941
Overton	22,083	22,084	22,088	22,177	22,211	22,039	22,028
Perry	7,915	7,915	7,919	7,834	7,830	7,851	7,822
Pickett	5,077	5,077	5,069	5,140	5,088	5,083	5,124
Polk	16,825	16,825	16,823	16,746	16,613	16,664	16,730
Putnam	72,321	72,328	72,542	72,852	73,071	73,553	74,165
Rhea	31,809	31,809	31,877	32,018	32,307	32,515	32,641
Roane	54,181	54,180	54,129	53,792	53,426	52,971	52,748
Robertson	66,283	66,293	66,364	66,668	66,719	67,288	68,079
Rutherford	262,604	262,604	263,774	269,046	274,208	281,373	288,906
Scott	22,228	22,228	22,241	22,116	22,166	22,009	21,987
Sequatchie	14,112	14,119	14,131	14,277	14,417	14,624	14,704
Sevier	89,889	89,876	90,135	91,336	92,532	93,693	95,110
Shelby	927,644	927,640	928,786	933,756	939,942	939,365	938,803
Smith	19,166	19,166	19,125	19,146	19,120	19,061	19,009
Stewart	13,324	13,324	13,351	13,244	13,336	13,345	13,279
Sullivan	156,823	156,823	156,856	156,978	156,673	156,694	157,047
Sumner	160,645	160,645	161,276	163,929	166,156	169,114	172,706
Tipton	61,081	61,081	61,121	61,279	61,576	61,564	61,623
Trousdale	7,870	7,870	7,874	7,820	7,791	7,806	8,002
Unicoi	18,313	18,313	18,290	18,294	18,251	18,077	17,963
Union	19,109	19,109	19,120	19,237	19,133	19,092	19,113
Van Buren	5,548	5,548	5,552	5,526	5,620	5,561	5,633
Warren	39,839	39,840	39,859	39,885	39,755	39,866	39,969
Washington	122,979	122,979	123,302	123,989	124,897	125,561	126,242
Wayne	17,021	17,021	16,985	17,001	16,990	16,946	16,913
Weakley	35,021	35,021	35,026	34,962	34,712	34,424	34,373
White	25,841	25,834	25,816	26,020	26,060	26,231	26,301
Williamson	183,182	183,180	184,068	188,299	193,037	198,975	205,226
Wilson	113,993	114,011	114,650	116,791	119,088	122,016	125,376

http://www.census.gov/popest/methodology/index.h

Suggested Citation:
Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014
Source: U.S. Census Bureau, Population Division
Release Dates: For the United States, regions, divisions, states, and Puerto Rico Commonwealth, December 2014. For counties, municipios, metropolitan statistical areas, micropolitan statistical areas, metropolitan divisions, and combined statistical areas, March 2015.

2010 Metropolitan/Micropolitan Areas of Tennessee

No proposed changes



TAPC Monitoring Equipment Evaluation 2015 AMP Field Sites

Site	Monitor		Chart Recorder		Data Logger		Calibrator		Shelter	
	Model	Condition	Model	Condition	Model	Condition	Model	Condition	Model	Condition
Blountville	Teledyne 400e	Good	L&N	Good	ESC8832	Good	Dasibi 1008PC	Good	T&R 8X20	Good
Blountville	API 400A	Good			ESC8832	Good	Dasibi (spare)			
Kingsport	Teledyne 400e	Good	L&N	Good	ESC8832	Good	Dasibi 1008PC	Good	Unknown	Good
Kingsport					ESC8832	Good				
Cookeville	R&P 2025	Good					Streamline Pro	Good		
Freel's Bend	API 400A	Good	E&A	Good	ESC8832	Good	Dasibi 1008PC	Good	820	Good
Freel's Bend					ESC8832	Good (spare)				
Freel's Bend	Teledyne M100E	New	E&A				Teledyne T700	New		
New Market	API 400E	Good	L&N	Good	ESC8832	Good	Dasibi 1008PC	Good	820	Good
New Market					ESC8832	Good (spare)				
Loudon Pope	R&P 2025	Good					Streamline Pro			
Loudon Pope	ATEC2200	Poor			ESC8832	Good				Good
Loudon Mid Sch at Pope (O3)	Teledyne 400e	Good	EA	Good	ESC8832	Good	Dasibi 1008PC	Good	818	Good
					ESC8832	Good (spare)				
Kingsport	R&P 2025	Good					Streamline Pro	Good		
Kingsport	TEOM1400a	Good			ESC8832	Good	ESC 8832(spare)			
Bristol	Hivol	Good								
Bristol	Hivol	Good					Kit #9	Good		
Clarksville	TEOM1400a	Good			ESC8832	Good			432SP	Good
Clarksville	Thermo 2025	Good								
Centerhill	MIC AUC	Good			ESC8816	Good				
Centerhill	Climatronics 101156-GO	Good								
Cedars of Leb	TEI49C	Good	E&A	Good	ESC8832	Good	Dasibi 1008PC	Good	Trailer	Good
Cedars of Leb					ESC8832	Good				
Dyersburg	R&P 2025	Good								
Dyersburg	TEOM 1400a	Good			ESC8816				TEOM 432SP	
Hendersonville	TEI49C	Good	Westronics 4000	Good	ESC8832	Good	Dasibi 1008PC	Good	Trailer	Good
Hendersonville					ESC8832	Good (spare)				
Hendersonville	R&P 2025	Good								
Hendersonville	R&P 2025	Good								
Hendersonville	TEOM1400a	Good								
Jackson	R&P 2025	Good								
Jackson	R&P 2025	Good								
Jackson	TEOM1400a	Good			ESC8816	Good			432SP	Good
Maryville	R&P 2025	Good								
Maryville	TEOM1400a	Good			ESC8816	Good	Streamline Pro	Good	TEOM 432SP	Good
Fairview	TEI49C	Good	L&N	Good	ESC8832	Good	Dasibi 1008PC	Good	T&R Custom	Good
Fairview					ESC8832	Good (spare)				
Columbia	R&P 2025	Good					Streamline Pro			
Lawrence	R&P 2025	Good								
Lawrence	TEOM1400a	Good			ESC8816	Good	Dasibi 1008PC	Good	432SP	Good
Lawrence	Unknown		L11013	Good						
Athens	R&P 2025	Good					Streamline Pro	Good		
Athens	TEOM1400a	Good			ESC8832	Good			Exto 4325P	Good
Luttrell	TEOM1400a	Good			ESC8832	Good	Streamline Pro	Good	Unknown	Good
Harriman	R&P 2025	Good								
Harriman	TEOM1400a	Good			ESC8816	Good			Unknown	Good
Hatchie Refuge									Unknown	Poor

TAPC Monitoring Equipment Evaluation 2015 AMP In Storage

Site	Monitor		Chart Recorder		Data Logger		Calibrator		Shelter	
	Model	Condition	Model	Condition	Model	Condition	Model	Condition	Model	Condition
NFO Storage and QA	Climatronics Sonic	Good			CS CR200	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Poor	Westronics 4010	Poor	ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good	Speedomax	Poor	ESC8816	Poor	Dasisbi 1008PC	Good		
NFO Storage and QA	TEOM 1400a	Good	Speedomax	Poor	ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good	Westronics 4010	Poor	ESC8816	Poor	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good	Westronics 4010	Poor	ESC8816	Poor	Dasisbi 1008PC	Good		
NFO Storage and QA	TEOM 1400a	Good	Westronics 4010	Poor	ESC8816	Good	Dasisbi 1008PC	Poor		
NFO Storage and QA	TEOM 1400a	Good		Poor	ESC8832	Good	Dasisbi 1008PC			
NFO Storage and QA	MetOne SASS	New	Speedomax	Poor	ESC8832	Good	Teledyne 703E	Good		
NFO Storage and QA	MetOne SASS	Poor			ESC8832	Good	Teledyne 703E	Good		
NFO Storage and QA	MetOne SASS	Good			ESC8832	Good	Teledyne 703E	Good		
NFO Storage and QA	MetOne SASS	Good			ESC8816	Poor	Teledyne T700	Good		
NFO Storage and QA	MetOne SASS	Good			ESC8816	Good	Teledyne T700	Good		
NFO Storage and QA					ESC8816	Good	Teledyne T700	Good		
NFO Storage and QA					ESC8816	Good	Teledyne 703E (referen)	Good		
NFO Storage and QA	URG3000N	Good			ESC8816	Good				
NFO Storage and QA	URG3000N	Good			ESC8816	Good	Environics 100	Poor		
NFO Storage and QA					ESC8816	Good	TEI 146	Poor		
NFO Storage and QA					ESC8816	Good				
NFO Storage and QA	R&P 2025	Poor			ESC8832	Good	GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Good					GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Poor					GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Good					GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Good					GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Good					GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Poor					GMW 76-100	Good		
NFO Storage and QA	R&P 2025	Good					GMW 2000	Good		
NFO Storage and QA	R&P 2025	Good					Streamline Pro	Good		
NFO Storage and QA	R&P 2025	Poor					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Streamline Pro	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Tetracal	Good		
NFO Storage and QA	MetOne BAM 1020	Good					Tetracal	Good		
NFO Storage and QA							Streamline FTS	Poor		
NFO Storage and QA	TEI49C	Good					Streamline FTS	Poor		
NFO Storage and QA	TEI49C	Good					Streamline FTS	Poor		
NFO Storage and QA	TEI 49C	Good					Streamline FTS	Poor		
NFO Storage and QA	TEI 49C	Good					Streamline FTS	Poor		
NFO Storage and QA	TEI 49i	Good					Streamline FTS	Poor		
NFO Storage and QA	TEI 49i	Good					Streamline FTS	Poor		
NFO Storage and QA	TEI 49i	Good					Streamline FTS	Poor		
NFO Storage and QA	API 400A	Good								
NFO Storage and QA	API 400A	Poor					Roots meter 5M125TC	Good		
NFO Storage and QA	API 400A	Good					BGI Orifice	Good		
NFO Storage and QA	API 400A	Poor					BGI Orifice	Good		
NFO Storage and QA	API 400A	Poor					BGI Orifice	Good		
NFO Storage and QA							Orifice	Good		
NFO Storage and QA	Teledyne M100E	Good								
NFO Storage and QA	Teledyne M100E	Good								
NFO Storage and QA	Teledyne M100E	Good					Buck M-5	Good		
NFO Storage and QA							BIOS DryCal DC-1B Rev 2.06F	Poor		
NFO Storage and QA	Tisch Housing	Good								
NFO Storage and QA	Tisch Housing	Good					Environics Calibrator	Poor		
NFO Storage and QA	Tisch Housing	Good					Environics Calibrator	Poor		
NFO Storage and QA	GMW Housing	Good					Environics Calibrator	Poor		
NFO Storage and QA	GMW Housing	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	GMW Housing	Good					Bios Drycal flow meter	Poor		
NFO Storage and QA	GMW Housing	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Anderson 2000	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Graseby	Good					Dasibi Calibrator	Poor		
NFO Storage and QA	Graseby	Good					Roots Meter	Good		
NFO Storage and QA	Aircheck 224-PCXR7	Poor					Sierra Cal Bench	Good		
NFO Storage and QA	Aircheck 224-PCXR7	Poor					Teledyne 703E	Good		
NFO Storage and QA	Aircheck 224-PCXR7	Poor					API (ref photometer)	Good		
NFO Storage and QA							Environics Calibrator 6103S	Good		
NFO Storage and QA									Shelter (from EV)	Good
NFO Storage and QA									Shelter (from Copper Hill)	
NFO Storage and QA									Shelter (from CT)	Good
NFO Storage and QA									Shelter (from Benton, TN)	Good

Tennessee Monitoring Site Agreement Letters

Kentucky

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Air Pollution Control
William R. Snodgrass TN Tower
312 Rosa L. Parks Ave., 15th Floor
Nashville, Tennessee 37243

July 2, 2014

Sean Alteri, Director
Kentucky Division for Air Quality
Kentucky Department for Environmental Protection
200 Fair Oaks Lane
Frankfort, KY 40601

Dear Mr. Alteri:

The United States Environmental Protection Agency (EPA) revised monitoring regulations found in 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 Montgomery county in Tennessee. The US Census Bureau lists this area as containing a population in excess of 260,000.

CBSA Code	Geographic area	Legal/statistical Area description	July 1, 2013 Estimate	2010 Census
17300	Clarksville, TN-KY	Metropolitan Statistical Area	272,579	260,625

The Tennessee Division of Air Pollution Control (TDAPC) currently operates one (1) PM 2.5 FRM monitor and one (1) continuous PM 2.5 monitor in this area. The TDAPC believes the operation of the existing PM 2.5 monitors; (FRM and 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 40 CFR58,AppD. 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/lb
Cc: Heather McTeer-Toney, US EPA Region IV

Steven L. Beshear
Governor

Leonard K. Peters
Secretary

Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601-1403
Web site: air.ky.gov

May 15, 2015

Mr. Barry R. Stephens, PE
Director
Tennessee Division of Air Pollution Control
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243

Dear Mr. Stephens:

In a letter from your office dated July 1, 2014, the Tennessee Division of Air Pollution Control (TDAPC) agreed to operate a continuous $PM_{2.5}$ monitor and an intermittent FRM $PM_{2.5}$ sampler, to meet the minimum network design requirements stated in 40 CFR 58, Appendix D for the Clarksville, TN-KY metropolitan statistical area (MSA). The Kentucky Division for Air Quality (Division) appreciates TDAPC's cooperation and looks forward to participating in TDAPC's annual air monitoring network review.

The Division currently operates one (1) intermittent FRM $PM_{2.5}$ sampler and one (1) continuous ozone monitor at the Hopkinsville site (21-047-0006) in Christian County. In accordance with Table D-2 of 40 CFR 58, Appendix D, one (1) ozone monitor is required to be operated in the Clarksville, TN-KY MSA, based upon the most current population estimates from the US Census Bureau, as well as 2012-2014 ozone design values.

Geographic Area	Area Description	2014 USCB Population Estimate	2014 Three-Year Ozone DV (ppm)
Christian County, KY	County	74,250	0.067
Trigg County, KY	County	14,142	0.069 (CASTNET)
Montgomery County, TN	County	189,961	N/A
Clarksville, TN-KY	**MSA**	**278,353**	**0.069**

To satisfy the regulatory requirement, the Division agrees to operate one ozone monitor at the Hopkinsville site. Also, the Division agrees to notify TDAPC in the event that shutdown or relocation of the ozone monitor is necessary.

Despite the fact that 2012-2014 design values show that no FRM $PM_{2.5}$ samplers are required in the Clarksville MSA, the Division will continue to operate the $PM_{2.5}$ sampler at

Hopkinsville. The Division also agrees to notify TDAPC in the event that the Hopkinsville FRM $PM_{2.5}$ sampler must be shutdown or relocated, as it is the design value monitor for the MSA.

The Division commits to sharing with TDAPC any and all quality-assured ambient monitoring data collected in the Kentucky portion of the Clarksville, TN-KY MSA. The Division also welcomes TDAPC participation in Kentucky's annual network review process. If you have any questions or concerns, please contact me at 502-564-3999.

Sincerely,

Sean Alteri,
Director

SA/jfm
c: -Heather McTeer Toney, USEPA Region IV
-Daniel Garver, USEPA Region IV

Virginia

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Air Pollution Control
William R. Snodgrass TN Tower
312 Rosa L. Parks Ave., 15th Floor
Nashville, Tennessee 37243

July 31, 2014

Michael Dowd
Director of Air Division
Virginia Department of
Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Dear Mr. Dowd:

The United States Environmental Protection Agency (EPA) revised monitoring regulations found in 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 describe 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 Virginia share the Kingsport-Bristol-Bristol, TN-VA MSA, which is comprised of Scott and Washington counties in Virginia along with the city of Bristol in Virginia and Hawkins and Sullivan counties in Tennessee. The US Census Bureau lists this area as containing a population in excess of 309,000.

CBSA Code	Geographic area	Legal/statistical Area description	July 1, 2013 Estimate	2010 Census
28700	Kingsport-Bristol-Bristol, TN-VA MSA	Metropolitan Statistical Area	308,283	309,544

The Tennessee Division of Air Pollution Control (TDAPC) currently operates a $PM_{2.5}$ FRM and a $PM_{2.5}$ TEOM continuous monitor at site 47-163-1007, two ozone monitors at sites 47-163-2002 and 47-163-2003, and a lead monitor at site 47-163-3004, all in Sullivan County. The TDAPC believes the operation of the existing monitors; (ozone, $PM_{2.5}$ FRM and continuous), are sufficient to properly characterize the particulate air quality in the entire Kingsport-Bristol-Bristol, TN-VA MSA and comply with the requirements for both population and concentration based monitoring identified in the revised monitoring regulations as found at 40 CFR 58, App D. TDAPC also is preparing to locate a new monitoring site for Sulfur Dioxide (SO_2) in Sullivan County near Kingsport. The TDAPC would like to invite the Virginia Department of Environmental Quality Air Division to

participate in Tennessee's annual ambient air monitoring network review. Tennessee commits to sharing with Virginia Department of Environmental Quality Air Division any and all quality assured ambient air monitoring data collected in the Tennessee portion of the Kingsport-Bristol-Bristol, TN-VA MSA. Tennessee also will notify Virginia Department of Environmental Quality Air Division in advance of the intent to relocate or shutdown any of the ozone or $PM_{2.5}$ monitors referenced above so that adequate monitoring arrangements can be made to meet the entire MSA monitoring requirements for ozone, $PM_{2.5}$ and SO_2.

Sincerely,

Barry R. Stephens

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

BRS/lb
Cc: Heather McTeer-Toney, US EPA Region IV

Sections of the CFR Referred to in the 2015 NMP

§ 58.10 Annual monitoring network plan and periodic network assessment.

(a)(1) Beginning July 1, 2007, the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations. The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.

(2) Any annual monitoring network plan that proposes SLAMS network modifications (including new monitoring sites, new determinations that data are not of sufficient quality to be compared to the NAAQS, and changes in identification of monitors as suitable or not suitable for comparison against the annual $PM_{2.5}$ NAAQS) is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

(3) The plan for establishing required NCore multi-pollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(4) A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting 1.0 tpy or greater shall be submitted to the EPA Regional Administrator no later than July 1, 2009, as part of the annual network plan required in paragraph (a)(1) of this section. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting 1.0 tpy or greater to be operational by January 1, 2010. A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy shall be submitted to the EPA Regional Administrator no later than July 1, 2011. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy to be operational by December 27, 2011.

(5)(i) A plan for establishing or identifying an area-wide NO_2 monitor, in accordance with the requirements of Appendix D, section 4.3.3 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2012. The plan shall provide for these required monitors to be operational by January 1, 2013.

(ii) A plan for establishing or identifying any NO_2 monitor intended to characterize vulnerable and susceptible populations, as required in Appendix D, section 4.3.4 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2012. The plan shall provide for these required monitors to be operational by January 1, 2013.

(iii) A plan for establishing a single near-road NO_2 monitor in CBSAs having 1,000,000 or more persons, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2013. The plan shall provide for these required monitors to be operational by January 1, 2014.

(iv) A plan for establishing a second near-road NO_2 monitor in any CBSA with a population of 2,500,000 or more persons, or a second monitor in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts, in accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2014. The plan shall provide for these required monitors to be operational by January 1, 2015.

(v) A plan for establishing a single near-road NO_2 monitor in all CBSAs having 500,000 or more persons, but less than 1,000,000, not already required by paragraph (a)(5)(iv) of this section, in

accordance with the requirements of Appendix D, section 4.3.2 to this part, shall be submitted as part of the Annual Monitoring Network Plan to the EPA Regional Administrator by July 1, 2016. The plan shall provide for these monitors to be operational by January 1, 2017.

(6) A plan for establishing SO_2 monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator by July 1, 2011 as part of the annual network plan required in paragraph (a) (1). The plan shall provide for all required SO_2 monitoring sites to be operational by January 1, 2013.

(7) A plan for establishing CO monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator. Plans for required CO monitors shall be submitted at least six months prior to the date such monitors must be established as required by section 58.13.

(8)(i) A plan for establishing near-road $PM_{2.5}$ monitoring sites in CBSAs having 2.5 million or more persons, in accordance with the requirements of appendix D to this part, shall be submitted as part of the annual monitoring network plan to the EPA Regional Administrator by July 1, 2014. The plan shall provide for these required monitoring stations to be operational by January 1, 2015.

(ii) A plan for establishing near-road $PM_{2.5}$ monitoring sites in CBSAs having 1 million or more persons, but less than 2.5 million persons, in accordance with the requirements of appendix D to this part, shall be submitted as part of the annual monitoring network plan to the EPA Regional Administrator by July 1, 2016. The plan shall provide for these required monitoring stations to be operational by January 1, 2017.

(b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in § 58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(9) The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58.

(10) Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

(11) Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

(12) The identification of required NO_2 monitors as near-road, area-wide, or vulnerable and susceptible population monitors in accordance with Appendix D, section 4.3 of this part.

(13) The identification of any $PM_{2.5}$ FEMs and/or ARMs used in the monitoring agency's network where the data are not of sufficient quality such that data are not to be compared to the NAAQS. For required SLAMS where the agency identifies that the $PM_{2.5}$ Class III FEM or ARM does not produce data of sufficient quality for comparison to the NAAQS, the monitoring agency must ensure that an operating FRM or filter-based FEM meeting the sample frequency requirements described in § 58.12 or other Class III $PM_{2.5}$ FEM or ARM with data of sufficient quality is operating and reporting data to meet the network design criteria described in appendix D to this part.

(c) The annual monitoring network plan must document how state and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor. The affected state or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

(d) The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to § 58.14. Code of Federal Regulations / Title 40 - Protection of Environment / Vol. 6 / 2013-07-01252 [71 FR 61298, Oct. 17, 2006, as amended at 72 FR 32210, June 12, 2007; 73 FR 67059, Nov. 12, 2008; 73 FR 77517, Dec. 19, 2008; 75 FR 6534, Feb. 9, 2010; 75 FR 35601, June 22, 2010; 75 FR 81137, Dec. 27, 2010; 76 FR 54341, Aug. 31, 2011; 78 FR 16188, Mar. 14, 2013; 78 FR 3282, Jan. 15, 2013]

Ozone monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

TABLE D–2 OF APPENDIX D TO PART 58 SLAMS MINIMUM O_3 MONITORING REQUIREMENTS

MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000 [5]	1	0

1. Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
2. Population based on latest available census figures.
3. The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4. These minimum monitoring requirements apply in the absence of a design value.
5. Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

CO monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.2 Carbon Monoxide (CO) Design Criteria.
4.2.1 General Requirements.
(a) Except as provided in subsection (b), one CO monitor is required to operate collocated with one required near-road NO_2 monitor, as required in Section 4.3.2 of this part, in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO2 monitor, only one CO monitor is required to be collocated with a near-road NO_2 monitor within that CBSA.
(b) If a state provides quantitative evidence demonstrating that peak ambient CO concentrations would occur in a near-road location which meets microscale siting criteria in Appendix E of this part but is not a near-road NO_2 monitoring site, then the EPA Regional Administrator may approve a request by a state to use such an alternate near-road location for a CO monitor in place of collocating a monitor at near-road NO_2 monitoring site.

4.2.2 Regional Administrator Required Monitoring.
(a) The Regional Administrators, in collaboration with states, may require additional CO monitors above the minimum number of monitors required in 4.2.1 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where data or other information suggest that CO concentrations may be approaching or exceeding the NAAQS.

NO_2 monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.3.2 Requirement for Near-road NO_2 Monitors
(a) Within the NO_2 network, there must be one microscale near-road NO_2 monitoring station in each CBSA with a population of 500,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high AADT counts as specified in paragraph 4.3.2(a)(1) of this appendix. An additional near-road NO_2 monitoring station is required for any CBSA with a population of 2,500,000 persons or more, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations. CBSA populations shall be based on the latest available census figures.
(1) The near-road NO_2 monitoring stations shall be selected by ranking all road segments within a CBSA by AADT and then identifying a location or locations adjacent to those highest ranked road

segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO_2 concentrations are expected to occur and siting criteria can be met in accordance with appendix E of this part. Where a State or local air monitoring agency identifies multiple acceptable candidate sites where maximum hourly NO_2 concentrations are expected to occur, the monitoring agency shall consider the potential for population exposure in the criteria utilized to select the final site location. Where one CBSA is required to have two near-road NO_2 monitoring stations, the sites shall be differentiated from each other by one or more of the following factors: fleet mix; congestion patterns; terrain; geographic area within the CBSA; or different route, interstate, or freeway designation.
(b) Measurements at required near-road NO_2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO_2, and NO_X.

Originally, near –road monitoring sites were to be established and in operation by January 1, 2013. However, the lack of funding has delayed the implementation of near-road monitoring requirements. As a result EPA is following a build and hold plan in establishing the near-road monitoring network. The Memphis and Nashville CBSA's are listed in the second phase of the build and hold plan and have received funding during fiscal year 2013 to establish a single near-road site in each CBSA. These sites are now established and operating during FY 2014/2015. The Knoxville and Chattanooga near-road sites may not be funded by EPA until sometime in the future.

4.3.3 Requirement for Area-wide NO_2 Monitoring
(a) Within the NO_2 network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales. PAMS sites collecting NO_2 data that are situated in an area of expected high NO_2 concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement when the NO_2 monitor is operated year round. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO_2 monitoring stations. CBSA populations shall be based on the latest available census figures.

An area-wide NO_2 monitoring site is required in each of the Memphis and Nashville CBSA's. An area-wide NO_2 monitoring site is currently in operation in the Nashville CBSA (Site 47-037-0011). Currently the State of Arkansas operates an NO_2 monitor at its Marion site (AQS 05-035-0005) which is in the Memphis CBSA.

SO_2 monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.4 Sulfur Dioxide (SO_2) Design Criteria.

4.4.1 General Requirements. (a) State and, where appropriate, local agencies must operate a minimum number of required SO_2 monitoring sites as described below.

4.4.2 Requirement for Monitoring by the Population Weighted Emissions Index.
(a) The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA) they contain or share with another State or States for use in the implementation of or adjustment to the SO_2 monitoring network. The PWEI shall be calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO_2 in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO_2 monitor is required within that CBSA.

(1) The SO_2 monitoring site(s) required as a result of the calculated PWEI in each CBSA shall satisfy minimum monitoring requirements if the monitor is sited within the boundaries of the parent CBSA and is one of the following site types (as defined in section 1.1.1 of this appendix): population exposure, highest concentration, source impacts, general background, or regional transport. SO_2 monitors at NCore stations may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors under this part. Any monitor that is sited outside of a CBSA with minimum monitoring requirements to assess the highest concentration resulting from the impact of significant sources or source categories existing within that CBSA shall be allowed to count towards minimum monitoring requirements for that CBSA.

PWEI calculations were performed for CBSA's in Tennessee based on emissions and populations listed in the following table. Based on these calculations ambient sulfur dioxide monitors are required as listed in the table.

CBSA ID	CBSA Name		2008 NEI v1.5 so2 (tpy)	Population (2010)	PWEI in Million persons-tpy	Required Monitors	Population (2009) Est.	PWEI in Million persons-tpy	Required Monitors
34980	Nashville-Davidson--Murfreesboro--Franklin	TN	41,476	1,589,934	65,944	1	1,582,264	65,626	1
28940	Knoxville	TN	39,833	698,030	27,805	1	699,247	27,853	1
32820	Memphis	TN-MS-AR	17,651	1,316,100	23,231	1	1,304,926	23,034	1
28700	Kingsport-Bristol-Bristol	TN-VA	56,754	309,544	17,568	1	305,629	17,346	1
17300	Clarksville	TN-KY	16,820	273,949	4,608	0	268,546	4,517	0
25340	Harriman	TN	50,674	54,181	2,746	0	53,508	2,711	0
16860	Chattanooga	TN-GA	2,178	528,143	1,150	0	524,303	1,142	0
27740	Johnson City	TN	2,976	198,716	591	0	197,381	587	0
34100	Morristown	TN	4,004	136,608	547	0	137,612	551	0
27180	Jackson	TN	2,894	115,425	334	0	113,629	329	0
17420	Cleveland	TN	2,692	115,788	312	0	113,358	305	0

Population Weighted Emissions Index (PWEI) Calcuations - April 2012 - Using 2010 Census Data & 2008 NEI v1.5 (no fires included)

4.4.3 Regional Administrator Required Monitoring.
(a) The Regional Administrator may require additional SO_2 monitoring stations above the minimum number of monitors required in 4.4.2 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where an area has the potential to have concentrations that may violate or contribute to the violation of the NAAQS, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations, which are not monitored under the minimum monitoring provisions described above. The Regional Administrator and the responsible State or local air monitoring agency shall work together to design and/or maintain the most appropriate SO_2 network to provide sufficient data to meet monitoring objectives

4.4.5 NCore Monitoring.
(a) SO_2 measurement are included within the NCore multi-pollutant site requirements as described in paragraph (3)(b) of this appendix. NCore based SO_2 measurements are primarily used to characterize SO_2 trends and assist in understanding SO_2 transport across representative areas in urban or rural locations and are also used for comparison with the SO_2 NAAQS. SO_2 monitors at NCore sites that exist in CBSAs with minimum monitoring requirements per section 4.4.2 above shall be allowed to count towards those minimum monitoring requirements.

Lead monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.5 Lead (Pb) Design Criteria.

(a) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, taking into account the logistics and potential for population exposure. At a minimum, there must be one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source

which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year based on either the most recent National Emission Inventory (*http://www.epa.gov/ttn/chief/eiinformation.html*) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure.
(i) One monitor may be used to meet the requirement in paragraph 4.5(a) for all sources involved when the location of the maximum Pb concentration due to one Pb source is expected to also be impacted by Pb emissions from a nearby source (or multiple sources). This monitor must be sited, taking into account logistics and the potential for population exposure, where the Pb concentration from all sources combined is expected to be at its maximum.
(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50% of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under 58.10(d).
(b) State and, where appropriate, local agencies are required to conduct non-source oriented Pb monitoring at each NCore site required under paragraph 3 of this appendix in a CBSA with a population of 500,000 or more.

PM_{10} monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

TABLE D–4 OF APPENDIX D TO PART 58. PM10 MINIMUM MONITORING REQUIREMENTS (NUMBER OF STATIONS PER MSA) 1

Population category	High concentration[2]	Medium concentration[3]	Low concentration[4,5]
>1,000,000	6–10	4–8	2–4
500,000–1,000,000	4–8	2–4	1–2
250,000–500,000	3–4	1–2	0–1
100,000–250,000	1–2	0–1	0

1 Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.
2 High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM_{10} NAAQS by 20 percent or more.
3 Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS.
4 Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS.
5 These minimum monitoring requirements apply in the absence of a design value.

$PM_{2.5}$ monitoring network requirements

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

TABLE D–5 OF APPENDIX D TO PART 58 $PM_{2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA population[1, 2]	Most recent 3-year design value concentrations ≥85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3-year design value concentrations <85% of any $PM_{2.5}$ NAAQS[3,4]	Continuous $PM_{2.5}$ Monitoring	$PM_{2.5}$ Background and Transport Sites	$PM_{2.5}$ Chemical Speciation Sites
>1,000,000	3	2	1 - 2	One site each per state for background and transport.	Existing STN Required Site(s)
500,000–1,000,000	2	1	1		
50,000–<500,000 [5]	1	0	0 - 1		

1 Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
2 Population based on latest available census figures.

3 The $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
4 These minimum monitoring requirements apply in the absence of a design value.
5 Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

4.7.2 Requirement for Continuous $PM_{2.5}$ Monitoring. The State, or where appropriate, local agencies must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies. State and local air monitoring agencies must use methodologies and quality assurance/quality control (QA/QC) procedures approved by the EPA Regional Administrator for these required continuous analyzers.

4.7.3 Requirement for $PM_{2.5}$ Background and Transport Sites. Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport.

4.7.4 $PM_{2.5}$ Chemical Speciation Site Requirements. Each State shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the $PM_{2.5}$ Speciation Trends Network (STN). The selection and modification of these STN sites must be approved by the Administrator.

Index reporting requirements

40 CFR 58 Subpart F, 58.50 Revised as of July 1, 2014

58.50 Index reporting.
(a) The State or where applicable, local agency shall report to the general public on a daily basis through prominent notice an air quality index that complies with the requirements of appendix G to this part.
(b) Reporting is required for all individual MSA with a population exceeding 350,000.
(c) The population of a MSA for purposes of index reporting is the most recent decennial U.S. census population.

Geographic area	2010 Census	2014 Census Est.	Required to Have AQI Reporting	Daily AQI/Air Quality Forecasts Provided
Chattanooga, TN-GA	528143	544559	Yes	Yes
Clarksville, TN-KY	260625	278353	No	Yes
Cleveland, TN	115788	119705	No	No
Jackson, TN	130011	130225	No	No
Johnson City, TN	198716	201091	No	Yes Based on the combined population of both areas.
Kingsport-Bristol-Bristol, TN-VA	309544	308079	No	
Knoxville, TN	837571	857585	Yes	Yes In addition, the GSMNP has a separate AQI/Forecast provided.
Memphis, TN-MS-AR	1324829	1343230	Yes	Yes
Morristown, TN	113951	115713	No	No
Nashville-Davidson--Murfreesboro, TN	1670890	1792649	Yes	Yes

NCore monitoring network requirements and $PM_{10-2.5}$

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

3. Design Criteria for NCore Sites
(a) Each State (i.e. the fifty States, District of Columbia, Puerto Rico, and the Virgin Islands) is required to operate at least one NCore site. States may delegate this requirement to a local agency. States with many MSAs often also have multiple air sheds with unique characteristics and, often, elevated air pollution. These States include, at a minimum, California, Florida, Illinois, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas. These States are required to identify one to

two additional NCore sites in order to account for their unique situations. These additional sites shall be located to avoid proximity to large emission sources. Any State or local agency can propose additional candidate NCore sites or modifications to these requirements for approval by the Administrator. The Ncore locations should be leveraged with other multi-pollutant air monitoring sites including PAMS sites, National Air Toxics Trends Stations (NATTS) sites, CASTNET sites, and STN sites. Site leveraging includes using the same monitoring platform and equipment to meet the objectives of the variety of programs where possible and advantageous.
(b) The NCore sites must measure, at a minimum, $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10-2.5}$ particle mass, speciated $PM_{10-2.5}$, O_3, SO_2, CO, NO/NOy, wind speed, wind direction, relative humidity, and ambient temperature. NCore sites in CBSA with a population of 500,000 people (as determined in the latest Census) or greater shall also measure Pb either as Pb-TSP or Pb- PM_{10}. The EPA Regional Administrator may approve an alternative location for the Pb measurement where the alternative location would be more appropriate for logistical reasons and the measurement would provide data on typical Pb concentrations in the CBSA.
(1) Although the measurement of NO_y is required in support of a number of monitoring objectives, available commercial instruments may indicate little difference in their measurement of NO_y compared to the conventional measurement of NO_X, particularly in areas with relatively fresh sources of nitrogen emissions. Therefore, in areas with negligible expected difference between NO_y and NO_X measured concentrations, the Administrator may allow for waivers that permit NO_X monitoring to be substituted for the required NO_y monitoring at applicable NCore sites.
(2) EPA recognizes that, in some cases, the physical location of the NCore site may not be suitable for representative meteorological measurements due to the site's physical surroundings. It is also possible that nearby meteorological measurements may be able to fulfill this data need. In these cases, the requirement for meteorological monitoring can be waived by the Administrator.

40 CFR 58 Subpart G, Appendix D to Part 58 Revised as of July 1, 2014

4.8 Coarse Particulate Matter ($PM_{10-2.5}$) Design Criteria.
4.8.1 General Monitoring Requirements.
The only required monitors for $PM_{10-2.5}$ are those required at NCore Stations.

NCore Look Rock Monitoring Site

Air quality monitoring at the Look Rock monitoring site has a long history dating at least back to about 1980. Monitoring at this site has been a joint effort of the National Park Service (NPS) Tennessee Valley Authority (TVA) and the State of Tennessee.

Siting

The coordinates are:
Latitude + 35.6334N
Longitude -83.9416W
Elevation 801 Meters.

Site is approved by the EPA as a rural NCore site.

Monitoring Objective

Determine compliance with NAAQS; observe pollution trends for national data analysis, provide pollution levels for daily index reporting; and provide date for scientific studies.

Quality Assurance

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

Area of Representativeness

40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. In the case of urban NCore the spatial scales to be used are neighborhood and urban. Because the Look Rock site is located in a pristine high elevation area, it is understood that the site is ideally suited for both background and transport related measurements..

Spatial Scales for Each Pollutant

Generally regional scale.

Need For Additional Resources

All parties agree that the collaboration between the National Park Service, TVA and the State of Tennessee at the Look Rock sampling site has produced an extraordinarily diverse and in-depth air quality record and that the bulk of this data set has been validated and reported to the U.S. EPA AQS repository. However, under the present piecemeal funding by the various agencies, there is no assurance that this will continue at the site for the longer term needed for monitoring compliance with the PM NAAQS and with the regional haze rule (RHR). What is needed is a long-term commitment by EPA to coordinate the operation of this and other sites to maintain quality and relevance in the NCore network over the long term. This commitment should commence by the 2011 time frame when NCore sites are expected to become fully operational.

TVA has discontinued support and funding for the portion of the NCore operations they previously supported. EPA has agreed to provide support and funding to continue the operation of the NCore site. The final equipment configurations and transfer of ownership were arranged by NPS and TVA staff. The following equipment list is subject to revisions and modifications based on the new working agreements between EPA and the NPS.

Air Monitoring Equipment at Look Rock
(Anticipated equipment remaining unchanged form 2012 inventory list provided)

Current TVA Air Monitoring at Look Rock
Updated by Solomon T. Bairai, March 14, 2012

POLLUTANT / INSTRUMENT	ANALYSIS METHOD	SAMPLING / REPORTING FREQ	AQS CODE	PARA METER CODE	POC	REP ORG CODE	DATE SAMPLING BEGAN	MONITOR		SAMPLING INSTRUMENT NAME AND DESIGNATION	FED AGENCY
								Type	Comment		
Sulfur dioxide (SO2) trace-level	Pulsed fluorescence	Continuous/ 1 hour	47-009-0101	42401	2	1029	20070401	Special Purpose	NCore	Thermo SO2 43i-TLE EQSA-0486-060	TVA
Carbon monoxide (CO)	trace-level NDIR-GFC	Continuous/ 1 hour	47-009-0101	42101	2	1029	20070401	Special Purpose	NCore	Thermo CO-48i TLE RFCA-0981-054	TVA
[1]Nitrogen oxide (NO) trace-level	Chemilumine-scence with molybdenum converter	Continuous/ 1 hour	47-009-0101	42601	2	1029	20070401	Special Purpose	NCore	Thermo NO/NOy 42C TLE RFNA-1289-074	TVA
[1]Total reactive nitrogen (NOy) trace-level	Chemilumine-scence with molybdenum converter	Continuous/ 1 hour	47-009-0101	42603	2	1029	20070401	Special Purpose	NCore	Thermo NO/NOy 42C TLE RFNA-1289-074	TVA
[1]Nitrogen oxide (NO) trace-level	Chemilumine-scence with photolytic converter	Continuous/ 1 hour	47-009-0101	42601	3	1029	20081001	Special Purpose	NCore	Teledyne NO/NO2/NOx 200EU with photolytic converter	TVA
[1]Nitrogen dioxide (NO2) trace-level	Chemilumine-scence with photolytic converter	Continuous/ 1 hour	47-009-0101	42602	3	1029	20081001	Special Purpose	NCore	Teledyne NO/NO2/NOx 200EU with photolytic converter	TVA
[1]Oxides of Nitrogen (NOx) trace-level	Chemilumine-scence with photolytic converter	Continuous/ 1 hour	47-009-0101	42603	3	1029	20081001	Special Purpose	NCore	Teledyne NO/NO2/NOx 200EU with photolytic converter	TVA
[1]Black carbon PM2.5 LC	Optical absorption	Continuous/ 1 hour	47-009-0101	88313	2	1029	20061001	Special Purpose	NCore	Magee Scientific AE21 Dual beam (BC/UV)	TVA
[1]Sulfate PM2.5 LC	Thermal reduction/ Pulsed fluorescence	Continuous/ 1 hour	47-009-0101	88403	2	1029	20061108	Special Purpose	NCore	Thermo Model 5020	TVA
PM2.5 Mass	Beta Attenuation	1 hour	47-009-0101	88101	NA	1029	20110128	Special purpose	NCore	BAM-1020	TVA
PM10 Mass	Beta Attenuation	1 hour	47-009-0101	81102	NA	1029	20110128	Special purpose	NCore	BAM-1020	TVA
[1]Calibrator	NA	Daily	NA	NA	NA	NA	20070401	NA	NA	Thermo Model 146C	TVA
[1]Zero Air Supply	NA	NA	NA	NA	NA	NA	20070401	NA	NA	Thermo 111	TVA
[1]Telemetry-Data Logger	NA	1 minute/1 hour	NA	NA	NA	NA	20070401	NA	NA	ESC 8832	TVA

Proposed SO2 Air Monitoring Site in the Sullivan Co. Nonattainment Area

Additional SO2 monitoring sites are being evaluated for the Kingsport area using the most recent modeling data available meeting EPA approved modeling requirements. The final approved version of the model was not available at the time the current analysis was prepared.

SO2 Monitor Site Proposal
For Sullivan County Nonattainment Area
Model Documentation and Property Evaluation

Draft 5/18/2015

Tennessee Division of Air Pollution Control

Contents

1. Eastman Model Inputs

Dispersion modeling was conducted to establish suitable SO2 monitor locations for Eastman Chemical Company in Kingsport, TN. The EPA's regulatory model, Aermod was used. SO2 dispersion was simulated using 1 year of on-site meteorological data, provided by Eastman. The upper air meteorology was from Nashville, TN, with missing observations taken from Roanoke, VA. All processed weather and surface characteristics (roughness, albedo, and Bowen ratio) were provided by Eastman.

Background Concentrations:

Background concentrations of SO2 were taken from Table 6-2 of the Eastman Site Specific Model Documentation (Jan 2015).

Table 1-1: Background Concentrations

Hour	DJF	MAM	JJA	SON
1	1.31	1.05	1.05	1.57
2	0.79	1.83	0.26	0.79
3	0.26	0.79	0.26	0.52
4	0.92	1.05	0.26	0.52
5	1.57	1.31	0.26	0.52
6	3.14	0.26	1.31	0.52
7	1.31	0.52	0.26	0.79
8	1.57	0.52	0.26	1.31
9	1.05	2.1	1.05	0.52
10	2.1	0.79	1.57	1.31
11	1.57	0.79	4.19	3.41
12	5.5	10.48	2.88	5.5
13	2.88	4.45	7.07	7.86
14	2.62	18.08	6.29	13.89
15	14.93	4.98	3.67	16.77
16	10.74	3.14	3.67	10.22
17	2.36	6.55	3.93	9.17
18	8.65	2.1	2.36	8.65
19	3.93	2.62	3.14	5.5
20	7.6	2.1	2.62	2.36
21	1.31	1.57	1.57	2.36
22	1.57	1.31	1.57	2.36
23	1.31	1.57	1.05	1.31
24	1.05	2.1	0.26	1.57

Buildings and Sources:

Buildings were imported from Eastman's BPIP output and moved to match satellite imagery locations. The coordinates provided by the company and those contained in the output files did not match satellite imagery or terrain features in Arcmap, Google Earth, or the BEEST GUI for Aermod. This is due to differences in coordinate systems.

Powerhouse 253 included two configurations, one in which the stacks were treated as a wall and the other with the stacks omitted from downwash. For this evaluation, the stacks were treated as a wall.

Sources were manually placed using satellite imagery and maps provided by Eastman. Stack parameters were derived from the Modeled Future NAAQS Attainment Demonstration for Sullivan County, TN documentation (Oct 2014). This configuration assumes future conversions from coal to natural gas boilers (#25-29):

Table 1-2: Source parameters

Source ID	Source Description	Easting	Northing	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter	SO2
		m	m	m	m	K	m/s	m	g/s
25	B253-25	362545.2	4042533	374.38	76.2	433.7	25.30	2.44	0.058
26	B253-26	362568.6	4042547	374.45	76.2	433.7	25.30	2.44	0.058
27	B253-27	362557.5	4042540	374.42	76.2	433.7	25.30	2.44	0.058
28	B253-28	362581.2	4042556	374.38	76.2	433.7	25.30	2.44	0.058
29	B253-29	362592.8	4042563	373.86	76.2	433.7	25.30	2.44	0.058
2324	B83-23-24	362227.3	4042681	368.35	70.1	434.0	9.28	4.27	93.2
1822	B83-18-22	362186.5	4042744	368.28	70.1	451.8	9.00	4.27	61.2
3031	B325-30-31	361797.7	4042292	365.64	114.3	354.5	18.25	3.05	37.2
DOMTAR	Domtar	359488.0	4046080	365.70	60.4	444.3	15.50	3.14	1.03
TAILGAS	Tail Gas	361673.5	4041996	364.90	38.1	644.3	21.30	0.76	2.75
HRTG_GLASS	Heritage Glass	361581.2	4043871	370.00	48.8	852.6	6.10	1.83	4.99

Figure 1-1: Building and source configurations

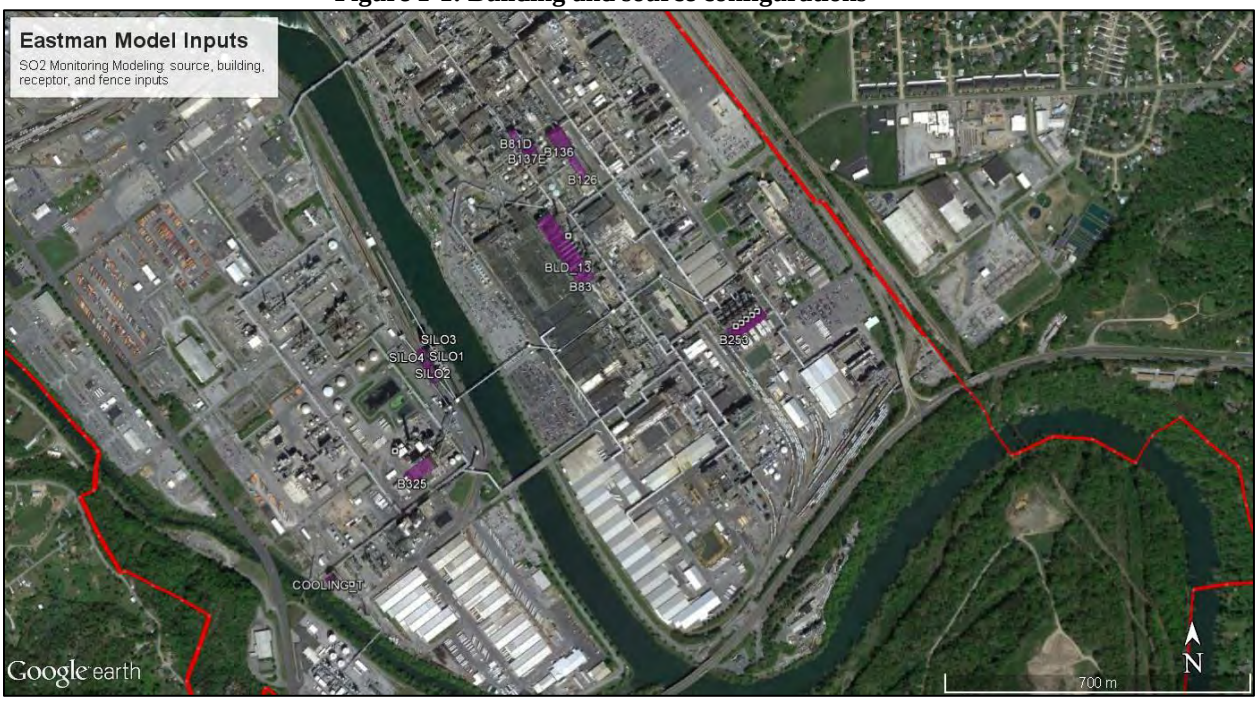
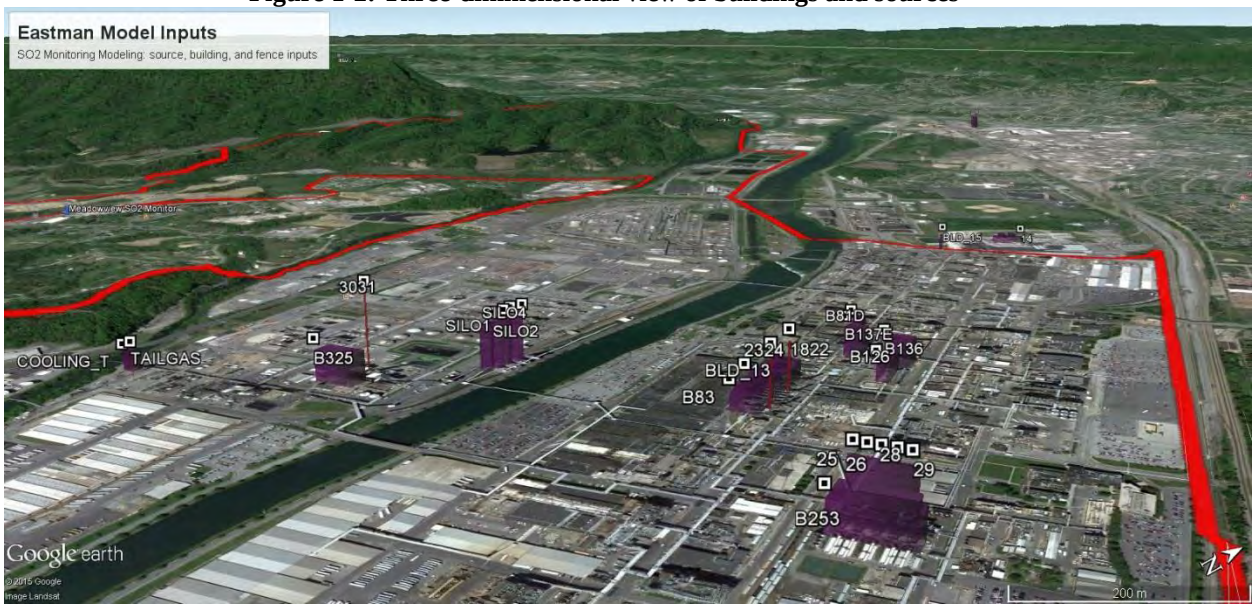


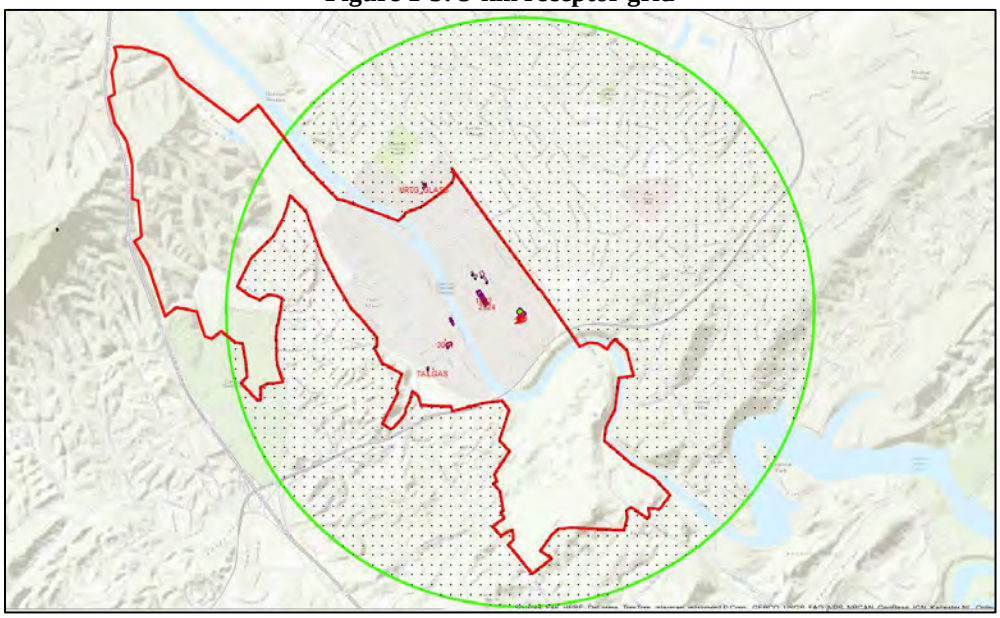
Figure 1-2: Three-dimmensional view of buildings and sources



Receptors:

A receptor grid was placed out to 3km from the B253 Powerhouse centroid, located at 36.5186,-82.535. Receptors were placed with 100-m spacing and along the fenceline at 100-m spacing. Receptors were removed from locations that were obviously inaccessible (rivers and lakes).

Figure 1-3: 3-km receptor grid



Terrain:

One arc second NED (WGS 84) terrain data was obtained from the USGS and processed using Aermap.

Control Options:

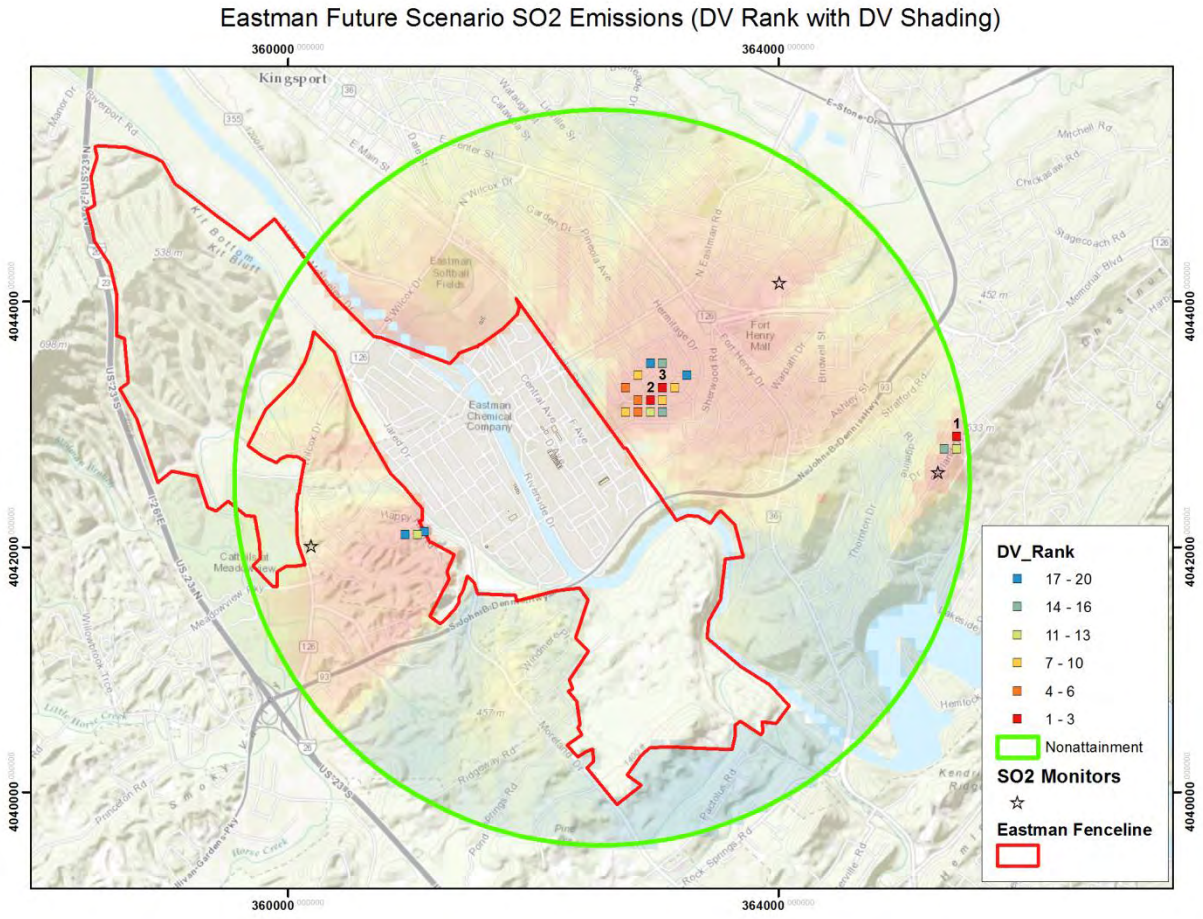
Hourly SO2 was computed with the 4th highest values at each receptor. A MAXDAILY file was also generated to rank receptors according to the May 2013 draft SO2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document.

The low wind speed options (LOWWIND2) were used with default adjustments retained (sigma-v: 0.3 m/s, meander fraction: 0.95). Aerlift was not utilized in this evaluation.

2. Model Output and Ranking Results:

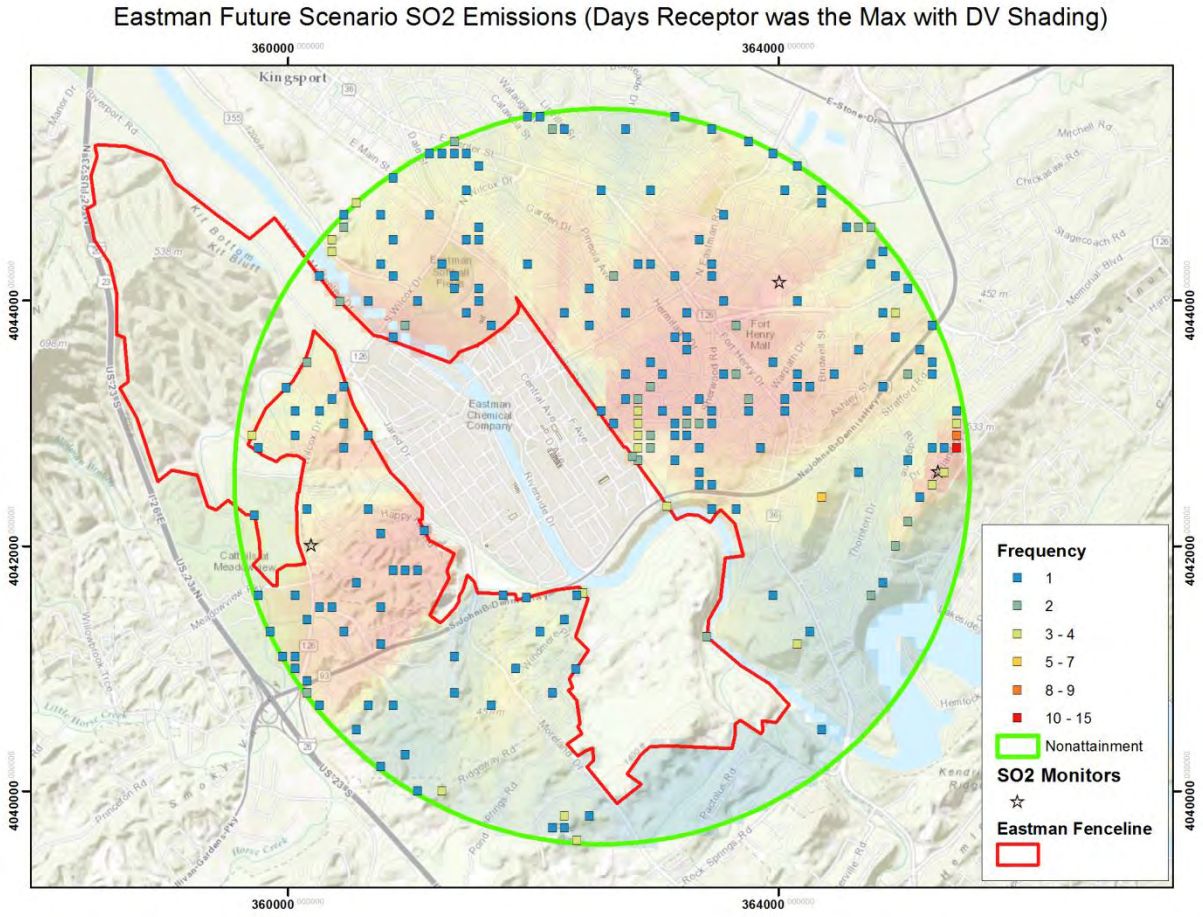
For this analysis, SO2 concentrations were not normalized prior to running the model. The highest concentrations were located on ridges, hills, and on the southwest and northeast edges of the fenceline. The top 20 rank of the receptors by overall highest concentrations (highest 4th high) can be seen below with the top 3 receptors labeled.

Figure 2-1: design value (highest 4th high) rank



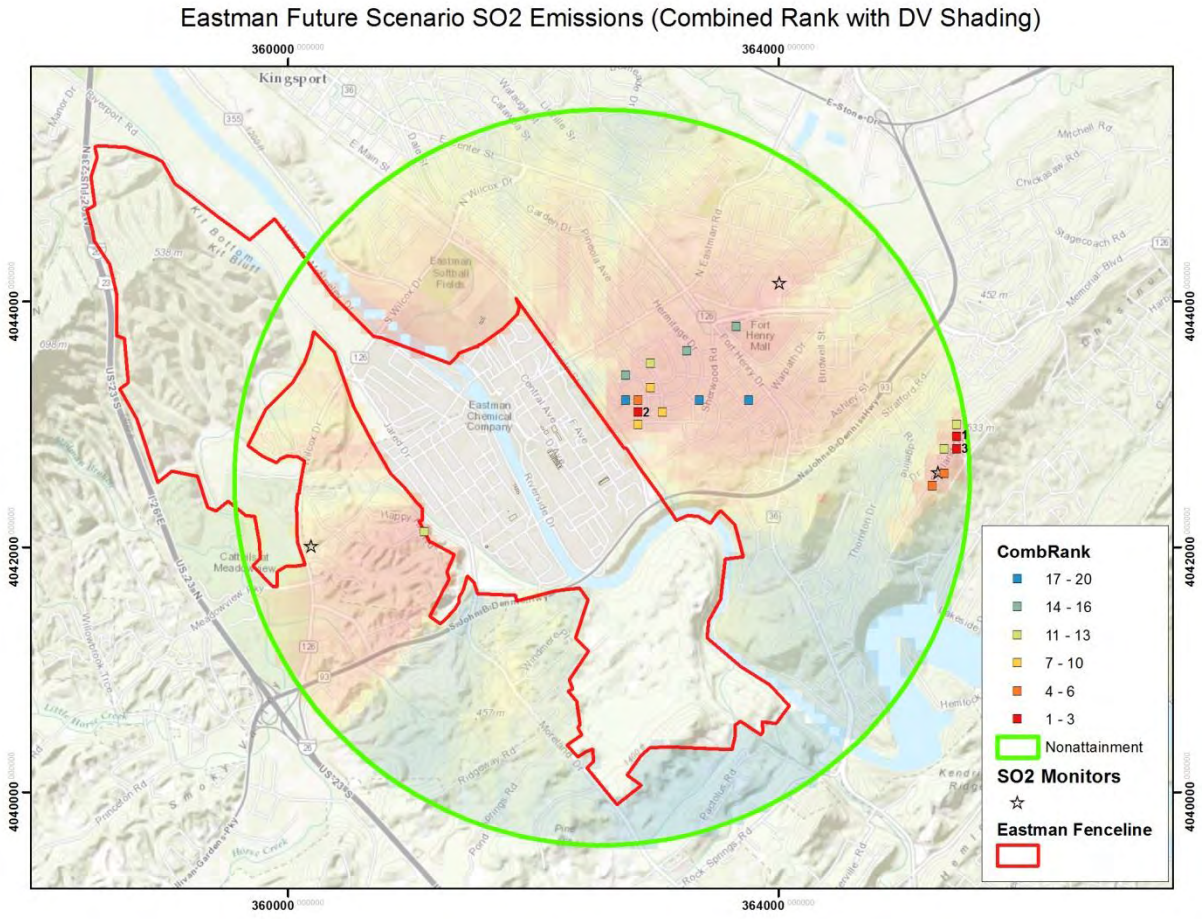
The frequency that each receptor had the maximum concentration for each day in the 365-day evaluation was calculated and ranked below. High frequency receptors favored the hilltops to the east of the plant.

Figure 2-2: Number of days each receptor was the max



The ranks were then combined and re-ranked. For example, if a receptor had the 3rd highest overall concentration and was the 8th most frequent daily maximum, it would have a combined score of 11. The combined scores were then ranked, giving a final overall rank. The top 20 receptors are shown below.

Figure 2-3: Combined rank



There are two clear areas of interest: the area just to the east of the fenceline with the number 2 ranked receptor, and the ridge top at the far eastern edge of the nonattainment boundary.

Table 2-1: Data rank summary

Receptor *(Receptor X & Y)*	**Modeled Design Value** *(µg/m³)*	**Design Value Rank**	**Number of Days the Receptor is the Highest Concentration for the Day Among all Receptors** *(Days)*	**Number of Days Rank**	**Combined Score** *(DV Rank + No. of Days Rank)*	**Combined Rank**
365458.00000 4042898.50000	284.46273	1	9	2	3	**1**
362858.00000 4043098.50000	261.54558	4	4	5	9	**2**
365458.00000 4042798.50000	250.7211	13	15	1	14	**3**
362858.00000 4043198.50000	260.80039	6	2	26	32	**4**
365258.00000 4042498.50000	236.46378	43	4	5	48	**5**
365358.00000 4042598.50000	235.18951	47	4	5	52	**6**
362858.00000 4042998.50000	233.81095	54	4	5	59	**7**
361095.10000 4042221.40000	236.85813	41	2	26	67	**8**
362958.00000 4043298.50000	236.49734	42	2	26	68	**9**
363058.00000 4043098.50000	250.59241	14	1	58	72	**10**
365358.00000 4042798.50000	248.99647	16	1	58	74	**11**
362958.00000 4043498.50000	248.86849	17	1	58	75	**12**
361112.00000 4042121.80000	248.0397	18	1	58	76	**13**
365458.00000 4042998.50000	232.24227	60	3	16	76	**13**
362758.00000 4043398.50000	243.23121	24	1	58	82	**15**
363258.00000 4043598.50000	240.37944	34	1	58	92	**16**
363658.00000 4043798.50000	230.6498	66	2	26	92	**16**
363358.00000 4043198.50000	239.33713	37	1	58	95	**18**
363758.00000 4043198.50000	224.63235	86	2	26	112	**19**
362758.00000 4043198.50000	233.11075	57	1	58	115	**20**
363258.00000 4043698.50000	231.07388	63	1	58	121	**21**
363158.00000 4043698.50000	231.00808	64	1	58	122	**22**
363058.00000 4043398.50000	230.28084	67	1	58	125	**23**
360858.00000 4041798.50000	228.39117	69	1	58	127	**24**
363258.00000 4043098.50000	224.85461	85	1	58	143	**25**
364058.00000 4043198.50000	223.53628	88	1	58	146	**26**
360958.00000 4041798.50000	223.21808	89	1	58	147	**27**
363758.00000 4043098.50000	222.38547	91	1	58	149	**28**
360958.00000 4043798.50000	215.80389	129	2	26	155	**29**
361058.00000 4041798.50000	219.9389	101	1	58	159	**30**
360758.00000 4042098.50000	219.93603	102	1	58	160	**31**
364058.00000 4043098.50000	218.00122	113	1	58	171	**32**
363658.00000 4043398.50000	210.24728	165	2	26	191	**33**
363258.00000 4043898.50000	215.05791	133	1	58	191	**33**
364158.00000 4043298.50000	212.55889	149	1	58	207	**35**
360558.00000 4041698.50000	211.72283	157	1	58	215	**36**
363558.00000 4043398.50000	207.41616	179	1	58	237	**37**
364258.00000 4043298.50000	206.59404	187	1	58	245	**38**
360758.00000 4041198.50000	206.00798	195	1	58	253	**39**
363458.00000 4043098.50000	205.24508	201	1	58	259	**40**
360858.00000 4043698.50000	204.87932	207	1	58	265	**41**
361223.50000 4043532.70000	203.638	217	1	58	275	**42**
362758.00000 4043898.50000	203.5645	218	1	58	276	**43**
364158.00000 4043398.50000	203.14544	222	1	58	280	**44**
360658.00000 4043998.50000	202.65958	224	1	58	282	**45**
363858.00000 4042798.50000	201.77399	233	1	58	291	**46**
363358.00000 4042798.50000	201.69119	234	1	58	292	**47**
363558.00000 4043998.50000	201.59929	236	1	58	294	**48**
363458.00000 4044198.50000	201.33444	240	1	58	298	**49**
363458.00000 4042998.50000	199.83798	260	1	58	318	**50**
362658.00000 4042998.50000	199.60067	263	1	58	321	**51**
363158.00000 4042998.50000	198.11528	283	1	58	341	**52**
364358.00000 4042398.50000	193.1581	360	7	3	363	**53**
360425.00000 4043992.30000	193.75485	345	2	26	371	**54**
360458.00000 4042798.50000	195.81827	314	1	58	372	**55**
363158.00000 4044198.50000	195.49932	322	1	58	380	**56**
360458.00000 4041298.50000	194.3038	337	1	58	395	**57**
363258.00000 4042898.50000	193.71916	347	1	58	405	**58**
363958.00000 4043498.50000	193.6629	348	1	58	406	**59**

Receptor *(Receptor X & Y)*	**Modeled Design Value** *(µg/m^3)*	**Design Value Rank**	**Number of Days the Receptor is the Highest Concentration for the Day Among all Receptors** *(Days)*	**Number of Days Rank**	**Combined Score** *(DV Rank + No. of Days Rank)*	**Combined Rank**
362858.00000 4042898.50000	190.52176	404	4	5	409	**60**
360258.00000 4044198.50000	193.02107	364	1	58	422	**61**
361232.60000 4041586.40000	189.4897	421	6	4	425	**62**
361164.30000 4042041.50000	192.37611	376	1	58	434	**63**
363458.00000 4044298.50000	191.97853	381	1	58	439	**64**
363358.00000 4042998.50000	189.80155	415	2	26	441	**65**
362958.00000 4044298.50000	191.66596	387	1	58	445	**66**
360559.90000 4043854.80000	191.4978	388	1	58	446	**67**
362858.00000 4044298.50000	191.4107	390	1	58	448	**68**
361458.00000 4043898.50000	191.31865	394	1	58	452	**69**
361558.00000 4043998.50000	191.14616	395	1	58	453	**70**
361558.00000 4044098.50000	189.7736	416	1	58	474	**71**
363258.00000 4042998.50000	188.00054	452	2	26	478	**72**
362258.00000 4043898.50000	189.24344	423	1	58	481	**73**
364458.00000 4043398.50000	188.98636	431	1	58	489	**74**
360358.00000 4041498.50000	188.78371	434	1	58	492	**75**
365158.00000 4042398.50000	188.00865	450	1	58	508	**76**
362458.00000 4044098.50000	188.00446	451	1	58	509	**77**
360258.00000 4041498.50000	186.779	470	1	58	528	**78**
361358.00000 4044198.50000	186.60494	472	1	58	530	**79**
361358.00000 4044098.50000	186.40324	477	1	58	535	**80**
360183.40000 4044294.50000	185.9483	483	1	58	541	**81**
360058.00000 4041098.50000	185.83851	485	1	58	543	**82**
360058.00000 4040998.50000	185.79953	486	1	58	544	**83**
361658.00000 4043798.50000	185.67459	487	1	58	545	**84**
361258.00000 4044298.50000	185.59899	489	1	58	547	**85**
365458.00000 4043098.50000	184.97423	498	1	58	556	**86**
361058.00000 4043998.50000	184.34445	519	1	58	577	**87**
360758.00000 4041498.50000	184.05675	525	1	58	583	**88**
361315.50000 4043498.10000	181.69246	580	3	16	596	**89**
361815.20000 4043841.70000	183.57787	540	1	58	598	**90**
360058.00000 4041598.50000	182.99607	547	1	58	605	**91**
363358.00000 4044498.50000	182.55993	562	1	58	620	**92**
363358.00000 4042598.50000	182.06963	572	1	58	630	**93**
362858.00000 4042698.50000	179.4961	619	2	26	645	**94**
360158.00000 4040898.50000	181.15687	593	1	58	651	**95**
362458.00000 4043798.50000	180.68087	597	1	58	655	**96**
359958.00000 4041098.50000	180.36389	602	1	58	660	**97**
363458.00000 4042498.50000	180.13087	606	1	58	664	**98**
360458.00000 4043298.50000	179.36884	621	1	58	679	**99**
363158.00000 4042898.50000	178.07656	651	1	58	709	**100**
363358.00000 4042498.50000	177.82393	655	1	58	713	**101**
361458.00000 4044498.50000	177.81722	656	1	58	714	**102**
362658.00000 4044198.50000	176.29131	699	2	26	725	**103**
362570.30000 4043041.90000	175.99943	709	2	26	735	**104**
360658.00000 4042298.50000	176.77845	680	1	58	738	**105**
362812.00000 4042728.60000	175.92427	713	2	26	739	**106**
360858.00000 4044198.50000	176.71367	683	1	58	741	**107**
360158.00000 4041398.50000	176.40384	695	1	58	753	**108**
364658.00000 4043598.50000	176.1744	705	1	58	763	**109**
362958.00000 4042898.50000	173.53659	769	2	26	795	**110**
364958.00000 4043898.50000	172.77089	784	3	16	800	**111**
365058.00000 4042198.50000	173.21565	775	2	26	801	**112**
365058.00000 4043398.50000	172.99464	779	2	26	805	**113**
360158.00000 4040798.50000	172.73664	786	2	26	812	**114**
364958.00000 4043698.50000	174.12127	754	1	58	812	**114**
362686.40000 4042882.70000	172.14678	802	2	26	828	**116**
360658.00000 4042898.50000	173.37038	771	1	58	829	**117**
363558.00000 4044698.50000	173.2298	774	1	58	832	**118**
361558.00000 4044498.50000	172.82218	782	1	58	840	**119**
360758.00000 4044298.50000	172.3039	794	1	58	852	**120**
360258.00000 4040698.50000	172.23368	795	1	58	853	**121**

Receptor *(Receptor X & Y)*	**Modeled Design Value** *(µg/m^3)*	**Design Value Rank**	**Number of Days the Receptor is the Highest Concentration for the Day Among all Receptors** *(Days)*	**Number of Days Rank**	**Combined Score** *(DV Rank + No. of Days Rank)*	**Combined Rank**
361867.80000 4043892.90000	172.17304	798	1	58	856	**122**
361158.00000 4044698.50000	171.89065	806	1	58	864	**123**
360358.00000 4044398.50000	169.77299	857	3	16	873	**124**
363158.00000 4042698.50000	171.05663	823	1	58	881	**125**
360858.00000 4044498.50000	170.82559	831	1	58	889	**126**
362628.30000 4042962.30000	170.71091	833	1	58	891	**127**
360358.00000 4043198.50000	170.39588	843	1	58	901	**128**
364858.00000 4043298.50000	169.70641	858	1	58	916	**129**
360646.30000 4042933.00000	169.65852	860	1	58	918	**130**
365258.00000 4042798.50000	169.19024	869	1	58	927	**131**
361958.00000 4044298.50000	169.17874	871	1	58	929	**132**
362558.00000 4043098.50000	169.03918	875	1	58	933	**133**
360131.80000 4042703.70000	168.73557	881	1	58	939	**134**
361964.30000 4043885.20000	168.20774	900	1	58	958	**135**
360086.80000 4043427.20000	167.95604	905	1	58	963	**136**
364558.00000 4044598.50000	167.71287	909	1	58	967	**137**
360058.00000 4042898.50000	167.37412	919	1	58	977	**138**
360158.00000 4043498.50000	165.86932	954	2	26	980	**139**
364158.00000 4043998.50000	167.07046	926	1	58	984	**140**
363658.00000 4042298.50000	166.57823	939	1	58	997	**141**
364658.00000 4044598.50000	165.14238	971	2	26	997	**141**
359706.00000 4042899.90000	164.00583	1008	4	5	1013	**143**
360458.00000 4042998.50000	164.96754	977	1	58	1035	**144**
361558.00000 4044598.50000	164.39458	1000	1	58	1058	**145**
365158.00000 4043598.50000	164.17746	1004	1	58	1062	**146**
364758.00000 4044598.50000	161.83487	1057	2	26	1083	**147**
365258.00000 4043498.50000	162.88659	1030	1	58	1088	**148**
360358.00000 4044498.50000	160.27815	1092	3	16	1108	**149**
359858.00000 4041298.50000	161.97161	1054	1	58	1112	**150**
365258.00000 4043798.50000	161.60567	1062	1	58	1120	**151**
361858.00000 4040998.50000	161.34392	1070	1	58	1128	**152**
360258.00000 4043098.50000	160.61493	1081	1	58	1139	**153**
360064.90000 4042289.20000	160.53556	1083	1	58	1141	**154**
359984.00000 4043289.70000	160.28457	1091	1	58	1149	**155**
359758.00000 4041598.50000	159.65668	1108	1	58	1166	**156**
360071.70000 4042208.00000	159.62668	1110	1	58	1168	**157**
361945.00000 4041579.90000	159.39501	1116	1	58	1174	**158**
360209.90000 4043754.80000	156.96522	1192	4	5	1197	**159**
359758.00000 4042798.50000	158.59062	1142	1	58	1200	**160**
359777.40000 4043045.00000	158.43553	1148	1	58	1206	**161**
364058.00000 4044898.50000	157.88082	1163	1	58	1221	**162**
360858.00000 4044998.50000	157.47105	1174	1	58	1232	**163**
360987.90000 4042438.50000	157.19813	1186	1	58	1244	**164**
359670.30000 4042827.40000	155.88942	1219	2	26	1245	**165**
361358.00000 4045298.50000	155.85532	1220	2	26	1246	**166**
361258.00000 4045198.50000	156.88349	1197	1	58	1255	**167**
360458.00000 4044598.50000	155.29393	1238	2	26	1264	**168**
362958.00000 4044898.50000	156.10537	1212	1	58	1270	**169**
360158.00000 4042298.50000	155.98801	1216	1	58	1274	**170**
361558.00000 4045098.50000	155.46728	1230	1	58	1288	**171**
364958.00000 4041998.50000	154.46531	1264	2	26	1290	**172**
361358.00000 4045198.50000	155.30756	1235	1	58	1293	**173**
363458.00000 4042298.50000	155.30049	1237	1	58	1295	**174**
361458.00000 4045198.50000	154.81155	1249	1	58	1307	**175**
363758.00000 4045298.50000	154.54497	1258	1	58	1316	**176**
364158.00000 4045098.50000	154.47572	1263	1	58	1321	**177**
362558.00000 4044898.50000	154.43372	1267	1	58	1325	**178**
360558.00000 4044798.50000	153.1884	1311	3	16	1327	**179**
360758.00000 4044698.50000	154.16659	1280	1	58	1338	**180**
362258.00000 4045398.50000	153.83995	1288	1	58	1346	**181**
359650.40000 4042259.60000	151.74781	1348	3	16	1364	**182**
365258.00000 4043398.50000	153.23742	1309	1	58	1367	**183**

Receptor *(Receptor X & Y)*	**Modeled Design Value** *(µg/m^3)*	**Design Value Rank**	**Number of Days the Receptor is the Highest Concentration for the Day Among all Receptors** *(Days)*	**Number of Days Rank**	**Combined Score** *(DV Rank + No. of Days Rank)*	**Combined Rank**
359726.00000 4042247.80000	153.18624	1312	1	58	1370	**184**
361458.00000 4044898.50000	153.05273	1316	1	58	1374	**185**
363958.00000 4045198.50000	152.78166	1322	1	58	1380	**186**
360179.10000 4043638.30000	152.03541	1333	1	58	1391	**187**
361658.00000 4040698.50000	151.99566	1335	1	58	1393	**188**
363495.10000 4041514.90000	150.9539	1364	1	58	1422	**189**
364858.00000 4043898.50000	150.94311	1365	1	58	1423	**190**
363458.00000 4045398.50000	150.26681	1382	1	58	1440	**191**
360058.00000 4043098.50000	149.98944	1389	1	58	1447	**192**
362958.00000 4042798.50000	148.61597	1424	2	26	1450	**193**
360318.40000 4043648.10000	149.80324	1394	1	58	1452	**194**
359870.10000 4043174.90000	149.45951	1404	1	58	1462	**195**
362158.00000 4045398.50000	147.65978	1440	2	26	1466	**196**
364958.00000 4044198.50000	149.3012	1409	1	58	1467	**197**
361158.00000 4045198.50000	149.13107	1410	1	58	1468	**198**
364358.00000 4044798.50000	149.04717	1414	1	58	1472	**199**
360458.00000 4044698.50000	148.8959	1417	1	58	1475	**200**
363431.80000 4041397.30000	147.63262	1441	1	58	1499	**201**
364358.00000 4044898.50000	146.00639	1475	1	58	1533	**202**
362058.00000 4041298.50000	145.33664	1490	1	58	1548	**203**
362858.00000 4042798.50000	141.61746	1550	4	5	1555	**204**
359813.10000 4043117.50000	143.09497	1525	1	58	1583	**205**
361958.00000 4045498.50000	142.26551	1537	1	58	1595	**206**
364758.00000 4044298.50000	141.63054	1548	1	58	1606	**207**
363417.00000 4041258.60000	139.20255	1589	2	26	1615	**208**
362358.00000 4039598.50000	138.35202	1614	4	5	1619	**209**
364858.00000 4044398.50000	139.8024	1577	1	58	1635	**210**
365058.00000 4044098.50000	139.65626	1580	1	58	1638	**211**
362258.00000 4039798.50000	137.69545	1629	3	16	1645	**212**
362258.00000 4041398.50000	139.19208	1590	1	58	1648	**213**
362158.00000 4040798.50000	138.77801	1602	1	58	1660	**214**
365058.00000 4042698.50000	138.77336	1603	1	58	1661	**215**
362058.00000 4045498.50000	138.65718	1607	1	58	1665	**216**
362258.00000 4039698.50000	136.63937	1640	1	58	1698	**217**
364658.00000 4042598.50000	136.502	1644	1	58	1702	**218**
360658.00000 4040698.50000	134.91806	1670	1	58	1728	**219**
363158.00000 4045498.50000	134.58539	1678	1	58	1736	**220**
362458.00000 4039798.50000	134.54428	1679	1	58	1737	**221**
360858.00000 4040698.50000	133.76917	1689	1	58	1747	**222**
364858.00000 4041698.50000	132.32339	1724	1	58	1782	**223**
362758.00000 4045398.50000	131.58936	1739	1	58	1797	**224**
363095.00000 4042323.00000	126.32283	1823	4	5	1828	**225**
361758.00000 4041598.50000	129.59262	1777	1	58	1835	**226**
364758.00000 4041598.50000	125.40295	1835	2	26	1861	**227**
361258.00000 4039998.50000	124.06222	1862	4	5	1867	**228**
360558.00000 4040498.50000	127.25504	1812	1	58	1870	**229**
362410.00000 4041616.70000	123.62346	1871	3	16	1887	**230**
362347.00000 4040993.50000	124.29731	1860	1	58	1918	**231**
364158.00000 4041198.50000	121.59578	1902	3	16	1918	**231**
363036.70000 4042408.40000	122.02731	1898	2	26	1924	**233**
363958.00000 4041598.50000	123.42045	1875	1	58	1933	**234**
361358.00000 4040798.50000	120.9091	1911	1	58	1969	**235**
362158.00000 4039698.50000	119.75569	1927	1	58	1985	**236**
361358.00000 4041098.50000	119.68952	1928	1	58	1986	**237**
360758.00000 4040198.50000	117.42469	1960	1	58	2018	**238**
362358.00000 4041598.50000	115.58603	1988	1	58	2046	**239**
362374.70000 4041665.00000	115.10006	2003	1	58	2061	**240**
362278.80000 4041653.70000	114.86987	2007	1	58	2065	**241**
364258.00000 4041298.50000	113.02832	2029	1	58	2087	**242**
361058.00000 4039998.50000	112.14023	2038	1	58	2096	**243**
360958.00000 4040298.50000	107.18602	2085	1	58	2143	**244**
364358.00000 4040498.50000	104.58276	2115	1	58	2173	**245**

Receptor *(Receptor X & Y)*	**Modeled Design Value** *($\mu g/m^3$)*	**Design Value Rank**	**Number of Days the Receptor is the Highest Concentration for the Day Among all Receptors** *(Days)*	**Number of Days Rank**	**Combined Score** *(DV Rank + No. of Days Rank)*	**Combined Rank**
358958.00000 4050198.50000	86.12733	2252	1	58	2310	**246**
359358.00000 4050198.50000	76.58162	2292	2	26	2318	**247**

Parcel Identification

In order to identify suitable parcels for monitoring, each parcel completely within the 3-km nonattainment radius was assigned a receptor rank (consisting of the max daily frequency and overall concentration) and parcels with no representative receptor rank were filtered out. Parcel ranks were determined by assigning a 50-m radius to each receptor and computing the minimum ranked receptor per parcel (below is a graphic to help visualize the procedure):

Figure 2-4: example of parcel rank assignment

Next, parcels owned by Eastman were filtered from the results. The top 5 parcels were examined for suitability.

Figure 2-5: highest ranked parcels

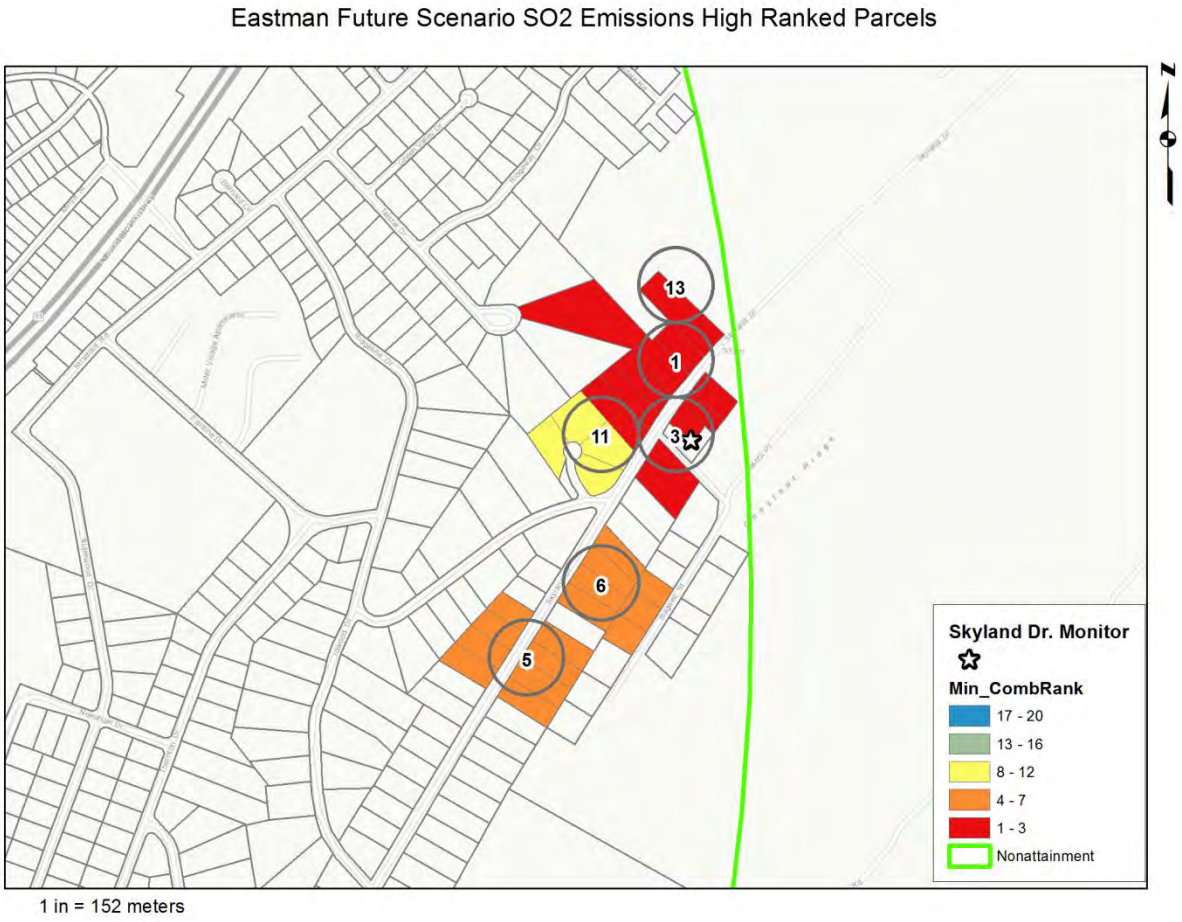
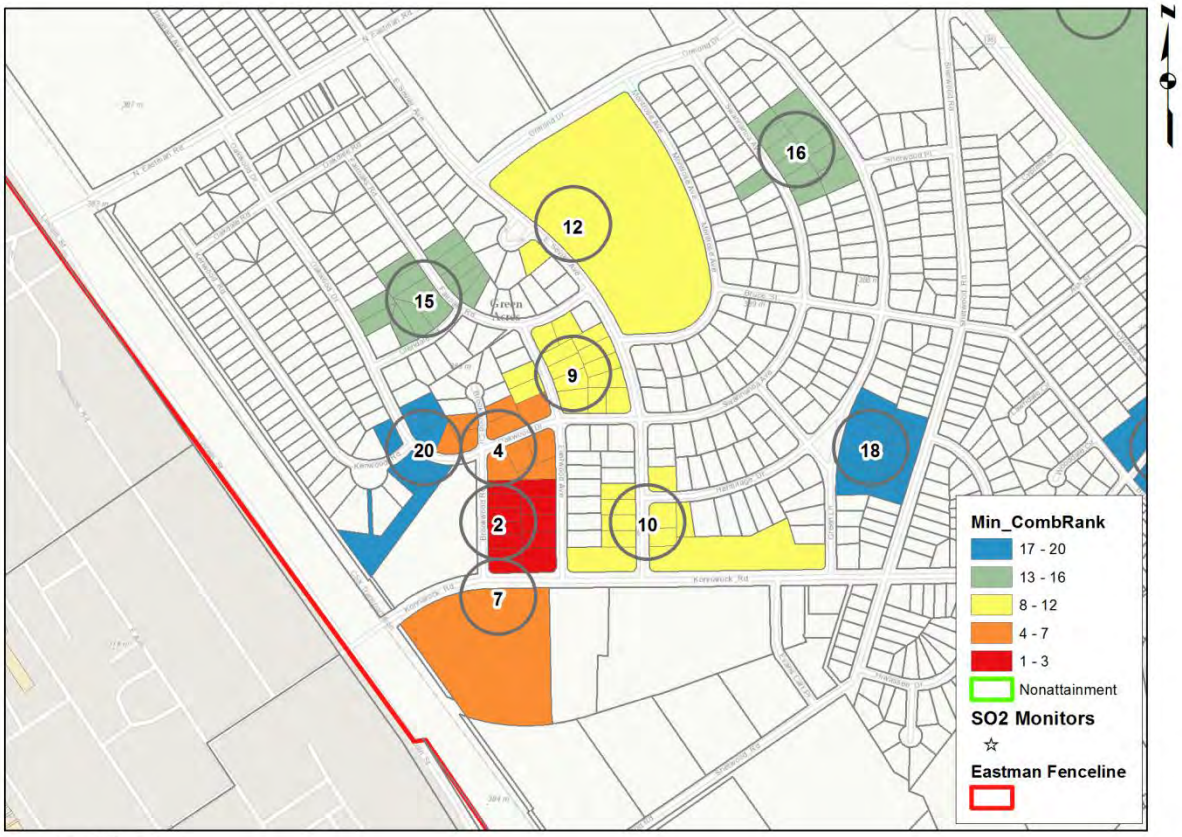


Figure 2-6: highest ranked parcels continued

Eastman Future Scenario SO2 Emissions High Ranked Parcels



1 in = 152 meters

Skyland Drive Area

The Skyland Drive area contains the top ranked receptor, as well as the 3rd and 5th highest ranked receptors.

Figure 2-7: skyland drive

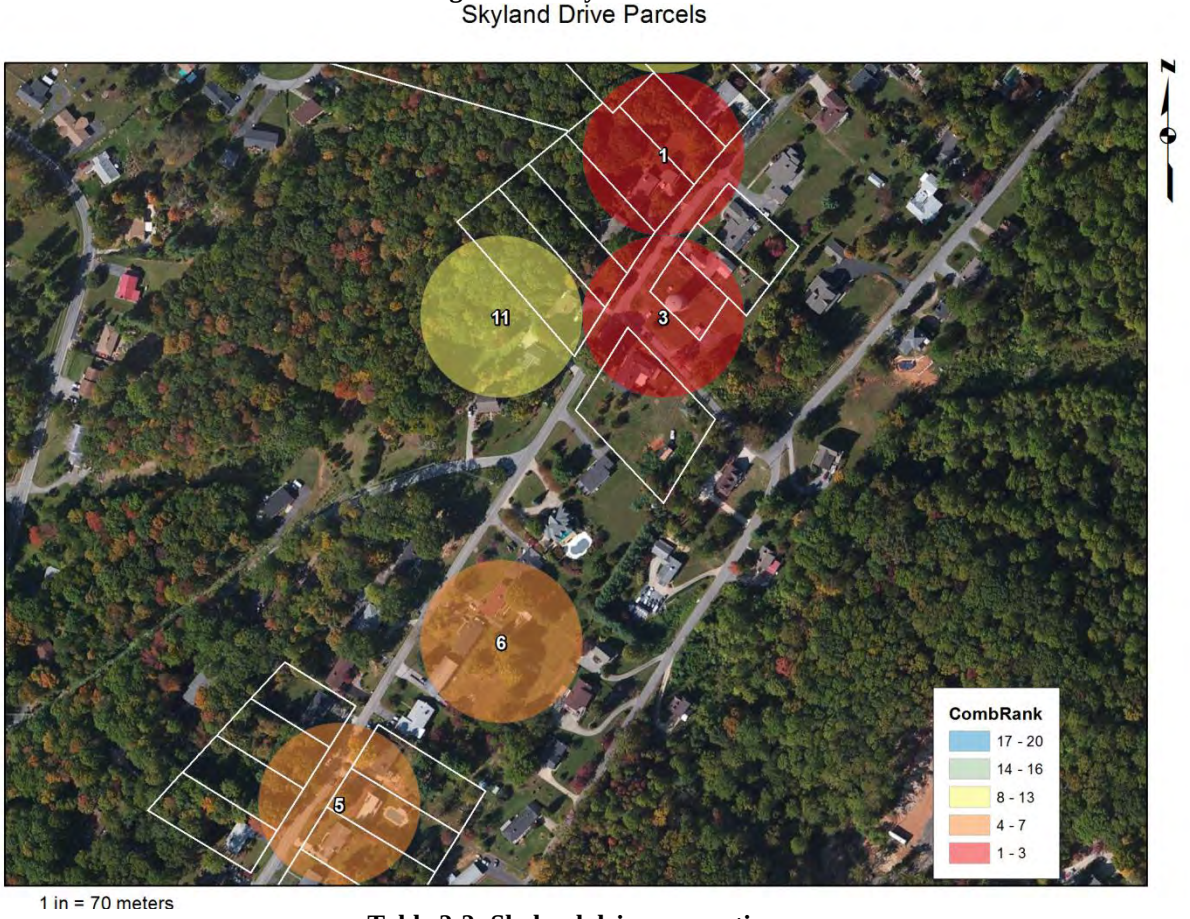


Table 2-2: Skyland drive properties

Combined Rank	Address	Classification	Mailing Address	City
1	SKYLAND DR 4016	00 RESIDENTIAL	4016 SKYLAND DR	KINGSPORT
1	SKYLAND DR 4023	00 RESIDENTIAL	4023 SKYLAND DR	KINGSPORT
1	SKYLAND DR 4019	00 RESIDENTIAL	4019 SKYLAND DRIVE	KINGSPORT
1	TELSTAR DR	00 RESIDENTIAL	3845 TELSTAR DR	KINGSPORT
1	SKYLAND DR	00 RESIDENTIAL	221 ALABAMA AVE #3	KINGSPORT
1	SKYLAND DR 4020	00 RESIDENTIAL	4020 SKYLAND DR	KINGSPORT
1	SKYLAND DR 4028	00 RESIDENTIAL	4028 SKYLAND DR	KINGSPORT
3	SKYLAND DR 4005	00 RESIDENTIAL	4005 SKYLAND DR	KINGSPORT
3	SKYLAND DR 4008	00 RESIDENTIAL	4008 SKYLAND DR	KINGSPORT
3	SKYLAND DR	00 RESIDENTIAL	4008 SKYLAND DR	KINGSPORT
3	SKYLAND DR 4015	02 CITY	CITY HALL	KINGSPORT
5	SKYLAND DR 3943	00 RESIDENTIAL	3943 SKYLAND DR	KINGSPORT
5	SKYLAND DR 3954	00 RESIDENTIAL	8458 GLEASON DR	KINGSPORT
5	SKYLAND DR 3955	00 RESIDENTIAL	816 SUMMER HILLS CT	KINGSPORT
5	SKYLAND DR 3946	00 RESIDENTIAL	2141 SWANNANOA DR	KINGSPORT
5	SKYLAND DR 3942	00 RESIDENTIAL	640 ROCK SPRINGS RD	KINGSPORT
5	SKYLAND DR 3950	00 RESIDENTIAL	3950 SKYLAND DRIVE	KINGSPORT
5	SKYLAND DR 3947	00 RESIDENTIAL	3947 SKYLAND DR	KINGSPORT
5	SKYLAND DR 3951	00 RESIDENTIAL	3951 SKYLAND DR	KINGSPORT

#1 Receptor

The top ranked receptor was the maximum receptor within the 3-km nonattainment radius for 9-modeled days. It was the 1st highest receptor by SO_2 concentration and had a combined score of 3. A 50-meter radius around the top ranked receptor intersects 7 parcels that are contained by the 3-km nonattainment radius. These 7 parcels are residential parcels with no suitable clearings.

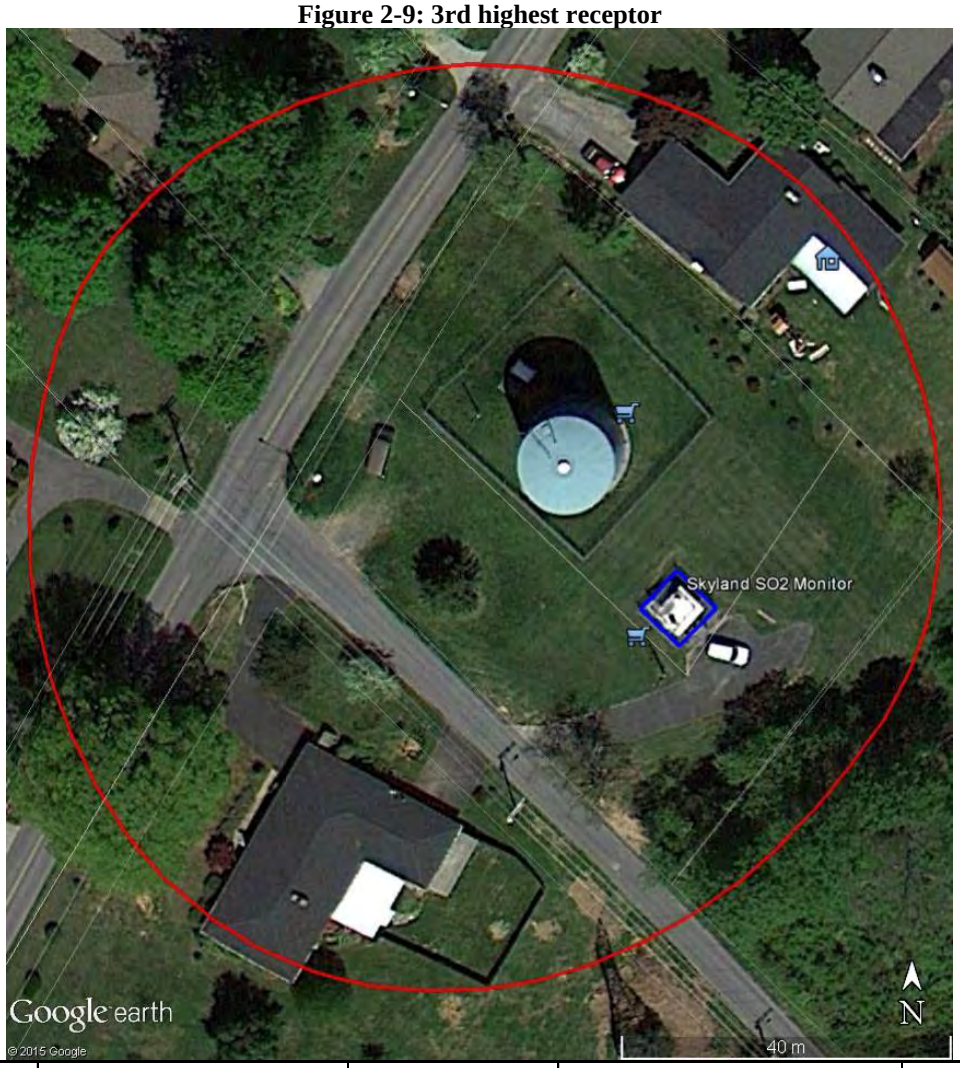
Figure 2-8: 1st highest receptor

Combined Rank	Address	Classification	Mailing Address	City
1	SKYLAND DR 4016	00 RESIDENTIAL	4016 SKYLAND DR	KINGSPORT
1	SKYLAND DR 4023	00 RESIDENTIAL	4023 SKYLAND DR	KINGSPORT
1	SKYLAND DR 4019	00 RESIDENTIAL	4019 SKYLAND DRIVE	KINGSPORT
1	TELSTAR DR	00 RESIDENTIAL	3845 TELSTAR DR	KINGSPORT
1	SKYLAND DR	00 RESIDENTIAL	221 ALABAMA AVE #3	KINGSPORT
1	SKYLAND DR 4020	00 RESIDENTIAL	4020 SKYLAND DR	KINGSPORT
1	SKYLAND DR 4028	00 RESIDENTIAL	4028 SKYLAND DR	KINGSPORT

#3 Receptor

The 3rd ranked receptor had a daily maximum frequency of 15 and a design value rank of 13, giving it a combined score of 14. There are 5 parcels within the 50-m receptor radius that are represented by this receptor. The three residential parcels do not contain enough open area to make them suitable for monitoring. The city-owned parcel is the site of the Skyland SO_2 monitor. This parcel is the most suitable parcel in the Skyland Drive area as it contains roughly 3,000 square meters of unobstructed land. The main concern for this location is the potential distruption of air flow from the water tower located to the north west of the existing monitor. This water tower is nearly 3-km from the b-253 powerhouse so any emissions should be well mixed at this distance. The ability to monitor exceedances at this location has been previously demonstrated by Eastman. The historical highest 4th high SO_2 concentration at this monitor was 406.6 $\mu g/m^3$ according to the Eastman Site-Specific Model Documentation Report (July 07, 2014).

Figure 2-9: 3rd highest receptor



Combined Rank	Address	Classification	Mailing Address	City
3	SKYLAND DR 4005	00 RESIDENTIAL	4005 SKYLAND DR	KINGSPORT
3	SKYLAND DR 4008	00 RESIDENTIAL	4008 SKYLAND DR	KINGSPORT
3	SKYLAND DR	00 RESIDENTIAL	4008 SKYLAND DR	KINGSPORT
3	SKYLAND DR 4015	02 CITY	CITY HALL	KINGSPORT

#5 Receptor

The 5th highest ranked receptor had a max daily frequency of 4 days and was the 43rd highest ranked receptor by design value, it had a combined score of 48. This receptor represents a 50-m radius area that is all residential. There are no suitable clearings on any of the 8 parcels represented.

Figure 2-10: 5th highest receptor

Combined Rank	Address	Classification	Mailing Address	City
5	SKYLAND DR 3943	00 RESIDENTIAL	3943 SKYLAND DR	KINGSPORT
5	SKYLAND DR 3954	00 RESIDENTIAL	8458 GLEASON DR	KINGSPORT
5	SKYLAND DR 3955	00 RESIDENTIAL	816 SUMMER HILLS CT	KINGSPORT
5	SKYLAND DR 3946	00 RESIDENTIAL	2141 SWANNANOA DR	KINGSPORT
5	SKYLAND DR 3942	00 RESIDENTIAL	640 ROCK SPRINGS RD	KINGSPORT
5	SKYLAND DR 3950	00 RESIDENTIAL	3950 SKYLAND DRIVE	KINGSPORT
5	SKYLAND DR 3947	00 RESIDENTIAL	3947 SKYLAND DR	KINGSPORT
5	SKYLAND DR 3951	00 RESIDENTIAL	3951 SKYLAND DR	KINGSPORT

Kingsport Power Company Area

The Kingsport Power Company area is the area just to the east of Eastman's fenceline. There are 2 receptors that ranked in the top 5. The city's water treatment plant is in the vicinity and potential emissions are a major concern for locating a monitor here.

Figure 2-11: kinsport power company

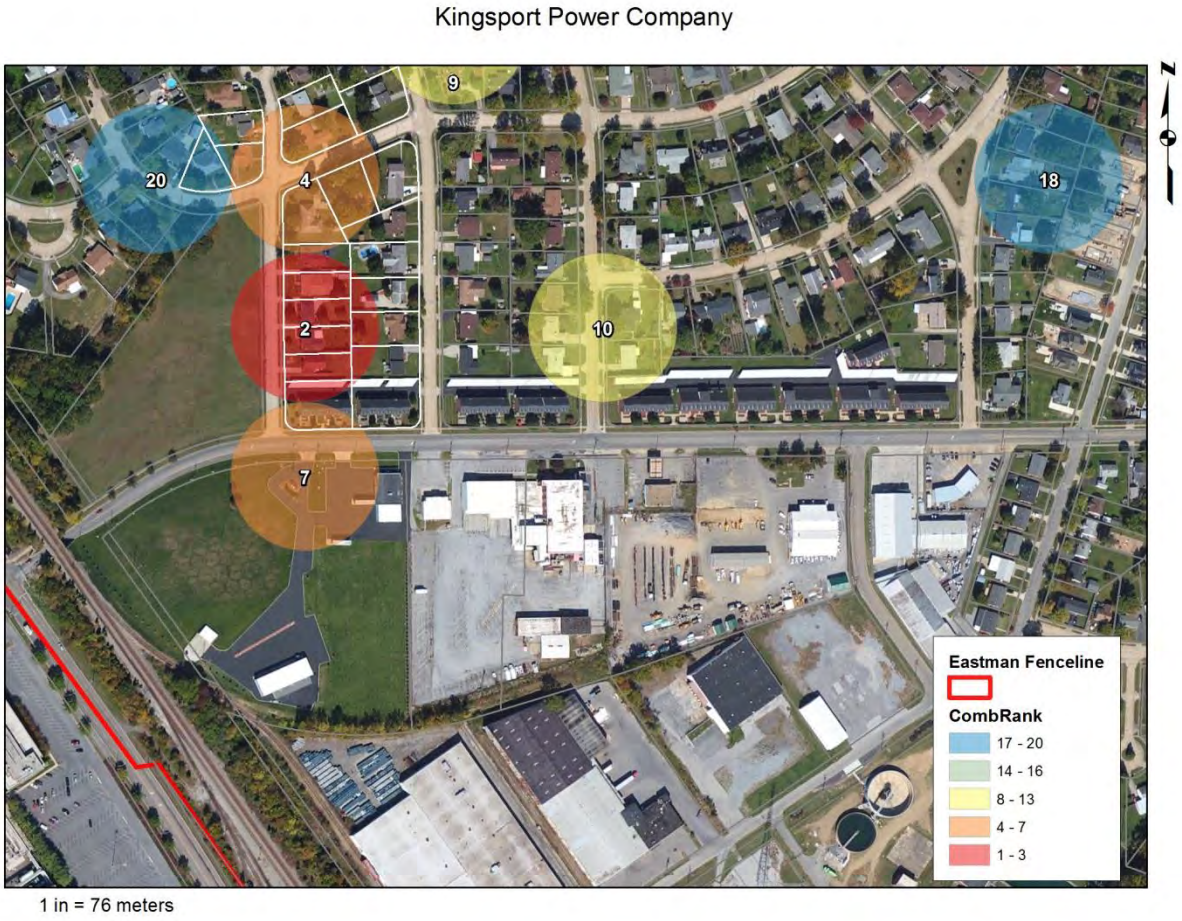


Table 2-3: kingsport power company properties

Combined Rank	Address	Classification	Mailing Address	City
2	KONNAROCK RD 1018	00 RESIDENTIAL	1018 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1016	00 RESIDENTIAL	7407 IRONWOOD CT	SCOTTSDALE
2	KONNAROCK RD 1014	00 RESIDENTIAL	1014 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD	00 RESIDENTIAL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD	06 ED/SCI/CHARITABL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1024	00 RESIDENTIAL	1024 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1022	00 RESIDENTIAL	1022 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1020	00 RESIDENTIAL	512 LYNNWOOD AVE	CHURCH HILL
2	EASTWOOD AVE 2113	00 RESIDENTIAL	2113 EASTWOOD AVE	KINGSPORT
2	BROOKWOOD RD 2124	00 RESIDENTIAL	2124 BROOKWOOD RD	KINGSPORT
2	BROOKWOOD RD 2116	00 RESIDENTIAL	2116 BROOKWOOD RD	KINGSPORT
2	BROOKWOOD RD 2112	00 RESIDENTIAL	1432 DOBYNS DR	KINGSPORT
2	BROOKWOOD RD 2128	00 RESIDENTIAL	1567 N EASTMAN RD STE #14	KINGSPORT
2	EASTWOOD AVE 2117	00 RESIDENTIAL	2117 EASTWOOD AVE	KINGSPORT
2	EASTWOOD AVE 2125	00 RESIDENTIAL	2125 EASTWOOD AVE	KINGSPORT
2	KONNAROCK RD	00 RESIDENTIAL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD	06 ED/SCI/CHARITABL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1010	00 RESIDENTIAL	1010 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1008	00 RESIDENTIAL	1008 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1006	00 RESIDENTIAL	518 OAK GROVE RD	GRAY
2	KONNAROCK RD 1004	00 RESIDENTIAL	5405 CHIPPEWA LN	KINGSPORT
2	KONNAROCK RD 1002	00 RESIDENTIAL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1000	00 RESIDENTIAL	1000 KONNAROCK RD	KINGSPORT
2	EASTWOOD AVE 2121	00 RESIDENTIAL	1805 FLEETWOOD DR	KINGSPORT
2	BROOKWOOD RD 2120	00 RESIDENTIAL	1570 CRESCENT DR	KINGSPORT
4	BROOKWOOD CIR 2016	00 RESIDENTIAL	5619 LONE STAR RD	KINGSPORT
4	EASTWOOD AVE 2101	00 RESIDENTIAL	2101 EASTWOOD AVE	KINGSPORT
4	BROOKWOOD CIR 2017	00 RESIDENTIAL	2017 BROOKWOOD CIR	KINGSPORT
4	EASTWOOD AVE 2109	00 RESIDENTIAL	2109 EASTWOOD AVE	KINGSPORT
4	EASTWOOD AVE 2017	00 RESIDENTIAL	2017 EASTWOOD AVE	KINGSPORT
4	OAKWOOD DR 1917	00 RESIDENTIAL	1917 OAKWOOD DR	KINGSPORT
4	BROOKWOOD RD 2100	00 RESIDENTIAL	2100 BROOKWOOD RD	KINGSPORT
4	BROOKWOOD CIR 2013	00 RESIDENTIAL	2013 BROOKWOOD CIR	KINGSPORT
4	OAKWOOD DR 1932	00 RESIDENTIAL	156 MEREDITH CIR	GRAY
4	BROOKWOOD CIR 2012	00 RESIDENTIAL	2012 BROOKWOOD CIR	KINGSPORT

#2 Receptor

The 2nd highest ranked receptor is located less than 250 meters outside of the Eastman fenceline. It had a daily maximum frequency of 4 and was the 4th highest receptor by design value. It had a combined score of 9. The receptor's 50-m radius intersects 11 residential parcels. The 50-m area also crosses a clearing to the west of Brookwood Rd. This cleared parcel is owned by Eastman. A major concern for this location is the proximity to the city's water treatment plant, about 450 meters to the southeast. Emissions from this facility could skew any monitored SO_2 concentrations in this vicinity. Another concern is that there is not enough open land in this area suitable for monitoring.

Figure 2-12: 2nd highest receptor

Combined Rank	Address	Classification	Mailing Address	City
2	KONNAROCK RD 1018	00 RESIDENTIAL	1018 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1016	00 RESIDENTIAL	7407 IRONWOOD CT	SCOTTSDALE
2	KONNAROCK RD 1014	00 RESIDENTIAL	1014 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD	00 RESIDENTIAL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD	06 ED/SCI/CHARITABL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1024	00 RESIDENTIAL	1024 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1022	00 RESIDENTIAL	1022 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1020	00 RESIDENTIAL	512 LYNNWOOD AVE	CHURCH HILL
2	EASTWOOD AVE 2113	00 RESIDENTIAL	2113 EASTWOOD AVE	KINGSPORT
2	BROOKWOOD RD 2124	00 RESIDENTIAL	2124 BROOKWOOD RD	KINGSPORT
2	BROOKWOOD RD 2116	00 RESIDENTIAL	2116 BROOKWOOD RD	KINGSPORT
2	BROOKWOOD RD 2112	00 RESIDENTIAL	1432 DOBYNS DR	KINGSPORT
2	BROOKWOOD RD 2128	00 RESIDENTIAL	1567 N EASTMAN RD STE #14	KINGSPORT
2	EASTWOOD AVE 2117	00 RESIDENTIAL	2117 EASTWOOD AVE	KINGSPORT
2	EASTWOOD AVE 2125	00 RESIDENTIAL	2125 EASTWOOD AVE	KINGSPORT
2	KONNAROCK RD	00 RESIDENTIAL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD	06 ED/SCI/CHARITABL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1010	00 RESIDENTIAL	1010 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1008	00 RESIDENTIAL	1008 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1006	00 RESIDENTIAL	518 OAK GROVE RD	GRAY
2	KONNAROCK RD 1004	00 RESIDENTIAL	5405 CHIPPEWA LN	KINGSPORT
2	KONNAROCK RD 1002	00 RESIDENTIAL	1002 KONNAROCK RD	KINGSPORT
2	KONNAROCK RD 1000	00 RESIDENTIAL	1000 KONNAROCK RD	KINGSPORT
2	EASTWOOD AVE 2121	00 RESIDENTIAL	1805 FLEETWOOD DR	KINGSPORT
2	BROOKWOOD RD 2120	00 RESIDENTIAL	1570 CRESCENT DR	KINGSPORT

#4 Receptor

The 4th highest receptor shares the same concerns as the 2nd highest. It is the northern neighbor of the 2nd highest receptor. It was the maximum receptor for 2 of the modeled days and had a dv rank of 6. The combined score for this receptor was 32. There are no suitable locations within this area for monitoring as it covers small residential lots. The clearing to the southwest is owned by Eastman.

Figure 2-13: 4th highest receptor

Combined Rank	Address	Classification	Mailing Address	City
4	BROOKWOOD CIR 2016	00 RESIDENTIAL	5619 LONE STAR RD	KINGSPORT
4	EASTWOOD AVE 2101	00 RESIDENTIAL	2101 EASTWOOD AVE	KINGSPORT
4	BROOKWOOD CIR 2017	00 RESIDENTIAL	2017 BROOKWOOD CIR	KINGSPORT
4	EASTWOOD AVE 2109	00 RESIDENTIAL	2109 EASTWOOD AVE	KINGSPORT
4	EASTWOOD AVE 2017	00 RESIDENTIAL	2017 EASTWOOD AVE	KINGSPORT
4	OAKWOOD DR 1917	00 RESIDENTIAL	1917 OAKWOOD DR	KINGSPORT
4	BROOKWOOD RD 2100	00 RESIDENTIAL	2100 BROOKWOOD RD	KINGSPORT
4	BROOKWOOD CIR 2013	00 RESIDENTIAL	2013 BROOKWOOD CIR	KINGSPORT
4	OAKWOOD DR 1932	00 RESIDENTIAL	156 MEREDITH CIR	GRAY
4	BROOKWOOD CIR 2012	00 RESIDENTIAL	2012 BROOKWOOD CIR	KINGSPORT

Table of Figures