



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

JUN 29 2004

The Honorable Robert L. Ehrlich, Jr.
Office of the Governor
100 State Circle
Annapolis, Maryland 21401

Dear Governor Ehrlich:

Fine-particle pollution represents one of the most significant barriers to clean air facing our nation today. These tiny particles – about 1/30th the diameter of a human hair – have been scientifically linked to serious human health problems. Their ability to be suspended in air for long periods of time makes them a public health threat far beyond the source of emissions. An important part of our nation's commitment to clean, healthy air deals with reducing levels of this fine particle or PM_{2.5} pollution.

In February, your State submitted its recommended boundaries for PM_{2.5} attainment and nonattainment areas. We have thoroughly reviewed your recommendations and the technical information you have submitted to support your recommendations. We appreciate the effort your State has made to develop this supporting information. Consistent with the Clean Air Act, this letter is to notify you that based on the information contained in your submittal, the Environmental Protection Agency (EPA) agrees with your recommended nonattainment designations and boundaries for most counties, but intends to modify your recommended designations and boundaries for some counties, as described in the enclosure discussed below.

Your Environmental Commissioner will receive a copy of this letter with a more detailed enclosure containing a description of areas where EPA intends to modify your State recommendations, and the basis for such modification. Should you have additional information that you wish to be considered by EPA in this process, we request that you provide it to us by September 1, 2004.

You will hear from us again in November when EPA takes the final step in the PM_{2.5} designation process and determines those areas that are in attainment (or unclassifiable) and those areas that are nonattainment. For areas in attainment, the challenge will be not only to maintain, but also to continue the progress you have made toward clean air. It is a commitment to no backsliding in your State's clean air status for fine particles. EPA will also issue a proposed fine particle implementation rule prior to final designations, which will allow you to proceed with planning to achieve clean air.

Customer Service **Hotline:** 1-800-438-2474

The Bush Administration is addressing fine particle pollution with a comprehensive national clean air strategy. This strategy includes EPA's recent rule to reduce pollution from nonroad diesel engines, and the proposed rule to reduce pollution from power plants in the eastern United States. These two rules are important components of EPA's efforts to help States and localities meet the more protective national fine-particle and 8-hour ozone air quality standards. Together these rules will help all areas of the country achieve cleaner air.

Should you or your staff have any questions, I invite you to contact our Regional Air Office. We look forward to a continued dialogue with you as we work together to implement the PM₁₀ standards.

Sincerely,

A handwritten signature in black ink that reads "Donald S. Welsh". The signature is written in a cursive, flowing style.

Donald S. Welsh
Regional Administrator

Enclosures

cc w/Enclosures: The Honorable Kendl P. Philbrick, Secretary, MDE

**Maryland
Enclosure A**

The fourth column of the following table identifies the counties within Maryland that EPA intends to designate as nonattainment.

Area	Maryland Counties in 1999 Metropolitan Statistical Area	State of Maryland Recommendation	EPA Recommendation of Maryland Counties
Baltimore MSA (Part of Washington-Baltimore CMSA)	Anne Arundel Baltimore City Baltimore Carroll Harford Howard Queen Anne's	Anne Arundel Baltimore City Baltimore	Anne Arundel Baltimore City Baltimore Carroll Harford Howard
Washington DC MSA (Part of Washington- Baltimore CMSA)	Calvert Charles Frederick Montgomery Prince Georges	Prince Georges	Charles Frederick Montgomery Prince Georges
Hagerstown-Martinsburg *	Washington (Also Berkeley, WV and Morgan, WV)	none	Washington
Total number of areas in Maryland	13	4	11

* Washington County was included as part of the Hagerstown-Martinsburg 2003 CBSA.



Enclosure B

State Summary

Maryland's initial recommendation was submitted by Governor Robert Ehrlich, Jr. on February 23, 2004. The submission identified two options for designation. The first option recommended 14 counties as nonattainment and 10 counties as attainment, consistent with the ozone nonattainment areas. The second option recommended only four nonattainment areas. Maryland's subsequent letter of May 28, 2004, from Thomas Snyder, recommended Option 2 as the State's preferred option.

Based on the air quality data for the years 2001-2003, there are three presumptive fine particulate (PM_{2.5}) nonattainment areas consisting of 13 counties in Maryland. EPA agrees with Maryland's recommended designation of attainment for the Cecil County portion of the Philadelphia CMSA. However, in addition to the four counties the State has recommended to be designated as nonattainment, EPA recommends that three additional counties in the Baltimore MSA, three additional counties in the Washington DC MSA, and one additional county in the Hagerstown-Martinsburg CBSA also be designated as nonattainment. The following discussion provides EPA's rationale for considering the modification to Maryland's recommendation.

Philadelphia Area

Discussion

Cecil County is part of the Philadelphia Area presumptive nonattainment area. Maryland's revised recommendation for the Philadelphia CMSA included Cecil County as attainment for the PM_{2.5} standard.

Summary of Evaluation

Cecil County has monitored attainment of 13.0 µg/m³ compared to the National Ambient Air Quality Standard of 15.0 µg/m³. A review of the remaining factors indicates that the county is well below the other counties of the Philadelphia Area, and provides sufficient evidence to modify the nonattainment boundary to exclude Cecil County.

PHILADELPHIA, PA MSA

Status of Counties: Alphabetical by State

EPA Reg	ST	COUNTY	State Recommend PM _{2.5} Designation	EPA Intent PM _{2.5} Designation	Area - '99 C/MSA
3	DE	New Castle	Nonattainment	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
3	MD	Cecil	Attainment/unclassifiable	Attainment/unclassifiable	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Atlantic	Attainment/unclassifiable	Attainment/unclassifiable	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Burlington	Attainment/unclassifiable	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Camden	Attainment/unclassifiable	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Cape May	Attainment/unclassifiable	Attainment/unclassifiable	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Cumberland	Attainment/unclassifiable	Attainment/unclassifiable	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Gloucester	Attainment/unclassifiable	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
2	NJ	Salem	Attainment/unclassifiable	Attainment/unclassifiable	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
3	PA	Bucks	Nonattainment	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
3	PA	Chester	Attainment/unclassifiable	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
3	PA	Delaware	Nonattainment	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
3	PA	Montgomery	Attainment/unclassifiable	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
3	PA	Philadelphia	Nonattainment	Nonattainment	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD

SUMMARY OF FACTOR 1: EMISSIONS PHILADELPHIA, PA MSA

** Counties Listed by Percent Contribution to area**

EPA Reg	ST	COUNTY	Total Emissions, 2001 (tons)						Weighted Emissions	EPA Intent PM _{2.5} Designation	
			PM	SO ₂	NOX	VOC	Amm	Carbon			Crustal
3	DE	New Castle	4,558	61,499	34,640	24,088	2,605	2,276	1,645	18.6	Nonattainment
3	PA	Philadelphia	3,944	16,861	55,011	50,439	3,506	2,116	1,200	14.0	Nonattainment
3	PA	Delaware	3,173	24,882	33,259	19,071	903	1,458	1,225	11.1	Nonattainment
3	PA	Montgomery	3,910	8,721	21,191	32,545	1,293	1,905	1,700	8.7	Nonattainment
3	PA	Chester	3,716	11,391	16,909	17,697	2,267	1,228	2,226	6.9	Nonattainment
3	PA	Bucks	3,100	6,870	16,852	23,024	1,124	1,443	1,444	6.8	Nonattainment
2	NJ	Gloucester	1,909	9,154	21,849	15,087	741	1,035	697	6.5	Nonattainment
2	NJ	Camden	2,151	4,120	17,025	20,904	887	1,286	727	5.9	Nonattainment
2	NJ	Burlington	2,298	2,330	15,113	18,139	913	1,326	836	5.6	Nonattainment
2	NJ	Cape May	2,157	14,578	7,894	11,886	206	938	1,044	5.5	Attainment/unclassifiable
2	NJ	Atlantic	1,404	1,905	8,676	11,906	437	773	563	3.3	Attainment/unclassifiable
2	NJ	Cumberland	1,374	1,941	7,054	9,279	423	638	669	2.8	Attainment/unclassifiable
2	NJ	Salem	1,243	4,485	5,457	8,229	534	487	653	2.6	Attainment/unclassifiable
3	MD	Cecil	950	948	5,502	4,441	505	401	518	1.8	Attainment/unclassifiable

SUMMARY OF FACTOR 2: AIR QUALITY PHILADELPHIA MSA

** Counties Listed by Highest DV **

EPA Reg	ST	COUNTY	Design Values			Estimated Air Quality based		EPA Intent PM _{2.5} Designation			
			'01-'03	'00-'02	'99-'01	Maximum Estimate (inc. real)	# Estimated violating point/#total pts				
3	PA	Philadelphia	16.4	NA	16.8	NA	16.6	NA	16.8	3/5	Nonattainment
3	DE	New Castle	16.2	NA	16.5	NA	16.6	NA	16.5	6/12	Nonattainment
3	PA	Delaware	15.6	NA	15.7	NA	15.0	a	15.7	4/4	Nonattainment
3	PA	Chester	15.1	na	14.6	a			16.1	10/11	Nonattainment
2	NJ	Camden	14.6	a	14.8	a	14.6	a	15.0	0/4	Nonattainment
3	PA	Bucks	14.6	A	14.3	a	13.4	a	14.6	0/10	Nonattainment
3	PA	Montgomery	14.3	A	14.2	A	13.8	a	15.3	1/6	Nonattainment
2	NJ	Gloucester	13.8	a	14.2	A	14.3	a	14.7	0/6	Nonattainment
3	MD	Cecil	13.0	a	13.4	A	12.5	a	14.7	0/7	attainment/unclassifiable
2	NJ	Atlantic	11.6	a	11.4	a	11.2	a	12.8	0/7	attainment/unclassifiable
2	NJ	Burlington			No Monitor				14.4	0/13	Nonattainment
2	NJ	Cape May			No Monitor				12.4	0/3	attainment/unclassifiable
2	NJ	Cumberland			No Monitor				13.8	0/8	attainment/unclassifiable
2	NJ	Salem			No Monitor				15.1	1/5	attainment/unclassifiable

SUMMARY OF FACTOR 3: POPULATION							
Counties Listed Highest to Lowest Population							
EPA Reg	ST	COUNTY	Population & Area			EPA Intent	PM _{2.5} Designation
			2002	Area (sq miles)	Density '02		
3	PA	Philadelphia	1,492,231	135	11,054	Nonattainment	
3	PA	Montgomery	766,517	483	1,587	Nonattainment	
3	PA	Bucks	610,440	608	1,004	Nonattainment	
3	PA	Delaware	553,435	184	3,008	Nonattainment	
3	DE	New Castle	512,370	426	1,203	Nonattainment	
2	NJ	Camden	511,957	222	2,306	Nonattainment	
3	PA	Chester	450,160	756	595	Nonattainment	
2	NJ	Burlington	437,871	805	544	Nonattainment	
2	NJ	Gloucester	262,049	325	806	Nonattainment	
2	NJ	Atlantic	259,423	561	462	Attainment/unclassifiable	
2	NJ	Cumberland	147,768	489	302	Attainment/unclassifiable	
2	NJ	Cape May	102,013	255	400	Attainment/unclassifiable	
3	MD	Cecil	90,335	348	260	Attainment/unclassifiable	
2	NJ	Salem	64,438	338	191	Attainment/unclassifiable	

SUMMARY OF FACTOR 3B POPULATION DENSITY							
Counties Listed Highest to Lowest Population							
EPA Reg	ST	COUNTY	Population & Area			EPA Intent	PM _{2.5} Designation
			2002	Area (sq miles)	Density '02		
3	PA	Philadelphia	1,492,231	135	11,054	Nonattainment	
3	PA	Montgomery	766,517	483	1,587	Nonattainment	
3	PA	Bucks	610,440	608	1,004	Nonattainment	
3	PA	Delaware	553,435	184	3,008	Nonattainment	
3	DE	New Castle	512,370	426	1,203	Nonattainment	
2	NJ	Camden	511,957	222	2,306	Nonattainment	
3	PA	Chester	450,160	756	595	Nonattainment	
2	NJ	Burlington	437,871	805	544	Nonattainment	
2	NJ	Gloucester	262,049	325	806	Nonattainment	
2	NJ	Atlantic	259,423	561	462	Attainment/unclassifiable	
2	NJ	Cumberland	147,768	489	302	Attainment/unclassifiable	
2	NJ	Cape May	102,013	255	400	Attainment/unclassifiable	
3	MD	Cecil	90,335	348	260	Attainment/unclassifiable	
2	NJ	Salem	64,438	338	191	Attainment/unclassifiable	

SUMMARY FACTOR 4: VMT					
Counties Listed Highest to Lowest					
EPA Reg	ST	COUNTY	VMT	Commuting to Other Metro	
			2002	Percent	Number
3	PA	Philadelphia	10,213	23	129,902
3	DE	New Castle	4,957	11	27,598
3	PA	Montgomery	4,677	32	120,472
2	NJ	Camden	4,332	43	98,432
3	PA	Bucks	3,830	31	93,563
2	NJ	Burlington	3,748	29	60,278
3	PA	Delaware	3,513	44	111,594
3	PA	Chester	3,128	32	70,486
2	NJ	Gloucester	2,312	51	62,141
2	NJ	Atlantic	2,236	13	14,237
3	MD	Cecil	1,340	39	16,195
2	NJ	Cumberland	1,166	22	12,911
2	NJ	Cape May	749	26	11,360
2	NJ	Salem	734	48	13,922

SUMMARY FACTOR 4: Number of Commuters					
Sorted Highest to Lowest					
EPA Reg	ST	COUNTY	VMT	Commuting to Other Metro	
			2002	Percent	Number
3	PA	Philadelphia	10,213	23	129,902
3	PA	Montgomery	4,677	32	120,472
3	PA	Delaware	3,513	44	111,594
2	NJ	Camden	4,332	43	98,432
3	PA	Bucks	3,830	31	93,563
3	PA	Chester	3,128	32	70,486
2	NJ	Gloucester	2,312	51	62,141
2	NJ	Burlington	3,748	29	60,278
3	DE	New Castle	4,957	11	27,598
3	MD	Cecil	1,340	39	16,195
2	NJ	Atlantic	2,236	13	14,237
2	NJ	Salem	734	48	13,922
2	NJ	Cumberland	1,166	22	12,911
2	NJ	Cape May	749	26	11,360

Factor 5 Growth Rate Sorted Highest to Lowest							
EPA Reg	ST	COUNTY	Population			VMT	
			2002	Growth '90-'00	Pct chng '90-'00	Growth '96-'02	Pct chng '96-'02
2	NJ	Atlantic	259,423	28,225	13	148	7
3	PA	Bucks	610,440	56,461	10	12	0
2	NJ	Burlington	437,871	28,328	7	449	14
2	NJ	Camden	511,957	6,108	1	261	6
2	NJ	Cape May	102,013	7,237	8	154	26
3	MD	Cecil	90,335	14,604	20	305	29
3	PA	Chester	450,160	57,105	15	23	1
2	NJ	Cumberland	147,768	8,385	6	158	16
3	PA	Delaware	553,435	3,213	1	-71	-2
2	NJ	Gloucester	262,049	24,591	11	257	13
3	PA	Montgomery	766,517	71,986	11	-141	-3
3	DE	New Castle	512,370	58,319	13	270	6
3	PA	Philadelphia	1,492,231	-68,027	-4	-207	-2
2	NJ	Salem	64,438	-1,009	-2	43	6

Factors 6 and 7 Meteorology and Geography/Topography												
EPA Reg	ST	COUNTY	Basic Weighted Emissions	WD & 1/x Weighted Emissions	LCC x	LCC y	Delta X	Delta Y	Dist	Quad	Freq	
3	DE	New Castle	18.6	18.6	1185.7	61.0	-34.4	-46.3	57.7	SW	28.0	
3	PA	Philadelphia	14.0	32.6	51.6	1220.7	110.6	0.6	3.3	NE	20.0	
3	PA	Delaware	11.1	43.7	10.2	1201.6	100.2	-18.5	-7.2	19.8	SW	30.0
3	PA	Montgomery	8.7	52.4	5.6	1198.9	130.7	-21.2	23.3	31.5	NW	34.0
3	PA	Chester	6.9	59.3	2.4	1171.0	102.1	-49.1	-5.3	49.4	SW	29.0
3	PA	Bucks	6.8	66.1	3.4	1216.0	148.2	-4.1	40.8	41.1	NW	35.0
2	NJ	Gloucester	6.5	72.6	2.2	1225.5	81.7	5.4	-25.7	26.2	SE	15.0
2	NJ	Camden	5.9	78.5	2.2	1241.5	95.6	21.4	-11.8	24.4	SE	15.0
2	NJ	Burlington	5.6	84.1	1.3	1258.0	103.6	37.9	-3.7	38.1	SE	15.0
2	NJ	Cape May	5.5	89.6	0.6	1267.0	30.3	46.9	-77.1	90.2	SE	15.0
2	NJ	Atlantic	3.3	92.9	0.5	1267.1	65.5	47.0	-41.9	63.0	SE	15.0
2	NJ	Cumberland	2.8	95.7	0.4	1267.1	65.5	47.0	-41.9	63.0	SE	16.0
2	NJ	Salem	2.6	98.3	1.1	1215.5	66.4	-4.6	-41.0	41.2	SW	29.0
3	MD	Cecil	1.8	100.1	0.4	1168.1	58.2	-52.0	-49.2	71.5	SW	28.0

Wind Direction and Distance Weighting

The weighted emissions ranking of counties considers the contribution of pollutants to the “urban excess” of the MSA on a species basis. The general form of the ranking considers each county in the same way, regardless of direction and distance from the violating monitor. To account for the effect of direction and distance in a simplistic way a modified emissions score was calculated as follows. For each county in and adjacent to the MSA the distance and general direction (expressed as a compass quadrant) of the county centroid to the MSA’s design value monitor were determined. For each county a 10-year or longer average frequency of occurrence of the wind direction quadrant was derived. The county’s weighted emissions score was modified by multiplying the score by the percentage of the wind direction from the county centroid to the design value monitor and divided by the distance in kilometers. For example, if the wind frequency was 25% and the distance was 50 kilometers, the emissions score would be modified by the fraction of 25 ÷ 50, or 0.5. The cumulative percentages were then calculated by normalizing by the sum of the modified emissions scores.

Factor 8 Jurisdictional Boundaries: The entire Philadelphia MSA has recently been designated nonattainment for the 8-hour ozone standard. Cecil County was included with the Philadelphia MSA in the ozone designation.

Factor 9 Level of Control of emission sources: EPA identified large sources greater than 1000 tons per year for any pollutant and evaluated its distance to a violating monitor for fine particulate.

Baltimore

Discussion

The Baltimore Metropolitan Statistical Area (MSA) is part of the Washington DC Consolidated Metropolitan Statistical Area (CMSA). Because of the large size of the CMSA, it has been split into three smaller areas to be more consistent with the ozone designations and to facilitate planning in the areas. Maryland has recommended that the smaller MSA be the basis for the Maryland designations.

The Baltimore MSA is comprised of 6 counties and one city: Anne Arundel, Baltimore (City), Baltimore, Carroll, Harford, Howard, and Queen Anne's. Baltimore County, Anne Arundel County, and Baltimore City have monitored violations of the fine particulate (PM_{2.5}) standard of 15.0 µg/m³. Based on the monitored violations, the Baltimore MSA is considered a presumptive nonattainment area. The Baltimore City monitor is intended to be used as the Design Value monitor for this MSA.

Maryland's revised recommendation included only Anne Arundel, Baltimore, and Baltimore (City) as nonattainment.

Summary of Evaluation

EPA reviewed the 9 factors for the counties within the Metropolitan area as well as counties adjacent to the Metropolitan area in order to determine the appropriate nonattainment area. Based on analysis of the factors, EPA agrees with the State's recommendation that Queen Anne's be designated as attainment, and excluded from the presumptive nonattainment area. EPA also agrees with the State that Anne Arundel, Baltimore and Baltimore (City) should be designated as nonattainment, however EPA intends to designate three additional counties as nonattainment: Carroll, Harford, and Howard.

Carroll and Howard counties have low to moderate emissions, and Harford has monitored attainment for 2001 -2003 (13.1 µg/m³). However, these counties have significant population, and are the areas showing the highest population growth in the MSA. They also have high commuting into other areas of the metropolitan area. The combined factor analysis shows the potential for these counties to contribute to nonattainment of the area, thus EPA intends to designate them as nonattainment.

Carroll, Harford, and Howard have recently been designated as nonattainment for 8-hour ozone.

SUMMARY OF BALTIMORE, MD MSA/ PART OF WASHINGTON DC CMSA

EPA Reg	ST	COUNTY	State Recommend PM _{2.5} Designation	EPA Intent PM _{2.5} Designation	Area - '99 C/MSA
C/MSA Total (excluding surrounding) = 4 counties					
3	MD	Anne Arundel	Nonattainment	Nonattainment	Baltimore, MD
3	MD	Baltimore	Nonattainment	Nonattainment	Baltimore, MD
3	MD	Baltimore (City)	Nonattainment	Nonattainment	Baltimore, MD
3	MD	Carroll	Attainment	Nonattainment	Baltimore, MD
3	MD	Harford	Attainment	Nonattainment	Baltimore, MD
3	MD	Howard	Attainment	Nonattainment	Baltimore, MD
3	MD	Queen Annes	Attainment	Attainment/Unclass	Baltimore, MD

SUMMARY OF FACTOR 1: EMISSIONS BALTIMORE, MD MSA

** Counties Listed by Percent Contribution to area**

EPA Reg	ST	COUNTY	Total Emissions, 2001 (tons)							Weighted Emissions
			PM	SO2	NOX	VOC	Amm	Carbon	Crustal	
3	MD	Baltimore	8,510	42,719	43,464	26,217	1,607	3,370	3,935	34.6
3	MD	Anne Arundel	5,572	71,439	36,715	18,182	962	2,228	2,715	27.1
3	MD	Baltimore (City)	2,446	10,686	34,810	21,256	1,581	1,473	726	14.2
3	MD	Carroll	2,563	3,266	12,165	6,312	1,776	754	1,517	7.3
3	MD	Harford	1,517	1,946	8,662	8,606	1,008	754	705	7.2
3	MD	Howard	1,179	2,702	9,987	9,467	435	776	361	7.0
3	MD	Queen Annes	879	428	2,149	2,636	1,128	289	572	2.7

SUMMARY OF FACTOR 2: AIR QUALITY BALTIMORE MSA

3	MD	Anne Arundel	15.4	NA	15.8	NA	15.9	na	15.8	2/8	
3	MD	Baltimore	15.3	NA	15.1	NA	16.0	na	15.4	7/10	
3	MD	Baltimore (City)	16.7	NA	17.0	NA	17.8	NA	17.0	5/5	
3	MD	Carroll	No Monitor							14.9	0/7
3	MD	Harford	13.1	a	14.0	a	14.5	a	15.0	0/5	
3	MD	Howard	No Monitor							14.7	0/3
3	MD	Queen Annes	No Monitor							13.9	0/4

SUMMARY OF FACTOR 3: POPULATION						Sorted
Highest to Lowest						
EPA Reg	ST	COUNTY	Population & Area			
			2002	Area (sq miles)	Density '02	
3	MD	Baltimore (City)	770,298	81	7,884	
3	MD	Baltimore	638,614	599	1,286	
3	MD	Anne Arundel	503,388	416	1,210	
3	MD	Howard	260,117	252	1,032	
3	MD	Harford	227,713	440	518	
3	MD	Carroll	159,025	449	354	
3	MD	Queen Annes	42,835	372	115	

SUMMARY OF FACTOR 3B: POPULATION DENSITY					
Sorted Highest to Lowest					
EPA Reg	ST	COUNTY	Population & Area		
			2002	Area (sq miles)	Density '02
3	MD	Baltimore (City)	770,298	81	7,884
3	MD	Baltimore	638,614	599	1,286
3	MD	Anne Arundel	503,388	416	1,210
3	MD	Howard	260,117	252	1,032
3	MD	Harford	227,713	440	518
3	MD	Carroll	159,025	449	354
3	MD	Queen Annes	42,835	372	115

**SUMMARY FACTOR 4: COMMUTING PATTERNS;
BALTIMORE, MD MSA**

EPA Reg	ST	COUNTY	VMT	Commuting to Other Metro Counties	
				Percent	Number
3	MD	Baltimore	6,912	46	172,129
3	MD	Baltimore (City)	6,707	37	92,988
3	MD	Anne Arundel	4,394	43	108,856
3	MD	Harford	2,208	44	49,021
3	MD	Howard	2,184	61	82,322
3	MD	Carroll	1,614	53	41,060
3	MD	Queen Annes	514	42	8,681

**SUMMARY FACTOR 4: COMMUTING PATTERNS;
BALTIMORE, MD MSA**

EPA Reg	ST	COUNTY	VMT	Commuting to Other Metro Counties	
				Percent	Number
3	MD	Baltimore	6,912	46	172,129
3	MD	Anne Arundel	4,394	43	108,856
3	MD	Baltimore (City)	6,707	37	92,988
3	MD	Howard	2,184	61	82,322
3	MD	Harford	2,208	44	49,021
3	MD	Carroll	1,614	53	41,060
3	MD	Queen Annes	514	42	8,681

SUMMARY FACTOR 5: EXPECTED GROWTH; BALTIMORE, MD MSA

EPA Reg	ST	COUNTY	Population			VMT	
			2002	Growth '90-'00	Pct chng '90-'00	Growth '96-'02	Pct chng '96-'02
3	MD	Anne Arundel	503,388	62,417	15	418	11
3	MD	Baltimore	770,298	62,158	9	224	3
3	MD	Baltimore (City)	638,614	-84,860	-12	448	7
3	MD	Carroll	159,025	27,525	22	293	22
3	MD	Harford	227,713	36,458	20	536	32
3	MD	Howard	260,117	60,514	32	337	18
3	MD	Queen Annes	42,835	6,610	19	104	25

Factors 6, 7, 8 and 9 are addressed together with the Washington DC MSA below.

Washington DC Area

Discussion

As noted above, the Washington DC MSA has been split from the larger Baltimore-Washington CMSA for planning purposes and for consistency with the 8-hour ozone designations..

The Washington DC MSA is comprised of 23 areas, five of which are located in Maryland. These counties are: Calvert, Charles, Frederick, Montgomery, and Prince Georges. Washington DC and Prince Georges County have monitored violations of the fine particulate (PM_{2.5}) standard of 15.0 µg/m³. Based on the monitored violations, the Washington DC MSA is considered a presumptive nonattainment area. The Washington DC monitor is intended to be used as the Design Value monitor for this MSA.

Maryland's revised recommendation for the Washington DC MSA included only Prince Georges County as nonattainment.

Summary of Evaluation

EPA reviewed the 9 factors for the counties within the Metropolitan area as well as counties adjacent to the Metropolitan area in order to determine the appropriate nonattainment area. EPA agrees with the State that Calvert County should be designated as attainment. Based on weighted emissions screening, this county has a fairly low contribution to the nonattainment area and should be excluded from the presumptive nonattainment area. This is further supported by the low levels of the other factors. EPA agrees with the State that Prince Georges should be designated as nonattainment.

EPA also intends to recommend that three additional counties be designated as nonattainment: Charles, Frederick, and Montgomery. Charles County has emissions associated with the Chalk Point Power Plant, and along with Frederick, has population and commuting levels which contribute to nonattainment in the MSA. Montgomery County has high population and high commuting levels into the metropolitan area, and has the highest VMT growth in the MSA. The combined factor analysis of these three areas indicates contribution to nonattainment of the MSA.

SUMMARY OF WASHINGTON, DC MSA/ PART OF WASHINGTON DC CMSA MSA

EPA Reg	ST	COUNTY	State Recommend PM _{2.5} Designation	EPA Intent PM _{2.5} Designation	Area - '99 C/MSA
3	DC	Washington	Nonattainment	Nonattainment	Washington, DC-MD-VA-WV
3	MD	Calvert	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	MD	Charles	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	MD	Frederick	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	MD	Montgomery	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	MD	Prince Georges	Nonattainment	Nonattainment	Washington, DC-MD-VA-WV
3	MD	Washington	Attainment	Nonattainment	Hagerstown MD
3	VA	Alexandria	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Arlington	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Clarke	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	VA	Culpeper	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	VA	Fairfax	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Fairfax (City)	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Falls Church	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Fauquier	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	VA	Fredericksburg	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	King George	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	VA	Loudoun	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Manassas	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Manassas Park	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Prince William	Attainment	Nonattainment	Washington, DC-MD-VA-WV
3	VA	Spotsylvania	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	VA	Stafford	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	VA	Warren	Attainment	Attainment/unclass	Washington, DC-MD-VA-WV
3	WV	Berkeley	Nonattainment	Nonattainment	* 2003 Hagerstown
3	WV	Jefferson	Attainment	Attainment/unclass	

Note: Berkeley and Jefferson Counties in West Virginia are included in the Washington MSA; However, Berkeley will be designated nonattainment as part of the Hagerstown area.

EPA Reg	ST	COUNTY	Total Emissions, 2001 (tons)							Weighted Emissions Factor DC
			PM	SO2	NOX	VOC	Amm	Carbon	Crustal	
3	MD	Montgomery	7,414	41,024	32,890	30,424	1,108	3,478	3,254	12.0
3	MD	Prince Georges	6,880	44,813	34,698	24,878	1,122	3,083	2,918	11.0
3	MD	Charles	7,916	79,120	20,928	5,146	204	1,974	4,773	9.0
3	VA	Fairfax	3,213	3,428	33,000	37,533	1,172	2,201	877	6.8
3	MD	Frederick	2,523	10,114	12,701	8,765	2,270	988	1,347	3.4
3	VA	Prince William	1,942	22,555	16,359	10,150	528	817	881	3.3
3	DC	Washington	1,839	8,200	14,823	17,750	1,398	895	767	3.0
3	WV	Berkeley	1,390	2,554	9,099	4,303	319	558	738	1.8
3	VA	Spotsylvania	864	296	4,278	4,625	223	525	316	1.6
3	VA	Alexandria	996	15,627	10,693	4,378	280	305	552	1.5
3	VA	Loudoun	1,286	530	5,987	6,381	518	466	787	1.5
3	VA	Stafford	889	359	5,562	4,591	204	485	378	1.5
3	VA	Arlington	577	748	7,460	6,753	1,160	408	139	1.3
3	MD	Calvert	870	647	3,146	3,342	153	377	465	1.2
3	VA	Fauquier	830	239	4,082	3,711	935	401	409	1.2
3	WV	Jefferson	758	906	2,918	2,105	321	255	488	0.8
3	VA	Culpeper	488	143	1,818	2,133	441	216	243	0.7
3	VA	Warren	345	160	2,441	2,299	190	194	140	0.6
3	VA	Clarke	228	68	760	927	230	95	126	0.3
3	VA	King George	263	514	1,436	942	107	106	141	0.3
3	VA	Manassas	155	52	944	1,021	26	82	60	0.3
3	VA	Fairfax (City)	113	39	417	941	28	56	55	0.2
3	VA	Fredericksburg	83	108	1,383	1,300	40	55	22	0.2
3	VA	Falls Church	59	17	250	580	9	36	20	0.1
3	VA	Manassas Park	23	11	247	236	5	13	9	0.0

SUMMARY OF FACTOR 2: AIR QUALITY

EPA Reg	ST	COUNTY	Design Values						Estimated Air Quality	
			'01-'03		'00-'02		'99-'01		Maximum Estimate (inc. real)	# Estimated violating point/ #total pts
3	MD	Prince Georges	17.7	na	17.4	NA	17.3	na	17.4	2/9
3	WV	Berkeley	16.3	NA	16.2	NA	16.0	NA	16.2	4/4
3	DC	Washington	15.8	NA	16.4	NA	16.6	NA	16.4	3/4
3	VA	Arlington	14.6	A	14.9	A	14.5	a		
3	VA	Fairfax	14.1	A	13.9	A	14.6	a	14.3	0/7
3	VA	Loudoun	13.6	A	13.8	A	13.6	a	14.8	0/9
3	MD	Montgomery	12.6	A	13.4	A	13.5	a	14.3	0/7
3	WV	Jefferson	No monitor						15.6	3/3
3	MD	Frederick	No monitor						14.6	0/8
3	VA	Alexandria	No monitor						14.6	0/1
3	VA	Clarke	No monitor						14.6	0/4
3	VA	Fauquier	No monitor						13.8	0/10
3	MD	Charles	No monitor						13.7	0/6
3	VA	Prince William	No monitor						13.7	0/5
3	VA	Warren	No monitor						13.7	0/3
3	MD	Calvert	No monitor						13.6	0/3
3	VA	King George	No monitor						13.3	0/3
3	VA	Stafford	No monitor						13.3	0/5
3	VA	Spotsylvania	No monitor						13.0	0/6
3	VA	Culpeper	No monitor						12.8	0/5
3	VA	Fairfax (City)	No monitor							
3	VA	Falls Church	No monitor							
3	VA	Fredericksburg	No monitor							
3	VA	Manassas	No monitor							
3	VA	Manassas Park	No monitor							

SUMMARY OF FACTOR 3: POPULATION			Sorted		
Highest to Lowest					
EPA Reg	ST	COUNTY	Population & Area		
			2002	Area (sq miles)	Density '02
3	VA	Fairfax	997,580	396	2519
3	MD	Montgomery	910,156	495	1839
3	MD	Prince Georges	833,084	486	1,714
3	DC	Washington	570,898	61	9,359
3	VA	Prince William	311,892	338	923
3	MD	Frederick	209,125	663	315
3	VA	Loudoun	204,054	520	392
3	VA	Arlington	189,927	26	7305
3	VA	Alexandria	130,804	15	8720
3	MD	Charles	129,040	461	280
3	VA	Stafford	104,823	270	388
3	VA	Spotsylvania	102,570	401	256
3	WV	Berkeley	81,262	321	253
3	MD	Calvert	80,906	215	376
3	VA	Fauquier	59,245	650	91
3	WV	Jefferson	44,926	210	214
3	VA	Manassas	37,288	10	3729
3	VA	Culpeper	36,893	381	97
3	VA	Warren	32,910	214	154
3	VA	Fairfax (City)	22,055	6	3,676
3	VA	Fredericksburg	20,076	11	1,825
3	VA	King George	17,657	180	98
3	VA	Clarke	13,290	177	75
3	VA	Manassas Park	10,909	2	5,455
3	VA	Falls Church	10,659	2	5,330

SUMMARY OF FACTOR 3: POP DENSITY			Sorted Highest to Lowest		
EPA Reg	ST	COUNTY	Population & Area		
			2002	Area (sq miles)	Density '02
3	DC	Washington	570,898	61	9,359
3	VA	Alexandria	130,804	15	8720
3	VA	Arlington	189,927	26	7305
3	VA	Manassas	10,909	2	5,455
3	VA	Falls Church	10,659	2	5,330
3	VA	Manassas	37,288	10	3729
3	VA	Fairfax (City)	22,055	6	3,676
3	VA	Fairfax	997,580	396	2519
3	MD	Montgomery	910,156	495	1839
3	VA	Fredericksburg	20,076	11	1,825
3	MD	Prince Georges	833,084	486	1,714
3	VA	Prince William	311,892	338	923
3	VA	Loudoun	204,054	520	392
3	VA	Stafford	104,823	270	388
3	MD	Calvert	80,906	215	376
3	MD	Frederick	209,125	663	315
3	MD	Charles	129,040	461	280
3	VA	Spotsylvania	102,570	401	256
3	WV	Berkeley	81,262	321	253
3	WV	Jefferson	44,926	210	214
3	VA	Warren	32,910	214	154
3	VA	King George	17,657	180	98
3	VA	Culpeper	36,893	381	97
3	VA	Fauquier	59,245	650	91
3	VA	Clarke	13,290	177	75

SUMMARY FACTOR 4: VMT

EPA Reg	ST	COUNTY	VMT	Commuting to Other	
			2002	Percent	Number
3	VA	Fairfax	10,532	46	242,944
3	MD	Montgomery	7,398	41	184,513
3	MD	Prince Georges	7,120	60	238,274
3	DC	Washington	3,802	26	67,157
3	VA	Prince William	2,786	65	98,427
3	MD	Frederick	2,508	39	40,199
3	VA	Arlington	1,807	69	79,757
3	VA	Loudoun	1,431	57	52,719
3	VA	Stafford	1,430	68	33,083
3	VA	Spotsylvania	1,270	57	25,808
3	MD	Charles	1,006	56	34,316
3	VA	Fauquier	1,005	56	15,753
3	VA	Alexandria	978	73	56,449
3	WV	Berkeley	852	34	12,098
3	MD	Calvert	848	50	18,711
3	VA	Fredericksburg	451	54	5,188
3	VA	Culpeper	405	40	6,393
3	WV	Jefferson	362	51	10,665
3	VA	Warren	339	39	6,019
3	VA	King George	263	41	3,329
3	VA	Clarke	252	41	2,701
3	VA	Manassas	130	75	13,576
3	VA	Fairfax (City)	124	76	9,014
3	VA	Falls Church	32	83	4,868
3	VA	Manassas Park	17	89	4,925

SUMMARY FACTOR 4B: Number of Commuters

EPA Reg	ST	COUNTY	VMT	Commuting to Other	
			2002	Percent	Number
3	VA	Fairfax	10,532	46	242,944
3	MD	Prince Georges	7,120	60	238,274
3	MD	Montgomery	7,398	41	184,513
3	VA	Prince William	2,786	65	98,427
3	VA	Arlington	1,807	69	79,757
3	DC	Washington	3,802	26	67,157
3	VA	Alexandria	978	73	56,449
3	VA	Loudoun	1,431	57	52,719
3	MD	Frederick	2,508	39	40,199
3	MD	Charles	1,006	56	34,316
3	VA	Stafford	1,430	68	33,083
3	VA	Spotsylvania	1,270	57	25,808
3	MD	Calvert	848	50	18,711
3	VA	Fauquier	1,005	56	15,753
3	VA	Manassas	130	75	13,576
3	WV	Berkeley	852	34	12,098
3	WV	Jefferson	362	51	10,665
3	VA	Fairfax (City)	124	76	9,014
3	VA	Culpeper	405	40	6,393
3	VA	Warren	339	39	6,019
3	VA	Fredericksburg	451	54	5,188
3	VA	Manassas	17	89	4,925
3	VA	Falls Church	32	83	4,868
3	VA	King George	263	41	3,329
3	VA	Clarke	252	41	2,701

Factor 6 and 7

EPA Reg	ST	COUNTY	Total Emissions, 2001 (tons)							Weighted Emissions Factor DC	Weighted Emissions Factor DC MSA only Corrected for Wind and
			PM	SO2	NOX	VOC	Amm	Carbon	Crustal		
3	MD	Montgomery	7,414	41,024	32,890	30,424	1,108	3,478	3,254	12.0	9.7
3	MD	Prince Georges	6,880	44,813	34,698	24,878	1,122	3,083	2,918	11.0	10.3
3	MD	Charles	7,916	79,120	20,928	5,146	204	1,974	4,773	9.0	5.0
3	VA	Fairfax	3,213	3,428	33,000	37,533	1,172	2,201	877	6.8	4.3
3	MD	Frederick	2,523	10,114	12,701	8,765	2,270	988	1,347	3.4	2.8
3	VA	Prince William	1,942	22,555	16,359	10,150	528	817	881	3.3	1.6
3	DC	Washington	1,839	8,200	14,823	17,750	1,398	895	767	3.0	2.7
3	WV	Berkeley	1,390	2,554	9,099	4,303	319	558	738	1.8	
3	VA	Spotsylvania	864	296	4,278	4,625	223	525	316	1.6	0.6
3	VA	Alexandria	996	15,627	10,693	4,378	280	305	552	1.5	1.1
3	VA	Loudoun	1,286	530	5,987	6,381	518	466	787	1.5	0.7
3	VA	Stafford	889	359	5,562	4,591	204	485	378	1.5	0.7
3	VA	Arlington	577	748	7,460	6,753	1,160	408	139	1.3	1.0
3	MD	Calvert	870	647	3,146	3,342	153	377	465	1.2	0.5
3	VA	Fauquier	830	239	4,082	3,711	935	401	409	1.2	0.5
3	WV	Jefferson	758	906	2,918	2,105	321	255	488	0.8	
3	VA	Culpeper	488	143	1,818	2,133	441	216	243	0.7	0.2
3	VA	Warren	345	160	2,441	2,299	190	194	140	0.6	0.2
3	VA	Clarke	228	68	760	927	230	95	126	0.3	0.1
3	VA	King George	263	514	1,436	942	107	106	141	0.3	0.1
3	VA	Manassas	155	52	944	1,021	26	82	60	0.3	0.1
3	VA	Fairfax (City)	113	39	417	941	28	56	55	0.2	0.1
3	VA	Fredericksburg	83	108	1,383	1,300	40	55	22	0.2	0.1
3	VA	Falls Church	59	17	250	580	9	36	20	0.1	0.1
3	VA	Manassas Park	23	11	247	236	5	13	9	0.0	0.0

Wind Direction and Distance Weighting

The weighted emissions ranking of counties considers the contribution of pollutants to the “urban excess” of the MSA on a species basis. The general form of the ranking considers each county in the same way, regardless of direction and distance from the violating monitor. To account for the effect of direction and distance in a simplistic way a modified emissions score was calculated as follows. For each county in and adjacent to the MSA the distance and general direction (expressed as a compass quadrant) of the county centroid to the MSA’s design value monitor were determined. For each county a 10-year or longer average frequency of occurrence of the wind direction quadrant was derived. The county’s weighted emissions score was modified by multiplying the score by the percentage of the wind direction from the county centroid to the design value monitor and divided by the distance in kilometers. For example, if the wind frequency was 25% and the distance was 50 kilometers, the emissions score would be modified by the fraction of $25 \div 50$, or 0.5. The cumulative percentages were then calculated by normalizing by the sum of the modified emissions scores.

Factor 8: Jurisdictional Boundaries

The Baltimore-Washington CMSA has recently been designated nonattainment for the 8-hour ozone standard. In those designations, the CMSA was divided along MSA boundaries. These boundaries will also be used for PM_{2.5} designations. These areas are the Baltimore MSA, the Washington DC MSA, and the Hagerstown-Martinsburg MSA. These three areas are under the jurisdiction of

separate planning organizations. The nonattainment boundaries which EPA intends to use will facilitate planning for ozone and PM_{2.5} by these separate organizations.

Factor 9: Level of Control of emission sources:

EPA identified large sources greater than 1000 tons per year for any pollutant and evaluated its distance to a violating monitor for fine particulate.

Hagerstown - Martinsburg

Discussion

As noted above, this area is part of the Baltimore-Washington CMSA, which has been split into the smaller MSA areas for planning purposes and for consistency with the 8-hour ozone designations. The Hagerstown-Martinsburg Area is comprised of two counties in West Virginia, and one county in Maryland. Berkeley County in West Virginia has monitored violations of the fine particulate (PM_{2.5}) standard of 15.0 µg/m³. Based on the monitored violations, the Hagerstown-Martinsburg area is considered a presumptive nonattainment area. The Berkeley County monitor is intended to be used as the Design Value monitor for this MSA

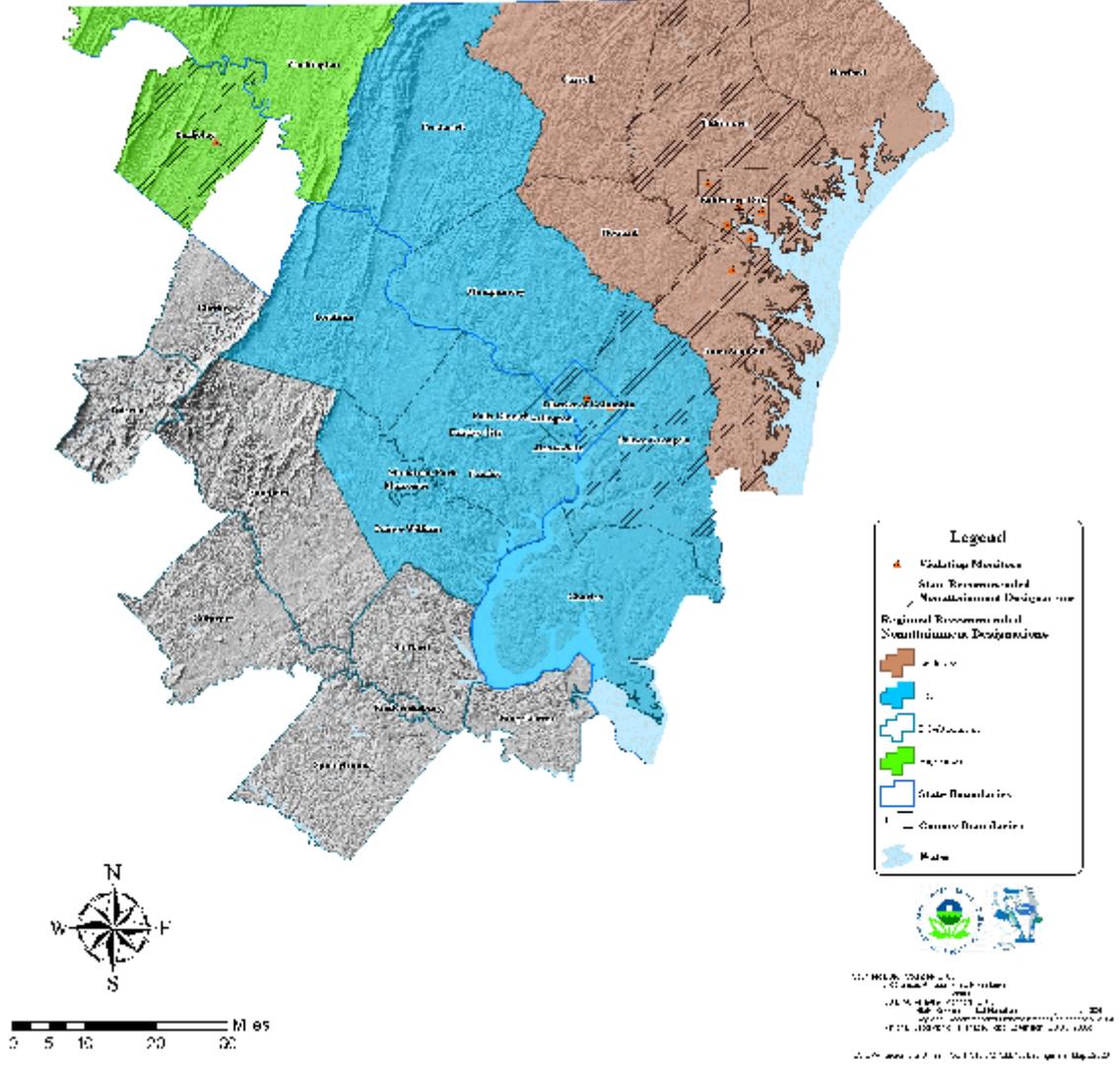
Washington County is part of the Hagerstown-Martinsburg CBSA, as defined by OMB in 2003. In its letter of February 23, 2004, Maryland recommended that Washington County be designated as nonattainment, however, in its revised recommendation of May 28, 2004, Maryland recommended a designation of attainment.

Summary of Evaluation

Washington County has monitored attainment for 2001 -2003 (14.0 µg/m³). However, weighted emissions screening indicates that this county potentially contributes to the nonattainment area.

Despite low population growth, population is the highest compared to other areas of the CBSA. VMT and VMT growth are also high compared to the other counties in the CBSA. The combined factor analysis indicates potential contribution to the nonattainment area, therefore EPA intends to designate Washington County as nonattainment.

Baltimore\D.C. Area PM_{2.5} Recommended Nonattainment Designations



Enclosure C

An Explanation of EPA's 9-Factor Analysis

Factor 1. Emissions in areas potentially included versus excluded from the nonattainment area:

The analysis for factor 1 looks at emissions of carbonaceous particles ("carbon"), inorganic particles ("crustal"), SO₂, and NO_x. EPA computed a composite emission score for each county by multiplying the county's emissions as a fraction of the metropolitan area emissions for each of these pollutants times a corresponding air quality weighting factor. The air quality weighting factors for each area are given below and reflect the percentages of the total estimated "urban excess" value found as, respectively, carbonaceous particles, miscellaneous inorganic particles ("crustal material"), ammonium sulfate, and ammonium nitrate. These scores add to 100 for the metropolitan area counties. Composite scores were also calculated for counties adjacent to the metropolitan area. Tables presented under factor 1 present the emissions of carbonaceous particles, inorganic particles, SO₂, and NO_x and the composite emission scores for the counties in the corresponding metropolitan area and adjacent counties. Metropolitan area counties are in bold. Emissions data indicate the potential for a county to contribute to observed violations, often making the emissions data the most important factor in assessing boundaries of nonattainment areas.

"Urban excess" values are derived by comparing urban monitored component concentrations against rural monitored component concentrations. Concentrations of the four PM_{2.5} components are obtained from local data if available (or, if necessary, from the nearest available urban site), and are compared to available rural concentrations. The monitoring sites used for this purpose are identified below. Although this information is air quality information, it is presented under Factor 1 due to its integration into the analysis of emissions information.

Factor 2. Air quality in potentially included versus excluded areas:

The air quality analysis looks at the annual average design value for each area based on data for 2001 to 2003. Counties without monitors are not listed.

Factor 3. Population density and degree of urbanization including commercial development in included versus excluded areas:

Tables presented under factor 3 show the 2003 population for each metropolitan area, as well as the population density for each county in that area. Population data indicate the likelihood of population-based emissions that might contribute to violations.

Factor 4. Traffic and commuting patterns:

The traffic and commuting analysis looks at the number of commuters in each county who drive to another county within the metropolitan area ("Number"), the percent of total commuters in

each county who commute to other counties within the metropolitan area (“percent”)*, as well as the total Vehicle Miles Traveled (VMT) for each county in thousands of miles. A county with numerous commuters is generally an integral part of the area, and would be an appropriate part of the domain of some mobile source strategies, thus warranting inclusion in the nonattainment area.

*Note that the percent of commuters traveling to counties within the metropolitan area is based on the total number of commuters from that county. This total includes commuters who may travel outside the metropolitan area from their county of origin.

Factor 5. Expected growth:

The expected growth analysis looks at the percent growth for counties in each metropolitan area from 1990 to 2000.

Factor 6. Meteorology:

The meteorology analysis looks at wind data gathered over a ten year period by the National Weather Service. Tables presented under factor 6 list the annual average wind direction frequencies by quadrant for each county in the corresponding metropolitan area. These data show that annual average PM_{2.5} concentrations are influenced by emissions in any direction at various times, but these data may also suggest that emissions in some directions relative to the violation may be more prone to contribute than emissions in other directions.

Factor 7. Geography/topography:

The geography/topography analysis looks at physical features of the land that might have an effect on the airshed, and therefore, the distribution of particulate matter over an area. nonattainment areas.

Factor 8. Jurisdictional boundaries:

The analysis of jurisdictional boundaries looks at the planning and organizational structure of an area to determine if the implementation of controls in a potential nonattainment area can be carried out in a cohesive manner.

Factor 9. Level of control of emission sources:

The level of control analysis looks at what controls are currently implemented in each area.