POLLUTION CONTROL DIVISION

ANNUAL REPORT 2012

Metro Public Health Dept
Nashville/Davidson County

Protecting, Improving, and Sustaining Health

Mayor of Metropolitan Government of

Nashville & Davidson County

The Honorable Megan Barry

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The mission of the Metro Public Health Department is to protect, improve and sustain the health and well-being of all people in Metropolitan Nashville.

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1. INTRODUCTION

The 1990 Clean Air Act Amendments state, "The prevention and control of air pollution at its source is a primary responsibility of state and local governments." Chapter 10.56 of the Metropolitan Code of Laws charges the Metropolitan Board of Health with the responsibility of adopting, promulgating, and enforcing such rules and regulations as necessary to achieve and maintain such levels of air quality as will protect human health and safety, and to the greatest degree practical, prevent injury to plant life and property and foster the comfort and convenience of the inhabitants of the Metropolitan Government area. This report covers the activities conducted by the Metro Public Health Department, Pollution Control Division (PCD) in carrying out these responsibilities for calendar year 2012.

The purpose of the Air Quality Program (which includes Pollution Control Division and Vehicle Inspection and Maintenance) is to provide assessment, information and protection products to everyone in Nashville so they can experience healthy living conditions through clean air and reduced exposure to environmental health and safety hazards.

2. ENGINEERING ACTIVITIES

Table I and Figures 1 through 5, present the 2012 annual emission inventory for five criteria pollutants (particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, and volatile organic compounds).

Figure 1 shows that miscellaneous sources account for approximately 70.8% of the total 2012 particulate (PM_{10}) emissions, and that on-road mobile source emissions account for approximately 9.3% of the total 2012 PM_{10} emissions. Figure 2 shows that fuel combustion accounts for approximately 80.7% of the total 2012 sulfur dioxide emissions. Figure 3 shows that the on-road and non-road mobile source emissions account for approximately 90.8% of the total 2012 nitrogen dioxide emissions. Figure 4 shows that approximately 97.8% of the 2012 carbon monoxide emissions are contributed by on-road and non-road mobile sources. Figure 5 shows that on-road and non-road mobile sources account for approximately 49.6% of the total 2012 volatile organic compound emissions, and approximately 23.2% is contributed by other solvent usage including degreasing, graphic arts, and consumer/commercial solvents.

Table II and Figure 6, are a comparison of Nitrogen Dioxide and Volatile Organic Compound emissions for the past 14 years. The large increase in nitrogen dioxide emissions seen between 2006 and 2007 is a result of the switch from using the MOBILE6.2 model to MOVES2010 to calculate on-road mobile source emissions. Originally, the emissions for 2006 through 2009 were calculated using MOBILE6.2. However, the emissions were recalculated using the MOVES model in order to provide a better sense of the trend of the emissions data. The MOVES model calculates significantly higher nitrogen dioxide emissions than MOBILE6.2, given the same input data.

The 2012 Davidson County Hazardous Air Pollutant Emission Inventory is shown in Table III.

During 2012, the Engineering Section reviewed plans and specifications for 57 new and/or modified stationary sources and issued the following permits:

Construction Permits:	56
Operating Permits:	518

In addition to the above permits, 301 permits were issued for asbestos removal. Revenue generated from the issuance of permits in 2012 was $484,377.

During 2012 this agency observed the following compliance source tests:

0	Nitrogen Oxides
0	Carbon Monoxide
0	Hydrochloric Acid

1	Volatile Organic Compounds
0	Particulate Matter
56	Pressure-decay tests on gasoline dispensing facilities

3. PART 70 OPERATING PERMIT PROGRAM

On October 13, 1993, the Metropolitan Board of Health adopted Regulation No. 13, “Part 70 Operating Permit Program.” Subsequently, EPA granted full approval to the Metro Public Health Department, Pollution Control Division’s Part 70 Operating Permit Program. All affected facilities were required to submit Part 70 Operating Permit Applications to the Pollution Control Division within twelve months of the effective date of March 15, 1996. The Pollution Control Division received four applications in 1996 and eleven applications during 1997. During that time, two more sources became subject to the Part 70 Operating Permit Program. These two applications were received in 1998. All seventeen applications were reviewed and determined to be complete. Five Part 70 Operating Permits were issued in 1997, six were issued in 1998, and three were issued in 1999. The remaining three permits were issued in 2000. Since that time one facility has expanded production to become a major source while some facilities have closed. The following facilities currently maintain Part 70 Operating Permits:

Permit Number	Facility Name
70-0002	E.I. du Pont de Nemours and Co.
70-0025	Gaylord Opryland Resort and Convention Center
70-0039	Vanderbilt University
70-0040	Carlex Glass America, LLC
70-0042	Triumph Aerostructures, LLC
70-0050	Metro District Energy System
70-0081	U.S. Smokeless Tobacco Manufacturing, LP
70-0154	Aqua Bath Company
70-0156	Gibson Guitar
70-0241	Vanderbilt University Medical Center

4. EMISSION INVENTORY

TABLE I
2012 Davidson County Annual Emission Inventory

STATIONARY SOURCES-TONS PER YEAR										
	PARTICULATE		SULFUR OXIDES		NITROGEN OXIDES		CARBON MONOXIDE		VOL. ORG. COMP.	
SOURCE CATEGORY	AREA	POINT	AREA	POINT	AREA	POINT	AREA	POINT	AREA	POINT
TRANS. & MKT. OF VOC										
VOL Storage & Handling	0.1	0.0	0.5	0.0	0.2	0.0	0.1	0.0	14.6	13.7
Bulk Gasoline Terminals	0.0	0.0	0.0	0.0	0.0	12.6	0.0	36.6	0.0	310.1
Bulk Gasoline Plants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0
Tank Truck Unl. (Stage I)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	219.9	0.0
Tank Trucks In Transit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.9	0.0
Subtotal	**0.1**	**0.0**	**0.5**	**0.0**	**0.2**	**12.6**	**0.1**	**36.6**	**293.1**	**323.8**
Total--Area + Point	**0.1**		**0.5**		**12.8**		**36.7**		**616.9**	
INDUSTRIAL PROCESSES										
Adhesives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerospace	0.6	0.2	0.0	0.0	0.2	0.0	0.1	0.0	7.7	18.9
Misc. Metal Products	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	23.3
Inorganic Chemical Mfg.	0.0	20.2	0.0	0.0	0.0	5.5	0.0	4.5	2.8	0.3
Organic Chemical Mfg.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Textile Mfg.	0.0	52.5	0.0	0.0	0.0	0.5	0.0	0.5	4.2	11.2
Rubber Tire Mfg.	3.2	0.0	0.0	0.0	0.1	0.0	0.1	0.0	4.8	0.0
Plastic Products Mfg.	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0
Wood Products Mfg.	7.2	1.8	1.0	0.0	14.6	0.0	3.1	0.0	35.6	153.2
Clay & Glass	2.6	73.4	0.0	101.4	0.0	621.0	0.0	15.2	0.5	20.1
Mineral Products	61.8	43.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Asphalt Plants	13.9	4.6	6.3	0.3	7.5	1.8	51.2	28.2	13.2	1.7
Paint Mfg.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0
Food & Agriculture	8.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	44.3
Primary/Sec. Metals	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Large Appliance Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paint and Body Shops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.2	0.0
Subtotal	**102.7**	**196.1**	**7.3**	**101.8**	**22.3**	**628.8**	**54.5**	**48.3**	**140.4**	**273.1**
Total--Area + Point	**298.8**		**109.1**		**651.1**		**102.8**		**413.5**	

TABLE I (continued)
2012 Davidson County Annual Emission Inventory

STATIONARY SOURCES-TONS PER YEAR (continued)										
	PARTICULATE		SULFUR OXIDES		NITROGEN OXIDES		CARBON MONOXIDE		VOL. ORG. COMP.	
SOURCE CATEGORY	**AREA**	**POINT**	**AREA**	**POINT**	**AREA**	**POINT**	**AREA**	**POINT**	**AREA**	**POINT**
NON-IND. SURFACE COAT.										
Architectural	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,142.3	0.0
Auto Refinishing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	819.9	0.0
Traffic Markings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	134.0	0.0
Subtotal	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2,096.3**	**0.0**
Total--Area + Point	**0.0**		**0.0**		**0.0**		**0.0**		**2,096.3**	
OTHER SOLVENT USE										
Cold Cleaners (exc. perc)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,393.8	0.0
Degreas. (exc cold clean.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Graphic Arts	0.1	0.5	0.0	0.0	0.0	4.7	4.7	1.7	65.0	0.0
Dry Cleaning (exc. perc)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Cons./Comm. Solv. Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,541.3	0.0
Subtotal	**0.1**	**0.5**	**0.0**	**0.0**	**0.0**	**4.7**	**4.7**	**1.7**	**4,001.3**	**0.0**
Total--Area + Point	**0.6**		**0.0**		**4.7**		**6.4**		**4,001.3**	
MISC. SOURCES										
Pesticide Application	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	577.0	0.0
Landfills	0.0	0.6	0.0	0.0	0.0	1.5	0.0	27.9	0.0	0.7
Scrap & Waste Material	33.2	13.8	0.8	1.2	15.0	2.8	1.5	5.5	0.2	0.0
Biogenic (PCBEIS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust From Paved Roads	1,808.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brake and Tire Wear	261.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction Projects	1,161.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tilling	57.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**3,321.8**	**14.5**	**0.8**	**1.2**	**15.0**	**4.3**	**1.5**	**33.3**	**577.1**	**0.7**
Total--Area + Point	**3,336.2**		**2.0**		**19.3**		**34.9**		**577.9**	

TABLE I (continued)
2012 Davidson County Annual Emission Inventory

STATIONARY SOURCES-TONS PER YEAR (continued)										
	PARTICULATE		SULFUR OXIDES		NITROGEN OXIDES		CARBON MONOXIDE		VOL. ORG. COMP.	
SOURCE CATEGORY	**AREA**	**POINT**	**AREA**	**POINT**	**AREA**	**POINT**	**AREA**	**POINT**	**AREA**	**POINT**
FUEL COMBUSTION										
Residential	146.1	0.0	14.5	0.0	361.4	0.0	1,010.5	0.0	800.0	0.0
Commercial/Institutional	12.4	45.7	7.0	1,004.1	172.1	589.6	103.8	297.9	10.0	20.2
Industrial	5.1	3.5	15.4	0.4	57.1	21.4	36.7	27.2	6.4	4.0
Subtotal	**163.7**	**49.3**	**37.0**	**1,004.6**	**590.6**	**611.0**	**1,151.0**	**325.1**	**816.3**	**24.2**
Total--Area + Point	**212.9**		**1,041.5**		**1,201.6**		**1,476.0**		**840.5**	
SOLID WASTE DISPOSAL										
Incinerators	1.0	0.0	0.3	0.0	2.2	0.0	0.8	0.0	0.3	0.0
POTW	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.2	0.0
TSDF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Structure Fires (inc. auto/truck)	79.3	0.0	0.0	0.0	0.2	0.0	655.9	0.0	90.1	0.0
Forest & Grass Fires	5.2	0.0	0.0	0.0	0.0	0.0	33.1	0.0	4.9	0.0
Subtotal	**85.5**	**0.0**	**0.3**	**0.0**	**2.3**	**0.0**	**689.8**	**0.0**	**121.5**	**0.0**
Total--Area + Point	**85.5**		**0.3**		**2.3**		**689.8**		**121.5**	
TOTAL STATIONARY SOURCES	**3,673.8**	**260.4**	**45.9**	**1,107.6**	**630.5**	**1,261.4**	**1,901.6**	**445.0**	**8,046.0**	**621.9**
TOTAL STA. AREA + POINT	**3,934.2**		**1,153.5**		**1,891.9**		**2,346.6**		**8,667.9**	

NON-ROAD MOBILE										
Railroad Locomotives	24.5	0.0	1.0	0.0	898.4	0.0	140.8	0.0	50.4	0.0
Aircraft	13.0	0.0	58.0	0.0	525.0	0.0	1,740.0	0.0	182.0	0.0
Commercial Marine	0.0	0.0	4.4	0.0	45.7	0.0	16.3	0.0	8.2	0.0
Non-road	302.5	0.0	8.2	0.0	2,584.0	0.0	34,778.1	0.0	3,326.9	0.0
Subtotal	**340.0**	**0.0**	**71.6**	**0.0**	**4,053.1**	**0.0**	**36,675.2**	**0.0**	**3,567.5**	**0.0**
Total--Area + Point	**340.0**		**71.6**		**4,053.1**		**36,675.2**		**3,567.5**	

TABLE I (continued)
2012 Davidson County Annual Emission Inventory

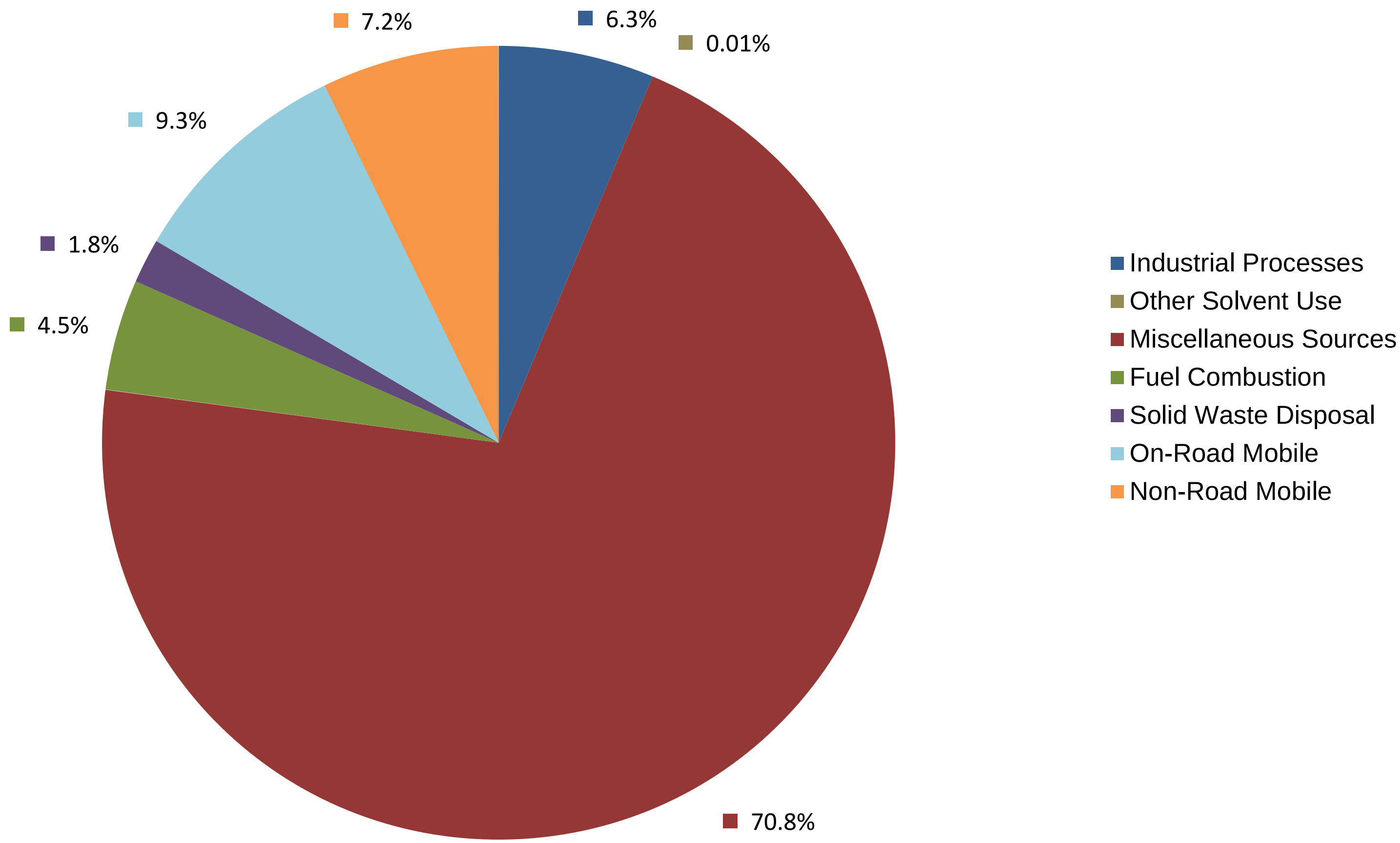
STATIONARY SOURCES-TONS PER YEAR (continued)										
	PARTICULATE		SULFUR OXIDES		NITROGEN OXIDES		CARBON MONOXIDE		VOL. ORG. COMP.	
SOURCE CATEGORY	AREA	POINT	AREA	POINT	AREA	POINT	AREA	POINT	AREA	POINT
ON-ROAD MOBILE										
Motorcycles	1.8	0.0	0.3	0.0	27.3	0.0	673.5	0.0	107.3	0.0
Passenger Cars	36.4	0.0	16.9	0.0	1,775.9	0.0	18,918.5	0.0	1,536.8	0.0
Passenger Trucks	74.1	0.0	28.1	0.0	4,212.6	0.0	32,772.8	0.0	1,996.5	0.0
Light Commercial Trucks	57.3	0.0	10.4	0.0	2,191.1	0.0	13,163.7	0.0	839.0	0.0
Intercity Buses	12.0	0.0	0.2	0.0	213.9	0.0	58.7	0.0	9.7	0.0
Transit Buses	2.9	0.0	0.1	0.0	55.8	0.0	23.8	0.0	3.6	0.0
School Buses	1.8	0.0	0.0	0.0	32.7	0.0	47.2	0.0	4.1	0.0
Refuse Trucks	3.2	0.0	0.1	0.0	66.4	0.0	33.3	0.0	4.0	0.0
Single-Unit Short Haul Trucks	23.0	0.0	1.4	0.0	573.6	0.0	1,742.2	0.0	101.7	0.0
Single-Unit Long Haul Trucks	1.6	0.0	0.1	0.0	39.1	0.0	103.0	0.0	6.5	0.0
Motor Homes	0.4	0.0	0.0	0.0	13.3	0.0	79.9	0.0	4.3	0.0
Combination Short Haul Trucks	106.7	0.0	3.9	0.0	2,247.8	0.0	606.8	0.0	112.5	0.0
Combination Long Haul Trucks	117.6	0.0	4.1	0.0	3,111.5	0.0	930.4	0.0	250.5	0.0
Subtotal	**438.9**	**0.0**	**65.7**	**0.0**	**14,561.1**	**0.0**	**69,153.7**	**0.0**	**4,976.6**	**0.0**
Total--Area + Point	**438.9**		**65.7**		**14,561.1**		**69,153.7**		**4,976.6**	

TOTAL MOBILE SOURCES	**778.9**	**0.0**	**137.2**	**0.0**	**18,614.2**	**0.0**	**105,828.9**	**0.0**	**8,544.1**	**0.0**
TOTAL MOBILE AREA + POINT	**778.9**		**137.2**		**18,614.2**		**105,828.9**		**8,544.1**	
TOTAL STATIONARY SOURCES	**3,673.8**	**260.4**	**45.9**	**1,107.6**	**630.5**	**1,261.4**	**1,901.6**	**445.0**	**8,046.0**	**621.9**
TOTAL STA. AREA + POINT	**3,934.2**		**1,153.5**		**1,891.9**		**2,346.6**		**8,667.9**	
GRAND TOTAL MOBILE + STA.	**4,713.0**		**1,290.7**		**20,506.1**		**108,175.5**		**17,212.0**	

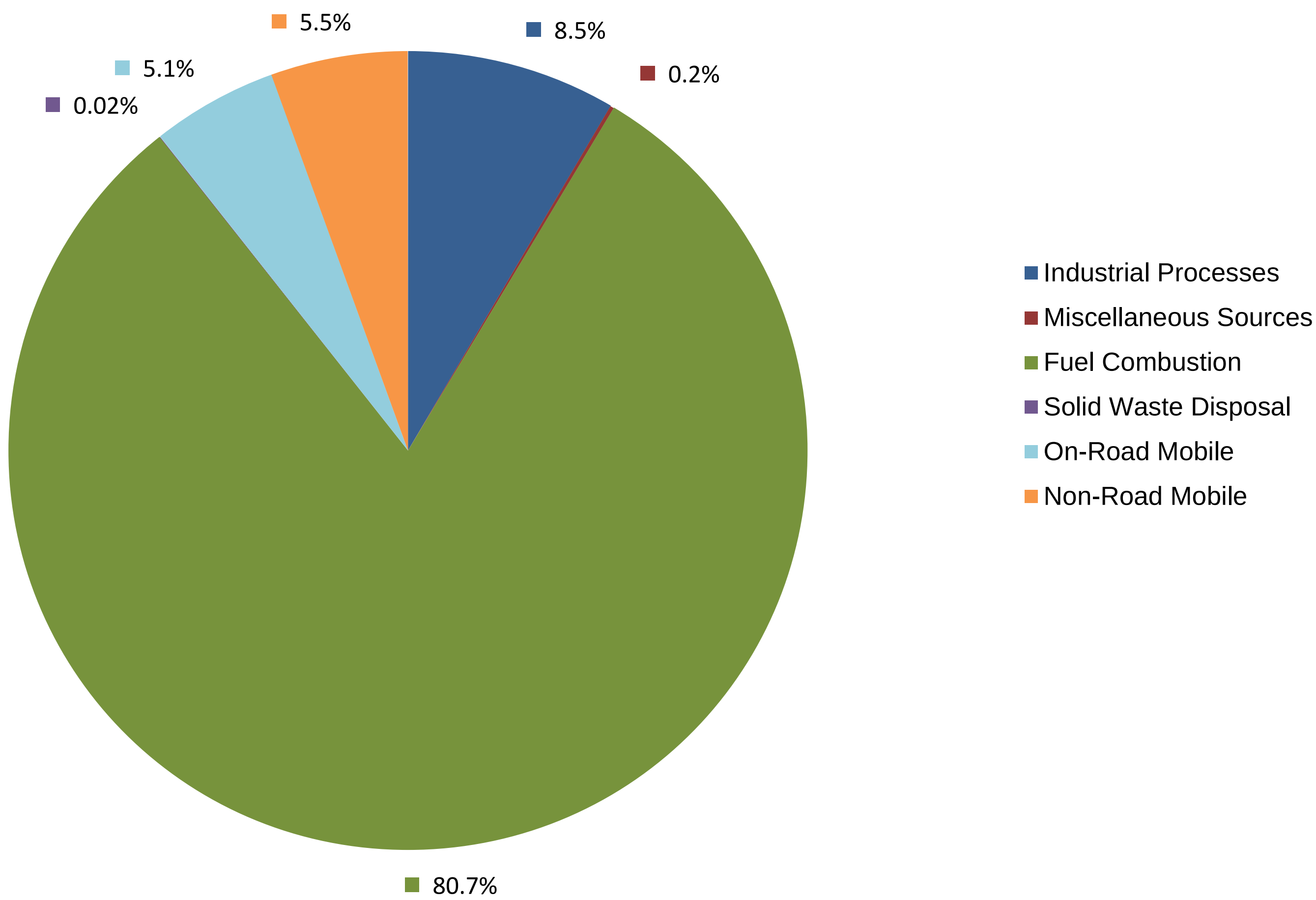
* Historically, the non-road mobile emissions (excluding railroad locomotives, aircraft and commercial marine) were calculated without the use of an EPA-approved computer model. EPA developed the NONROAD model in 2004. This became the recommended method of calculating the non-road mobile emissions (excluding railroad locomotives, aircraft and commercial marine). The latest version of this model, NONROAD2008.1.0, was used to calculate the non-road mobile emissions (excluding railroad locomotives, aircraft and commercial marine) for this emissions inventory. The on-road mobile emissions were calculated using the latest version of the EPA's on-road model, MOVES 2010b, which replaced the previous model, MOBILE6.2, in 2010.

** Stage II refueling emissions are accounted for in the on-road mobile emissions totals. In previous years, Stage II emissions were calculated by running the mobile model with and without Stage II refueling. The newer MOVES model takes refueling emissions into account in the model runs.

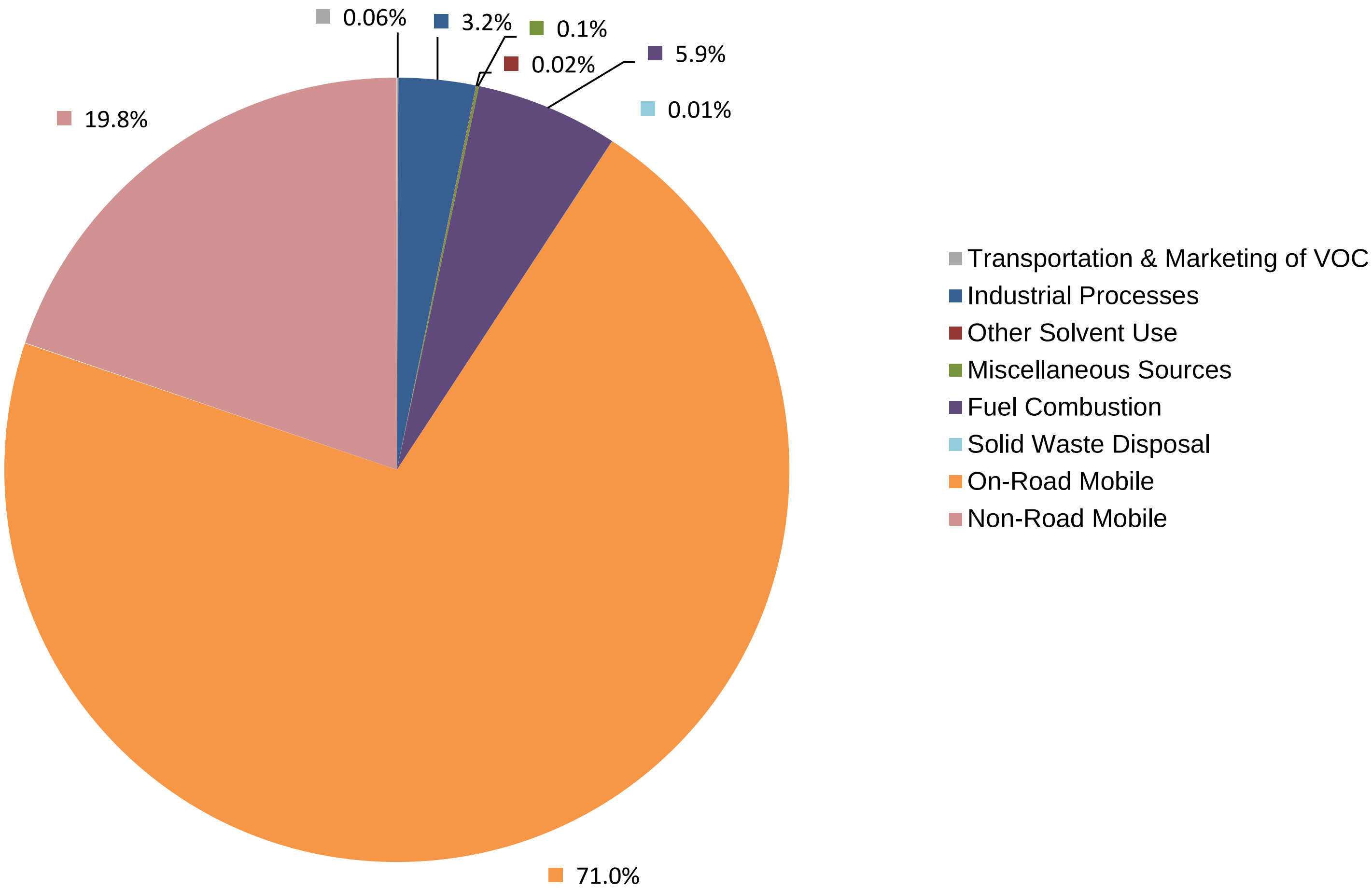
PM10 Emissions for Various Source Categories
Figure 1



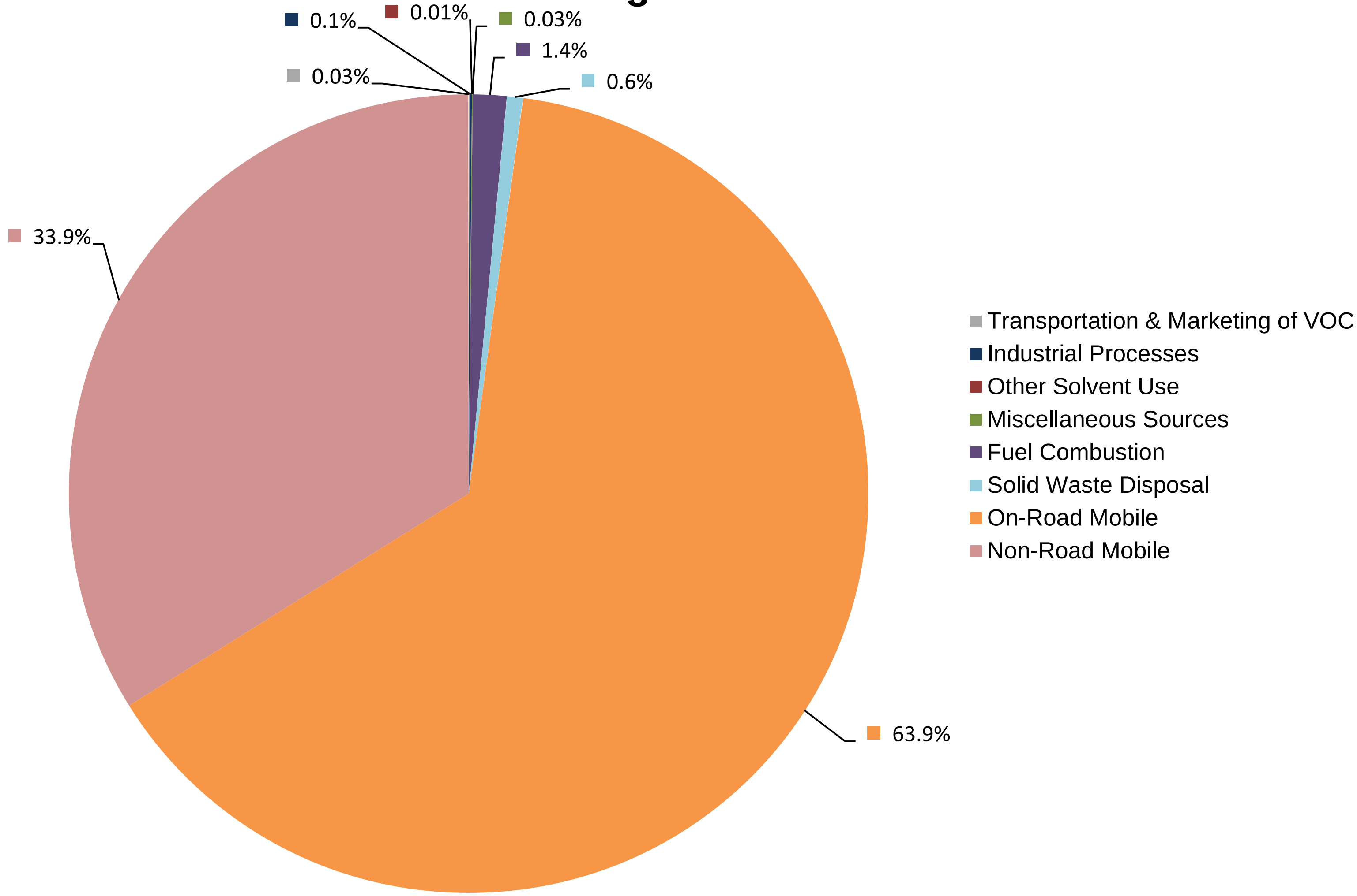
Sulfur Dioxide Emissions for Various Source Categories
Figure 2



Nitrogen Oxide Emissions for Various Source Categories
Figure 3



Carbon Monoxide Emissions for Various Source Categories
Figure 4



Volatile Organic Compound Emissions for Various Source Categories
Figure 5

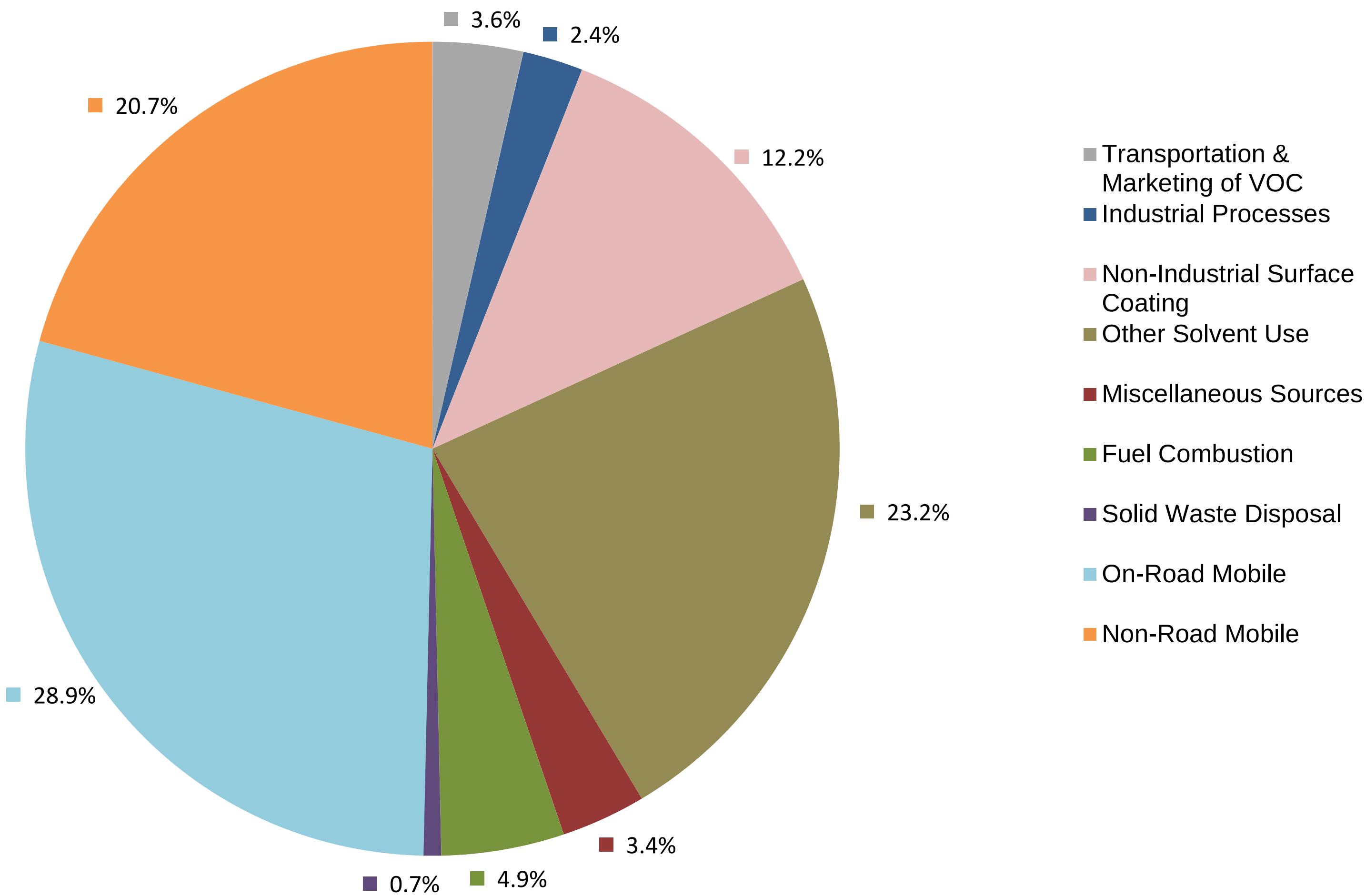


TABLE II
1999 - 2012 Annual Comparison of Nitrogen Dioxide and Volatile Organic Compound Emissions

Nitrogen Dioxide (Tons/Year)

Source Category	1999	2000	2001	2002	2003	2004	2005	2006	2007*	2008*	2009*	2010	2011	2012
Trans. & Mkt. of VOC	5	5	6	4	3	7	10	12	10	11	13	14	13	13
Industrial Processes	1,914	1,672	1,365	898	899	890	884	703	1,009	833	716	942	875	651
Other Solvents	0	0	3	0	4	5	6	6	7	7	23	29	6	5
Miscellaneous Sources	8	2	7	0	0	0	0	0	27	30	29	33	32	19
Fuel Combustion	2,866	3,063	3,118	3,074	3,119	2,565	2,348	2,238	2,208	2,294	2,027	2,142	1,394	1,202
Solid Waste Disposal	458	460	404	144	1	2	2	7	6	2	3	9	2	2
On-Road Mobile	21,001	18,548	19,669	19,218	16,875	16,114	14,844	13,352	24,119	21,851	19,328	16,479	15,264	14,561
Non-Road Mobile	4,585	4,825	5,207	4,965	4,711	4,657	4,648	4,542	4,318	4,176	3,927	3,756	4,261	4,053
TOTAL	**30,836**	**28,575**	**29,778**	**28,308**	**25,612**	**24,248**	**22,743**	**21,018**	**31,704**	**29,204**	**26,066**	**23,407**	**21,848**	**20,506**

* On-Road Mobile NO_x emissions for 2007-2009 were re-calculated using the latest version of the MOVES model (MOVES 2010b)

Volatile Organic Compounds (Tons/Year)

Source Category	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Trans. & Mkt. of VOC	691	676	633	660	651	677	667	691	620	717	690	728	606	617
Industrial Processes	1,868	1,675	1,976	1,516	1,456	1,344	1,068	1,075	847	640	429	457	382	414
Non-Ind. Surface Coating	1,973	1,999	1,885	1,804	1,815	1,845	1,912	1,946	1,932	2,001	2,025	1,990	1,980	2,096
Other Solvents	2,749	3,004	2,999	3,033	3,052	3,101	3,164	3,206	3,052	3,129	3,732	2,554	4,045	4,001
Miscellaneous Sources	498	511	519	531	536	545	550	551	553	561	579	560	568	578
Fuel Combustion	5,780	1,250	827	883	938	767	768	787	800	1,078	1,394	1,510	1,500	841
Solid Waste Disposal	113	101	98	90	76	110	55	80	126	75	91	101	76	122
On-Road Mobile	9,852	8,557	8,292	8,227	10,568	9,909	9,036	8,478	7,990	6,747	6,073	5,462	4,959	4,977
Non-Road Mobile	4,274	4,475	4,063	4,552	4,169	3,869	4,990	4,788	4,641	4,044	3,963	4,163	3,686	3,568
TOTAL	**27,798**	**22,247**	**21,290**	**21,296**	**23,260**	**22,167**	**22,210**	**22,040**	**20,565**	**18,991**	**18,976**	**17,528**	**17,801**	**17,212**

* Historically, the on-road mobile emissions were calculated using the latest version of the EPA's MOBILE model. In 1996, MOBILE5b was released, followed by MOBILE6.0 in 2002. Finally, MOBILE 6.2 was released in 2004, and was used to model emissions up through calendar year 2009. The MOBILE model was officially replaced by the MOVES model in 2010. To calculate the on-road mobile emissions, MOVES 2010a was used for calendar year 2010, and MOVES 2010b was used for calendar years 2011 and 2012. EPA has acknowledged that the MOVES model calculates significantly higher NO_x emissions than the MOBILE model. Due to the significant increase in modeled NO_x emissions using the MOVES model, this office went back and re-ran MOVES 2010b for NO_x for calendar years 2007 through 2009, in order to give a better sense of the trend in NO_x emissions using the current model.

Annual Comparison of Nitrogen Oxide and VOC Emissions
Figure 6

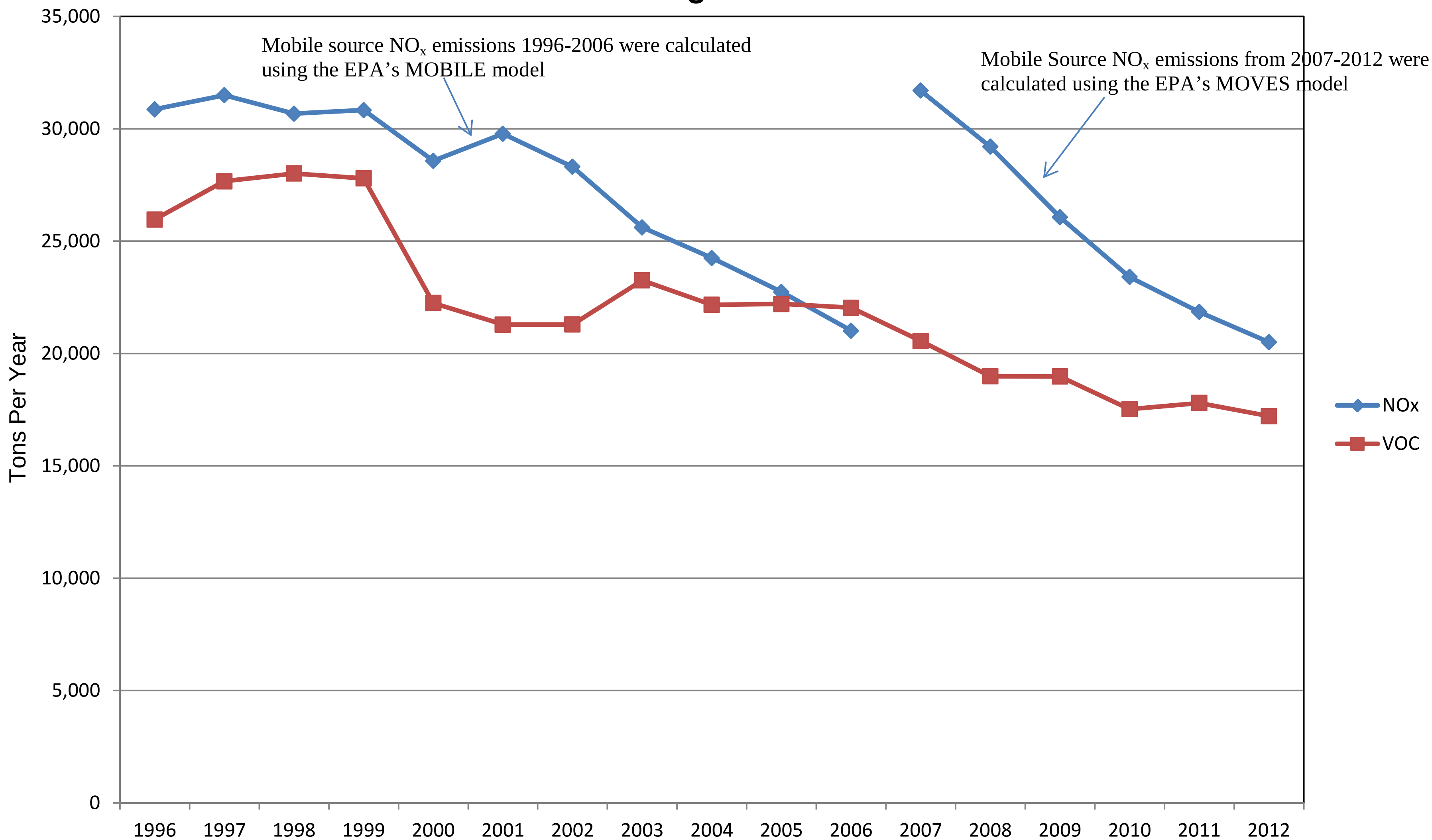


TABLE III
2012 Davidson County Hazardous Air Pollutant Emission Inventory

POLLUTANT	CAS #	TPY
1,1,2,2-Tetrachloroethane	79-34-5	0.012
1,1,2-Trichloroethane	79-00-5	0.021
1,2,4, Trichlorobenzene	120-82-1	0.062
1,3-Butadiene	106-99-0	20.227
1,3-Dichloropropene	542-75-6	51.864
1,4-Dichlorobenzene	106-46-7	53.886
1,4-Dioxane	123-91-1	0.004
2,2,4-Trimethylpentane	540-84-1	51.048
2-Nitropropane	79-46-9	0.001
4-4'-Methylene Diphenyl Diisocyanate	101-68-8	0.004
Acetaldehyde	75-07-0	106.399
Acetophenone	98-86-2	4.130
Acrolein	107-02-8	12.454
Acrylonitrile	107-13-1	0.022
Aniline	62-53-3	0.010
Arsenic Compounds	7440-38-2	0.002
Benzene	71-43-2	191.877
Benzyl chloride	100-44-7	0.018
Biphenyl	92-52-4	0.165
Bis(2-Ethylhexyl)phthlate (DEHP)	117-81-7	2.036
Bromoform	75-25-2	0.001
Carbon Disulfide	75-15-0	0.027
Carbon Tetrachloride	56-23-5	0.044
Carbonyl Sulfide	463-58-1	0.005
Chlorine	7782-50-5	1.083
Chlorobenzene	108-90-7	23.216
Chloroform	67-66-3	0.430
Chromium compounds	7440-47-3	0.081
Cobalt Compounds	7440-48-4	0.005
Cumene	98-82-8	0.608
Cyanide Compounds	57-12-5	0.065
Dibenzofurans	132-64-9	0.024
Dibutyl Phthalate	84-74-2	0.140
Diethanolamine	111-42-2	0.024
Dimethyl Formamide	68-12-2	3.987
Dimethyl Sulfate	77-78-1	0.001
Ethyl Chloride	75-00-3	2.090
Ethylbenzene	100-41-4	59.514
Ethylene Dichloride	107-06-2	0.005
Ethylene Glycol	107-21-1	10.835
Ethylene Oxide	75-21-8	4.955
Ethylidine Dichloride	75-34-3	0.015
Formaldehyde	50-00-0	142.537
Glycol Ethers	171	17.981

TABLE III (Continued)
Davidson County Hazardous Air Pollutant Emission Inventory

Hexamethylene-1,6-Diisocyanate	822-06-0	0.016
Hexane	110-54-3	255.810
Hydrogen Chloride	7647-01-0	89.469
Hydrogen Fluoride	7664-39-3	7.810
Hydrogen Sulfide*	7783-06-4	32.150
Hydroquinone	123-31-9	0.000
Isophorone	78-59-1	0.322
Lead Compounds	00-00-0	0.004
Manganese Compounds	00-00-0	0.015
Methanol	67-56-1	263.236
Methyl Bromide	74-83-9	71.965
Methyl Chloride	74-87-3	1.750
Methyl Chloroform	71-55-6	125.427
Methyl Hydrazine	60-34-4	0.004
Methyl Isobutyl Ketone	108-10-1	12.858
Methyl Methacrylate	80-62-6	0.149
Methyl tert-Butyl Ether	1634-04-4	0.506
Methylene Chloride	75-09-2	33.078
Methylene Diphenyl Diisocyanate	101-68-8	0.008
m-Xylene	108-38-3	56.916
Naphthalene	91-20-3	28.637
Nickel compounds	7440-02-0	0.045
o-Toluidine	95-53-4	0.001
o-Xylene	95-47-6	29.394
Phenol	108-95-2	0.484
Phthalic Anhydride	85-44-9	0.902
Polycyclic Organic Matter (POM)	250	0.158
Propionaldehyde	123-38-6	14.026
Propylene Dichloride	78-87-5	0.001
Propylene Oxide	75-56-9	0.318
Quinone	106-51-4	0.036
Selenium Compounds	7782-49-2	0.000
Styrene	100-42-5	4.646
Sulfuric Acid Mist (SAM)*	7664-93-9	12.740
Tetrachloroethylene (Perc)	127-18-4	38.533
Toluene	108-88-3	385.465
Trichloroethylene	79-01-6	2.405
Triethylamine	121-44-8	0.499
Vinyl Acetate	108-05-4	0.000
Vinyl Chloride	75-01-4	0.030
Vinylidene Chloride	75-35-4	0.001
Xylenes	1330-20-7	278.529
Total of All Hazardous Air Pollutants		**2,519.253**

*** Hydrogen Sulfide and Sulfuric Acid Mist are not Hazardous Air Pollutants, but are reported on this list because they are regulated air pollutants, and are not reported elsewhere.**

5. FIELD ENFORCEMENT ACTIVITIES

Field enforcement includes two main areas of compliance activities: (1) Inspection of stationary sources; and (2) Citizen complaint investigation. All stationary sources are inspected annually. These inspections include a physical tour of the facility, checking of air pollution control equipment, fuel usage, emissions, recordkeeping, and general facility conditions. Citizen complaints are investigated to determine if there is a valid air pollution problem and, if so, appropriate action is taken. During 2012 this agency conducted:

703 inspections of stationary air pollution sources;
178 inspections of asbestos removal sites;
42 asbestos assessments on buildings to be demolished;
75 indoor air quality inspections;
112 complaint investigations; and
54 pressure-decay and blockage tests observed at gasoline dispensing facilities.

During 2012, this agency issued 10 warning letters, 20 notices of violation, 64 citations, 3 consent agreements and no Director's Orders. Total penalties collected were $4,000.

6. MONITORING ACTIVITIES

During 2012 this agency operated eight air monitoring sites in Davidson County. Figure 7 shows the location of each of these sites along with two monitoring sites that are no longer operating. The addresses and pollutants monitored are shown in Table IV. All ambient air monitoring is conducted in strict accordance with Federal guidelines. A list of the National Ambient Air Quality Standards for all criteria pollutants is presented in Table V.

Particulate matter is measured at five sites. Three sites measure PM_{10}, and two sites measure $PM_{2.5}$. Two of the PM_{10} sites (Trevecca College and McCann Elementary School) are manual, where PM_{10} is measured by operating a selective size inlet sampler (SSI), and the filters are removed for weighing. Fine particulate ($PM_{2.5}$) samplers are operating at Lockeland Elementary School and Hillwood High School. Two manual monitors, one continuous monitor (used for AQI purposes) and a speciation monitor are in operation at Lockeland. One manual monitor is operating at Hillwood. A continuous monitor was installed at Hillwood in November, 2005, however, ceased operation October 15, 2008. The $PM_{2.5}$ monitor located at Wright Middle School ceased operation January 1, 2008 with EPA's concurrence.

Carbon monoxide was measured by a continuous monitor at Hume Fogg High School. The carbon monoxide monitor located at Douglas Park ceased operation May 1, 2007 with EPA's concurrence. Ozone is measured by continuous monitors at East Health Center and Percy Priest Dam. The East Health Center also houses a continuous sulfur dioxide monitor and a continuous nitrogen oxide/nitrogen dioxide monitor.

During the pollen season, March through October, the PCD operates a Durham sampler measuring pollen. The Durham sampler is located on the roof of the Metro Public Health Department parking garage at 311 23rd Avenue North.

The AQI and pollen count are made available to the public by calling (615) 340-0488 and on the Metro Public Health Department's website which can be found at http://health.nashville.gov.

LOCATION OF AIR MONITORING SITES
Figure 7

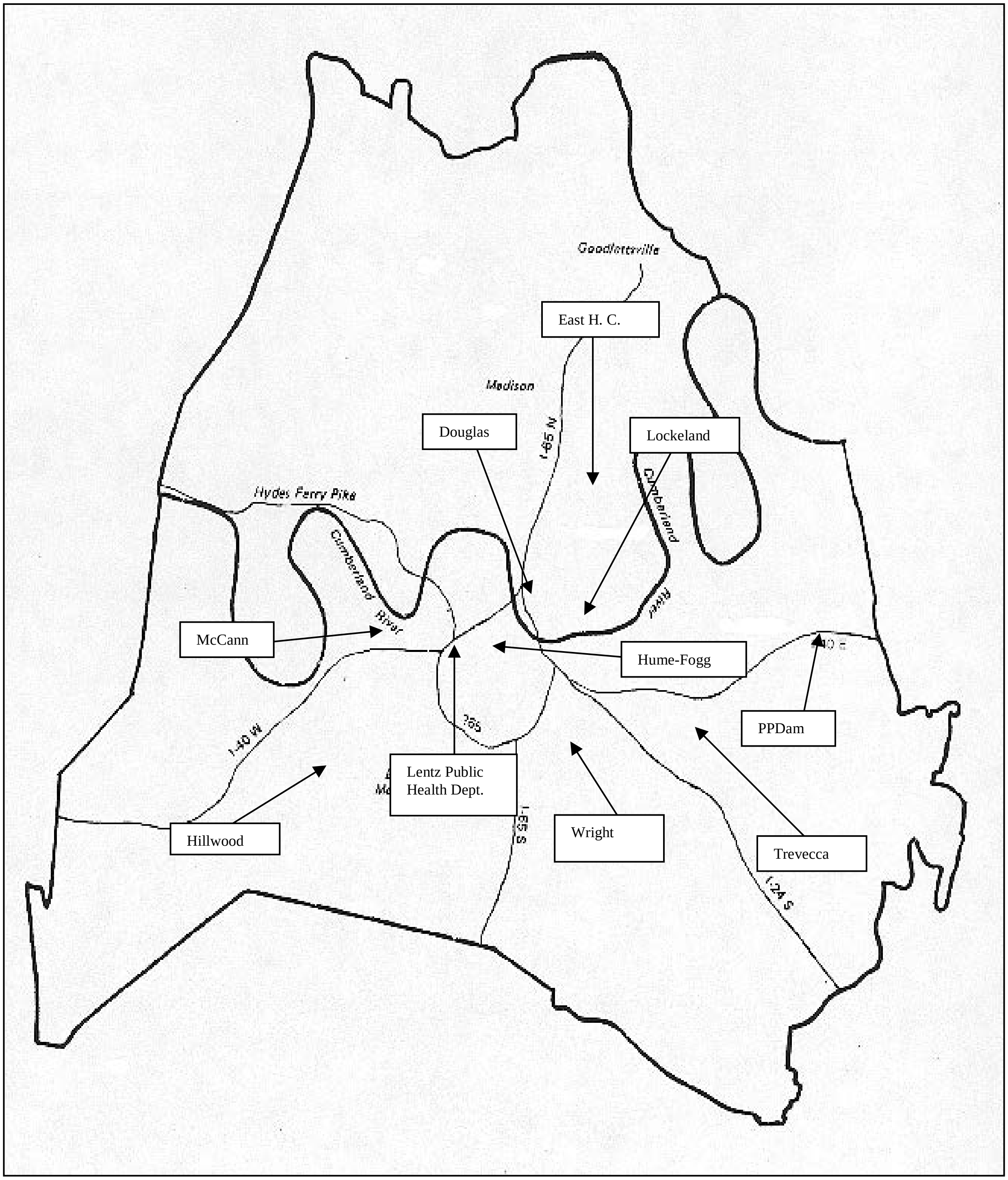


TABLE IV
Air Monitoring Site Location and Classification

Site No.	Address	UTM Coordinates		Land Use	Pollutants Sampled
47-037-0002	Trevecca Nazarene College 333 Murfreesboro Road	522.1	3999.9	CC-C	PM_{10}**
47-037-0011	East Nashville Health Center 1015 East Trinity Lane	522.9	4006.7	CC-R	SO_2*, NO_2**, Ozone*
47-037-0021	Hume-Fogg Magnet School 700 Broadway	519.7	4001.7	CC-C	CO*
47-037-0023	Lockeland Elementary School 101 South Seventeenth St.	523.5	4003.5	CC-R	$PM_{2.5}$**
47-037-0024	McCann School 1300 56th Avenue North	513.1	4002.0	CC-R, I	PM_{10}*
47-037-0025 ceased 1/1/08	Wright Middle School*** 180 McCall Street	523.9	3995.1	S-R	$PM_{2.5}$**
47-037-0026	Percy Priest Dam Bell Road	533.9	4000.7	Background	Ozone**
47-037-0031 ceased 5/1/07	Douglas Park**** 210 North Seventh St.	521.3	4003.6	CC-R	CO*
47-037-0036	Hillwood High School***** 400 Davidson Road	511.4	3997.1	S-R	$PM_{2.5}$**

Land Use Terms	Monitor Classification
CC-Center City S-Suburban	*NAMS-National Air Monitoring Stations
I-Industrial C-Commercial R-Residential	**SLAMS-State/Local Air Monitoring Stations

***The $PM_{2.5}$ monitor located at Wright Middle School, 180 McCall Street ceased operation January 1, 2008 with EPA's concurrence. This is no longer an air monitoring site.
****The CO monitor located at Douglas Park, 210 North Seventh Street ceased operation May 1, 2008 with EPA's concurrence. This is no longer an air monitoring site.
*****The $PM_{2.5}$ contiuunous monitor located at Hillwood High School, 400 Davidson Street, ceased operation October 15, 2008 with EPA's concurrence.

Table V
National Ambient Air Quality Standards*

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour (1)	None	
	35 ppm (40 mg/m^3)	1-hour (1)		
Lead	0.15 µg/m^3 (2) (2008 std)	Rolling 3-Month Average	Same as Primary	
Nitrogen Dioxide	100ppb 53 ppb (3)	1-hour* Annual (Arithmetic Average)	Same as Primary	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour (4)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual (5) (Arithmetic Average)	Same as Primary	
	35 µg/m^3	24-hour (6)	Same as Primary	
Ozone	0.075 ppm	8-hour (8), (9)	Same as Primary	
Sulfur Dioxide	75 ppb	1-hour (99th percentile of 1-hour daily max. concentrations, Averaged over 3 years)	0.5 ppm	3-hour (1)

* As of December 31, 2012

(1) Not to be exceeded more than once per year.
(2) Final rule signed October 15, 2008.
(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard
(4) Not to be exceeded more than once per year on average over 3 years.

(5) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(6) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).
(7) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
(9) In 2007 the EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

PARTICULATE MATTER

The air pollutant called "particulate matter" includes airborne pollutants of materials such as dust, soot, pollen, aerosols, etc. Particulates range in diameter from 0.005 to 250 microns. There are many sources of particulate matter that includes both natural and anthropogenic (man-made).

PM_{10} and $PM_{2.5}$ focus on those particles with aerodynamic diameters smaller than 10 micrometers and 2.5 micrometers respectively, which are likely to be responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract. Particulate matter has a negative effect on breathing and respiratory systems. It aggravates existing respiratory and cardiovascular disease. The elderly, children and people with chronic pulmonary or cardiovascular disease, or asthma are especially sensitive to the effects of particulate matter.

The concentration of particulate matter in the ambient air ($\mu g/m^3$) is computed by measuring the mass of the particulate matter collected and the volume of air sampled. For determining the average concentrations of particulate matter, a 24-hour sampling period is used. After sampling for 24 hours, the filter is removed and returned to the laboratory where it is allowed to equilibrate and is weighed.

The Pollution Control Division operates two sites equipped with manual, intermittent PM_{10} monitors. One site is also equipped with a co-located manual PM_{10} monitor. The PCD also operates two sites equipped with manual $PM_{2.5}$ monitors. One of the $PM_{2.5}$ sites has a continuous $PM_{2.5}$ monitor and a manual, intermittent $PM_{2.5}$ monitor operating.

Tables VI and VII present a summary of the measured PM_{10} concentrations during 2012. This data shows that the ambient air quality standard for PM_{10} was not exceeded in 2012. Tables VIII and IX compare the PM_{10} concentrations for the past 11 years. Figures 8 and 9 summarize the maximum 24-hour monitored concentrations and the maximum 24-hour annual average PM_{10} concentrations for years 2002-2012.

Tables X, XI, XII and XIII present a summary of the 2012 $PM_{2.5}$ data. Figures 10 and 11 summarize the annual 98th percentile of 24–hour monitored concentrations and the maximum 24 hour annual average $PM_{2.5}$ concentrations for years 2002 - 2012. Figure 10 shows that Davidson County is in compliance with the 24–hour average standard based on the 3-year average of the annual 98th percentile of 24–hour monitored concentrations. Figure 11 shows that based on the 2010 - 2012 data, Davidson County complied with the annual average $PM_{2.5}$ National Ambient Air Quality Standard.

TABLE VI
2012 Summary of PM_{10} ($\mu g/m^3$)

SITE LOCATION	Trevecca	McCann
Number of Observations	36	61
Maximum 24-Hr Concentration	29	36
Date of Maximum Concentration	11/29	3/28
2nd Maximum 24-Hr Concentration	28	34
Date of 2nd Maximum 24-Hr. Concentration	11/17	7/2
Annual Arithmetic Mean	16.11	18.08
Number of Exceedances of 24-Hr Standard	0	0

TABLE VII 2012 Quarterly Comparison of PM_{10} Arithmetic Mean (μg/m^3)					
Site Location	**1st**	**2nd**	**3rd**	**4th**	**Annual**
Trevecca	13.2	N/A*	19.6	15.9	16.1
McCann	16.7	18.6	21.1	15.8	18.1

* No readings were recorded for the Trevecca monitor during the 2nd Quarter of 2012.

TABLE VIII 2002 – 2012 24-Hour Maximum PM_{10} Concentrations (μg/m^3)											
Site Location	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Trevecca	47	51	45	62	58	58	38	37	42	35	29
East*	49	42	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lockeland*	56	56	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
McCann	53	58	47	59	57	53	38	35	42	35	36

TABLE IX 2002 – 2012 Annual Average PM_{10} Concentrations (μg/m^3)											
Site Location	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Trevecca	22	25	24	25	23	24	20	17	20	18	16
East*	21	23	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lockeland*	24	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
McCann	24	27	25	28	25	26	21	18	21	19	18

* Due to the density of PM_{10} monitoring sites in Davidson County and the history of the Davidson County PM_{10} values being well below the NAAQS for PM_{10}, the Environmental Protection Agency recommended that the monitors at East and Lockeland be taken out of service on June 30, 2003. Therefore, these monitors were permanently taken out of service in 2003. Also On September 21, 2006 the EPA revoked the annual PM_{10} standard.

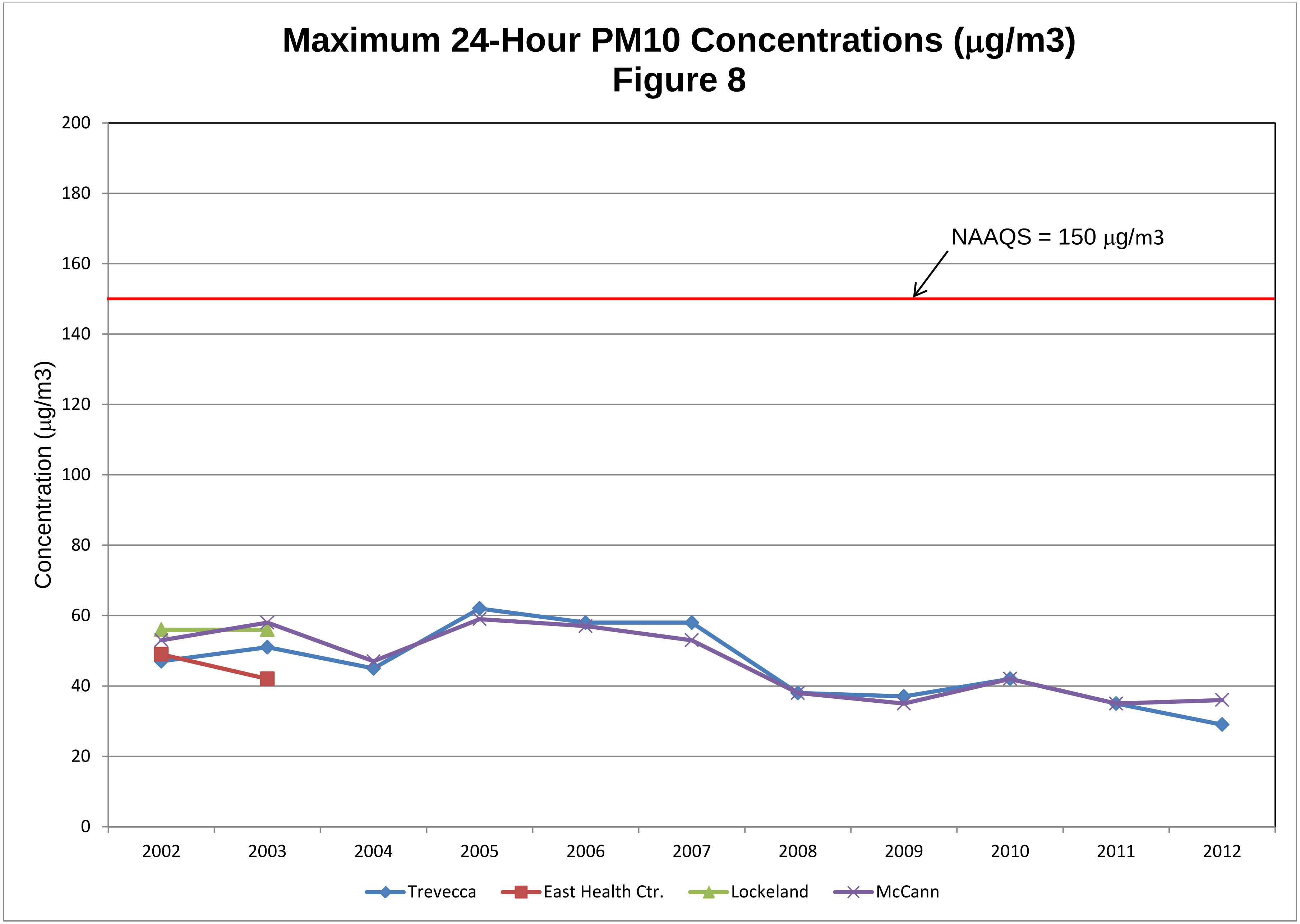
TABLE X 2012 Summary of $PM_{2.5}$ (μg/m^3)			
SITE LOCATION	**Lockeland**	**Lockeland Colocated**	**Hillwood**
Number of Observations	356	60	342
Maximum 24-Hr Concentration	24.1	20.1	22.5
Date of Maximum Concentration	12/25	11/17	12/25
2nd Maximum 24-Hr Concentration	22.5	18.5	21.8
Date of 2nd Maximum 24-Hr. Concentration	11/18	5/27	5/2
Annual Arithmetic Mean	10.32	10.14	9.54
Number of Exceedances of 24-Hr Standard	0	0	0

TABLE XI 2012 Quarterly Comparison of $PM_{2.5}$ Arithmetic Mean (μg/m^3)					
Site Location	**1st**	**2nd**	**3rd**	**4th**	**Annual**
Lockeland	8.6	10.9	11.2	10.6	10.3
Lockeland (colocated)	9.3	10.8	11.2	9.3	10.1
Wright*	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]
Hillwood	8.5	9.6	10.4	9.6	9.5

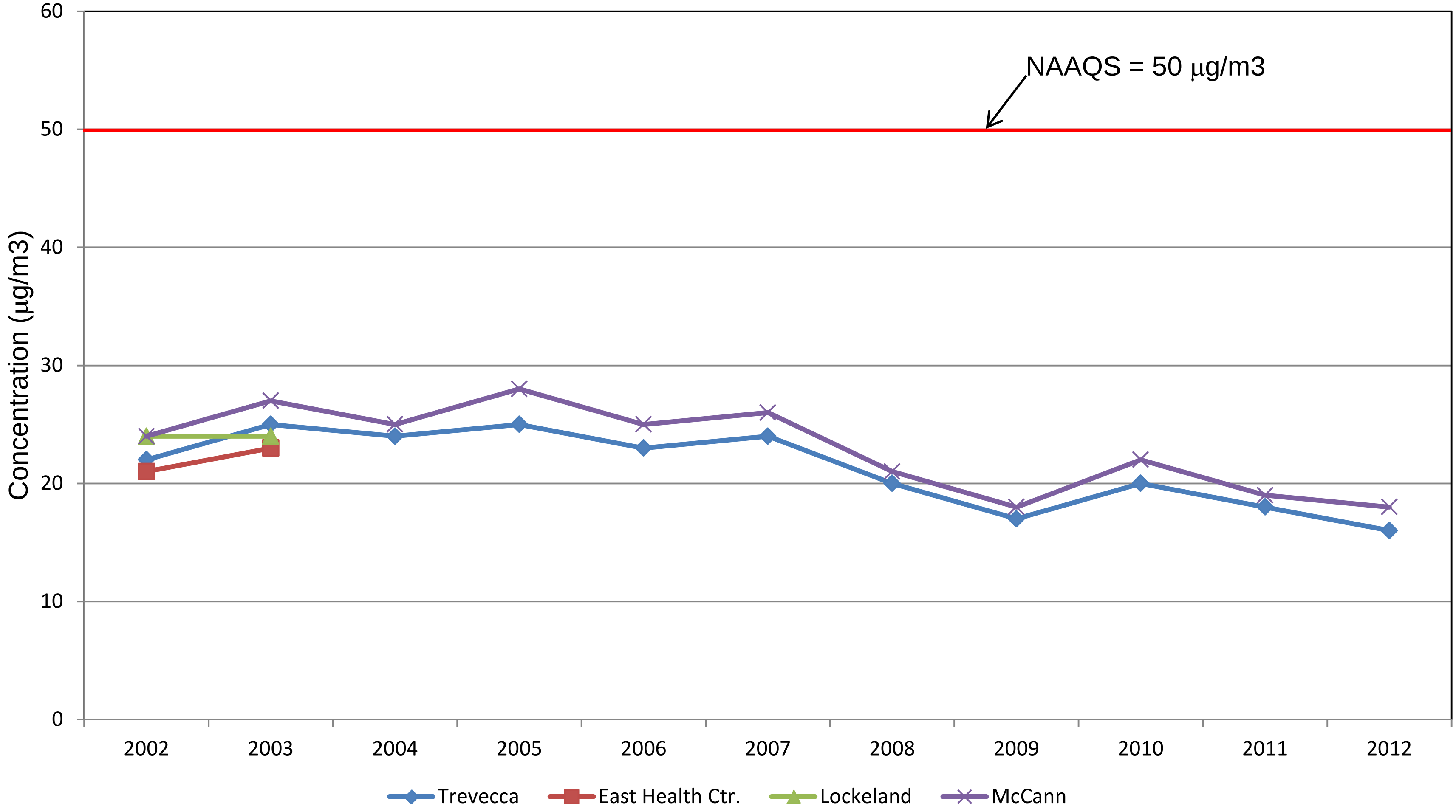
TABLE XII 2005 - 2012 24-Hour Maximum $PM_{2.5}$ Concentrations ($\mu g/m^3$)								
Site Location	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Lockeland	58.6	37.2	46.6	31.5	23.7	28.9	32.7	24.1
Lockeland (colocated)	36.6	31.2	44.9	33.7	23.4	24.7	23.9	22.5
Wright*	38.5	36.6	41.27	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]
Hillwood	54.3	35.7	43.0	35.7	23.7	27.5	29.3	22.5

TABLE XIII 2007 - 2012 Annual Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)							
Site Location	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**LATEST 3 YEAR AVERAGE**
Lockeland	13.8	11.5	10.1	11.8	10.6	10.3	10.9
Lockeland (colocated)	14.8	12.7	9.8	11.6	11.1	10.1	10.9
Wright*	14.3	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]	n/a[1]
Hillwood	12.1	10.9	9.6	10.7	10.0	9.5	10.1
Sumner County	13.9	12.1	9.5	10.7	10.4	9.5	10.2

*The $PM_{2.5}$ monitor located at Wright Middle School, 180 McCall Street ceased operation December 31, 2007 with EPA's concurrence.

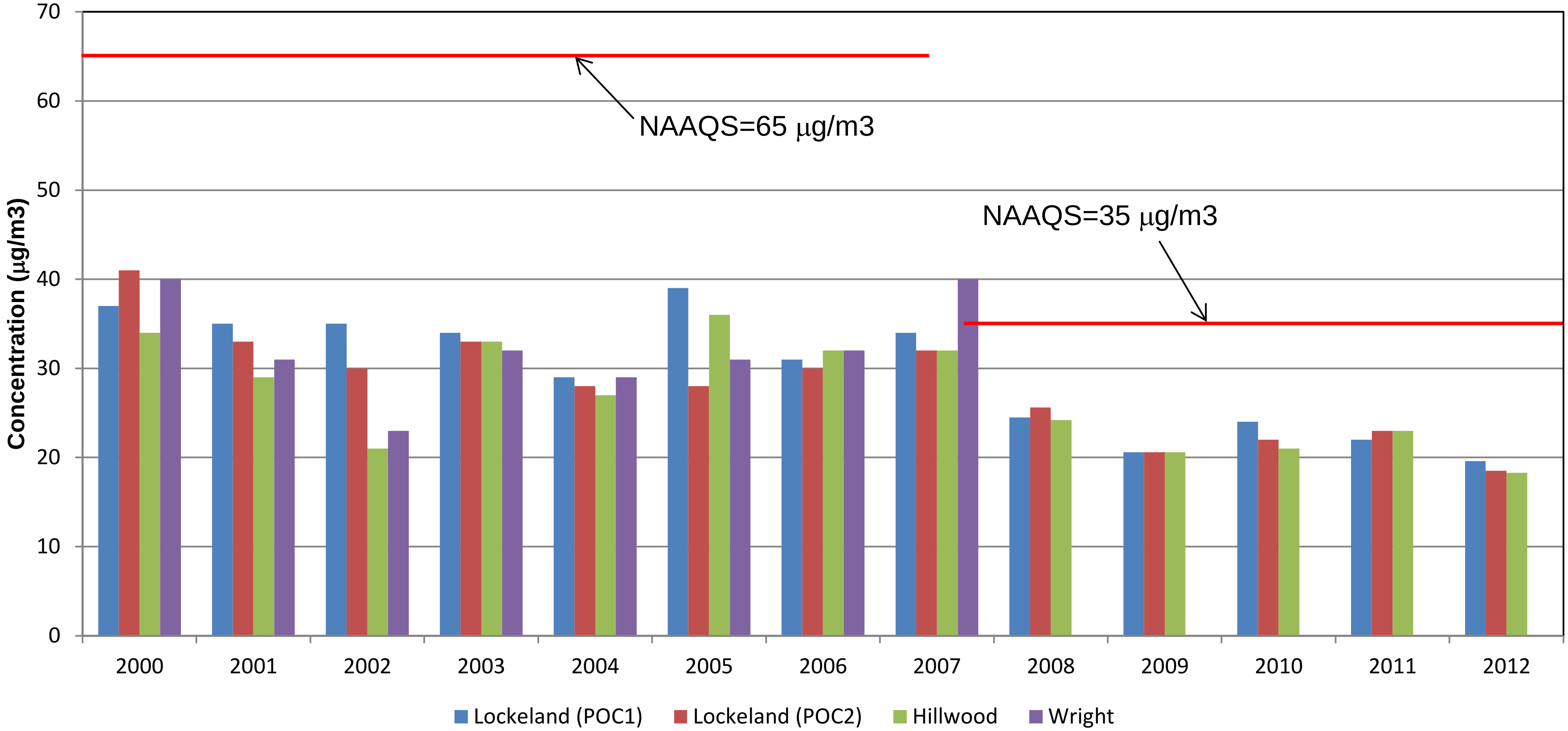

Maximum 24-Hour PM10 Concentrations (µg/m3)
Figure 8
NAAQS = 150 µg/m3
Concentration (µg/m3)
0
20
40
60
80
100
120
140
160
180
200
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Trevecca
East Health Ctr.
Lockeland
McCann

Annual Average PM10 Concentrations (µg/m3)
Figure 9



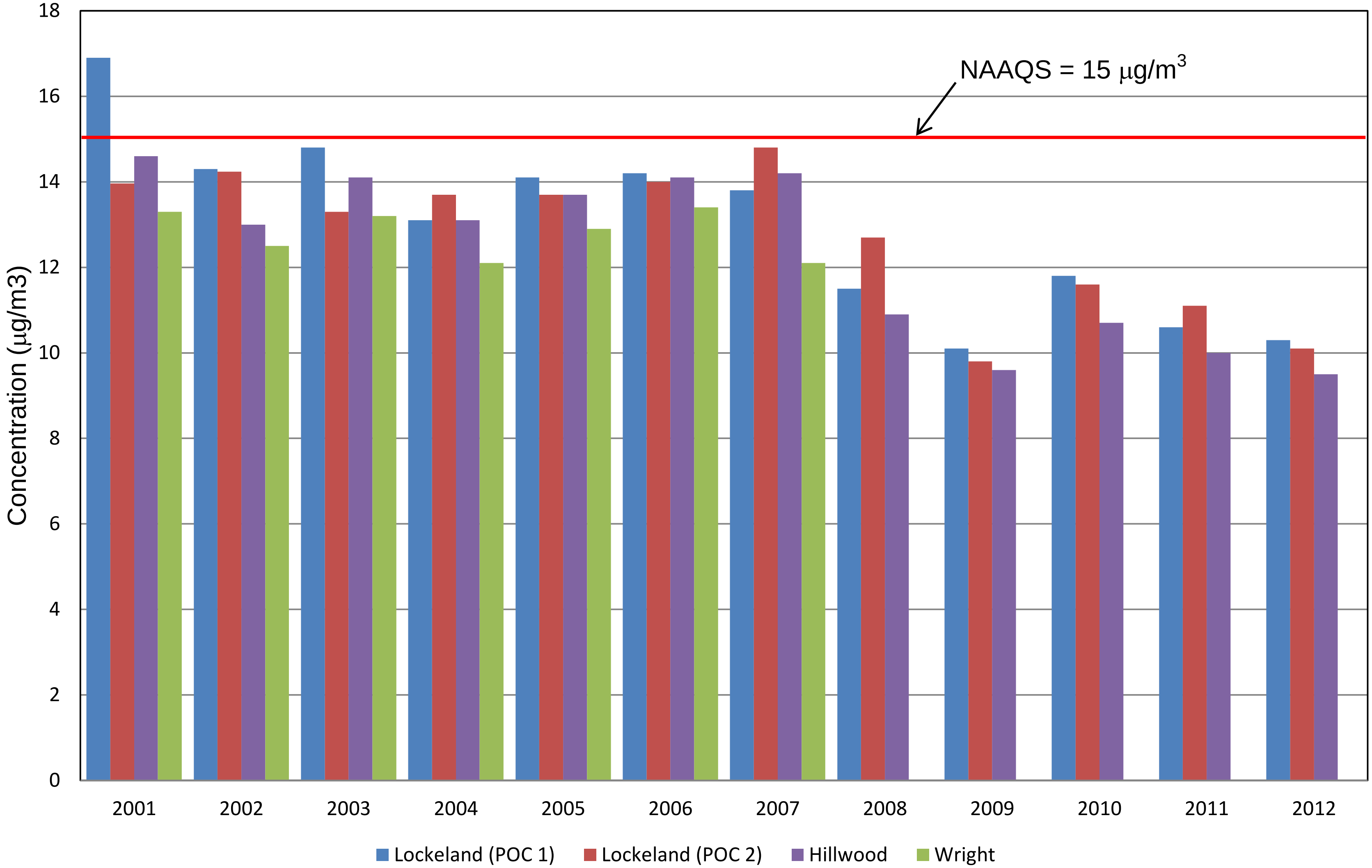
On September 21, 2006 the EPA revoked the annual PM10 standard, because available evidence generally did not suggest a link between long-term exposure to the current levels of coarse particles and health problems.

Annual 98th Percentile of 24-Hour PM2.5 Concentrations (μg/m3)
Figure 10



On December 17, 2006, the 24 hour $PM_{2.5}$ standard was reduced from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. Attainment is demonstrated when the 3-year average of the 98th percentile of 24 hour monitored concentrations is less than or equal to 35 $\mu g/m^3$. The 3-year average for Lockland and Hillwood demonstrate attainment with the more stringent standard.

Annual Average PM2.5 Concentrations (µg/m3)
Figure 11



LEAD

The traditional major sources of ambient lead are from the combustion of leaded gasoline, and the manufacture of lead storage batteries. Based on low monitored lead levels and EPA guidance, ambient monitoring for lead was discontinued in Nashville and Davidson County on December 31, 1997. On October 15, 2008 the lead standard was revised. Davidson County was not required to resume monitoring.

SULFUR DIOXIDE

Sulfur dioxide is a heavy, pungent, colorless gas that combines easily with water vapor to form sulfuric acid. The major health concerns associated with exposure to sulfur dioxide include effects on breathing, respiratory illness, alterations in the lungs' defenses, and aggravation of existing cardiovascular disease. Sulfur dioxide was measured at East Health Center (site 0011) during 2012. Table XIV presents a summary of this data. The data shows that the primary 1-hour standard of 0.075 ppm and the secondary 3-hour standard of 0.5 ppm were not violated in 2012. The main source of sulfur dioxide in Metropolitan Nashville and Davidson County is from fuel combustion.

TABLE XIV
2012 Sulfur Dioxide (ppm), Site 47-037-0011, East Health Center

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
No. of Observations	740	672	740	716	739	713	725	738	689	738	716	741	8667
Arithmetic Mean	0.001	0.002	0.001	0.002	0.003	0.003	0.001	0.001	0.002	0.003	0.002	0.001	0.002
Highest 1-Hr Conc.	0.010	0.011	0.008	0.007	0.008	0.011	0.004	0.010	0.098	0.009	0.017	0.011	0.098
Date of Highest 1-Hr Conc.	1/15	2/17	3/10	4/27	5/09	6/07	7/01	8/29	9/21	10/22	11/02	12/13	9/21
2nd Highest 1-Hr Conc.	0.009	0.007	0.006	0.007	0.007	0.009	0.004	0.006	0.008	0.009	0.011	0.006	0.017
Date of 2nd Highest 1-Hr Conc.	1/08	2/09	3/30	4/30	5/19	6/06	7/06	8/12	9/19	10/23	11/14	12/02	11/02
Highest 3-Hr Conc.	0.007	0.008	0.007	0.005	0.007	0.008	0.003	0.006	0.006	0.009	0.009	0.008	0.009
Date of Highest 3-Hr Conc.	1/08	2/17	3/10	4/08	5/09	6/07	7/15	8/29	9/19	10/24	11/02	12/13	10/24
2nd Highest 3-Hr Conc.	0.007	0.007	0.004	0.005	0.005	0.007	0.003	0.004	0.005	0.008	0.007	0.003	0.009
Date of 2nd Highest 3-Hr Conc.	1/15	2/09	3/30	4/27	5/22	6/19	7/16	8/12	9/15	10/22	11/08	12/14	11/02
1-Hr or 3-Hr Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0

NITROGEN DIOXIDE

Air is composed of approximately 78% nitrogen and 21% oxygen. When combustion occurs at high temperatures, such as in automobile engines and in other fossil fuel combustion, nitrogen combines with oxygen to form several different gaseous compounds collectively known as oxides of nitrogen (NO_x). Of these, nitrogen dioxide (NO_2) and nitric oxide (NO) are the most important from an air pollution standpoint. Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections. Nitrogen dioxide contributes to the formation of ozone through a chemical reaction with volatile organic compounds in the presence of sunlight. On-road mobile sources emitted approximately 70% of the nitrogen dioxide emissions in 2012, with light duty cars and trucks responsible for 38% of the total nitrogen dioxide emissions.

Nitrogen dioxide was measured at East Health Center (site 0011) during 2012. Tables XV and XVI present a summary of this data. The current NAAQS for nitrogen dioxide are 0.053 ppm as an annual arithmetic average and 0.10 ppm as a 1-hour standard (calculated as the 98^{th} percentile 1-hour concentrations, averaged over 3 years). The data in the tables below show that the standards for nitrogen dioxide were not violated in 2012.

TABLE XV 2012 Nitrogen Dioxide (ppm), SITE 47-037-0011, East Health Center													
MONTH	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**ANNUAL**
No. of Observations	720	663	740	712	577	464	723	739	714	737	715	740	8244
Arithmetic Mean	0.013	0.013	0.012	0.012	0.012	0.013	0.009	0.011	0.011	0.012	0.016	0.012	0.012
Highest 24-Hr Conc.	0.027	0.021	0.024	0.019	0.020	0.023	0.015	0.017	0.020	0.020	0.028	0.027	0.028
Date of Highest 24-Hr Conc.	1/05	2/22	3/28	4/13	5/23	6/28	7/02	8/23	9/27	10/23	11/19	12/14	11/19
2nd Highest 24-Hr Conc.	0.025	0.020	0.021	0.018	0.017	0.020	0.013	0.017	0.018	0.019	0.028	0.023	0.028
Date of 2nd Highest 24-Hr Conc.	1/04	2/10	3/01	4/19	5/16	6/29	7/04	8/24	9/20	10/24	11/20	12/13	11/20
No. of 24-Hour Conc													
0.0 - 0.049	31	29	31	30	31	28	31	31	30	31	30	31	364
0.050 - 0.089	0	0	0	0	0	0	0	0	0	0	0	0	0
0.090 - 0.129	0	0	0	0	0	0	0	0	0	0	0	0	0
0.130 - 0.169	0	0	0	0	0	0	0	0	0	0	0	0	0
Highest 1-Hr Conc.	0.047	0.036	0.044	0.040	0.042	0.060	0.041	0.038	0.039	0.034	0.044	0.042	0.060
Date of Highest 1-Hr Conc.	1/06	2/17	3/28	4/12	5/10	6/27	7/31	8/07	9/26	10/04	11/20	12/13	6/27
2nd Highest 1-Hr Conc.	0.044	0.035	0.041	0.040	0.042	0.052	0.037	0.035	0.038	0.034	0.041	0.038	0.052
Date of 2nd Highest 1-Hr Conc.	1/04	2/02	3/1	4/13	5/23	6/28	7/02	8/23	9/27	10/15	11/19	12/14	6/28

TABLE XVI 2007 - 2012 Maximum 1-Hour Nitrogen Dioxide Concentrations (ppm)*							
Site Location	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**LATEST 3 YEAR AVERAGE**
East Health Center	0.065	0.073	0.049	0.051	0.058	0.060	0.056

* The 1-hour NAAQS for nitrogen dioxide is calculated as the 98th percentile concentrations averaged over 3 years. Since the highest 1-hour concentrations are all below the NAAQS of 0.100 ppm, the 98th percentile concentrations would likewise be lower than the NAAQS.

OZONE

Ozone (O_3) is an unstable, pungent gas in the stratosphere, about ten miles above the earth, which protects us by shielding us from the sun’s ultraviolet rays. Tropospheric ozone at the earth’s surface has a different effect, acting as an eye, nose and throat irritant. It can lower a person’s resistance to infection, cause shortness of breath, and over time could damage the lungs. Tropospheric ozone is also harmful to plants and animals.

Ozone is not released directly from sources. It is produced by a complex series of chemical reactions called photochemical oxidation involving the reaction of non-methane hydrocarbons and nitrogen dioxide in the presence of heat and sunlight. Ozone is a seasonal problem occurring normally from April through October when warm, sunny weather is abundant. High ozone levels occur in the afternoon after the temperature has risen and the precursors have had time to react. The major sources of volatile organic compounds include various types of industrial processes, surface coating, solvent usage, fuel combustion and automobiles.

Tables XVII and XVIII are summaries of the maximum 8-hour average ozone concentrations for 2012. The EPA adopted a new 8-hour ozone standard of 0.075 ppm in March 2008. The maximum 8-hour average concentration of 0.093 ppm was measured at Percy Priest Dam (site 0026) on June 29, 2012. The 8-hour ozone NAAQS is the three year average of the annual fourth highest 8-hour value.

TABLE XVII

2012 Ozone (ppm), Daily Maximum 8-Hour Average Values, Site 47-037-0011, East Health Center

MONTH	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	ANNUAL
No. of Observations	744	567	744	714	716	744	679	727	5635
Highest 8-Hr Avg. Conc.	0.066	0.061	0.076	0.089	0.082	0.074	0.055	0.048	0.089
Date of Highest Conc.	3/07	4/14	5/18	6/29	7/07	8/24	9/06	10/23	6/29
2nd Highest 8-Hr Avg. Conc.	0.046	0.056	0.071	0.078	0.069	0.071	0.053	0.045	0.082
Date of 2nd Highest Conc.	3/19	4/07	5/23	6/27	7/06	8/08	9/14	10/17	7/07
3rd Highest 8-Hr Avg. Conc.	0.046	0.053	0.069	0.074	0.068	0.069	0.050	0.043	0.078
Date of 3rd Highest Conc.	3/20	4/13	5/30	6/14	7/05	8/23	9/13	10/21	6/27
4th Highest 8-Hr Avg. Conc.	0.044	0.052	0.068	0.073	0.066	0.065	0.049	0.041	0.076
Date of 4th Highest Conc.	3/06	4/09	5/16	6/28	7/09	8/02	9/11	10/25	5/18
No. of 8-Hr Exceedances	0	0	1	2	1	0	0	0	4
No. of 8-Hr Concentrations									
0.000 - 0.059	744	716	698	644	712	716	720	744	5694
0.060 - 0.075	0	4	45	67	28	28	0	0	172
0.076 - 0.095	0	0	1	9	4	0	0	0	14
0.096 - 0.115	0	0	0	0	0	0	0	0	0
0.116 - 0.374	0	0	0	0	0	0	0	0	0
Greater Than 0.374	0	0	0	0	0	0	0	0	0

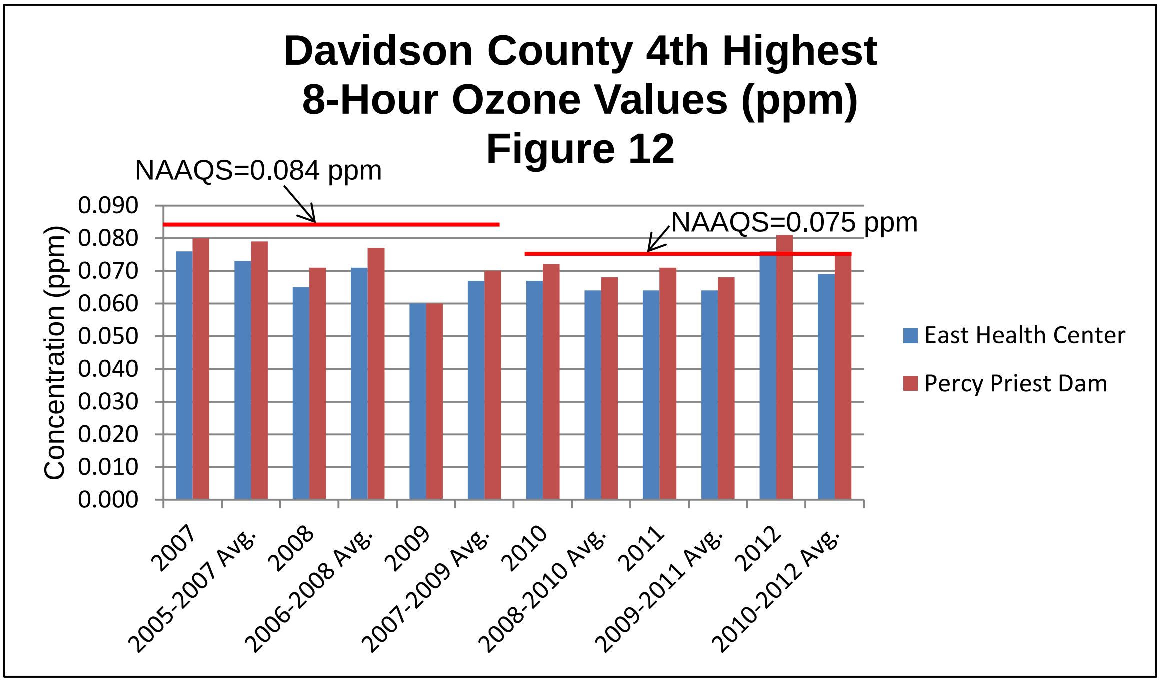
TABLE XVIII

2012 Ozone (ppm), Daily Maximum 8-Hour Average Values, Site 47-037-0026, Percy Priest Dam

MONTH	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	ANNUAL
No. of Observations	744	720	744	720	735	744	708	739	5854
Highest 8-Hr Avg. Conc.	0.057	0.059	0.069	0.093	0.076	0.091	0.063	0.051	0.093
Date of Highest Conc.	3/29	4/25	5/18	6/29	7/06	8/08	9/06	10/04	6/29
2nd Highest 8-Hr Avg. Conc.	0.053	0.057	0.068	0.085	0.075	0.075	0.057	0.051	0.091
Date of 2nd Highest Conc.	3/27	4/14	5/16	6/28	7/07	8/24	9/13	10/05	8/8
3rd Highest 8-Hr Avg. Conc.	0.053	0.055	0.067	0.081	0.074	0.073	0.057	0.051	0.085
Date of 3rd Highest Conc.	3/28	4/07	5/23	6/27	7/27	8/01	9/14	10/22	6/28
4th Highest 8-Hr Avg. Conc.	0.049	0.055	0.067	0.074	0.071	0.073	0.057	0.050	0.081
Date of 4th Highest Conc.	3/19	4/13	5/27	6/30	7/05	8/23	9/25	10/23	6/27
No. of 8-Hr Exceedances	0	0	0	3	1	1	0	0	5
No. of 8-Hr Concentrations									
0.000 - 0.059	744	720	688	635	686	679	720	744	5616
0.060 - 0.075	0	0	56	72	56	59	0	0	243
0.076 - 0.095	0	0	0	13	2	6	0	0	21
0.096 - 0.115	0	0	0	0	0	0	0	0	0
0.116 - 0.374	0	0	0	0	0	0	0	0	0
Greater Than 0.374	0	0	0	0	0	0	0	0	0

TABLE XIX 2003 – 2012 Annual Comparison of 8-Hour Average Ozone Concentrations (ppm)										
SITE 47-037-0011 EAST HEALTH CENTER										
YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Highest 8-hour average concentration	0.078	0.071	0.074	0.084	0.079	0.078	0.069	0.071	0.081	0.089
2nd highest 8-hour average concentration	0.066	0.065	0.071	0.077	0.077	0.074	0.064	0.068	0.070	0.082
3rd highest 8-hour average concentration	0.065	0.065	0.071	0.072	0.073	0.073	0.060	0.067	0.066	0.078
4th highest 8-hour average concentration	0.064	0.064	0.070	0.072	0.072	0.065	0.060	0.067	0.064	0.076
No. of exceedences of the 8-hour standard	0	0	0	0	0	1	0	0	1	4
SITE 47-037-0026 PERCY PRIEST DAM										
YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Highest 8-hour average concentration	0.085	0.082	0.094	0.098	0.100	0.079	0.065	0.080	0.085	0.093
2nd highest 8-hour average concentration	0.082	0.077	0.081	0.088	0.088	0.077	0.065	0.075	0.078	0.091
3rd highest 8-hour average concentration	0.075	0.077	0.079	0.082	0.083	0.074	0.062	0.073	0.076	0.085
4th highest 8-hour average concentration	0.074	0.076	0.079	0.079	0.079	0.071	0.060	0.072	0.071	0.081
No. of exceedences of the 8-hour standard	1	0	1	2	2	2	0	1	3	5

The EPA adopted a new 8-hour NAAQS of 0.075 ppm for ozone in March, 2008. The data in Table XIX shows that during 2012 the 8-hour average ozone concentration was greater than 0.075 ppm four times at the East Health Center and five times at Percy Priest Dam. Compliance with the new 8-hour average ozone NAAQS is achieved when the 3-year average of the annual fourth highest value does not exceed 0.075 ppm. The Davidson County 3-year average (2010, 2011, and 2012) at the Percy Priest Dam site is 0.0747 ppm which is below the 8-hour NAAQS during 2012.



Designation for the Middle Tennessee area for the 1997 8-hour ozone standard occurred in April, 2004. The area was designated nonattainment for 8-hour ozone with the requirements being deferred as long as the Early Action Compact milestones are met. The Middle Tennessee EAC area met all milestones, and therefore received timely deferrals from EPA in order to remain in the EAC. On April 2, 2008 the Middle Tennessee area, including Davidson County, was designated attainment for the 1997 ozone NAAQS.

Table XX shows the highest ozone values measured in the Middle Tennessee area during the 3-year period of 2010 through 2012. Compliance with the 8-hour standard is achieved when the three year average of the annual fourth highest 8-hour ozone value does not exceed 0.075 ppm. Therefore, Davidson County is in compliance with the 8-hour ozone NAAQS of 0.075 ppm adopted by the EPA in March 2008. The Old Hickory Dam and the Cottontown monitors in Sumner County exceeded the 8-hour ozone standard in 2012, with 3-year averages of 0.079 ppm and 0.076 ppm, respectively.

TABLE XX
2010 - 2012 Summary of the Four Highest 8-Hour Average Ozone Concentrations in the Middle Tennessee Area

SITE NUMBER & LOCATION	YEAR	MAXIMUM CONCENTRATIONS 1st 8-Hr.	2nd 8-Hr.	3rd 8-Hr.	4th 8-Hr.	NUMBER OF READINGS > 8-Hr. STANDARD	3-YEAR AVG. OF 4th HIGHEST CONCENTRATION
47-037-0011 East Health Center-Davidson	2010	0.071	0.068	0.067	0.067	0	
	2011	0.081	0.070	0.066	0.064	1	
	2012	0.089	0.082	0.078	0.076	4	0.069
COMPLIANCE WITH NAAQS						**Yes**	
47-037-0026 Percy Priest Dam-Davidson	2010	0.080	0.075	0.073	0.072	1	
	2011	0.085	0.078	0.076	0.071	3	
	2012	0.093	0.091	0.085	0.081	5	0.075
COMPLIANCE WITH NAAQS						**Yes**	
47-149-0101* Eagleville-Rutherford	2010	0.077	0.074	0.074	0.073	1	
	2011	0.070	0.069	0.069	0.067	0	
	2012	0.072	0.072	0.072	0.072	0	0.071
COMPLIANCE WITH NAAQS						**Yes**	
47-165-0007* Old Hickory Dam-Sumner	2010	0.088	0.084	0.080	0.078	8	
	2011	0.086	0.081	0.077	0.077	7	
	2012	0.097	0.086	0.084	0.083	20	0.079
COMPLIANCE WITH NAAQS						**No**	
47-165-0101* Cottontown-Sumner	2010	0.076	0.076	0.073	0.073	2	
	2011	0.080	0.077	0.077	0.076	4	
	2012	0.085	0.081	0.079	0.078	6	0.076
COMPLIANCE WITH NAAQS						**No**	
47-187-0106* Fairview-Williamson	2010	0.078	0.076	0.074	0.074	2	
	2011	0.078	0.076	0.074	0.074	3	
	2012	0.081	0.075	0.074	0.074	1	0.074
COMPLIANCE WITH NAAQS						**Yes**	
47-189-0103* Cedars of Lebanon-Wilson	2010	0.078	0.076	0.075	0.074	2	
	2011	0.078	0.076	0.075	0.074	1	
	2012	0.100	0.094	0.080	0.077	6	0.075
COMPLIANCE WITH NAAQS						**Yes**	

*OPERATED BY THE STATE OF TENNESSEE--DIVISION OF AIR POLLUTION CONTROL

CARBON MONOXIDE

Carbon monoxide is a colorless, odorless gas that is a product of incomplete combustion. The major source of carbon monoxide is the internal combustion engine, particularly the automobile. Carbon monoxide enters the bloodstream and reduces oxygen delivery to the body's organs and tissues. The method used for measuring carbon monoxide is a non-dispersive infrared method. During 2012, carbon monoxide was measured at Hume Fogg Magnet School (site 0021). The Donelson Library site (site 0028) was taken out of service at the end of 2002 and the Douglas Park site (site 0031) was taken out of service on April 30, 2007 with EPA concurrence, due to continuing compliance with the carbon monoxide NAAQS. Tables XXI and XXII present a summary of the carbon monoxide data for 2012. This data along with Figures 13 and 14 show the National Ambient Air Quality Standards of 35 ppm as a 1-hour average and 9 ppm as an 8-hour average were not violated during 2012.

TABLE XXI
2012 Carbon Monoxide (ppm), Site 47-037-0021, Hume-Fogg Magnet School

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
No. of Observations	716	714	741	712	742	715	740	741	717	740	717	740	8735
Highest 1-Hr Conc.	1.5	1.3	1.5	1.3	1.3	1.5	0.9	0.9	1.5	1.2	1.4	1.9	1.9
Date of Highest Conc.	1/05	2/06	3/13	4/28	5/16	6/06	7/04	8/24	9/21	10/20	11/10	12/13	12/13
2nd Highest 1-Hr Conc.	1.3	1.3	1.5	1.3	1.3	1.3	0.7	0.8	1.4	1.0	1.3	1.6	1.6
Date of 2nd Highest 1-Hr Conc.	1/06	2/07	3/17	4/29	5/26	6/04	7/13	8/25	9/20	10/04	11/09	12/14	12/14
No. of 1-Hr Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0
Highest 8-Hr Conc.	1.1	0.9	1.1	1.1	1.2	1.4	0.6	0.4	1.5	0.8	1.1	1.7	1.7
Date of Highest 8-Hr Conc.	1/30	2/13	3/11	4/29	5/27	6/06	7/14	8/08	9/21	10/05	11/09	12/14	12/14
2nd Highest 8-Hr Conc.	0.8	0.8	1.1	0.9	1.0	1.3	0.5	0.4	1.3	0.8	1.0	1.5	1.5
Date of 2nd Highest 8-Hr Conc.	1/05	2/06	3/17	4/26	5/17	6/07	7/13	8/25	9/20	10/21	11/08	12/13	9/21
No. of 8-Hr Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of 8-Hr Concentrations													
0 - 4.9	733	696	744	720	744	714	744	744	720	744	720	744	8767
5.0 - 8.9	0	0	0	0	0	0	0	0	0	0	0	0	0
9.0 - 12.9	0	0	0	0	0	0	0	0	0	0	0	0	0
13.0 - 16.9	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE XXII
2012 Summary of Carbon Monoxide Concentrations (ppm)

SITE	HUME-FOGG	ANNUAL
Highest 1-Hr Conc.	1.9	1.9
2nd Highest 1-Hr Conc.	1.6	1.6
Highest 8-Hr Conc.	1.7	1.7
2nd Highest 8-Hr Conc.	1.5	1.5
No. of 1-Hr Exceedances	0	0
No. of 8-Hr Exceedances	0	0
No. of Days 8-Hr Exceedances	0	0

Tables XXIII, XXIV, XXV, and Figures 13 and 14, show a comparison of the concentrations of carbon monoxide over the past several years. This data shows no violations of the 1-hour NAAQS of 35 ppm or the 8-hour NAAQS of 9.0 ppm since 1988.

TABLE XXIII
1988– 2012 Annual Comparison of Carbon Monoxide Concentrations (ppm)

SITE 47-037-0021 HUME-FOGG MAGNET SCHOOL

YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Highest 1-Hr Conc.	12.5	11.0	9.5	7.5	8.5	11.0	9.0	7.5	6.0	7.5	6.9	7.9	5.7	5.0	4.9	5.4	3.9	3.3	3.5	3.0	3.2	2.4	3.3	2.1	1.9
2nd Highest 1-Hr Conc.	11.0	11.0	8.0	7.5	8.0	8.5	9.0	7.0	5.5	7.0	5.8	7.6	5.7	4.8	4.8	4.9	3.9	3.3	3.4	2.9	3.2	2.2	2.9	1.9	1.6
Highest 8-Hr Conc.	8.0	8.8	7.8	5.3	6.3	7.0	6.3	6.5	4.4	5.8	4.9	6.2	3.9	3.7	3.7	3.9	2.7	2.6	3.0	2.3	2.4	1.7	2.2	1.6	1.7
2nd Highest 8-Hr Conc.	7.8	7.6	5.8	4.9	5.8	8.5	5.4	4.8	4.1	5.1	4.6	5.2	3.6	3.7	3.5	3.0	2.7	2.4	2.6	2.1	2.3	1.6	1.9	1.4	1.5
No. of 1-Hr Exceedances of the Standard (35 ppm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of 8-Hr Exceedances of the Standard (9 ppm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Days 8-Hr. Standard Exceeded (Standard = 9 ppm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE XXIV
1982 - 2002 Annual Comparison of Carbon Monoxide Concentrations, (ppm)

SITE 47-037-0028 DONELSON LIBRARY*

YEAR	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Highest 1-Hr Conc.	10.0	13.5	8.0	8.5	8.5	8.0	7.0	11.5	8.5	8.0	8.0	7.0	6.0	3.5	5.0	4.0	3.6	4.1	3.5	3.9	2.7
2nd Highest 1-Hr Conc.	9.5	8.0	7.5	7.0	6.5	8.0	7.0	7.0	7.5	6.5	7.0	6.8	5.5	3.0	4.5	4.0	3.4	4.0	3.4	3.5	2.6
Highest 8-Hr Conc.	6.1	9.5	6.6	4.1	6.3	4.4	6.1	5.6	5.6	5.5	4.4	5.8	4.1	2.8	2.7	2.9	3.1	3.6	3.0	2.8	2.2
2nd Highest 8-Hr Conc.	5.9	4.9	6.2	3.8	5.8	4.1	4.5	5.6	4.3	3.4	4.4	5.4	3.1	2.4	2.5	2.8	2.8	2.6	2.4	2.7	1.8
No. of 1-Hr Exceedances of the Standard (35PPM)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of 8-Hr Exceedances of the Standard (9PPM)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Days 8-Hr. Standard Exceeded (Standard = 9PPM)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Donelson Library site was taken out of service in 2002.

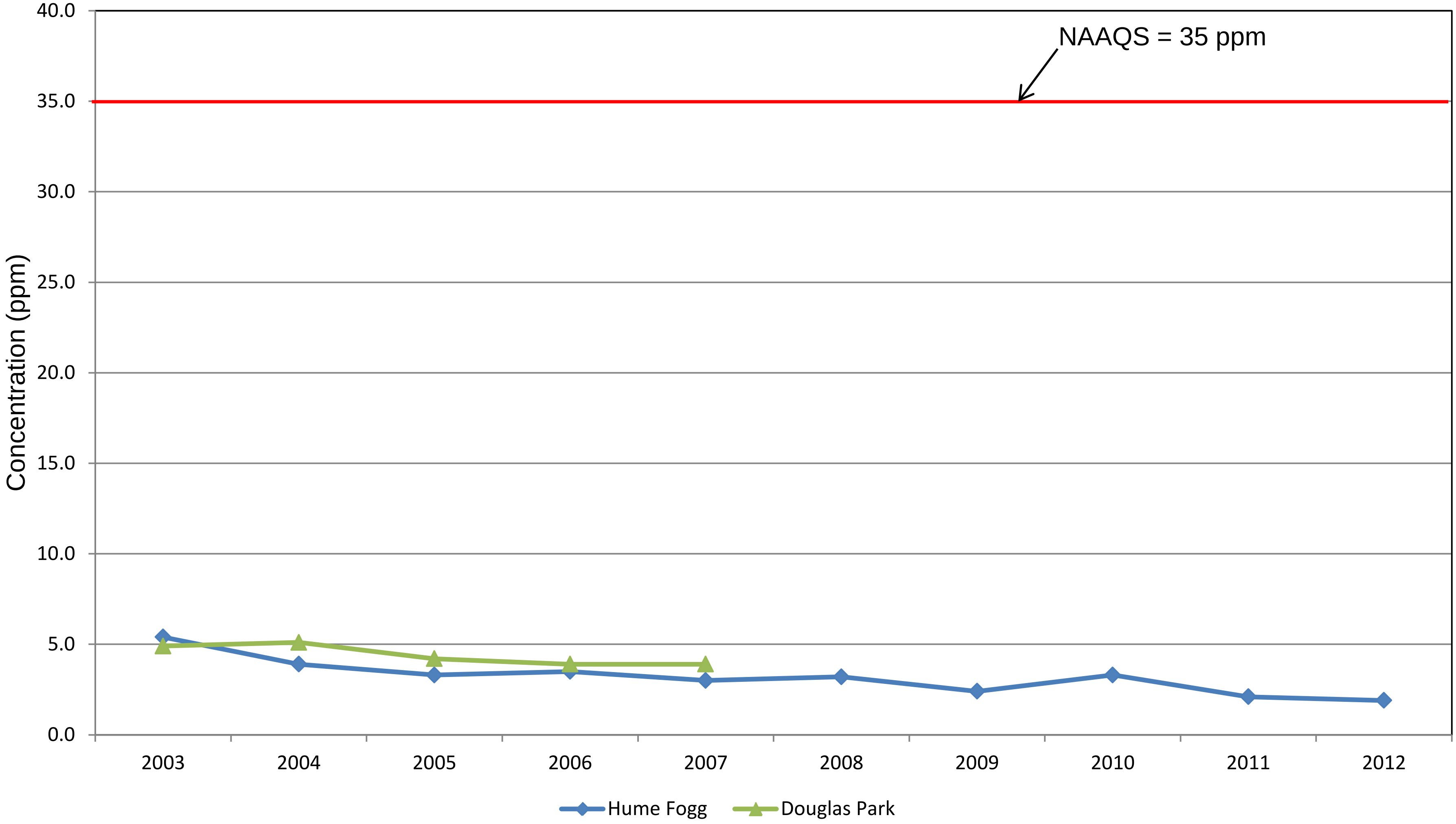
TABLE XXV
1987 - 2007 Annual Comparison of Carbon Monoxide Concentrations, (ppm)

SITE 47-037-0031 DOUGLAS PARK*

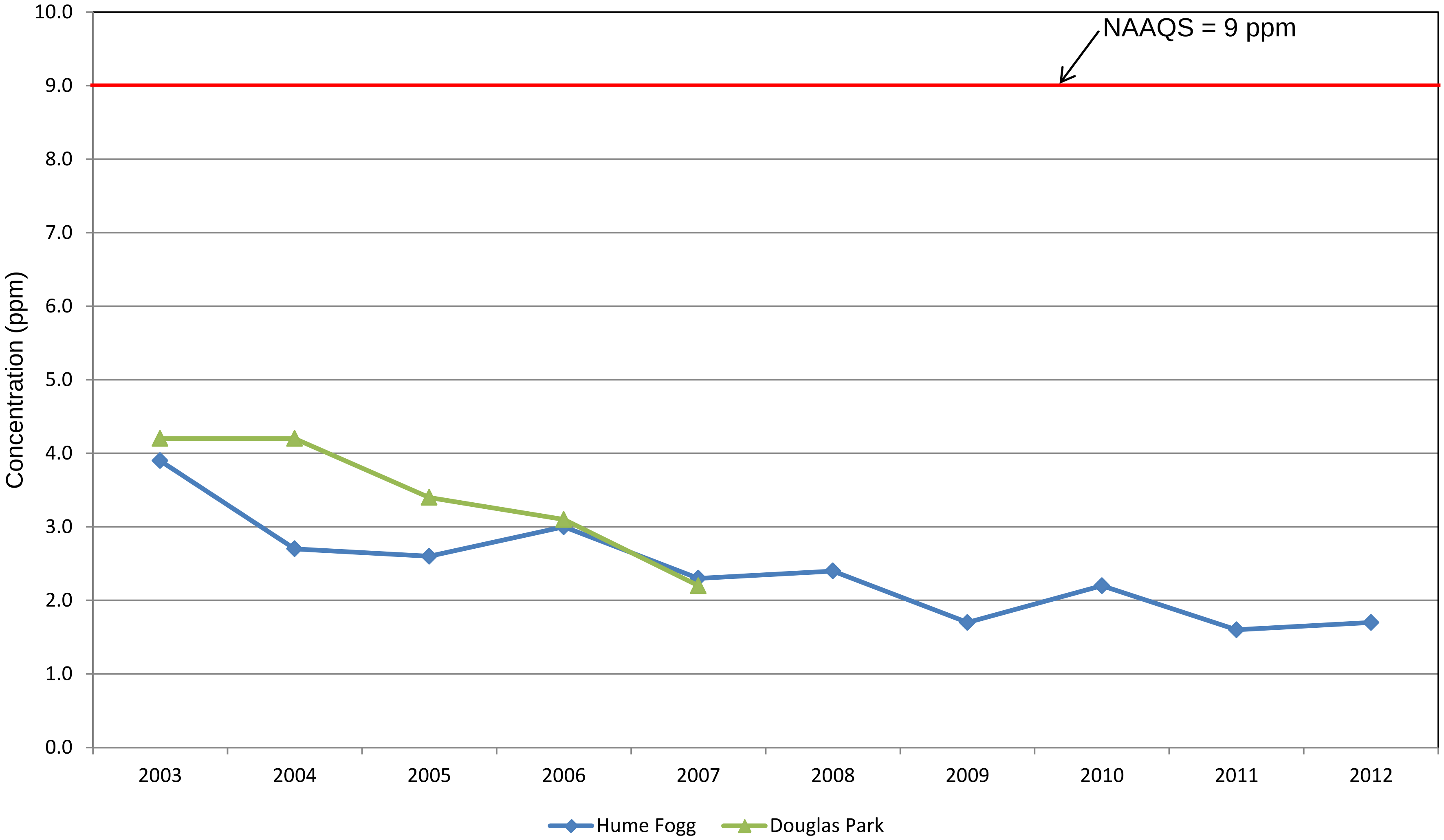
YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Highest 1-Hr Concentration	10.0	10.0	13.5	9.5	8.5	8.5	8.5	8.0	9.0	6.5	7.0	7.5	7.5	6.7	7.7	6.9	4.9	5.1	4.2	3.9	3.9
2nd Highest 1-Hr Concentration	9.0	9.5	12.5	9.0	8.5	8.0	8.5	8.0	8.5	6.0	7.0	7.2	7.2	6.7	7.1	6.2	4.9	5.1	4.1	3.7	3.7
Highest 8-Hr Concentration	8.9	8.3	12.1	8.4	7.6	6.8	7.4	7.1	7.6	5.8	6.4	7.0	5.6	6.4	6.6	5.3	4.2	4.2	3.4	3.1	2.2
2nd Highest 8-Hr Concentration	8.1	7.0	8.3	7.7	6.2	6.4	7.3	7.1	7.3	5.0	6.3	6.1	5.3	5.6	5.7	5.0	3.6	3.8	3.2	3.1	1.9
No. of 1-Hr Exceedances of the Standard (35PPM)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of 8-Hr Exceedances of the Standard (9PPM)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Days 8-Hr. Standard Exceeded (Standard=9PPM)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Douglas Park site was taken out of service in 2007.

Annual Comparison of Carbon Monoxide Concentrations (ppm)
Highest 1-Hour Concentrations
Figure 13



Annual Comparison of Carbon Monoxide Concentrations (ppm)
Highest 8-Hour Average Concentrations
Figure 14



AIR QUALITY INDEX

The Air Quality Index (AQI) is a tool for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air.

The AQI for Nashville and Davidson County, Tennessee is reported by the Metro Public Health Department, Air Pollution Control Division. The reported AQI is the maximum value for the previous day from midnight to midnight. It incorporates the measured concentrations of five pollutants: carbon monoxide, ozone, sulfur dioxide, $PM_{2.5}$ and nitrogen dioxide. For each of these pollutants, EPA has established national ambient air quality standards to protect public health. Ground-level ozone and airborne particles are the two criteria pollutants that pose the greatest threat to human health in this country.

The AQI is updated daily, Monday through Friday, at approximately 9:00 A.M using data from the continuous monitors located at East Health Center, Lockland Elementary School and Percy Priest Dam. A daily recorded update of the AQI can be obtained by calling (615) 340-0488 and on the Metro Public Health Department's website which can be found at www.nashville.gov/Health-Department. Table XXIX reflects the daily AQI data that is available on the EPA Air Data website. This data may differ from the daily AQI values reported by this agency due to the fact that EPA calculates the AQI for particulate matter based on the $PM_{2.5}$ manual monitoring data rather the continuous monitoring data.

Think of the AQI as a yardstick that runs from 0 to 500. The higher the AQI value the greater the level of air pollution and the greater the health concern. For example, an AQI value of 50 represents good air quality with little potential to affect public health, while an AQI value over 300 represents hazardous air quality.

An AQI value of 100 generally corresponds to the national ambient air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy - at first for certain sensitive groups of people, then for everyone as AQI values get higher.

The purpose of the AQI is to help you understand what local air quality means to your health. To make it easier to understand, the AQI is divided into six categories:

Air Quality Index (AQI) Values	**Levels of Health Concern**	**Colors**
When the AQI is in this range:	***...air quality conditions are:***	***...as symbolized by this color:***
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Each category corresponds to a different level of health concern. The six levels of health concern and what they mean are:

- **"Good"** The AQI value for your community is between 0 and 50. Air quality is considered satisfactory, and air pollution poses little or no risk.

- **"Moderate"** The AQI for your community is between 51 and 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.

- **"Unhealthy for Sensitive Groups"** When AQI values are between 101 and 150, members of sensitive groups may experience health effects. This means they are likely to be affected at lower levels than the general public. For example, people with lung disease are at greater risk from exposure to ozone, while people with either lung disease or heart disease are at greater risk from exposure to particle pollution. The general public is not likely to be affected when the AQI is in this range.

- **"Unhealthy"** Everyone may begin to experience health effects when AQI values are between 151 and 200. Members of sensitive groups may experience more serious health effects.

- **"Very Unhealthy"** AQI values between 201 and 300 trigger a health alert, meaning everyone may experience more serious health effects.

- **"Hazardous"** AQI values over 300 trigger health warnings of emergency conditions. The entire population is more likely to be affected.

EPA has assigned a specific color to each AQI category to make it easier for people to understand quickly whether air pollution is reaching unhealthy levels in their communities. For example, green means good, yellow means moderate, orange means "unhealthy for sensitive groups," while red means that conditions may be "unhealthy for everyone," and so on.

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Health alert: everyone may experience more serious health effects.
Hazardous	> 300	Health warnings of emergency conditions. The entire population is more likely to be affected.

TABLE XXVI 2012 AQI Summary		
Range	**Number of Days**	**% of Total Days**
Good	296	81%
Moderate	63	17%
Unhealthy for Sensitive Groups	7	2%

The PCD has established a performance goal (Air Quality Key Results Measure) of Nashville's air being in the good or moderate range according to EPA's AQI on 95% of the days of the year. The calculation method simply involves counting the number of days during a calendar year that the air quality in Nashville is in the good or moderate range and then dividing that total by 366. Based on the 2012 data, Nashville's air was in the good or moderate range on 98% of the days according to EPA's AQI. Therefore, the PCD achieved its performance goal in 2012.

The Davidson County maximum AQI in 2012 was on August 2, 2012 when the 8-hour ozone concentration reached 0.085 ppm at the Percy Priest Dam monitoring site. The 0.085 ppm concentration resulted in a reported AQI of 124. Hot temperatures along with sunny skies and stagnant conditions persisted across the nation causing elevated ground level ozone concentrations during this time period.

AIR QUALITY FORECASTING

In cooperation with the Tennessee Department of Environment and Conservation, Air Pollution Control Division, the PCD participates in the issuance of a daily air quality forecast. This forecast is issued to alert the Middle Tennessee area of the probable maximum ozone and particulate matter ($PM_{2.5}$) concentration on the next day. An Air Quality Action Day is called when the predicted ozone or $PM_{2.5}$ air quality for the next day is forecast to be in the unhealthy for sensitive groups (or higher) category. The intent is to notify those people that might be affected by the next day's air quality so that they have the opportunity to make adjustments to minimize their exposure to ozone and particulate matter ($PM_{2.5}$) air pollution. It also provides the opportunity for area residents and businesses to alter their activities to minimize their impact on air quality in the Middle Tennessee area.

The PCD is an active member of the regional Clean Air Partnership (CAP) of Middle Tennessee. The CAP directs the Air Quality Action Day program. This program continues to develop, promoting the use of local air quality forecasts to induce voluntary behavior changes that improve air quality and protect the health of sensitive individuals.

Progress to date includes continued relationships with weather staff at each of the local TV news stations, continued relationships with local newspaper environmental and transportation reporters, development and continued support of the CAP of Middle Tennessee's www.cleanairpartnership.info website and quarterly newsletter, multi-media outreach campaign including billboards, radio, television, and newspaper advertising, participation in the Nashville Earth Day Festival and several other community events, several radio interviews, on-camera interviews aired on local TV news programs on Air Quality Action Days, and the launch of the Air Quality 101 Workshop series, and the formal launch of the CAP Employer Partner Program, which has grown to reach over 11,000 Middle Tennessee employees. Planned activities include promoting air quality curriculum materials for use in area public and private schools, development of an anti-idling program, increasing the number of businesses participating in the CAP Employer Partner Program, launching a Clean Air Schools program in partnership with the Tennessee Department of Transportation's Clear the Air program, and working with other schools and businesses interested in air quality projects as part of the Tennessee Pollution Prevention Partnership program.

The daily air quality forecast is made available to the public by the PCD by calling (615) 340-0488 and on the Metro Public Health Department's website which can be found at www.nashville.gov/Health-Department. Individuals also may sign up to receive the air quality forecasts or alerts via www.airnow.gov.

POLLEN

Pollen is a small, spherical-shaped grain which is produced by plants and is necessary for plant fertilization. Each plant has its own pollinating season which tends to be fairly constant from year to year. In this region, trees generally pollinate from around the first of March through May, grass from the first of March until killing frost and ragweed in the fall. The actual amount of pollen in the air, at any given time, depends on the weather conditions, as well as total amount of pollen produced.

Pollen is measured using a Durham pollen sampler. Pollen is collected on a microscope slide which has been smeared with a light coating of white petroleum jelly or silicone grease. The slide is exposed for 24 hours and then returned to the laboratory where it is stained with a few drops of Calberia's staining solution. The pollen on the slide is read with a microscope on low power (10X). Five scans across the stained area are counted, and the pollen count is computed as the number of grains of pollen per square centimeter. The following is used for the pollen count:

0 to 5 Pollen Grains/cm^2	Slight
6 to 15 Pollen Grains/cm^2	Moderate
16 to 25 Pollen Grains/cm^2	Heavy
Greater than 25 Pollen Grains/cm^2	Extremely Heavy

Table XXVII gives a summary of the 2012 pollen season. The maximum daily pollen count for Nashville during 2012 was 611 grains/cm^2 measured April 11, 2012 due to the combination of cedar, maple, and pine pollen.

TABLE XXVII
2012 Pollen Count Summary

Range	Number of Days	% of Total Days
Slight	53	31%
Moderate	57	33%
Heavy	26	15%
Extremely Heavy	36	21%

7. INDOOR AIR QUALITY

According to comparative risk studies performed by EPA and its Science Advisory Board, indoor air pollution has been ranked among the top five environmental risks to public health. Children may be especially vulnerable to these health effects. EPA estimates that indoor levels of many pollutants are typically 2-5 times, and occasionally more than 100 times, higher than outdoor levels. These levels are of particular concern because it is estimated that most people spend 90% of their time indoors.

The Pollution Control Division is presently operating an Indoor Air Quality (IAQ) program at the Metro Public Health Department. Currently, there are no regulations directly addressing non-occupational indoor air quality. This is a voluntary program that seeks to provide information, diagnostic services (when possible) and suggestions in hopes of increasing the public's knowledge of IAQ and decrease the health effects associated with poor indoor air quality. The IAQ program provides support and expertise to address the indoor air quality concerns of residences (homes, apartments, etc.), schools, childcare facilities, and public facilities. For indoor air quality issues relating to the workplace, the Tennessee Occupational Safety and Health Administration (TOSHA) is responsible for the health and safety of employees at commercial and industrial establishments.

During 2012, the Pollution Control Division responded to more than 200 telephone calls from the community seeking information and guidance on how to improve their indoor air quality or how to address a particular indoor air situation. Complaints and requests for assistance have been received from homeowners, renters, students, parents and staff at public and private schools, church members, parents and staff at daycare centers and employees and employers at commercial and industrial facilities.

Recently, there has been growing concern over mold in the indoor environment. News stories have focused on numerous health concerns reportedly caused by exposure to mold. The most common (documented) symptom is an allergic reaction. At this time, there is still much to learn about what other health effects can actually be directly related to mold exposure. Since there are no regulatory limits for mold in the home or work environment, the best advice is as follows: If you suspect you have a mold problem, look for a source of moisture. Moisture control is the key to mold control. Microbials need a source of moisture and a source of food to grow and multiply. Before successful remediation can take place, the source of moisture must be eliminated or the problem can reoccur. In most cases, mold can be removed from surfaces with soap and water and the surfaces sanitized with a weak bleach solution. Once mold begins to grow in insulation or wallboard the only way to deal with the problem is by removal and replacement. If you have an extensive amount of mold and believe you cannot manage the cleanup on your own, you may want to contact a professional who has experience in remediation of mold in homes and other buildings.

There are many other sources of indoor air pollution that may be present in the home. Combustion sources such as oil, gas, kerosene, coal, wood, and tobacco products can produce pollutants such as carbon monoxide, nitrogen dioxide, and particulates. Organic chemicals are widely used as ingredients in many household products. Paints, varnishes, and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing, and hobby products. All these products can release volatile organic compounds while being used. Biological contaminants such as mold and mildew, dust mites, pet dander and cockroaches can trigger asthma and allergic reactions. By monitoring the relative humidity, increasing ventilation, and routinely cleaning the home, contact with many biological contaminants can be reduced.

Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in homes. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the home. High temperature and humidity levels can also increase concentrations of some pollutants. Controlling these aspects of the indoor environment will help decrease exposure to most indoor air pollutants.

8. VEHICLE INSPECTION PROGRAM

The Federal Clean Air Act, as amended, mandates a Vehicle Inspection Program in non-attainment areas unable to demonstrate attainment of the National Ambient Air Quality Standard (NAAQS) for carbon monoxide and ozone by December 31, 1982. Davidson County was unable to demonstrate attainment by December 31, 1982. Therefore, a 5-year extension was requested to demonstrate attainment of the NAAQS for carbon monoxide and ozone. The basis for the requested extension was a commitment to implement a mandatory vehicle emissions testing program. The Vehicle Inspection Program began the mandatory testing of light duty gasoline motor vehicles in 1985. Failure to implement this mandatory vehicle inspection program could have resulted in sanctions including federal highway funds, air program funds and a construction moratorium.

Carbon monoxide (CO) is a colorless, odorless gas that is a product of incomplete combustion. The major source of carbon monoxide in Davidson County is light duty vehicles. Ozone (O_3) is a colorless, pungent gas that is produced by the reaction of sunlight with volatile organic compounds and nitrogen oxides. A major source of volatile organic compounds and nitrogen oxides in Davidson County is light duty vehicles.

This section describes the results of Davidson County's Vehicle Inspection Program for the period of January 1, 2012 through December 31, 2012.

VEHICLE INSPECTION PROGRAM DESCRIPTION

The Metropolitan Code of Nashville and Davidson County, Chapter 10.56, "Air Pollution Control," Section 10.56.240, "Internal Combustion Engines," authorizes the Metropolitan Board of Health to develop and implement a vehicle inspection maintenance program. On May 31, 1981, the Metropolitan Board of Health adopted the Metro Public Health Department, Pollution Control Division, Regulation No. 8, "Regulation of Emissions From Light-Duty Motor Vehicles Through Mandatory Vehicle Inspection and Maintenance Program," which provides for a vehicle inspection program for all light duty vehicles manufactured from 1975 through current model year with a maximum gross vehicle weight of 8,500 pounds or less. The only exceptions were diesel or electric powered light duty vehicles and motorcycles. This regulation was approved by the Metropolitan Council of Nashville and Davidson County May 17, 1983, Resolution No. R83-1471. The program approved by the Metropolitan Council is a centralized program operated by a contractor.

The Vehicle Inspection Program became mandatory January 1, 1985. Before the owner of a light duty vehicle can purchase the Davidson County wheel tax license, they must show proof that the vehicle has met the allowable emission standards of the Vehicle Inspection Program.

Effective December 1, 1994, the program was changed to require all 1975 and newer, to undergo a visual three-point anti-tampering inspection. This includes the gas cap, gasoline inlet restrictor and catalytic converter.

In August, 2001, the Metropolitan Council adopted Resolution No. RS 2001-716 to allow all 1996 and newer vehicles to receive an on-board diagnostic (OBD) test for emissions compliance. The OBD testing started April 1, 2002.

On April 1, 2005, the Vehicle Inspection Program changed the test weight of vehicles from 8,500 pounds Gross Vehicle Weight Rate (GVWR) to include vehicles up to 10,500 pounds GVWR. The program also added diesel powered vehicles.

The Nashville Vehicle Inspection Program requires all light duty gasoline and diesel powered vehicles with a GVWR of 10,500 pounds or less to be inspected annually. Vehicles found to have excessive emissions must be repaired, retested and pass the emissions test prior to being issued a Davidson County wheel tax license.

The Nashville Vehicle Inspection Program uses idle, OBD and curb idle (opacity) test procedures. Light duty gasoline vehicles 1975 – 1995 are tested using the idle test. Light duty diesel vehicles 1975 – 2001 are tested using the curb idle (opacity) test. Light duty gasoline vehicles 1996 and newer, and light duty diesel vehicles 2002 and newer, are tested using the OBD test.

The 1975 - 1995 light duty gasoline vehicles are tested at idle RPM with the transmission in neutral or park. If the vehicle fails to pass this test, a high RPM precondition is used, and the vehicle is given a second idle test. A vehicle does not fail the initial test unless it fails both idle tests. The allowable emission standards for various vehicle types and ages are listed in Table XXVIII.

The OBD test consists of two types of examinations. There is a visual check of the dashboard check engine light (malfunction indicator light or mil) and an electronic examination of the OBD computer. The vehicle analyzer is plugged into the data link connector (DLC) on the vehicle, and the stored information from the vehicle's on-board computer is downloaded to the analyzer.

The curb idle (opacity) test measures the density of the exhaust from light duty diesel vehicles. The opacity is compared to the 10% standard, and pass-fail is determined.

Table XXVIII
Maximum Allowable Emissions
During Idle Speed (Tailpipe) Test

Vehicle Model Year	Carbon Monoxide %		Hydrocarbon (PPM)	
	LIGHT DUTY VEHICLES LESS THAN OR EQUAL TO 6000 LBS. GVWR	LIGHT DUTY VEHICLES GREATER THAN 6000 LBS. GVWR	LIGHT DUTY VEHICLES LESS THAN OR EQUAL TO 6000 LBS. GVWR	LIGHT DUTY VEHICLES GREATER THAN 6000 LBS. GVWR
1975	5.0	6.5	500	750
1976	5.0	6.5	500	750
1977	5.0	6.5	500	750
1978	4.0	6.0	400	600
1979	4.0	6.0	400	600
1980	3.0	4.5	300	400
1981 & Newer	1.2	4.0	220	400

VEHICLE INSPECTION PROGRAM OPERATING STATISTICS

During 2012, the Nashville Vehicle Inspection Program performed 580,931 emission inspections. Compared to the 580,526 inspections performed during 2011, there was an increase of 405 inspections.

VEHICLE INSPECTION PASS AND FAIL RATES

In 2012, a total of 516,273 unique vehicles were inspected. The 2012 initial test pass rate was 90.2%, and the initial test fail rate was 9.8%. The initial inspection fail rates rounded to the nearest percent by year since the program start-up can be found in Table XXIX.

TABLE XXIX
Initial Emission Inspection Fail Rate by Year

Year	Fail Rate
1986	18%
1987	16%
1988	14%
1989	12%
1990	11%
1991	9%
1992	7%
1993	7%
1994	7%
1995	10%
1996	9%
1997	8%
1998	8%
1999	7%
2000	6%
2001	6%
2002	10%
2003	11%
2004	10%
2005	9%
2006	9%
2007	9%
2008	9%
2009	9%
2010	10%
2011	10%
2012	10%

The most reasonable explanation for the decreasing fail rates from 1986 - 1994 is that affected vehicles are being better maintained and many gross polluters have been taken out of service. Encouraging motorists to maintain their vehicles is an essential goal of the program.

Also, note that the fail rate went up beginning in 1995 after years of decline. This is due to the adding of a three-point anti-tampering inspection into the program in 1995. Again, the increase in the 2002 and later vehicle fail rate was due to the addition of OBD testing on 1996 and newer vehicles.

This data shows that the Nashville Vehicle Inspection Program is effective in reducing light duty gasoline and diesel vehicle emissions from the test fleet.

VEHICLE INSPECTION PROGRAM QUALITY ASSURANCE

The Metro Public Health Department Vehicle Inspection Staff is also assigned the duty of auditing all emission inspection facilities in the Davidson County program. The program has six fixed test centers and seven mobile (remote) locations as seen in Table XXX.

TABLE XXX
Test Center Locations
Davidson County, Tennessee

Station 1	501 Craighead Street
Station 2	3494 Dickerson Road
Station 3	715 Gallatin Road North, Madison
Station 4	3363 Stoners Bend Drive
Station 5	1317 Antioch Pike
Station 6	7008 West Belt Drive
Mobile 1	Rhodes Park – 710 Mainstream Drive
Mobile 2	Joelton Park – 3570 Old Clarksville Pike, Joelton
Mobile 3	Cane Ridge Park – 419 Battle Road, Antioch
Mobile 4	Bellevue YMCA – 8101 Highway 100
Mobile 5	Extra Mobile Test Van
Mobile 6	CarMax – Thompson Lane
Mobile 7	CarMax – Rivergate

The audit involves review of inspection facility records and compliance with administrative requirements and tests of emission inspection equipment to ensure that the equipment is operating in accordance with all federal and local requirements. Audits are conducted twice a month on all inspection facilities. Gas analyzer audits involve tests to ensure that the gas analyzers are measuring criterion gases (i.e., hydrocarbons, carbon monoxide and carbon dioxide) accurately. During 2012, there were 1,007 gas analyzer audits on 43 gas analyzers used by the test centers. Also, there were 93 covert activities conducted on contractor inspection facilities.

VEHICLE INSPECTION PROGRAM ENFORCEMENT

During 2012, various enforcement activities were carried out to ensure compliance with the vehicle inspection program. The staff issued 517 Notices of Violation or Citations.

Due to the enforcement efforts of the staff, the Nashville Vehicle Inspection Program has a 98% compliance rate. The compliance rate of a vehicle inspection program is the percentage of vehicles in a fleet that ultimately receives a certificate of compliance after testing and any needed repair. Overall, the data shows that the Nashville Vehicle Inspection Program is effective in reducing emissions from light duty vehicles, since the dirty vehicles are being identified and repaired.