



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

JUN 29 2004

The Honorable Mark R. Warner
Governor of Virginia
State Capitol, 3rd Floor
Richmond, Virginia 23219

Dear Governor Warner:

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, slightly slanted style.

Donald S. Welsh
Regional Administrator

Enclosures

cc w/Enclosures: The Honorable W. Tayloe Murphy, Jr., Secretary of Natural Resources

Enclosure A

The fourth column of the following table identifies the counties and cities in Virginia that EPA intends to designate as nonattainment.

Area	Virginia Counties and Cities in 1999 Metropolitan Statistical Area	State of Virginia Recommendation	EPA Recommendation of Virginia Counties and Cities
Washington, DC MSA (Part of the Washington-Baltimore CMSA)	Alexandria (City) Arlington Clarke Culpeper Fairfax Fairfax (City) Falls Church (City) Fauquier Fredericksburg King George Loudoun Manassas (City) Manassas Park (City) Prince William Spotsylvania Stafford Warren	None Recommended	Arlington Alexandria (City) Fairfax Fairfax (City) Falls Church (City) Loudoun Manassas (City) Manassas Park (City) Prince William
Total number of areas	17	0	9

Enclosure B

State Summary

Washington DC Area

The Commonwealth of Virginia's recommendation was submitted on February 13, 2003, in a letter from Robert B. Burnley.

Based on the air quality data for the years 2001-2003, the Washington DC fine particulate (PM_{2.5}) nonattainment area consists, in part, of the 17 northern counties/cities in Virginia. Virginia has recommended that all areas in the State be designated as attaining the PM_{2.5} standard. While EPA agrees with the State's recommendations in part, we intend to modify the recommendations for the Virginia portion of the Washington DC MSA. EPA has identified five counties and four cities in Virginia that we recommend as nonattainment. The following discussion provides EPA's rationale for considering the modification to Virginia's recommendation.

Discussion

The Washington DC 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.

The Washington DC MSA is comprised of 23 areas: 5 in Maryland, 17 in Virginia, and the District of Columbia. Washington DC and Prince Georges County in Maryland 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.

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 Virginia's recommendation of attainment for the following counties in the Washington DC MSA: Clarke, Culpeper, Fauquier, Fredericksburg, King George, Spotsylvania, Stafford, and Warren. Based on weighted emissions screening, EPA considers these counties to have low contribution to the nonattainment area. The combined factor analysis supports exclusion of these counties from the presumptive boundaries of the nonattainment area.

The 9 factor analysis for Arlington, Alexandria, Fairfax, Fairfax (City), Falls Church, Loudoun, Manassas, Manassas Park, and Prince William support a designation of nonattainment, thus EPA intends to designate these counties as nonattainment.

Arlington and Alexandria have significant populations and commuting into the nonattainment area (despite monitored attainment in Arlington), Fairfax has the highest population and commuting levels in the MSA and has moderate levels of emissions. Prince William has a high level of emissions, high population and population growth. Fairfax (City), Falls Church, Manassas, and Manassas Park are small areas (10 square

miles or less) with high density populations that are entirely within the nonattainment area. The combined factor analysis for these areas indicate potential contribution to the violations in the nonattainment area, therefore EPA intends to designate them as nonattainment.

Loudoun County has low emissions, and has monitored attainment for 2001 -2003 (13.6 µg/m³). However, Loudoun County has experienced high growth, having had the highest population growth percentage in the MSA. The amount of population growth ranks third in the MSA from 1990 - 2000, and there is high population density in the eastern portion of the county. VMT growth is moderate, and a large percentage of the commuters are entering the other areas of the MSA. The combined factor analysis for Loudoun indicates potential contribution to the violations in the nonattainment area, therefore EPA intends to designate Loudoun County as nonattainment.

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

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

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EPA Reg	ST	COUNTY	Population & Area		
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3	DC	Washington	570,898	61	9,359
3	VA	Alexandria	130,804	15	8720
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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

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	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

EPA Reg	ST	COUNTY	VMT	Commuting to Other	
			2002	Percent	Number
3	VA	Fairfax	10,532	46	242,944
3	MD	Prince Ge	7,120	60	238,274
3	MD	Montgom	7,398	41	184,513
3	VA	Prince Wil	2,786	65	98,427
3	VA	Arlington	1,807	69	79,757
3	DC	Washingt	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
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3	VA	Warren	339	39	6,019
3	VA	Fredericks	451	54	5,188
3	VA	Manassas	17	89	4,925
3	VA	Falls Chu	32	83	4,868
3	VA	King Geor	263	41	3,329
3	VA	Clarke	252	41	2,701

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

Factors 6 and 7; Meteorology and Geography/Topography

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 speciated 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 the $PM_{2.5}$ 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:

Virginia submitted additional information on the control of emissions in Prince William County. EPA reviewed the additional information. The emissions contribution from point sources have been reduced based on control technology installed in 2002. Population and commuting patterns, however, still indicate that Prince William is a significant contributor to the violations in the DC nonattainment area.

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.