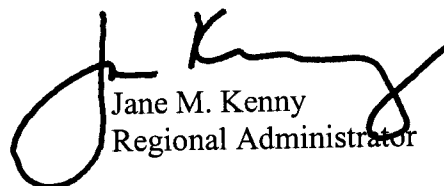JUL - 1 2004

Mr. Bradley M. Campbell
Commissioner
New Jersey Department of Environmental Protection
401 East State Street (7th Floor)
Post Office Box 402
Trenton, New Jersey 08625-0402

Dear Commissioner Campbell:

On June 29, 2004 I wrote to Governor McGreevey informing him of the Environmental Protection Agency's proposed fine particulate matter designations. For your information, I have enclosed a copy of that letter as well as a copy of the technical analysis that presents the basis for our nonattainment recommendations.

We look forward to a continued dialogue with New Jersey as we work to finalize the designations for the fine particulate standard. If you have any questions, please do not hesitate to contact me at 212-637-5000 or have your staff contact Walter Mugdan, Director of the Division of Environmental Planning and Protection at 212-637-3724.

Sincerely,

Jane M. Kenny
Regional Administrator

Enclosures

cc: Sam A. Wolf, Assistant Commissioner
      New Jersey Department of Environmental Protection

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

JUN 29 2004

Honorable James E. McGreevey
Governor, State of New Jersey
The State House
P.O. Box 001
Trenton, New Jersey 08625

Dear Governor McGreevey:

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 PM2.5 pollution.

In February, New Jersey submitted its recommended boundaries for PM2.5 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 New Jersey 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. This is described in the enclosure discussed below.

Commissioner Campbell will receive a copy of this letter with a more detailed enclosure containing a description of areas where EPA intends to modify New Jersey's 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.

You will hear from us again in November when EPA takes the final step in the PM2.5 designation process and determines those areas that are in attainment, unclassifiable, or 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 New Jersey'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.
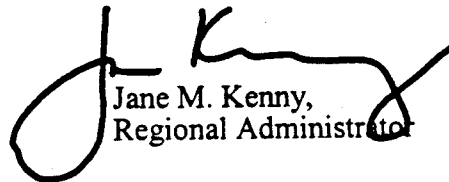
The Bush Administration is addressing fine particle pollution with a comprehensive national clean air strategy. This strategy includes EPA's recent rule to reduce pollution from nonroad diesel engines, and the proposed rule to reduce pollution from power plants in the eastern United States. These two 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 me at (212) 637-5000 or have your staff contact Walter Mugdan, Director of the Division of Environmental Planning and Protection at (212) 637-3724. We look forward to a continued dialogue with you as we work together to implement the PM2.5 standards.

Sincerely,

Jane M. Kenny,
Regional Administrator

Enclosure

cc: Bradley M. Campbell, Commissioner
New Jersey Department of Environmental Protection

Enclosure

The following table identifies the individual counties within New Jersey that EPA intends to designate as nonattainment or attainment/unclassifiable.

New Jersey's Recommended Nonattainment Counties	EPA Recommended Nonattainment Counties	Attainment/ Unclassifiable
Hudson, Union, Middlesex, Bergen, Monmouth, Essex, Mercer, Morris, Somerset, Passaic counties	Hudson, Union, Middlesex, Bergen, Monmouth, Essex, Mercer, Morris, Somerset, Passaic counties EPA is proposing the addition of Gloucester, Camden, and Burlington counties.	The remainding counties of the State of New Jersey

EPA TECHNICAL ANALYSIS FOR PM2.5 DESIGNATIONS - NEW JERSEY

A.   Modifications to New Jersey's Recommendations

Gloucester

New Jersey did not recommend Gloucester County as a nonattainment county. EPA is modifying the New Jersey recommendation by designating Gloucester County as nonattainment.

Gloucester County ranks high for emissions, population, traffic, and commuting patterns. Gloucester is also adjacent to a county with a violating monitor. Point sources are also located near the county with the violating monitor.

Camden

New Jersey did not recommend Camden County as a nonattainment county. EPA is modifying the New Jersey recommendation by designating Camden County as nonattainment.

Camden County ranks high for emissions, population, traffic, and commuting patterns. Camden is also adjacent to a county with a violating monitor. Point sources are also located near the county with the violating monitor.

Burlington

New Jersey did not recommend Burlington County as a nonattainment county. EPA is modifying the New Jersey recommendation by designating Burlington County as nonattainment.

Burlington County ranks high for emissions, population, traffic, and commuting patterns. Burlington is also adjacent to a county with a violating monitor. Point sources are also located near the county with the violating monitor.

B.   An Explanation of EPA's 9-Factor Analysis

Factor 1. Emissions:

*The analysis for factor 1 looks at emissions of carbonaceous particles (carbon), inorganic particles (crustal), SO_2, and NOx. In general, 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. These scores for the metropolitan area counties add to 100. For metropolitan areas with four or fewer counties, counties' emissions were taken as a fraction of total emissions summed over the metropolitan area plus counties adjacent to either the 1999 or the 2003 metropolitan area. For these areas, scores for the metropolitan area counties plus adjacent counties add to 100. The air quality weighting factors for each area are given below and reflect the percentages of the total estimated "urban excess" value found as carbonaceous particles, miscellaneous inorganic particles (crustal material), ammonium sulfate, and ammonium nitrate. Tables presented under factor 1 provide the carbonaceous particles, inorganic particles, SO_2, and NOx emissions and the composite emission scores for the counties in the corresponding metropolitan area and adjacent counties. Emissions data are derived from the National Emissions Inventory and are for 2001, given in tons per year. 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.

Factor 2. Air quality:

The air quality analysis looks at the annual averaged design value for each area based on data for 2001 to 2003.

Factor 3. Population/ Population density:

Tables presented under factor 3 show the 2002 population for each metropolitan area, as well as the population density for each county in that area. Population density is listed in people per square mile. Population data indicate the likelihood of population-based emissions that might contribute to violations.

Factor 4. Traffic and commuting patterns:

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. A table summarizes the vehicle miles traveled (VMT) in 2002 and the number of commuters who travel to counties within the metropolitan area with violating monitors are also provided

Factor 5. Growth:

The 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 year round average prevailing wind directions by quadrant for each county in the corresponding metropolitan area. This data shows 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.

The meteorological analysis also included use of the HYSPLIT4 (HYbrid Single-Particle Lagrangian Integrated Trajectory) model to calculate 24-hour back trajectories, and analysis of pollution and wind rose data to further investigate the influence of weather patterns on observed PM 2.5 mass concentrations.

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.

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.

C.   **Analysis of the New Jersey portion of the PA-NJ-MD C/MSA and adjacent counties**

The New Jersey portion of this area includes the counties of Gloucester, Camden, Burlington, Cape May, Atlantic, Cumberland, Salem, Mercer, Monmouth, Ocean, Hunterdon, and Warren. Violating monitors (based on 2001-2003 data) are present in Philadelphia and Delaware

Counties in Pennsylvania, and in New Castle in Delaware.

Based on EPA's nine factor analysis, EPA is recommending that additional counties should be added to the nonattainment area for the New Jersey portion of the PA-NJ-MD C/MSA and adjacent counties.

EPA Recommendation	State Recommendation
Gloucester, Camden, and Burlington	None

The following is a brief summary of the 9 criteria for the New Jersey portion of the PA-NJ-MD C/MSA and adjacent counties. Although listed in the tables for comparison purposes, Monmouth and Mercer counties are not specifically discussed in the analysis since they have been recommended for nonattainment by New Jersey.

Factor 1: Emissions in the PA-NJ-MD C/MSA and for those that are adjacent to the C/MSA.

The following table shows total emissions (in tons) and emission scores for Pennsylvania, New York and Maryland, and Delaware included in the PA-NJ-MD C/MSA and for those that are adjacent to the C/MSA. (Data source: 2001 National Emissions Inventory (NEI)).

County	direct PM 2.5 (tons)	SOx (tons)	NOx (tons)	Carbon PM 2.5 (tons)	Crustal PM 2.5 (tons)	Emission-Score	Cumulative Score
New Castle, DE	4,558	61,499	34,640	2,276	15,147	18.6	18.6
Philadelphia, PA	3,944	16,681	55,011	2,116	1,200	14.0	32.6
Delaware, PA	3,173	24,882	33,259	1,458	1,225	11.1	43.7
Montgomery, PA	3,910	8,721	21,191	1,905	1,700	8.7	52.4
Chester, PA	3,716	11,391	16,909	1,228	2,226	6.9	59.3
Bucks, PA	3,100	6,870	16,852	1,443	1,444	6.8	66.1
Gloucester, NJ	1,909	9,154	21,849	1,035	697	6.5	72.6
Camden, NJ	2,154	4,120	17,025	1,286	727	5.9	78.5
Burlington, NJ	2,298	2,330	15,113	1,326	836	5.6	84.1
Cape May, NJ	2,157	14,578	7,894	938	1,044	5.5	89.6
Atlantic, NJ	1,404	1,905	8,676	773	563	3.3	92.9
Cumberland, NJ	1,374	1,941	7,054	638	669	2.8	95.7
Salem, NJ	1,243	4,485	5,457	487	653	2.6	98.3
Cecil, MD	950	948	5,502	401	518	1.8	100.1
Northampton, PA	5,646	55,105	24,051	1,212	3,374	13.9	
Berks, PA	4,806	17,143	21,834	1,520	2,821	9.1	
Lancaster, PA	5,673	10,786	20,901	1,746	3,569	8.8	
Mercer, NJ	2,950	16,426	27,098	1,113	1,608	8.4	
Monmouth, NJ	3,143	3,028	18,971	1,820	1,226	7.4	
Ocean NJ	3,291	1,500	13,754	1,802	1,404	6.6	
Lehigh, PA	1,844	6,027	12,154	624	1,018	3.9	
Kent, DE	1,503	5,124	8,512	618	818	3.4	

Hartford, MD	1,517	1,946	8,662	754	705	3.3	
Hunterdon, NJ	1,490	1,158	8,494	628	809	2.8	
Warren, NJ	1,204	975	6,358	600	530	2.5	
Kent, MD	438	228	1,009	170	259	0.6	

Applied to New Jersey, the process identifies Mercer, Monmouth, Gloucester, Camden, Burlington, and Ocean Counties as having elevated emissions relative to the remainder of the C/MSA.

Gloucester, Camden, Burlington, and Salem Counties in New Jersey have multiple large point sources which are concentrated along the border of Philadelphia, Delaware and New Castle Counties. In contrast, Ocean County does not any significant point sources.

The bulk of mobile source emissions from Gloucester, Camden, and Burlington counties would be concentrated along the border of eastern Pennsylvania since the population of the New Jersey counties are concentrated along the border of Philadelphia and Delaware counties. In contrast the population for Ocean County is concentrated in the north east section of the county.

Factor 2: Air quality

County	PM 2.5 2001- 2003 Design Value (ug/m3)
New Castle, DE	16.2
Philadelphia, PA	16.4
Delaware, PA	15.6
Montgomery, PA	14.3
Chester, PA	15.1
Bucks, PA	14.6
Gloucester, NJ	13.8
Camden, NJ	14.6
Burlington, NJ	No monitor
Cape May, NJ	No monitor
Atlantic, NJ	11.6
Northampton, PA	14.8
Berks, PA	16.4
Lancaster, PA	17.0

Mercer, NJ	14.0
Monmouth, NJ	No monitor
Ocean, NJ	11.7
Lehigh, PA	14.6
Kent, DE	13.1
Hartford, MD	13.1
Hunterdon, NJ	No monitor
Kent, DE	13.1
Cumberland, NJ	No monitor
Salem, NJ	No monitor
Cecil, MD	No monitor

New Jersey does not have any design values above the standard in the area.
Gloucester and Camden counties have design values approaching the standard.

The following New Jersey counties are adjacent to counties with violating monitors: Burlington, Camden, Salem and Gloucester.

Factor 3: Population/ Population density

County	2002 Population	2002 Population Density (population per sq mi)
New Castle, DE	512,370	1,203
Philadelphia PA	1,492,231	11,054
Delaware, PA	553,435	3,008
Montgomery PA	766,517	1,587
Chester, PA	450,160	595
Bucks, PA	610,440	1,004
Gloucester, NJ	262,049	806
Ocean, NJ	537,065	844
Camden, NJ	511,957	2,306
Burlington, NJ	437,871	544

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Cape May, NJ	102, 013	400
Atlantic, NJ	259,423	462
Northampton, PA	273,324	731
Berks, PA	382,108	445
Lancaster, PA	478,561	504
Lehigh, PA	317,533	915
Kent, DE	131,069	222
Hartford, MD	227,713	518
Mercer, NJ	359,463	1,591
Monmouth, NJ	629,836	1,334
Cumberland, NJ	147,768	302
Salem, NJ	64,438	191
Cecil, MD	90,335	260

The analysis for this factor looks at population data from 2002. Population data indicates the likelihood of population-based emissions to contribute to monitored violations.

Due to its large concentrated population and relative land size area, the county of Philadelphia dominates the remainder of the C/MSA.

To a much lesser extent, Camden County is also more urbanized than the majority of the remaining counties in the C/MSA.

The population of Gloucester, Camden, and Burlington are concentrated along the border of Philadelphia and Delaware counties. In contrast, the population of Ocean County is concentrated in the north-eastern most section of the state.

Factor 4: Traffic and commuting patterns

County	VMT[1] (1000 miles)	#Commu to Phil, PA.	#Commuters to Delaware, PA.	#Commuters to New Castle, DE.
New Castle, DE	4,957	5,386	8,150	209,742
Phila, PA	10,213	429,667	21,802	1,856
Delaware PA	3,513	48,151	137,988	9,002
Montgomery, PA	4,677	54,576	11,758	1,201
Chester, PA	3,128	10,568	17,870	12,976
Bucks, PA	3,830	31,892	2,754	493
Gloucester, NJ	2,312	13,778	3,179	1,662
Ocean, NJ	3,641	491	118	45
Camden, NJ	4,332	32,961	3,232	1,286
Burlington, NJ	3,748	17,661	1,771	597
Cape May, NJ	749	716	224	109
Atlantic, NJ	2,236	1,359	314	175
Northampton, PA	2,132	244	66	16
Berks, PA	3,952	702	505	157
Lancaster, PA	4,004	607	615	523
Lehigh, PA	2,738	578	171	22
Kent, DE	1,633	37	125	6,058
Hartford, MD	2,208	88	35	1,033
Monmouth, NJ	5,146	622	66	40
Mercer, NJ	3,869	1,574	244	139
Cumberland, NJ	1,166	618	105	171
Cecil, MD	1,340	254	373	14,059
Salem, NJ	734	615	486	3,258

[1] Vehicle Miles Traveled within county in 2002

The analysis of this factor looks at the number of commuters who drive to counties within the

metropolitan area with violating monitors, as well as total Vehicle Miles Traveled (VMT) for each county in thousands of miles.

The largest number of commuters are from Pennsylvania and Delaware counties. Camden, Burlington, and Gloucester also has a large number of people who commute to Philadelphia. All other New Jersey counties are low for the number of commuters. Ocean County has very low number of commuters to Philadelphia.

After Philadelphia, there does not appear to be a significant difference in VMT between the remainder of the counties in the CMSA.

Factor 5: Expected growth

County	2002 Population	% growth (90-00)	Population Growth (90-00)
New Castle, DE	512,370	13	58,319
Philadelphia, PA	1,492,231	-4	-68,027
Delaware, PA	553,435	1	3,213
Montgomery, PA	766,517	11	71,986
Chester, PA	450,160	15	57,105
Bucks, PA	610,440	10	56,461
Gloucester, NJ	262,049	11	24,591
Ocean, NJ	537,065	18	77,713
Camden, NJ	511,957	1	6,108
Burlington, NJ	437,871	10	28,328
Cape May, NJ	102,013	8	7,237
Atlantic, NJ	259,423	13	28,225
Northampton, PA	273,324	8	19,961
Berks, PA	382,108	11	37,115
Lancaster, PA	478,561	11	47,836
Lehigh, PA	317,533	7	20,960
Kent, DE	131,069	14	15,704
Hartford, MD	227,713	20	36,458
Monmouth, NJ	629,836	11	62, 177

Mercer, NJ	359,463	8	24,937
Cumberland, NJ	147,768	6	8,385
Salem, NJ	64,438	-2	-1,009
Cecil, NJ	90,335	20	14,604

Ocean, Gloucester, and Burlington counties experienced moderate growth in New Jersey.

Factor 6: Meteorology

This factor did not play a significant role in the decision making process for New Jersey counties with the exception of Ocean, Cape May, and Atlantic Counties.

County	Prevailing Wind Direction %			
	NW	SW	SE	NE
Phila PA	35	31	15	20
Delaw, PA	35	30	15	20
New Castle, DE	38	28	15	19

The prevailing wind direction to counties with violating monitors is predominately from the NW and SW.

Ocean, Cape May, and Atlantic Counties had a negligible contribution based upon analysis of pollution roses.

Further analysis of 24 hour back trajectories (HYSPLIT model) calculated and plotted for twenty-two high PM days in Philadelphia indicate that emissions from Ocean County have a very low impact on Philadelphia. The HYSPLIT model was used with 80 KM EDAS data to calculate 24-hour back trajectories ending at an elevation of 500 meters over Philadelphia ending at 07 UTC, 13 UTC, 19 UTC, and 01 UTC (next day). Back trajectories passed through Ocean County only on four days. Further review of those trajectories indicate the following:

January 13, 2001
One out of the four trajectories plotted (i.e. back trajectory ending at 19 WTC) passed through the north western most section of the county. That section of the county has a low population density. The trajectory continued through Camden and Gloucester and looped through heavily populated sections of Philadelphia (entered the city from the west).

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<u>Dec 10, 2002</u>
Light and variable winds observed which would indicate the impact of local emissions from the Philadelphia area. One out of the four trajectories plotted (i.e. back trajectory ending at 07 WTC) passed through the center of the county. The trajectory looped through Kent and New Castle and then entered Philadelphia from the west.

<u>Jan 30, 2003</u>
One out of the four trajectories plotted (i.e back trajectory ending at 19 WTC) passed through the north western most section of the county. That section of the county has a low population density.

<u>Oct 27, 2000</u>
Two out of the four trajectories plotted (i.e. back trajectory ending at 07 and 13 WTC) passed through the southern most section of the county. That section of the county has a low population density. Trajectory ending at 01 WTC on October 28th was from the west.

Factor 7: Geography/topography

The area does not have any geographical or topographical boundaries limiting its airshed in the areas.

Factor 8: Jurisdictional boundaries

EPA is striving to achieve consistency with the 8-hour ozone nonattainment areas for purposes of state air quality planning. Although this factor is considered as part of the analysis, this factor is not a dominant factor in the decision making process.

All counties in New Jersey were designated nonattainment for the 8-hour ozone standard on April 15, 2004.

Factor 9: Level of control of emission sources

This factor did not play a significant role in the decision making. The level of control of emission is reflected in factor 1.

D.   **Analysis of the New York and New Jersey portions of the NY-NJ-CT-PA C/MSA and adjacent counties**

The New York portion of this area includes the counties of Suffolk, Nassau, Queens, New York, Orange, Kings, Westchester, Dutchess, Bronx, Rockland, Richmond, Putnam, Ulster, Sullivan, Greene, Columbia, and Delaware. Violating monitors (based on 2001-2003 data) in New York

State are present in New York and the Bronx counties.

The New Jersey portion of the area includes Middlesex, Bergen, Monmouth, Essex, Ocean, Mercer, Hudson, Union, Morris, Somerset, Passaic, Hunterdon, Sussex, Warren, and Burlington. A violating monitor (based on 2001-2003 data) in New Jersey is present in Union County.

A violating monitor (based on 2001-2003 data) is also present in New Haven, Connecticut.

New York State has recommended that the most effective boundary for the New York portion of this nonattainment area would consist of the five counties comprising New York City which includes New York, the Bronx, Kings, Queens, and Richmond Counties.

New Jersey's recommendation includes Hudson, Union, Middlesex, Bergen, Monmouth, Essex, Mercer, Morris, Somerset, and Passaic counties.

Based on EPA's nine factor analysis, EPA is recommending that additional counties should be added to the nonattainment area for the New York portion of the NY-NJ-CT-PA C/MSA and adjacent counties. EPA is not recommending that any additional counties be added to the New Jersey portion of the NY-NJ-CT-PA C/MSA and adjacent counties.

NY-NJ-CT-PA Area	EPA Recommendation	State Recommendation
New York	New York, the Bronx, Kings, Queens, Richmond, Suffolk, Nassau, Orange, Westchester, and Rockland.	New York, the Bronx, Kings, Queens, and Richmond Counties.
New Jersey	Hudson, Union, Middlesex, Bergen, Monmouth, Essex, Mercer, Morris, Somerset, Passaic counties.	Hudson, Union, Middlesex, Bergen, Monmouth, Essex, Mercer, Morris, Somerset, Passaic counties.

The following is a brief summary of the 9 criteria for the New York State and New Jersey portions of the NY-NJ-CT-PA C/MSA including adjacent counties. Counties that are in the C/MSA are in bold. Burlington, NJ was not evaluated since it was recommended for nonattainment by us based on our 9 factor analysis for the New Jersey portion of the PA-NJ-MD C/MSA area.

Factor 1: Emissions for New York and New Jersey Counties included in the NY-NJ-CT-PA and for those that are adjacent to the C/MSA

The following table shows total emissions (in tons) and Emission Scores for New York and New Jersey Counties included in the NY-NJ-CT-PA and for those that are adjacent to the C/MSA.

(Data source: 2001 National Emissions Inventory (NEI)).

County	direct PM 2.5 (tons)	SOx (tons)	NOx (tons)	Carbon PM 2.5 (tons)	Crustal PM 2.5 (tons)	Emission Score	Cumulative Score
Suffolk, NY	9,834	45,379	42,938	5,894	3,455	10.8	10.8
Nassau, NY	7,289	12,587	30,695	4,665	2,370	7.9	18.7
Queens, NY	5,443	21,315	57,013	3,203	1,539	7.0	25.7
New York, NY	4,531	29,811	45,611	2,701	1,269	6.1	31.8
Orange, NY	4,410	30,875	22,978	2,091	2,058	4.5	36.3
Kings, NY	3,039	14,163	42,392	1,800	973	4.4	40.7
Middlesex, NJ	3,430	5,663	26,425	1,960	1,269	3.9	53.1
Westchester, NY	3,229	9,680	20,815	1,923	1,154	3.7	56.8
Bergen, NJ	2,691	7,945	27,835	1,451	1,726	3.6	60.4
Monmouth, NJ	3,143	3,028	18,971	1,820	1,226	3.4	63.8
Essex, NJ	2,435	8,114	27,325	1,466	808	3.2	67.0
Ocean, NJ	3,291	1,500	13,754	1,802	1,404	3.1	70.1
Mercer, NJ	2,950	16,426	27,098	1,113	1,608	3.0	73.1
Hudson, NJ	2,529	22,745	25,572	1,004	1,241	2.9	76.0
Union, NJ	2,092	5,393	21,149	1,263	688	2.7	78.7
Morris, NJ	2,038	3,753	16,208	1,301	648	2.5	81.2
Dutchess, NY	2,804	4,786	11,471	1,387	1,330	2.5	83.7
Bronx, NY	1,460	6,723	20,299	849	503	2.1	85.8
Rockland, NY	1,762	9,541	10,621	928	625	1.9	87.7
Somerset, NJ	1,523	2,490	9,743	816	610	1.6	89.3
Passaic, NJ	994	4,349	13,645	658	260	1.5	92.3
Richmond, NY	1,776	1,079	8,399	708	1,009	1.4	95.1
Hunterdon, NJ	1,490	1,158	8,494	628	809	1.3	96.4
Sussex, NJ	1,225	872	5,191	612	574	1.1	97.5
Warren, NJ	1,204	975	6,358	600	530	1.1	98.6
Putnam, NY	1,040	548	3,083	505	512	0.9	99.5
Burlington, NJ	2,298	2,330	15,113	1,326	836	2.5	
Ulster, NY	2,328	3,818	8,417	1,025	1,235	1.9	
Sullivan, NY	1,200	612	2,875	625	544	1.0	
Greene, NY	936	3,836	7,511	375	503	0.9	
Columbia, NY	1,018	585	3,497	420	574	0.8	
Delaware, NY	996	879	2,705	496	475	0.8	

Applied to New York, this process identifies Suffolk, Nassau, Queens, New York, Orange, Kings, Westchester, and Dutchess as having elevated emissions relative to the remainder of the C/MSA.

Applied to New Jersey, the process identifies Middlesex, Bergen, Monmouth, Essex, Ocean, Mercer, Hudson, Union, and Morris as having elevated emissions relative to the remainder of the C/MSA.

Putnam, Sussex, and Ocean Counties do not have any significant point sources.

Factor 2: Air quality

County	PM 2.5 2001- 2003 Design Value (ug/m3)
Suffolk, NY	12.3
Nassau, NY	12.4
Queens, NY	13.6
New York, NY	17.7
Orange, NY	11.6
Kings, NY	14.9
Middlesex, NJ	12.7
Fairfield, CT	13.3
New Haven, CT	16.7
Westchester, NY	12.5
Bergen, NJ	13.8
Monmouth, NJ	No monitor
Essex, NJ	14.5
Ocean, NJ	11.7
Mercer, NJ	14.0
Hudson, NJ	14.8
Union, NJ	15.7
Morris, NJ	12.6
Dutchess, NY	11.0
Bronx, NY	15.8
Rockland, NY	NA
Somerset, NJ	No monitor
Passaic, NJ	13.3
Richmond, NY	12.2
Hunterdon, NJ	No monitor
Sussex, NY	No monitor

Warren, NJ	No monitor
Putnam, NY	No monitor
Ulster, NY	No monitor
Sullivan, NY	No monitor
Greene, NY	No monitor
Columbia, NY	No monitor
Delaware, NY	No monitor

All counties with design values above the standard have been recommended for nonattainment designation by New York and New Jersey. Suffolk, Nassau, Westchester, Queens, Kings, Westchester, and Richmond counties in New York had design values approaching the standard. Middlesex, Bergen, Essex, Mercer, Hudson, Morris, and Passaic had design values approaching the standard in New Jersey.

The following New York counties are adjacent to counties with violating monitors: Westchester, Queens, Kings, and Richmond. The following New Jersey counties are adjacent to counties with violating monitors: Bergen, Essex, Hudson, Middlesex, Somerset, and Morris.

Factor 3: Population/ Population density

County	2002 Population	2002 Population Density (population per sq mi)
Suffolk, NY	1,458,655	1601
Nassau, NY	1,344,892	4686
Queens, NY	2,237,815	20,530
New York, NY	1,546,856	55,245
Orange, NY	356,773	437
Kings, NY	2,488,194	35,045
Middlesex, NJ	775,549	2,494
Westchester, NY	937,279	2165
Bergen, NJ	895,091	3,825
Monmouth, NJ	629,836	1,334
Essex, NJ	798,301	6,336

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Ocean, NJ	537,065	844
Mercer, NJ	359,463	1,591
Hudson, NJ	611,439	13,009
Union, NJ	530,763	5,153
Morris, NJ	478,730	1,021
Dutchess, NY	287,752	359
Bronx, NY	1,354,068	32,240
Rockland, NY	291,835	1677
Richmond, NY	457,383	7,752
Somerset, NJ	309,886	1,016
Passaic, NJ	496,646	2,685
Ulster, NY	179,986	160
Hunterdon, NJ	125, 795	293
Sussex, NJ	148,680	285
Warren, NJ	107,537	300
Putnam, NY	98,257	424
Sullivan, NY	74,273	77
Greene, NY	48,538	75
Columbia, NY	63,532	100
Delaware, NY	47,302	33

Due to its large concentrated population and relative land area size, the counties within New York City (i.e. New York, Bronx, Kings, Queens, and Richmond counties) are high for this factor (i.e. high population densities, high population relative to the remainder of the CMSA and adjacent counties). Suffolk, Nassau, and Westchester counties in New York; and Middlesex, Essex, Hudson, and Union in New Jersey are also score moderately high for this factor

Factor 4: Traffic and commuting patterns

County	VMT[1] (1000 miles)	#Commuters to New York Co.	#Commuters to Bronx Co.	# Commuters to Union Co.	# Commuters to New Haven, CT
Suffolk, NY	7,414	41,121	2,614	180	113
Nassau, NY	6,875	94,485	6,274	187	90
Queens, NY	10,441	346,268	18,373	780	138
New York, NY	7,961	631,132	20,775	967	178
Orange, NY	3,628	9,610	2,414	147	29
Kings, NY	12,313	341,155	11,365	1,567	112
Middlesex, NJ	5,794	25,765	355	26,653	51
Westchester, NY	4,964	79,643	27,053	327	343
Bergen, NJ	6,732	61,253	5,353	5,124	74
Monmouth, NJ	5,146	22,425	313	8,319	32
Essex, NJ	6,356	28,076	782	24,052	10
Ocean, NJ	3,641	2,964	115	4,567	13
Mercer, NJ	3,869	5,654	147	1,291	15
Hudson, NJ	4,518	58,423	1,214	6,740	23
Union, NJ	4,034	16,305	417	113,263	11
Morris, NJ	3,939	11,516	268	8,755	15
Dutchess, NY	2,905	3,963	1,085	22	199
Bronx, NY	6,440	159,664	168,903	586	56
Rockland, NY	1,413	17,025	6,245	350	56
Somerset, NJ	2,209	6,243	87	11,835	14
Passaic, NJ	3,568	8,402	473	2,943	5
Richmond, NY	2,030	53,249	1,095	1,486	11
Ulster, NY	1,850	1,565	1,565	0	11
Fairfield, CT	7,889	24,831	1,258	56	21,900
New Haven, CT	6,989	1,584	183	23	290,098
Hartford, CT	8,105	460	36	11	16,948

New London, CT	2,958	126	19	9	1,638
Hunterdon, NJ	1,893	1,176	7	3,069	0
Sussex, NJ	1,323	1,449	94	967	13
Warren, NJ	1,473	562	5	991	0
Putnam, NY	781	4,416	2,021	30	181
Sullivan, NY	683	829	110	6	0
Greene, NY	643	305	10	8	0
Columbia, NY	754	610	37	0	4
Delaware, NY	508	248	9	0	4

Note: CT counties shown for comparison purposes

[1] Vehicle Miles Traveled within county in 2002

The largest number of commuters to counties with violating monitors in New York and New Jersey are from the following counties within New York City: New York, Queens, Kings, and the Bronx. A slightly smaller but still significant number of commuters are also traveling into New York, Bronx, and Union counties from Nassau, Westchester, Suffolk, and Richmond Counties in New York; and Middlesex, Bergen, Monmouth, Essex, Hudson, and Union Counties in New Jersey. The remaining counties in New York and New Jersey have a low numbers of commuters to counties in the C/MSA with violating monitors.

Suffolk, Nassau, Queens, New York, Kings, and the Bronx in New York; and Middlesex, Bergen, and Essex in New Jersey score the highest for VMT when compared to the rest of the CMSA and adjacent areas.

Both New York and New Jersey counties have a very low number of commuters to New Haven County, CT.

Factor 5: Expected growth

County	2002 Population	% growth (90-00)	Population Growth (90-00)
Suffolk, NY	1,458,655	7	97,505
Nassau, NY	1,344,892	4	47,196
Queens, NY	2,237,815	14	277,781

New York, NY	1,546,856	3	49,659
Orange, NY	356,773	11	33,720
Kings, NY	2,488,194	7	164,662
Middlesex, NJ	775,549	12	78,382
Westchester, NY	937,279	6	48,593
Bergen, NJ	895,091	7	58,738
Monmouth, NJ	629,836	11	62,177
Essex, NJ	798,301	2	15,427
Ocean, NJ	537,065	18	77,713
Mercer, NJ	359,463	8	24,937
Hudson, NJ	611,439	10	55,876
Union, NJ	530,763	6	28,722
Morris, NJ	478,730	12	48,859
Dutchess, NY	287,752	8	20,688
Bronx, NY	1,354,068	11	128,861
Rockland, NY	291,835	8	21,278
Somerset, NJ	309,886	24	57,211
Passaic, NJ	496,646	8	35,989
Richmond, NY	457,383	17	64,751
Ulster, NY	179,986	8	12,445
Hunterdon, NJ	125,795	13	14,213
Sussex, NJ	148,680	10	13,223
Warren, NJ	107,537	12	10,830
Putnam, NY	98,257	14	11,804
Sullivan, NY	74,273	7	4,689
Greene, NY	48,538	8	3,456
Columbia, NY	63,532	0	112
Delaware, NY	47,302	2	830

Based upon an analysis of this factor, the counties of Queens, Kings, the Bronx, and Somerset counties have been identified as experiencing either significant recent growth on a percentage or absolute basis. Orange, Richmond, Ocean, Suffolk, Middlesex, Monmouth, Hudson, Morris,

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Richmond, Hunterdon, Sussex, Warren, and Putnam counties experienced moderate growth. The remainder of the counties have very low growth.

Factor 6: Meteorology

This factor did not play a significant role in the decision making process for Queens, New York, Kings, Bronx, Richmond in New York. Meteorology did not play a significant role in the decision making process for New Jersey Counties with the exception of Ocean County.

County	Prevailing Wind Direction %			
	NW	SW	SE	NE
New York, NY	34	29	11	26
Bronx, NY	33	30	12	25
Union, NJ	31	32	14	23
New Haven, CT	34	30	13	24

The prevailing wind direction to counties with violating monitors is predominately from the northwest, southwest, and northeast.

Analysis of pollution roses and back trajectories to New Haven, CT showed a contribution from Suffolk, Nassau, Orange, Westchester, Dutchess, Rockland, and Ulster Counties.

EPA REMSAD (Regional Modeling System for Aerosols and Deposition) model used during the analysis for the Interstate Air Quality Rule demonstrated that the maximum contribution from New York State to the monitor in New Haven was 0.85 ug/m3, or above the 0.15 ug/m3 threshold for determining whether emissions in a State make a significant contribution to PM 2.5 nonattainment in another state.

Ocean County had a negligible contribution based upon the analysis of pollution roses and back trajectory analysis to New York City. Analysis of back trajectories (HYSPLIT model) calculated and plotted for the thirty-nine high PM days in New York City indicate that emissions from Ocean County have a very low impact on New York City. Back trajectories passed through Ocean County on only two days. Further review of these trajectories indicate the following:

August 28, 2001
Two out of the four trajectories plotted for this day passed through Ocean County. It is not likely that Ocean County was the source of the high PM on this day. The analysis from the Bronx speciation monitor showed that the particulate matter was mostly sulfate. Ocean County is a very

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low emitter of sulfur dioxide (i.e. 1,500 released in 2001)

October 6, 2000
One out of four trajectories plotted for this day passed through Ocean County. This trajectory also passed through areas with a heavy concentration of point sources in the Camden/ Philadelphia and northeastern New Jersey areas before entering New York City from the west.

Factor 7: Geography/topography

The area does not have any geographical or topographical boundaries limiting its airshed in the areas.

Factor 8: Jurisdictional boundaries

EPA is striving to achieve consistency with the 8-hour ozone nonattainment areas for purposes of state air quality planning. Although this factor is considered as part of the analysis, this factor is not a dominant factor in the decision making process.

All counties in New Jersey were designated nonattainment for the 8-hour ozone standard on April 15, 2004. All counties within the New York portion of the NY-NJ-CT-PA C/MSA and adjacent counties, with the exception of Ulster, Sullivan, Columbia, and Delaware, were also designated nonattainment for ozone.

Factor 9: Level of control of emission sources

This factor does not play a significant role in the decision making process. The level of control of emission sources is reflected in factor 1.