

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

April 15, 2004

**SUB-
JECT:** Technical Support Document for the Region III 8-hour
Ozone Designations 11- Factor Analysis

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TO: 8-Hour Region III Ozone Designations File

THROUGH: _____
Makeba Morris, Chief [signed]
Air Quality Planning Branch

Summary

As required by section 107 of the Clean Air Act Amendments of 1990, EPA is designating 104 counties in Region III as nonattainment and 158 Region III counties as attainment for the 8-hour ozone standard. The effect of this action is determination of the applicability of 8-hour ozone implementation policy requirements for these areas. The 8-hour ozone implementation policy is not the subject of this action. However, the 8-hour ozone classification cut-points are established in a separate Federal Register notice.

Background

The 8-hour ozone standard was promulgated by EPA on July 18, 1997 but its implementation was delayed by several lawsuits, which were finally settled by March 26, 2002. See *Federal Register* 68: 32803-32870 (June 2, 2003) for full legal history. In addition, EPA was sued by 9 parties for failing to designate areas in the nation by 2002. On November 13, 2002, this suit was settled with an agreement that EPA would make final designations for the 8-hour ozone standard by no later than April 15, 2004. This action is intended to fulfill that obligation.

On July 9, 2003, July 14, 2003, July 15, 2003, Delaware, the District of Columbia,

Maryland, Pennsylvania, Virginia, and West Virginia submitted letters from their Governors

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recommending areas within their jurisdiction as attainment or nonattainment or unclassifiable for the 8-hour ozone standard.

EPA Ozone Designations Guidance

Designations guidance was issued by EPA through a March 28, 2000 memorandum from John S. Seitz, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Directors, U.S. EPA Regions I-X. This guidance memo listed 11 criteria that are, among any other criteria deemed to be relevant, to be used to analyze the areas for 8-hour ozone designations. These 11 criteria are: 1) emissions and air quality in adjacent areas, 2) population density and degree of urbanization including commercial development, 3) monitoring data representing ozone concentrations in local areas and larger areas, 4) location of emission sources, 5) traffic and commuting patterns, 6) expected growth, 7) meteorology, 8) geography/topography, 9) jurisdictional boundaries, 10) level of control of emission sources, and 11) regional emission reductions. This memo recommended that nonattainment area boundaries be defaulted to the geopolitical boundaries represented by the Consolidated Metropolitan Statistical Area (CMSA) or Metropolitan Statistical Area (MSA) unless information was provided to show why these counties should not be part of the nonattainment area. In addition, this memo directed EPA Regions to examine the counties adjacent to those containing violating monitors and to determine whether these counties should be designated nonattainment because of their contribution to nearby nonattainment problems.

The 1990 Clean Air Act was written for the 1-hour ozone standard but it is still the most current piece of legislation on the topic of ozone designations. The Act instructs EPA to consider not only air quality in making designation decisions but particularly in the situation where a nonattainment area is located within a metropolitan statistical area and classified (under the 1-hour ozone standard) as serious, severe or extreme, EPA is to consider “factors such as population density, traffic congestion, commercial development, industrial development, meteorological conditions, and pollution transport.” (CAA Section 107 (d)(4)(A)). This additional piece of guidance in the statute has been particularly helpful because it is simply not possible to place an ozone monitor in every county and yet, EPA is required to designate every county as either attainment, nonattainment or unclassifiable. The combination of the presumptive nonattainment areas with EPA’s 11 guidance criteria provides both the necessary comparison benchmark as well as the evaluation criteria for EPA to conduct an analysis of the counties.

EPA’s 11-Factor Designations Analysis

With the exception of a county monitoring a violation of the 8-hour ozone standard, the decision to designate a county nonattainment or not requires an analysis by EPA. The analysis could be conducted in any number of ways and be consistent with the broadly expressed intentions of the statute and EPA guidance. EPA Region III’s (EPA) has, consistent with both the statute and EPA guidance, collected data on the 11 criteria for the counties in Region III and analyzed this data in light of the March 28, 2000 guidance. EPA’s analysis under that guidance begins with the presumption that the 8-hour ozone nonattainment area is the geographic extent of the 1999 Consolidated Metropolitan Statistical Area (CMSA) boundaries as established by the Office of Management and Budget (OMB). Counties outside these presumptive nonattainment areas and which are not adjacent to the presumptive nonattainment areas and do not have violating monitors are presumed to be attainment. Using both of these presumptions

(presumptive attainment and presumptive nonattainment), it is now possible to evaluate, using the guidance criteria, all counties relative to these benchmarks.

Every county can be given a unique profile based on the 11 criteria. That profile can be compared to the benchmark nonattainment profile and the benchmark attainment profile to evaluate all the counties, paying particular attention to counties adjacent to the presumptive nonattainment areas in order to determine whether these counties look more like the nonattainment counties or more like the attainment counties. Other than a monitored ozone violation in a county, there is no single criterion in the analysis that “trumps” all of the remaining 11 criteria. This means that all counties can be relativistically assessed based on the overall balance of the 11 criteria. In accordance with the statute and EPA guidance, the attainment/nonattainment decision is based on describing, as consistently as possible, the presumptive nonattainment area using the criteria guidance. While the designations decision still requires EPA judgment, the designations analysis, conducted in this manner, is constrained by the data.

For any county, when the relative values for all of the criteria (air quality, emissions, population, growth, etc.) are very high, the decision to make that county nonattainment is rather straight-forward. Likewise, when the relative values for these criteria are very low for any county, the decision to make those counties attainment is also rather straight-forward. However, not all counties exhibit consistently high values in all criteria or consistently low values in all criteria. Therefore, where there are counties exhibiting a range of values among the criteria (from high to low), EPA has done a relativistic comparison in order to determine, on balance, how the criteria values for each of the counties determine the relative nonattainment character of a particular county may be when compared with the presumptive nonattainment counties versus the presumptive attainment counties. The March 2000 EPA guidance memo stated that the presumptive 8-hour ozone nonattainment boundary was the 1999 CMSA boundary unless an analysis using the 11 guidance criteria (at a minimum) could show that the nonattainment boundary should be different. The details of EPA’s methodology is available from EPA. The methodology is further explicated in two published documents (Stahl et al. (2002), Stahl (2003)).¹

In the section below detailing each of the nonattainment areas, examples are used to illustrate why particular counties are included or excluded from the nonattainment area. These examples are provided to give the reader some sense of the characteristics of these counties. However, the use of specific criteria in the examples below is not meant to imply that these are

¹ Stahl, C.H., A.J. Cimorelli, and A.H. Chow (2002), “A New Approach to Environmental Decision Analysis: Multi-criteria Integrated Resource Assessment (MIRA),” *Bulletin of Science, Technology, and Society* 22(6): 443-459.

Stahl, C.H. (2003), “Multi-criteria Integrated Resource Assessment (MIRA): A New Decision Analytic Approach to Inform Environmental Policy Analysis,” Dissertation, University of Delaware.

the only criteria used in the overall designation analysis. For example, EPA generally considered air quality and emissions the two more important criteria. NOx and VOC emissions were considered equally important to the designation decision. NOx point and mobile source emissions and VOC point and mobile source emissions were considered more important than NOx area source emissions and VOC area source emissions, respectively.

EPA conducted stakeholder meetings with its states in the Fall of 2001 and Fall 2002-Winter 2003. In addition, several meetings were held with other stakeholders, including representatives from the industrial and business community, transportation planning organizations, and environmental organizations. Through these meetings and discussions, the process regarding designations was described and explained. Overall, stakeholders responded positively to the analysis.

The EPA designation analysis begins with associating the 11 guidance criteria with specific metrics or indicators. For example, the air quality criterion is more specifically the 2003 8-hour ozone design value, and the emissions criterion is the 1999 National Emissions Inventory (NEI) version 3 draft broken down into stationary sources, area sources and mobile sources. The 1999 NEI version 3 draft was the most current emissions information available at the time and states agreed that it was appropriate to use in the designations analysis. The following chart shows the 11 guidance criteria on the left, with the corresponding specific metrics used by EPA on the right.

March 2000 EPA Guidance Criteria	EPA Analysis
Emissions and air quality in adjacent areas	VOC/NOx emissions (point, area, mobile; 1999 NEI, version 3 draft) and air quality estimates in all adjacent areas (interpolated from 2003 8-hour ozone design values and considering uncertainty of the interpolation ²)
Population density/urbanization	Population density/population/CMSA (2001 census population, 1999 OMB CMSA boundaries)
Air quality monitoring data	Air quality monitoring data for counties with monitors (2003 8-hour ozone design values)
Emission sources	VOC/NOx point, area, mobile emissions for all areas (1999 NEI version 3, draft)
Traffic/commuting patterns	CMSA/VMT (1999 OMB, 1999 VMT)
Expected growth	VMT growth (1999 to 2030) and population growth (1990 to 2010, where available; 2001 to 2010 otherwise)

² See Attachment A for a brief description of this methodology, which is also available as an enclosure to an EPA letter to Mr. John Pitner, Air Team Leader, West Virginia Manufacturers Association, dated August 18, 2003.

Meteorology	Meteorology considered in data for air quality modeling
Geography/topography	Geography/topography considered in data for air quality modeling
Jurisdictional boundaries	County, C/MSA (1999 OMB), 1-hour ozone nonattainment areas (if ever nonattainment under 1-hour ozone standard)
Level of emission controls	Control margin (previous nonattainment classification, Ozone Transport Region membership)
Regional emission reductions	NOx SIP call (Relative Reduction Factors)

Stakeholders were invited at the EPA-conducted meetings in 2001, 2002 and 2003 to examine and critique the data, the metrics constructed for the analysis, and the methodology. In these stakeholder meetings, the specific methodology was explained, examples given and opportunities for further discussion offered. EPA received several comments and criticisms that resulted in the inclusion or modification of criteria that is exhibited in the final analysis.

Comments Received in Response to EPA’s December 3, 2003 letters

On December 3, 2003, EPA sent letters to states responding to the July 2003 state recommendations for 8-hour ozone nonattainment areas. The states were given until February 6, 2004 to respond to EPA’s December 2003 letter (120 day letter). Attachment B summarizes the differences between the 1999 CMSA presumptive 8-hour ozone nonattainment boundaries, the EPA 120 day letter proposal and the February 2004 state responses. This section summarizes the comments received.

District of Columbia

The District of Columbia did not respond to EPA’s December 3, 2003 letter but EPA had agreee with the District’s July 2003 recommendation that the entire District of Columbia should be part of the Washington D.C. 8-hour ozone nonattainment area.

Delaware

On February 2, 2004, Delaware responded to EPA’s December 3, 2003 letter by indicating that it disagreed with EPA placing all three of its counties (New Castle, Kent, and Sussex) in the Philadelphia 8-hour ozone nonattainment area. The Delaware letter stated that EPA was not designating ozone nonattainment areas that were large enough to address attaining the ozone standard in Delaware. Delaware recommended that EPA use the existing NOx SIP call information, modeling from UAM-V and CAMx, and the proposed Interstate Air Quality Rule (IAQR) to set 8-hour ozone nonattainment boundaries. Delaware argues that since the NOx SIP call modeling shows that reductions from the SIP call alone will not bring Delaware into ozone attainment, it is imperative that EPA consider designating broader nonattainment areas. Delaware further argues that the consideration of the modeling from the NOx SIP call, UAM-V, CAMx, and the IAQR would result in the creation of a broad interstate ozone

nonattainment area consisting of all of Delaware, Maryland, Michigan, North Carolina, Ohio, Pennsylvania, Virginia, West Virginia, New Jersey, and New York. In the alternative, Delaware recommended that if EPA determines that it cannot include counties monitoring attainment in this broad nonattainment area, that it include all counties monitoring or modeling nonattainment in the 8-hour ozone nonattainment area. Delaware's February 2004 letter reiterates comments made to EPA in their July 2003 submittal for 8-hour ozone nonattainment areas, which also urged EPA to more seriously consider regional approaches to addressing the 8-hour ozone nonattainment problem.

Maryland

On February 5, 2004, Maryland responded to EPA's December 3, 2003 letter by indicating one overarching concern and one area-specific concern. Maryland's overarching concern, also expressed to EPA in their July 2003 8-hour ozone nonattainment area recommendations, is regional consistency in addressing ozone transport. They state that EPA, in its December 2003 letters to different states, appeared to be inconsistent in how it was proposing to designate nonattainment areas. It is their position that upwind states need to be held accountable for transported downwind pollution.

Maryland's area-specific concern is two-fold. The first pertains to EPA's proposal to designate Kent and Queen Anne's Counties nonattainment when Maryland believes that EPA should approve an Early Action Compact (EAC) for these two counties, which would result in a deferred nonattainment designation. The second pertains to EPA's proposal to place Kent and Queen Anne's Counties with the Baltimore 8-hour ozone nonattainment unless Maryland enters into a Memorandum of Agreement (MOA) that would stipulate that Kent and Queen Anne's Counties must be designated at the same classification as Baltimore and cannot redesignate to attainment until its monitor and all of the monitors in the Baltimore nonattainment area measure attainment of the 8-hour ozone standard. While Maryland believes that tying Kent and Queen Anne's Counties to Baltimore is consistent with their position on addressing regional transport, Maryland argues that it does not wish for Kent and Queen Anne's Counties to be singled out if other similar areas in the country are not being required to sign similar MOAs. It is Maryland's preference that EPA grant Kent and Queen Anne's Counties an EAC. Maryland expressed concern that EPA's denial of an EAC for these counties is not consistent with its other EAC decisions in other EPA regions, and specifically in South Carolina and Colorado.

Pennsylvania

On February 6, 2004, Pennsylvania responded to EPA's December 3, 2003 letter indicating several areas of disagreement. These are: 1) the inclusion of Monroe County with the Scranton-Wilkes Barre nonattainment area, 2) the designation of Lycoming and Indiana Counties as nonattainment, and 3) the nonattainment designation of several rural counties with violating ozone monitors but with little means to impose emission controls on the contributing upwind areas, which are not being designated nonattainment by EPA. With respect to Lycoming County, Pennsylvania argues that while there are 2 ozone monitors in that county, one is measuring attainment and the other (while indicating nonattainment) has only 2 years of ozone air quality data. Therefore, Pennsylvania requests that EPA designate Lycoming County as unclassifiable/attainment while further data is gathered in the 2004 ozone season. Pennsylvania also requests that Indiana County be designated as unclassifiable/attainment as it intends to install an ozone monitor in the county and if either the Lycoming or Indiana monitors measure

nonattainment, EPA could designate them nonattainment at that time. Pennsylvania also clearly indicated that they agreed with EPA's December 2003 letter that places Ocean County, NJ into the New York nonattainment area rather than the Philadelphia nonattainment area. It indicated that if this decision is being reconsidered by EPA, it would like to participate in those discussions prior to finalization of the designations on April 15, 2004.

Virginia

On February 10, 2004, Virginia responded to EPA's December 3, 2004 letter indicating disagreements in 3 nonattainment areas. These areas are: 1) Northern Virginia (Washington D.C. nonattainment area), 2) Richmond, and 3) Hampton Roads-Norfolk (Norfolk-Virginia Beach-Newport News nonattainment area). In Northern Virginia, Virginia requested that Fauquier County be designated attainment since its 2003 ozone design value was below the ozone standard. In Richmond, Virginia disagreed with EPA's addition to 2 jurisdictions to the original 1-hour ozone nonattainment area. Virginia also disagreed with EPA's proposal to designate all of Charles City County as nonattainment. These two jurisdictions are Prince George County and the City of Petersburg. In Hampton Roads-Norfolk, Virginia disagreed with EPA's proposal to include Gloucester County and Isle of Wight County to the original 1-hour ozone nonattainment area. Virginia provided additional information, including some back trajectories for a non-contiguous 2 week ozone episode in 2002, regarding these four jurisdictions to support their request that these areas be designated attainment.

Fauquier County

On February 11, 2004, the Board of Supervisors of Fauquier County, VA responded to EPA's December 3, 2003 letter with regard to EPA's proposal to designate Fauquier County, VA as part of the Washington D.C. 8-hour ozone nonattainment area. The Board urged EPA to designate the County attainment based on its current ozone monitor, which exhibits a 2003 ozone attainment design value. The Board also submitted additional information with regard to the length of primary roads, average 24-hour traffic/mile, and distance from the District of Columbia.

Crater Planning District Commission

On February 5, 2004, the Crater Planning District Commission responded to EPA's December 3, 2003 letter regarding the inclusion of Prince George County and the City of Petersburg in the Richmond 8-hour ozone nonattainment area. Information regarding emissions, population density, traffic and commuting patterns, among other data was provided. Much of this information is the same as that used in the EPA designation analysis.

National Park Service

On February 19, 2004, the National Park Service (NPS) responded to EPA's December 3, 2003 letter indicating that it disagreed with EPA's approach to isolate the Shenandoah National Park from contributing emission sources. Specifically, the NPS disagreed with EPA's designation of Page and Madison Counties, VA and with EPA's separation of the Baltimore-Washington CMSA into six separate 8-hour ozone nonattainment areas and designating as attainment some counties on the edges of this Baltimore-Washington CMSA that are adjacent to the Park. With regard to EPA's partial county designation of Page and Madison Counties, VA,

portions of which make up a part of the Shenandoah National Park, the NPS urged EPA to designate not just these portions of two counties as nonattainment but to conduct the necessary modeling to determine which upwind counties contribute to the violations measured in the Shenandoah National Park in Madison County. The NPS argues that it is EPA's obligation under the section 107 of the Clean Air Act to identify the areas that contribute to the Park's ozone problem and to include these areas in the Shenandoah National Park 8-hour ozone nonattainment area. The NPS argues that the isolation of the Park from sources contributing to its ozone problem makes the nonattainment designation of the Park meaningless; particularly so if EPA designates the Park as a rural transport area with no means to control upwind sources and do air quality planning with those sources.

Pertaining to EPA's proposal to split the Baltimore-Washington CMSA into several separate nonattainment areas, the National Park Service argues that it is inappropriate to separate these areas as the Shenandoah National Park abuts this major urban area and that until it is determined that this urban area or the Park meets the ozone standard, it is inappropriate to dismantle this large CMSA into smaller nonattainment areas. Further, the NPS argues that is also inappropriate to designate as attainment, those counties at the fringe of the urban area but which abut the Park because it would be unfair to burden the Park with meeting more stringent nonattainment requirements when nearby and contributing areas would not be required to do the same.

American Lung Association of Virginia et al.

On March 8, 2004, the American Lung Association of Virginia together with the Blue Ridge Environmental Defense League, the Coalition for Smarter Growth, the National Parks Conservation Association, the Piedmont Environmental Council, the Sierra Club – Virginia Chapter, and the Virginia Conservation Network submitted comments to EPA supporting, in general, EPA's December 3, 2004 list of proposed 8-hour ozone nonattainment areas. The American Lung Association of Virginia et al. support the exclusion of Mathews County from the Norfolk nonattainment area and the designation of Frederick (and City of Winchester), Roanoke, Botetourt, Roanoke City, and Salem City as nonattainment. They support the separation of the Fredericksburg nonattainment area consisting of Caroline County, Fredericksburg City, Fredericksburg County, and Stafford County with the requirement that the area will have the classification as Washington D.C. and rely on the Washington D.C. ozone monitors for redesignation purposes. These organizations disagree with EPA's proposal regarding the nonattainment boundaries of the Shenandoah National Park. They argue that EPA is required to designate as nonattainment, all areas that exhibit poor air quality as well as those areas that contribute to nearby poor air quality. They urge EPA or VADEQ to conduct the necessary modeling or similar analysis to determine the nearby and upwind county contributions to the Shenandoah National Park's unhealthy ozone levels. Until these studies are completed, these organizations request that EPA designate the Shenandoah National Park and the potential upwind counties not being designated as nonattainment as unclassifiable. Further, these organizations request that EPA provide its analysis for excluding counties/cities in the Charlottesville/Albemarle and Pittsylvania/Danville areas. Specifically, these organizations point out that the anticipated growth in Charlottesville and the violating ozone monitors in North Carolina adjacent to Pittsylvania as well as Pittsylvania's topography and meteorology, growth, proximity to large stationary sources, and ozone transport would warrant an investigation of these counties as potential nonattainment areas.

Earthjustice/Sierra Club

On February 11, 2004, David Baron, Earthjustice attorney representing the Sierra Club, sent an email to Judith Katz, Director, Air Protection Division, U.S. EPA Region III, regarding the proposed ozone nonattainment boundaries for the Baltimore-Washington D.C. area. The Sierra Club questions the scientific basis for EPA's December 3, 2004 proposal to split the Baltimore-Washington D.C. CMSA into six separate nonattainment areas since EPA guidance states that the ozone nonattainment area presumption is the C/MSA boundary and further argues that this kind of split is a violation of section 107(d)(4)(A)(iv) of the Clean Air Act. The Sierra Club argues that the facts do not support splitting this CMSA and that coordinated air quality planning needs to occur in this area in order for the entire area to attain the ozone standard. In addition, the Sierra Club opposes EPA's proposal to exclude King George, Culpepper, Warren and Clarke Counties from the nonattainment area because these counties have experienced up to 20% population growth in the last 10 years.

West Virginia

On January 28, 2004, West Virginia responded to EPA's December 3, 2003 letter indicating it disagreed with EPA's position that, if the EAC for Berkeley and Jefferson Counties failed, these counties would become nonattainment at the same classification as the Washington D.C. 8-hour ozone nonattainment area. Berkeley and Jefferson Counties are part of the 1999 Washington PMSA, the presumptive 8-hour ozone nonattainment area. Because of the approved EAC, which would defer the nonattainment designation for these two counties, Berkeley and Jefferson counties will not be designated nonattainment on April 15, 2004. West Virginia argues that, even if the EAC were to fail, Berkeley and Jefferson Counties should be designated nonattainment but classified using the ozone monitor in Berkeley County, WV.

EPA 8-hour Ozone Designation Final Decision and Response to Comments

As a result of the analysis using the 11 guidance criteria in the March 2000 Seitz memo, EPA determines that the 8-hour ozone nonattainment areas in Region III are described as follows. Data and further analytical details are contained in a spreadsheet file and other materials available from Region III.

District of Columbia – Washington D.C. Nonattainment Area

All of the District of Columbia is in the Washington D.C. 8-hour ozone nonattainment area. The rest of the Washington D.C. nonattainment includes: Calvert County, MD; Charles County, MD; Frederick County, MD; Montgomery County, MD; Prince George's County, MD; Alexandria City, VA; Arlington County, VA; Fairfax City, VA; Fairfax County, VA; Falls Church City, VA; Loudoun County, VA; Manassas City, VA; Manassas Park City, VA; and Prince William County, VA.

Several comments were received regarding the boundaries of the Washington D.C. nonattainment area. Among these, the broadest comments pertained to the splitting of the Baltimore-Washington D.C. CMSA and this will be addressed first. In EPA's judgment, splitting the Baltimore-Washington D.C. CMSA into six separate ozone nonattainment areas is warranted because, where applicable, the areas will receive the same ozone classification and the adoption of similar emission control measures will be required. Two areas that split from the

Baltimore-Washington D.C. CMSA will not be classified the same as the Baltimore-Washington D.C. area because they have entered into Early Action Compacts (EACs) with EPA. This places them on a different schedule to adopt necessary emission control measures and to demonstrate attainment of the ozone standard by December 31, 2007. In EPA's judgment, the separation of these areas will not impede ozone attainment and will provide the various jurisdictions with some flexibility to conduct the necessary air quality planning. For areas that were not previously separate 1-hour ozone nonattainment areas, EPA is requiring that the classification of the area be the same as that of the core area. Consequently, EPA is requiring the Fredericksburg area to be classified the same as the Washington D.C. 8-hour ozone nonattainment area. EPA has received a Memorandum of Agreement from VADEQ agreeing to EPA's classification of Fredericksburg.

Other comments regarding the Washington D.C. nonattainment area pertain to the exclusion of King George, Culpepper, Warren, and Clarke Counties. These counties are relatively more rural and contain fewer nonattainment characteristics (using the 11 guidance criteria) than the other Washington D.C. area counties. Specifically, one commenter noted that the population growth in some of these counties was 20% in the last 10 years. In Region III, the population growth rate between 1990 and 2010 varies from -7400 people/year (loss of people) to +12,700 people/year. The growth rates for King George, Culpepper, Warren, and Clarke Counties used in our analysis are 424 people/year, 486 people/year, 593 people/year, and 135 people/year, respectively. The EPA decision to exclude these Virginia counties was not made on the basis of just this criterion but was a result of an analysis that simultaneously considered this data together with emissions, population, and the other guidance criteria.

Delaware – Philadelphia Nonattainment Area

The Delaware portion of the Philadelphia 8-hour ozone nonattainment area consists of New Castle, Kent and Sussex Counties, DE. The rest of the Philadelphia 8-hour ozone nonattainment area includes the following counties: Cecil, MD; Burlington, NJ; Camden, NJ; Cumberland, NJ; Gloucester, NJ; Salem, NJ; Mercer, NJ; Atlantic, NJ; Cape May, NJ; Bucks, PA; Chester, PA; Delaware, PA; Montgomery, PA; and Philadelphia, PA.

In its February 2, 2004 letter, Delaware stated that it disagreed with EPA including all three Delaware counties in the Philadelphia 8-hour ozone nonattainment area but then went on to state that EPA should designate ozone nonattainment areas that are broader than the CMSA boundaries. Delaware has since indicated that they would not object to Kent and Sussex Counties being part of the Philadelphia 8-hour ozone nonattainment area as long as EPA did not require that the nonattainment area designated under the fine Particulate Matter standard (PM_{2.5}) automatically and exactly follow the Philadelphia 8-hour ozone nonattainment boundaries. Delaware believes that it has very different ozone and PM_{2.5} problems and that it does not make sense to automatically require that both nonattainment areas be the same. For ozone designation purposes, EPA believes that it makes sense to include New Castle, Kent, and Sussex Counties, DE in the Philadelphia 8-hour ozone nonattainment area.

Pennsylvania – Adams-York Nonattainment Area

The Adams-York, PA 8-hour ozone nonattainment area consists of Adams County, PA and York County, PA. York County, PA was a single county MSA in 1999. Adams County is being added to York to make up this nonattainment area.

Pennsylvania – Allentown-Bethlehem Nonattainment Area

The Allentown-Bethlehem, PA 8-hour ozone nonattainment area consists of Carbon, County, PA, Lehigh County, PA and Northampton County, PA. These three counties make up the entire 1999 Allentown-Bethlehem MSA.

Pennsylvania – Altoona Nonattainment Area

The Altoona, PA 8-hour ozone nonattainment area is a single county nonattainment area consisting of Blair County. Blair County makes up the entire 1999 Altoona MSA.

Pennsylvania – Clearfield - Indiana Nonattainment Area

The Clearfield - Indiana, PA 8-hour ozone nonattainment area is a two county nonattainment area. Clearfield County is not part of any 1999 CMSA but has a violating ozone monitor. Indiana County, PA is also not part of any 1999 CMSA and it is a county without an ozone monitor. Its proximity adjacent to three metropolitan areas with ozone violations (Pittsburgh, Clearfield, and Cambria) together with its relatively high NOx emissions make Indiana County a potential contributor to downwind ozone air quality. Therefore, Indiana is being added to Clearfield County to make up the Clearfield-Indiana, PA 8-hour ozone nonattainment area.

Pennsylvania – Erie Nonattainment Area

The Erie, PA 8-hour ozone nonattainment area is a single county nonattainment area. This county is a single 1999 MSA with violating ozone monitor.

Pennsylvania – Franklin Nonattainment Area

The Franklin, PA 8-hour ozone nonattainment area is a single county nonattainment area. This county is not part of any 1999 CMSA but has a violating monitor.

Pennsylvania – Greene Nonattainment Area

The Greene, PA 8-hour ozone nonattainment area is single county nonattainment area. This county is not part of any 1999 CMSA but has a violating monitor.

Pennsylvania – Harrisburg-Carlisle Nonattainment Area

The Harrisburg-Carlisle 8-hour ozone nonattainment area consists of Cumberland, Dauphin, Lebanon, and Perry Counties, which make up the entire 1999 Harrisburg-Carlisle MSA.

Pennsylvania – Johnstown Nonattainment Area

The Johnstown 8-hour ozone nonattainment area consists of Cambria County, PA. Although the 1999 Johnstown MSA includes both Cambria and Somerset Counties, EPA has evaluated Somerset County and believes that it should be designated attainment instead. On balance, the values for Somerset for all of the 11 criteria justify a designation of attainment. For

example, Cambria contains more than half of the total emissions of VOC and NOx and total population in the Johnstown MSA. Cambria contains all the utility emissions in the Johnstown MSA.

Pennsylvania – Lancaster Nonattainment Area

The Lancaster 8-hour ozone nonattainment area consists of Lancaster County, PA. The 1999 Lancaster MSA is a single county MSA.

Pennsylvania – Lycoming County Attainment Area

EPA is designating Lycoming County, PA as attainment because it is a county that has an ozone monitor with only 2 years of monitoring data, 2002 and 2003. In 2002, the 4th highest ozone reading was 91 ppb. In 2003, the 4th highest ozone reading was 83 ppb. Currently, there are two ozone monitors in Lycoming County. The second ozone monitor is currently measuring attainment of the ozone standard. EPA policy³ in counties with multiple ozone monitors is to use the monitor with the highest ozone measurements as representative of the county's air quality. However, since the monitor reading the highest values in Lycoming County has only 2 years worth of data, EPA policy dictates that the 2003 design value cannot be calculated from just those 2 years of data.

Pennsylvania – Philadelphia Nonattainment Area

The Pennsylvania portion of the Philadelphia 8-hour ozone nonattainment area consists of the following counties: Bucks, PA, Chester, PA, Delaware, PA, Montgomery, PA, and Philadelphia, PA. These Pennsylvania counties are the only counties in Pennsylvania that are part of the 1999 Philadelphia CMSA. The remainder of the Philadelphia 8-hour ozone nonattainment area includes the following counties in Maryland, Delaware and New Jersey: Cecil, MD; New Castle, DE; Kent, DE; Sussex, DE; Burlington, NJ; Camden, NJ; Cumberland, NJ; Gloucester, NJ; Salem, NJ; Mercer, NJ; Atlantic, NJ; and Cape May, NJ. There are three ozone monitors in Philadelphia County, PA. Although one monitor is measuring attainment in 2003 (ozone design value), EPA has decided that the violating ozone monitors better represent the status of the air quality in Philadelphia County. The complex and non-linear photochemistry of ozone formation can lead to small pockets of ozone attainment even within a broader ozone nonattainment problem. Ozone monitors provide valuable information but these are point measurements that, when used in policy decision making, requires additional information and judgment.

Much discussion has occurred among the 4 states that have counties that comprise the Philadelphia metropolitan area with regard to the appropriateness of moving Ocean County, NJ, which is part of the 1999 New York CMSA, into the Philadelphia 8-hour ozone nonattainment area. Several different analyses were produced by New Jersey, Delaware, Maryland and EPA. The final decision to move Ocean County, NJ to the Philadelphia 8-hour ozone nonattainment area considered technical evidence as well as policy implications.

³ Guideline on Data Handling Conventions for the 8-hour Ozone NAAQS, EPA OAQPS, EPA-454/R-98-017, December 1998.

Pennsylvania – Pittsburgh Nonattainment Area

The Pittsburgh 8-hour ozone nonattainment area consists of the following counties: Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, and Westmoreland Counties. Together, these counties represent the entire 1999 Pittsburgh MSA with the addition of Armstrong County, which is not part of the 1999 Pittsburgh MSA but was part of the Pittsburgh 1-hour ozone nonattainment area.

Pennsylvania – Reading Nonattainment Area

The Reading 8-hour ozone nonattainment area is a single county nonattainment area consisting of Berks County. This county represents the entire 1999 Reading MSA.

Pennsylvania – Scranton-Wilkes Barre Nonattainment Area

The Scranton-Wilkes Barre 8-hour ozone nonattainment area consists of the following counties: Lackawanna, Luzerne, Wyoming, and Monroe. The 1999 Scranton-Wilkes Barre MSA consists of Columbia, Lackawanna, Luzerne, and Wyoming Counties. Monroe is a county adjacent to this MSA that does not belong to it or any other MSA. However, Monroe was part of the Scranton-Wilkes Barre 1-hour ozone nonattainment area, and technical analysis indicated that this county ranked high in its nonattainment characteristics. Columbia County is not being designated nonattainment because, in EPA's assessment using the 11 guidance criteria, it does not, overall, exhibit nonattainment characteristics like the other nonattainment counties. For example, for total VOC and NOx emissions and 2001 population, Columbia County's values are less than half of the mean for the Lackawanna, Luzerne, Wyoming, and Monroe area. Overall, Columbia County, as judged by its values for the 11 guidance criteria, is dissimilar to the other counties in the Scranton-Wilkes Barre nonattainment area.

Pennsylvania – State College Nonattainment Area

The State College, PA 8-hour ozone nonattainment area is a single county nonattainment area consisting of Centre County. The 1999 State College MSA consists of Centre County, PA.

Pennsylvania – Tioga Nonattainment Area

The Tioga, PA 8-hour ozone nonattainment area is a single county area consisting of Tioga County. This county is not part of any 1999 CMSA.

Pennsylvania – Youngstown-Warren-Sharon Nonattainment Area

The Youngstown-Warren-Sharon OH, PA 8-hour ozone nonattainment area consists of three Ohio counties and one Pennsylvania county. The Pennsylvania county is Mercer County, which in 1999, was a single county MSA. The Ohio counties are Trumbull, Mahoning, and Columbiana, which make up the 1999 Youngstown-Warren MSA. The Sharon MSA (Mercer County, PA) is being added to the Youngstown-Warren MSA to make up the Youngstown-Warren-Sharon 8-hour ozone nonattainment area.

Pennsylvania – New York-Northern New Jersey-Long Island Nonattainment Area

Pike County, PA is the only Pennsylvania county that is part of the 1999 New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA. Pike County does not contain an ozone monitor. EPA's analysis supports the exclusion of Pike County from the New York ozone nonattainment area. Since all of Pennsylvania is in the Ozone Transport Region, Pike County has already applied several emission control programs. In addition, Pike County has no point VOC and NOx emissions, its area VOC emissions are about 1000 tons per year, its area NOx emissions are less than 180 tons per year, its mobile emissions are about 2000 tons per year for VOC and 3000 tons per year for NOx. Its population is about 44,000 people.

Maryland – Baltimore Nonattainment Area

The Baltimore 8-hour ozone nonattainment area consists of the following counties: Anne Arundel, MD; Baltimore City, MD; Baltimore County, MD; Carroll County, MD; Harford County, MD; and Howard County, MD. These counties represent the entire 1999 Baltimore Primary Metropolitan Statistical Area (PMSA). The Baltimore PMSA and the Washington D.C. PMSA make up the 1999 Baltimore-Washington CMSA. EPA is agreeing to allow each of these PMSAs become separate 8-hour ozone nonattainment areas because the entire area would include 21 counties and independent cities and, otherwise, difficult to conduct a single air quality planning effort. The Baltimore PMSA was a free-standing 1-hour ozone nonattainment area. Further details about the rationale for this split of the 1999 Baltimore-Washington CMSA into 2 separate 8-hour ozone nonattainment areas was provided in the December 3, 2003 EPA letter to the Maryland Governor. As mentioned earlier, EPA does not believe that the separation of the Baltimore-Washington D.C. CMSA would impede air quality planning but would, however, provide the respective jurisdictions some flexibility to attain the ozone standard.

Maryland – Philadelphia Nonattainment Area

The Maryland portion of the Philadelphia 8-hour ozone nonattainment area consists of Cecil County, MD. Cecil County is the only county in Maryland that is part of the 1999 Philadelphia CMSA. The complete Philadelphia 8-hour ozone nonattainment area consists of the additional counties in Pennsylvania, New Jersey, and Delaware: Bucks, PA; Chester, PA; Delaware, PA; Montgomery, PA; and Philadelphia, PA; Burlington, NJ; Camden, NJ; Cumberland, NJ; Gloucester, NJ; Salem, NJ; Mercer, NJ; Atlantic, NJ; Cape May, NJ; New Castle, DE; Kent, DE; and Sussex, DE.

Maryland – Kent/Queen Anne's Ozone Nonattainment Area

The Kent/Queen Anne's 8-hour ozone nonattainment area consists of Kent, MD and Queen Anne's, MD. Queen Anne's County is part of the 1999 Baltimore MSA. Kent County is not part of any 1999 MSA or CMSA. Kent and Queen Anne's Counties were a separate 1-hour ozone nonattainment area and Maryland requested that EPA preserve this arrangement under the 8-hour ozone nonattainment designations. EPA is granting this request, without the requirement of an MOA, on the basis that this area was a separate 1-hour ozone nonattainment area and the continued separation of Kent/Queen Anne's Counties from the Baltimore nonattainment area will not jeopardize attainment of the ozone standard in either of these areas and will provide some planning flexibility for these areas. EPA has previously informed Maryland that it is not approving regarding their request for an Early Action Compact for Kent and Queen Anne's Counties.

Maryland – Hagerstown Early Action Compact Area

EPA is deferring the 8-hour ozone nonattainment designation for Washington County, MD because it has a signed agreement with EPA as an Early Action Compact area (December 31, 2002). Washington County, MD is a single county 1999 MSA, the Hagerstown MSA, which is also a part of the 1999 Washington D.C. PMSA. Under the EAC agreement, this area must attain the 8-hour ozone standard by no later than December 31, 2007.

Maryland – Washington D.C. Nonattainment Area

The Maryland portion of the Washington D.C. 8-hour ozone nonattainment area consists of Calvert, Charles, Frederick, Montgomery, and Prince George's Counties. The entire 1999 Washington D.C. PMSA consists of the District of Columbia plus following counties and cities in Maryland and Virginia: Calvert, MD; Charles, MD; Frederick, MD; Montgomery, MD; Prince George's, MD; Arlington County, VA; Alexandria City, VA; Fairfax County, VA; Fairfax City, VA; Falls Church City, VA; Loudoun County, VA; Manassas City, VA; Manassas Park City, VA; Prince Williams County, VA; Stafford County, VA; Spotsylvania County, VA; Fredericksburg City, VA; Clarke County, VA; Warren County, VA; King George County, VA; and Culpeper County, VA. All of the Maryland portion of the 1999 Washington D.C. PMSA is being designated nonattainment. As mentioned earlier, EPA does not believe that the separation of the Baltimore-Washington D.C. CMSA would impede air quality planning but would, however, provide the respective jurisdictions some flexibility to attain the ozone standard.

Virginia – Washington D.C. Nonattainment Area

The Virginia portion of the Washington D.C. 8-hour ozone nonattainment area consists of: Arlington County, Alexandria City, Fairfax County, Fairfax City, Falls Church City, Loudoun County, Manassas City, Manassas Park City, and Prince Williams County. This Virginia portion of the first of these two areas consists of the existing one-hour nonattainment area boundary, with the exclusion of Stafford County. The Virginia portion of the 1999 Washington D.C. PMSA consists of all the above counties (including Stafford County) plus Fauquier, Spotsylvania, Clarke, Warren, King George and Culpeper Counties, and the City of Fredericksburg. Fauquier County is currently measuring attainment of the ozone standard (2003 ozone design value).

Clarke, Warren, King George, and Culpeper are non-monitored counties that, when evaluated using the 11 EPA guidance criteria, are characteristically different from the core Baltimore or Washington metropolitan areas. For example, these four counties contain either little or no VOC and NO_x emissions, emission densities are less than 5 tons/year-km² (compared with 41 tons/year-km² and higher for the overall Washington D.C. 8-hour ozone nonattainment area), and these counties have very low populations. Furthermore, Warren and Clarke counties are separated from the rest of the Washington metropolitan area by the easternmost portion of the Appalachian Mountains. Stafford, Spotsylvania and the City of Fredericksburg are being split into a separate nonattainment area, the Fredericksburg, VA 8-hour ozone nonattainment area.

The entire 1999 Washington D.C. PMSA consists of the District of Columbia plus following counties and cities in Maryland and Virginia: Calvert, MD; Charles, MD; Frederick, MD; Montgomery, MD; and Prince George's, MD; Arlington County, VA; Alexandria City, VA; Fairfax County, VA; Fairfax City, VA; Falls Church City, VA; Loudoun County, VA;

Manassas City, VA; Manassas Park City, VA; Prince Williams County, VA; Stafford County, VA; Spotsylvania County, VA; Fredericksburg City, VA; Clarke County, VA; Warren County, VA; King George County, VA; and Culpeper County, VA.

Virginia – Fredericksburg Nonattainment Area

The Fredericksburg 8-hour ozone nonattainment area consists of Stafford County, VA, Spotsylvania, VA and the City of Fredericksburg, VA. This area was not previously a free-standing 1-hour ozone nonattainment area and so will be designated the same ozone classification as the Washington D.C. 8-hour ozone nonattainment area. EPA and VADEQ have signed a Memorandum of Agreement (MOA) that articulates this understanding. This MOA is available as Attachment C.

Virginia – Caroline County Attainment Area

Although VADEQ and Caroline County, VA requested to become an 8-hour ozone nonattainment area, EPA is designating Caroline County, VA as attainment. This is a single county is not part of any 1999 C/MSA and currently contains an ozone monitor that is measuring attainment of the 8-hour ozone standard.

Virginia – Hampton Roads - Norfolk Nonattainment Area

The Hampton Roads - Norfolk 8-hour ozone nonattainment area consists of the following counties and cities: James City County, York County, City of Chesapeake, City of Hampton, City of Newport News, City of Norfolk, City of Poquoson, City of Portsmouth, City of Suffolk, City of Virginia Beach, City of Williamsburg, Gloucester County, and Isle of Wight County. The Hampton Roads-Norfolk metropolitan area is known as the 1999 Norfolk-Virginia Beach-Newport News MSA, which consists of all the above counties and independent cities plus Currituck, NC and Mathews, VA. Mathews, VA is not being designated nonattainment because EPA's analysis has determined that it is characteristically unlike the other nonattainment counties. For example, compared with the core Norfolk nonattainment area, the VOC and NO_x emissions from this county are very low, there are no utility NO_x emissions, very low population, and very low population and VMT growth rates.

Virginia DEQ provided some HYSPLIT back trajectory runs to show that the violations in the Hampton Roads area were not due to emissions from Gloucester or Isle of Wight. HYSPLIT is an air quality model available for online use from the National Oceanic and Atmospheric Administration (NOAA) web site (<http://www.arl.noaa.gov/ready.html>). However, the information provided failed to consider lower level ozone precursor transport (less than 500km height) and failed to examine all of the days and hours contributing to the Hampton Roads ozone violations; at each monitor only one hour of the 24 hour (4th high 8 hour period in each of 3 years) contribution to the estimate of the design value was considered. By evaluating the days and hours contributing to the 2003 8-hour ozone design values at the area monitors, it can be shown that these counties lie in the path of the back trajectories, indicating that it is possible that they contribute to the ozone violations at the area monitors. Further details are contained in Attachment D.

On balance, through an analysis using the 11 guidance criteria, Gloucester and Isle of Wight Counties are more similar to the core Hampton Roads-Norfolk counties than to Mathews

County or other attainment counties. The analytical methodology used to evaluate these and other counties was shared with VADEQ prior to the issuance of EPA's December 3, 2003 letter informing them of the inclusion of Gloucester and Isle of Wight Counties in the Hampton Roads-Norfolk nonattainment area.

Virginia – Richmond Nonattainment Area

The Richmond 8-hour ozone nonattainment area consists of the following counties and cities: Charles City County, Chesterfield County, Hanover County, Henrico County, City of Colonial Heights, City of Hopewell, City of Richmond, City of Petersburg, and Prince George County. The 1999 Richmond MSA consists of all the above counties and independent cities plus Dinwiddie County, VA; Goochland County, VA; New Kent, VA; and Powhatan, VA. EPA is not designating Dinwiddie or Goochland nonattainment.

VADEQ requested that EPA designate as nonattainment only the portion of Charles City County containing the violating ozone monitor and which was a 1-hour ozone nonattainment area. However, Charles City County is an integral part of the Richmond area and, in EPA's judgment, the entire county should be designated nonattainment.

Virginia DEQ provided some HYSPLIT back trajectory runs to show that the violations in the Richmond area were not due to emissions from Charles City, Prince George or the City of Petersburg. HYSPLIT is an ozone model available for online use from the National Oceanic and Atmospheric Administration (NOAA) web site (<http://www.arl.noaa.gov/ready.html>). However, the information provided failed to consider lower level ozone precursor transport (less than 500km height) and failed to examine all of the days and hours contributing to the Richmond ozone violations. By evaluating the days and hours contributing to the 2003 8-hour ozone design values at the area monitors, it can be shown that these counties lie in the path of the back trajectories, indicating that it is possible that they contribute to the ozone violations at the area monitors. It is not possible to use HYSPLIT to determine whether the emissions in Charles City County affect the monitor in that county. The model does not contain this kind of resolution. Since Charles City County is part of the presumptive Richmond nonattainment area (i.e. is an integral part of the Richmond area), contains a violating ozone monitor, and the ozone violation measured at the Charles City monitor and other monitors in the general area, it is expected that poor air quality exists throughout the county. Therefore, in EPA's judgment, all of Charles City County should be designated nonattainment. Further details pertaining to the HYSPLIT runs and Prince George and the City of Petersburg are contained in Attachment D.

On balance, using the 11 guidance criteria, Prince George County and the City of Petersburg exhibit nonattainment characteristics more similar to the other counties in the Richmond nonattainment area. In contrast, the 4 counties in the presumptive 8-hour ozone nonattainment area, Dinwiddie, Goochland, New Kent and Powhatan, are substantially dissimilar to the other nonattainment counties so as to warrant their exclusion from the Richmond 8-hour ozone nonattainment area.

Virginia – Frederick Early Action Compact Area

EPA is deferring the 8-hour ozone nonattainment designation for Frederick, VA and the City of Winchester because these two jurisdictions have an Early Action Compact agreement with EPA. Frederick County, VA and the City of Winchester, VA are not part of any 1999

C/MSA. Under this agreement, this area must attain the 8-hour ozone standard by no later than December 31, 2007.

Virginia – Roanoke Early Action Compact Area

EPA is deferring the 8-hour ozone nonattainment designation for the four jurisdictions that make up the Roanoke Early Action Compact Area. These jurisdictions are: Botetourt County, Roanoke County, City of Roanoke, and City of Salem. These four jurisdictions make up the entire 1999 Roanoke MSA. This area has an Early Action Compact agreement with EPA. Under this agreement, this area must attain the 8-hour ozone standard by no later than December 31, 2007.

Virginia – Shenandoah Nonattainment Area

The Shenandoah National Park is a Class I Area and consists of portions of 8 counties, Albemarle, Augusta, Greene, Rockingham, Page, Warren, Rappahannock, and Madison. Only Page and Madison Counties have ozone monitors. The 2003 ozone design value for Page County is meeting the standard. The Madison County ozone monitor is at 1073 meters (2943 ft.) elevation above the valley floor (3524 feet above sea level). The Page County monitor is at 275 meters.

The Shenandoah, VA 8-hour ozone nonattainment area consists of the portions of Madison County, VA and Page County, VA that are within the boundaries of the Shenandoah National Park. The Clean Air Act requires EPA to designate areas as nonattainment if they are exhibiting poor air quality or contributing to nearby poor air quality. EPA is granting VADEQ's request for partial county nonattainment because the violating ozone monitor in Madison County is at high terrain and measuring ozone pollution transported into the Shenandoah National Park. As such EPA believes that only the portions of Page and Madison Counties that comprise the Shenandoah National Park exhibit poor air quality. Therefore, EPA believes that the nonattainment designation of partial counties in this particular case is justified because the ozone violations are due, in large measure, to high nighttime readings resulting from the monitor being impacted by an elevated layer at high ozone. Using the NOAA's HYSPLIT ozone model, it is possible to gain some insight into the general areas of contribution to the Madison County ozone violations. Specifically, by examining the back trajectories for those days and hours contributing to the Madison County 2003 ozone design value, it is possible to learn about the nature of the Madison ozone violations. Further details are contained in Attachment E.

Both of these counties have no point VOC and NOx emissions, very low area and mobile emissions (less 1120 tons/year), low population (less than 23,000 people), and the population growth rate is very low. Therefore, the sources in the Page and Madison counties do not contribute to the ozone violations in Madison County or nearby areas and EPA believes that the remainder of Page and Madison Counties that are not part of the Shenandoah National Park does not exhibit the kind of poor air quality exhibited in the Park.

Several commenters requested that EPA designate as unclassifiable the Shenandoah National Park as well as any surrounding counties that might otherwise be designated attainment in order to provide some additional time for contribution modeling to be conducted. EPA believes that the implementation of national programs such as the Interstate Air Quality Rule, will bring needed emission reductions to favorably impact the ozone air quality in the

Shenandoah National Park. The National Park Service also argued that EPA should not split the Baltimore-Washington D.C. area into separate ozone nonattainment areas without better understanding the area's potential contribution to the ozone violations in the Shenandoah National Park. As mentioned earlier, EPA does not believe that the separation of the Baltimore-Washington D.C. CMSA would impede air quality planning but would, however, provide the respective jurisdictions some flexibility to attain the ozone standard.

Comments on other Virginia Areas

Commenters requested that EPA provide its analysis that would support excluding the Charlottesville/Albemarle and Pittsylvania/Danville areas in Virginia. The data and analysis used to support these decisions are available from Region III. Although both of these areas are metropolitan areas, neither of them contains an ozone monitor. Based on air quality interpolation, Charlottesville/Albemarle's air quality is estimated at 84 ppb, which would be considered attainment if this value had been monitored. However, EPA's analysis considers 3 sub-aspects of air quality: the value, the uncertainty and whether the estimate is under or over the ozone standard (attainment or nonattainment). The methodology for the uncertainty of this air quality estimate is described in the analytical materials available from Region III and summarized in the enclosure to an August 18, 2003 letter to Mr. John Pitner, Air Team Leader, West Virginia Manufacturers Association. For the designations analysis, where there is an ozone monitor in the county, the certainty is presumed to be 100%. For counties without an ozone monitor, EPA does not use the air quality estimate alone to determine whether that area should be attainment or nonattainment. Therefore, in EPA's judgment, on balance and based on its 11-factor ozone designations analysis, Charlottesville/Albemarle is relatively more attainment than the counties selected for nonattainment.

The air quality estimate for Pittsylvania/Danville was estimated by interpolation also and the value is 89 ppb. The overall assessment of Pittsylvania/Danville's attainment/nonattainment status includes this as well as the other information. The data and details of the multi-criteria analysis are available from Region III. The violating ozone monitors in the North Carolina counties adjacent to Pittsylvania/Danville can be used to examine whether Pittsylvania emissions might contribute to those violations. Using the ozone monitor in Caswell, NC (since all the NC monitors are relatively close, Caswell is used to represent all these monitors) and examining the back trajectories using HYSPLIT, it is possible to gain some insight into the path of the ozone mass that measured nonattainment at the Caswell monitor. In brief, there appear to be very few opportunities for Pittsylvania to contribute to the Caswell violations. The details of the HYSPLIT information is contained in Attachment F. In EPA's judgment, Pittsylvania is similar to many attainment counties.

West Virginia – Charleston Nonattainment Area

The Charleston 8-hour ozone nonattainment area consists of Kanawha and Putnam Counties in West Virginia. These two counties make up the entire 1999 Charleston, WV MSA.

West Virginia – Berkeley/Jefferson (Eastern Panhandle, WV) Early Action Compact Area

EPA is deferring the 8-hour ozone nonattainment designation for Berkeley and Jefferson counties in West Virginia. These two counties have an Early Action Compact agreement with EPA. Both Berkeley, WV and Jefferson, WV are part of the 1999 Washington D.C. MSA but

because of the Early Action Compact agreement, will remain a separate, and deferred, 8-hour ozone nonattainment area. Under the EAC agreement, this area must attain the 8-hour ozone standard by no later than December 31, 2007.

West Virginia – Huntington-Ashland-Ironton KY-WV-OH Nonattainment Area

The Huntington-Ashland-Ironton 8-hour ozone nonattainment area consists of the following counties: Cabell County, WV; Wayne County, WV; and Boyd County, KY; and Lawrence County, OH. The 1999 Huntington-Ashland-Ironton MSA consists of the counties named above plus Carter, KY; Greenup, KY; and Lawrence, OH.

West Virginia – Parkersburg-Marietta OH-WV Nonattainment Area

The Parkersburg-Marietta 8-hour ozone nonattainment area consists of Wood County, WV and Washington County, OH. These two counties make up the entire 1999 Parkersburg-Marietta MSA.

West Virginia – Steubenville-Weirton OH-WV Nonattainment Area

The Steubenville-Weirton 8-hour ozone nonattainment area consists of Brooke County, WV; Hancock County, WV; and Jefferson County, OH. These three counties make up the entire 1999 Steubenville-Weirton MSA.

West Virginia – Wheeling OH-WV Nonattainment Area

The Wheeling 8-hour ozone nonattainment area consists of Marshall County, WV and Ohio County, WV. The 1999 Wheeling MSA includes these two counties plus Belmont, OH.

Attachments:

Attachment A: August 18, 2003 letter from Judith Katz, EPA Region III to John Pitner, West Virginia Manufacturers Association.

Attachment B: Comparison Chart (dated February 26, 2004) of 1999 CMSAs, Region III 120 day letter proposal, and February 2004 state responses

Attachment C: EPA-Fredericksburg, VA 8-hour ozone nonattainment area Memorandum of Agreement (MOA)

Attachment D: EPA back trajectory analysis using HYSPLIT for Virginia areas

Attachment E: EPA back trajectory analysis using HYSPLIT for the high elevation Madison County ozone monitor in the Shenandoah National Park

Attachment F: EPA back trajectory analysis using HYSPLIT for Pittsylvania/Danville on Caswell, NC

Attachment D – EPA back trajectory analysis using HYSPLIT for Assessing Potential Ozone Impact of Certain Virginia areas

Methodology:

Four counties/independent city were evaluated in this analysis and their potential contributions to the ozone violations at nearby monitors was examined. These four areas of interest are Gloucester, Isle of Wight, Prince George and the City of Petersburg. Each of these counties/independent city are part of the presumptive 8-hour ozone nonattainment area so the burden of proof to designate these attainment rather than nonattainment lies with the State. The ozone monitors examined were Charles City County, Henrico, and Hampton Roads.

Based on the 2003 ozone design value, which uses 2001, 2002, and 2003 data, determine which days/hours comprise the 4th highest values for each of these years. The 8-hour ozone design value is computed by taking the average of the 4th highest ozone 8-hour average for each of the 3 years (in this case, 2001, 2002, and 2003). Therefore, determining the contributing hours to the 8-hour design value results in finding 24 hours of ozone readings. Using HYSPLIT, run back trajectories for each of the monitors of interest and examine high, mid and lower level trajectories to determine whether the air mass passed over the areas of interest. Back trajectories trace an hourly air packet from an ozone monitor back over a geographic area to determine the general area where that air packet originated and over what path it traveled. Presumably, emissions all along that path have the potential to contribute to the final ozone readings at the monitor from which the back trajectory starts. The back trajectory is run for a specific day and hour at an ozone monitor and provides information to the analyst about the origins of the air packet that eventually came to rest over the ozone monitor. Consequently, in order to determine which geographic areas can contribute to the ozone violations at a monitor, it is necessary to run back trajectories for each of the 24 hours that contribute to the ozone violations.

The reader is cautioned from concluding that this information provides absolute proof of emissions contribution. A back trajectory path over a particular county only suggests that it may be possible that those county's emissions may contribute to the ozone violation. It is possible that an air packet may travel over an area without picking up any contributing emissions. On the other hand, if, for example, all back trajectories do not pass over a particular county, one can conclude that the emissions of that county do not contribute to the ozone violations of the targeted ozone monitor. Back trajectories are useful information when used within a holistic analysis.

Results:

The Virginia counties, Gloucester, Isle of Wight, Prince George and City of Petersburg, all contribute at some time toward the violations at the area ozone monitors (Charles City County, Hampton Roads, Henrico). The Charles City County and Henrico County monitors are located in the Richmond MSA. The Hampton Roads monitor is located in the Norfolk-Virginia Beach MSA. The analysis examined back trajectories at 300, 500, and 1500 meters above the ground. The days of the ozone violations at each monitor, where there are potential contributions from Gloucester, Isle of Wight, Prince George, and City of Petersburg are shown in the table below. Also in the table below, the relevant days and hours at the violating ozone monitors are shown where the counties of interest potentially contribute to the ozone violations at the listed monitors. For simplicity, the specific times of the back trajectories are not shown in

this table so that where indicated, it is possible for back trajectories for each of the hours listed for a violating day to have passed over the named counties or only a portion of those hours.

Monitor	Date of violation	Hours of violation at monitor	Air Packet Traveled over
Charles City	June 26, 2001	1 pm through 8 pm	Isle of Wight (500 and 300m trajectories) Prince George (1500m)
Charles City	July 2, 2002	10am through 5 pm	Prince George (500m and 300m) City of Petersburg (500m and 300m)
Charles City	August 27, 2003	10am through 5 pm	Prince George (500m and 300m) City of Petersburg (500m and 300m)
Hampton Roads	May 5, 2001	11 am through 6 pm	Gloucester (1500m, 500m, and 300m) Prince George (500m and 300m) City of Petersburg (500m and 300m)
Hampton Roads	August 13, 2002	11 am through 6 pm	Isle of Wight (1500m, 500m, and 300m) Prince George (500m and 300m) City of Petersburg (500m and 300m)
Henrico	April 30, 2003	12 noon through 7 pm	Gloucester (500m and 300m) Isle of Wight (1500m, 500m, and 300m)

Examples of the HYSPLIT runs (back trajectories) for the above dates and hours are attached.

A summary of the potential contribution of a county in question (e.g. Gloucester) grouped by the number of times a back trajectory passed over one or more of the three violating monitors in the area (Charles City County, Hampton Roads, and Henrico) is provided below. These tables provide a quick look at the frequency of the potential emissions contribution in the respective counties on the area ozone monitors.

**Isle of Wight, VA: Total Number of ‘hits’ over all 3 monitors (Charles City County,
Hampton Roads, Henrico)**

Air Quality Measurement (ppb)	Back trajectory Height 1500 meters	Back trajectory Height 500 meters	Back trajectory Height 300 meters
< 85	0	3	3
85 - 95	1	8	8
96 - 105	0	1	1
106 - 115	1	1	1
> 115	2	2	2

**Gloucester, VA: Total Number of ‘hits’ over all 3 monitors (Charles City County,
Hampton Roads, Henrico)**

Air Quality Measurement (ppb)	Back trajectory Height 1500 meters	Back trajectory Height 500 meters	Back trajectory Height 300 meters
< 85	3	3	3
85 - 95	1	2	2
96 - 105	0	2	2
106 - 115	0	0	0
> 115	0	0	0

**City of Petersburg, VA: Total Number of ‘hits’ over all 3 monitors (Charles City County,
Hampton Roads, Henrico)**

Air Quality Measurement (ppb)	Back trajectory Height 1500 meters	Back trajectory Height 500 meters	Back trajectory Height 300 meters
< 85	0	4	5
85 - 95	0	2	2
96 - 105	0	2	4
106 - 115	0	2	3
> 115	0	1	1

Prince George, VA: Total Number of ‘hits’ over all 3 monitors (Charles City County, Hampton Roads, Henrico)

Air Quality Measurement (ppb)	Back trajectory Height 1500 meters	Back trajectory Height 500 meters	Back trajectory Height 300 meters
< 85	2	4	4
85 - 95	6	2	2
96 - 105	0	2	3
106 - 115	0	2	3
> 115	0	1	1

Conclusion:

Gloucester, Isle of Wight, Prince George and the City of Petersburg all have the potential to contribute to the monitored ozone violations in the Richmond and Norfolk-Virginia Beach MSAs.

Attachment E: EPA back trajectory analysis using HYSPLIT for the high elevation Madison County ozone monitor in the Shenandoah National Park

Methodology:

This methodology is similar as that described in Attachment D but the evaluation of a high elevation monitor requires some additional considerations. These considerations are the mixing height of the atmosphere and the potential differences between air quality values when the atmosphere is connected versus when it is disconnected. When the atmosphere is disconnected, the higher elevations can have ozone levels that are much different than those at lower levels. This occurs with ozone because of the phenomenon of ozone transport. High readings at night at monitors above the mixing height when the atmosphere is stratified are indications of ozone transport. The table below shows the 24 hours that comprise the 2003 8-hour ozone design value for Madison County, the corresponding hourly readings, the mixing height at the time and whether the atmosphere at the monitor (upper atmosphere) is connected to the atmosphere that is below the monitor (lower atmosphere) for each of those hours.

Date	Hours	Ozone Hourly Reading (ppb)	Mixing Height (meters)	Upper and lower atmosphere connected?
May 3, 2001	11 pm	88	250	no
	12 midnight	88	250	no
May 4, 2001	1 am	90	250	no
	2 am	no reading	250	no
	3 am	90	250	no
	4 am	92	250	no
	5 am	92	250	no
	6 am	91	250	no
July 16, 2003	5 pm	81	2172	yes
	6 pm	85	2029	yes
	7 pm	92	1855	yes
	8 pm	91	1679	yes
	9 pm	89	1261	yes
	10 pm	88	794	no
	11 pm	83	327	no
	12 midnight	80	250	no

April 15, 2003	12 noon	83	860	no
	1 pm	82	1476	yes
	2 pm	84	2073	yes
	3 pm	86	2173	yes
	4 pm	88	2174	yes
	5 pm	89	2175	yes
	6 pm	89	1640	yes
	7 pm	90	938	no

Out of 24 hours that comprise the 2003 8-hour ozone design value at Madison County, only 11 readings or 46% occur when the atmosphere is connected (i.e., when the ozone levels at and below the Madison County monitor are expected to be similar). The average hourly ozone reading when the atmosphere is connected is 86.9 ppb. The average hourly ozone reading when the atmosphere is not connected is 87.9 ppb, which indicates that higher ozone levels are being transported and measured at the Madison County monitor than generally experienced at the lower levels of Madison County. The HYSPLIT runs corresponding to this information is attached.

Conclusion:

The Madison County high terrain monitor often measures ozone levels that are different from and higher than those experienced at the lower levels of the county.

Attachment F: EPA back trajectory analysis using HYSPLIT for Pittsylvania/Danville on Caswell, NC

Methodology:

This methodology is similar as that described in Attachment D. Back trajectories to determine the potential impact of Pittsylvania/Danville on the Caswell, NC ozone monitor is the objective of this analysis.

Results:

The relevant day and hours of potential impact from Pittsylvania on the Caswell monitor is August 11, 2002 from 11 am through 6pm. Of these hours, it appears that only the hours from 11am through 4pm showed a back trajectory path over Pittsylvania. Only the 1500 meter back trajectory showed this path while the 500 meter and 300 meter trajectories did not. A summary table is provided below.

Pittsylvania/Danville, VA: Total Number of 'hits' over the Caswell, NC monitor

Air Quality Measurement (ppb)	Back trajectory Height 1500 meters	Back trajectory Height 500 meters	Back trajectory Height 300 meters
< 85	1	0	0
85 - 95	1	0	0
96 - 105	3	0	0
106 - 115	1	0	0
> 115	0	0	0