

Attachment A

Designation of Nonattainment Areas in New Jersey for the 24-Hour PM_{2.5} National Ambient Air Quality Standard

Nine Factor Analysis

December 18, 2007

Nine Factor Analysis for the Designation of Nonattainment Areas in New Jersey for the 24-Hour PM_{2.5} National Ambient Air Quality Standard

Introduction

The United States Environmental Protection Agency (USEPA) adopted new annual and 24-hour PM_{2.5} National Ambient Air Quality Standards (NAAQS) effective December 18, 2006. The new standard for the annual standard remained the same but the 24-hour standard was lowered from 65 µg/m³ to 35 µg/m³. According to Section 107(d)(1)(A) of the federal Clean Air Act, states have one year from the time the new standard is effective to submit a recommendation for designating nonattainment area(s) to the USEPA for consideration. The USEPA has then one year to decide what the final nonattainment area designation should be.

The USEPA issued guidance for determining the boundaries of 24-hour fine particle nonattainment areas on June 8, 2007.¹ The nine factors used for determining attainment areas are essentially the same as those used for designating annual PM_{2.5} nonattainment areas in 2004,² with the exception that urban nonattainment areas do not need to be based on United States Office of Management and Budget boundaries as required by the PM_{2.5} annual guidance.

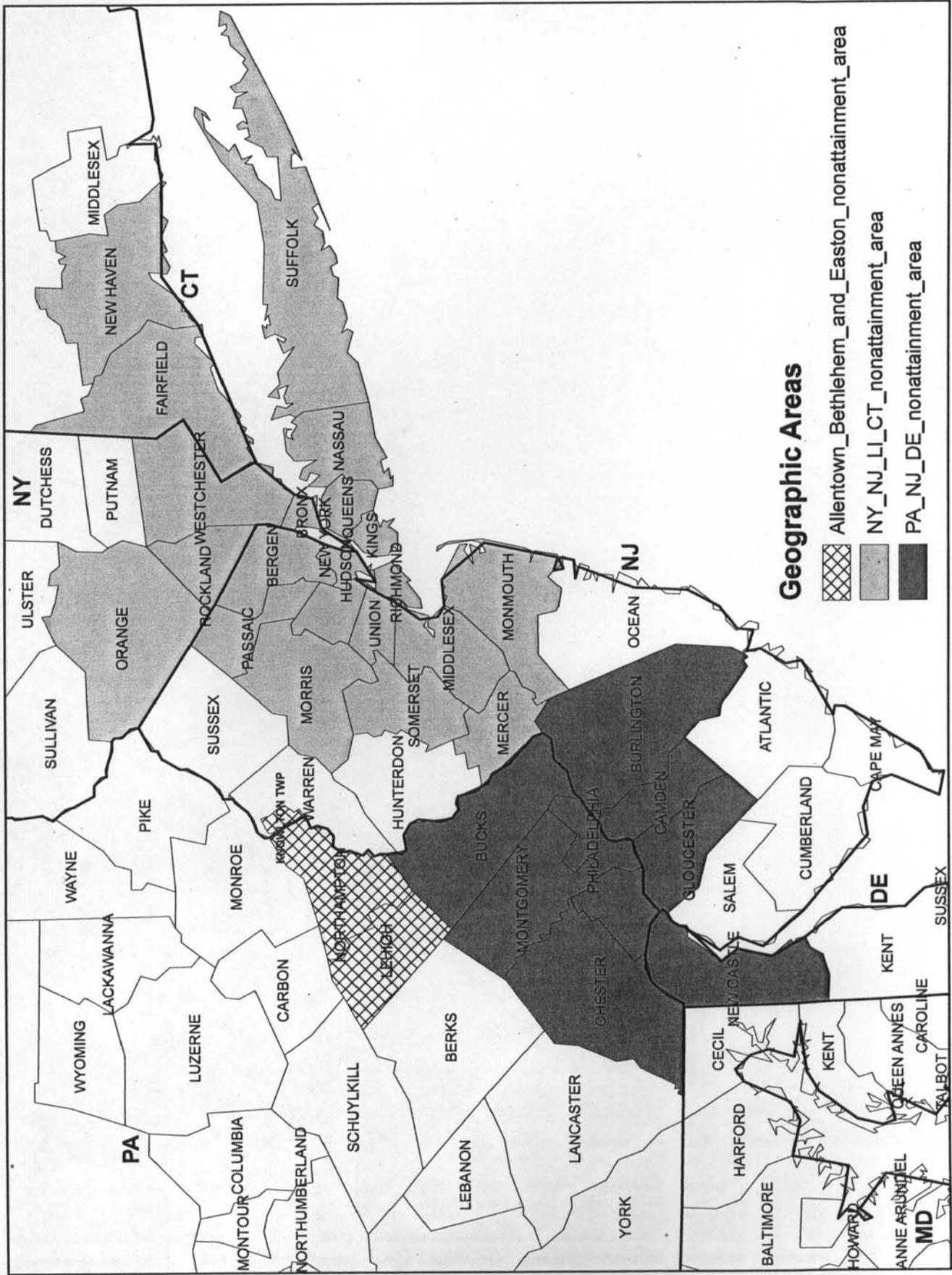
The USEPA designated nonattainment areas for the annual PM_{2.5} standard in December 2004. New Jersey is part of two nonattainment areas: the Northern New Jersey/New York/Connecticut (NNY/NY/CT) nonattainment area that includes the New Jersey counties of Bergen, Essex, Hudson, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset and Union and the Southern New Jersey/Philadelphia/Delaware (SNJ/Phila/DE) nonattainment area that include New Jersey counties of Burlington, Camden and Gloucester.

New Jersey analyzed the existing annual PM_{2.5} nonattainment areas to determine if there should be any changes in these areas because of significant changes in the data analyzed for the designations. The New Jersey Department of Environmental Protection (NJDEP) is not recommending any changes to the current annual PM_{2.5} nonattainment areas. The nine-factor analysis was also performed in these areas to determine if these areas were also appropriate to designate as nonattainment for the 24-hour PM_{2.5} NAAQS. The NJDEP is recommending that the current annual PM_{2.5} nonattainment areas also be designated as 24-hour PM_{2.5} nonattainment areas. Additionally, the NJDEP is recommending that the Township of Knowlton in Warren County be designated as part of a multi-state nonattainment area including Northampton and Lehigh Counties in Pennsylvania as proposed by the Pennsylvania Department of Environmental Protection. Each nonattainment area recommendation is discussed separately in this document.

¹ June 8, 2007 Memorandum from Robert J. Meyers on "Area Designations for the Revised 24-Hour Fine Particle National Ambient Air Quality Standard."

² An explanation of each of these nine factors is provided in Chapter 5 of the Technical Support Document for December 17, 2004 designations and April 2005 modification, available at: <http://www.epa.gov/pmdesignations/tech.htm>.

New Jersey Recommendations for Designation Multi-State PM2.5 Nonattainment Areas



Analysis of the New Jersey Portion of the Southern New Jersey/Philadelphia/Delaware Nonattainment Area (Annual) for Consideration as a Nonattainment Area for the 24-Hour PM_{2.5} National Ambient Air Quality Standard

The New Jersey portion of the Southern New Jersey/Philadelphia/Delaware nonattainment area for the annual PM_{2.5} NAAQS includes the counties of Gloucester, Camden, and Burlington.

The NJDEP recommends that New Jersey portion of the current Southern New Jersey/Philadelphia/ Delaware PM_{2.5} nonattainment area be designated as a 24-hour PM_{2.5} nonattainment area. The following is a brief summary of the nine factors for Southern New Jersey's regional air quality. Data are presented for the counties in the current annual PM_{2.5} nonattainment area and the adjacent counties.

Factor 1: Air Quality Data

The air quality analysis is an examination of PM_{2.5} air quality monitoring data, including the daily design value calculated for each area based on air quality data for a 3-year period.

The only violating monitors (based on 2004-2006 design value data) for New Jersey are in Camden County.

County	PM _{2.5} 2004- 2006 Design Value (µg/m ³)
New Castle, DE	37
Kent, DE	32
Philadelphia, PA	36
Delaware, PA	35
Montgomery, PA	32.4
Chester, PA	34.9
Bucks, PA	33
Northampton, PA	37
Berks, PA	36
Lancaster, PA	39
Lehigh, PA	No longer have a monitor
Gloucester, NJ	28.5
Camden, NJ	37
Burlington, NJ	No monitor
Atlantic, NJ	30.1
Mercer, NJ	34
Monmouth, NJ	No monitor
Ocean, NJ	31
Hunterdon, NJ	No monitor
Cumberland, NJ	No monitor
Salem, NJ	No monitor

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

Factor 2: Emissions in the Southern New Jersey/Philadelphia/Delaware Nonattainment Area (Annual) and Adjacent Counties.

The following table shows total emissions (in tons per year) for Delaware, Pennsylvania, New Jersey, and Maryland counties included in the Southern New Jersey/Philadelphia/Delaware nonattainment area (annual) and adjacent counties. (Data source: 2002 MANE-VU Modeling Inventory).

County	2002 PM _{2.5} (tons)	Proj 2009 PM _{2.5} (tons)	02-09 % change	2002 SO ₂ (tons)	Proj 2009 SO ₂ (tons)	02-09 % change	2002 NO _x (tons)	Proj 2009 NO _x (tons)	02-09 % change
New Castle, DE	3,818	3,130	-18	50,140	12,000	-76	31,544	23,104	-27
Kent, DE	1,164	1,115	-4	4,029	2,201	-45	10,336	8,554	-17
Philadelphia, PA	2,681	2,716	1	9,504	6,892	-27	31,157	2,4315	-22
Delaware, PA	2,022	2,442	21	16,074	8,311	-48	23,838	2,0642	-13
Montgomery, PA	2,851	2,831	-1	5,172	4,828	-7	25,341	17,906	-29
Chester, PA	2,279	2,324	2	5,511	3,719	-33	18,779	13,642	-27
Northampton, PA	2,996	6,340	112	58,797	39,973	-32	24,518	6,340	-74
Berks, PA	2,833	3,949	39	17,593	12,843	-27	22,221	15,638	-30
Lancaster, PA	3,736	3,927	5	3,980	3,522	-12	20,045	13,941	-30
Lehigh, PA	1,511	1,568	4	3,762	3,796	1	14,525	9,589	-34
Bucks, PA	2,170	2,158	-1	3,837	3,588	-6	20,195	14,400	-29
Gloucester, NJ	1,303	1,462	12	7,169	3,476	-52	14,515	9,494	-35
Camden, NJ	1,289	1,157	-10	1,908	922	-52	15,372	9,201	-40
Burlington, NJ	1,893	1,717	-9	3,429	1,314	-62	18,522	12,233	-34
Atlantic, NJ	1,010	926	-8	880	638	-28	8,331	5,719	-31
Cumberland, NJ	871	863	-1	3,216	2,452	-24	6,971	5,919	-15
Salem, NJ	750	1,033	38	5,451	5,420	-1	6,622	4,964	-25
Mercer, NJ	1,236	1,653	34	15,508	4,270	-72	25,520	9,957	-61
Monmouth, NJ	1,640	1,481	-10	1,669	810	-51	17,925	11,291	-37
Ocean, NJ	2,256	2,023	-10	1,074	762	-29	10,421	7,300	-30
Warren, NJ	1,031	958	-7	565	464	-18	5,250	3,065	-42
Hunterdon, NJ	1,168	1,047	-10	613	434	-29	6,613	3,942	-40
Cecil, MD	908	896	-1	639	502	-21	5,037	2,841	-44
Kent, MD	506	546	8	385	272	-29	1,212	932	-23

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 and Atlantic counties do not have any significant point sources.

Factor 3: Population/Population Density

County	2006 Population	2006 Population Density (population per sq mi)
New Castle, DE	525,587	1,174
Kent, DE	147,601	215
Philadelphia PA	1,448,394	10,000
Delaware, PA	555,996	2,994
Montgomery PA	775,688	1,553
Chester, PA	482,112	573
Bucks, PA	623,205	985
Northampton, PA	291,306	714
Berks, PA	401,149	435
Lancaster, PA	494,486	496
Lehigh, PA	335,544	899
Gloucester, NJ	282,031	784
Camden, NJ	517,001	2,293
Burlington, NJ	450,627	526
Ocean, NJ	562,335	803
Atlantic, NJ	271,620	450
Mercer, NJ	367,605	1,552
Monmouth, NJ	635,285	1,304
Cumberland, NJ	154,823	300
Salem, NJ	66,595	190
Cecil, MD	99,506	247

Due to its large concentrated population and land size area, the county of Philadelphia has the most population and the highest population density indicates the likelihood of population-based emissions to contribute to monitored violations.

To a much lesser extent, Camden County is also more urbanized than the majority of the remaining counties in the Southern New Jersey/Philadelphia/Delaware nonattainment area (annual) and adjacent counties.

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 northeastern most section of the county.

Factor 4: Traffic and Commuting Patterns

The total Vehicle Miles Traveled (VMT) for 2005 is provided for each county in millions of miles. 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.

County	VMT (Millions)	#Commuters to Philadelphia, PA	#Commuters to Delaware, PA	#Commuters to New Castle, DE
New Castle, DE	5674.40	5,386	8,150	209,742
Kent, DE	1435.19	37	125	6,058
Philadelphia, PA	6499.46	429,667	21,802	1,856
Delaware, PA	4011.36	48,151	137,988	9,002
Montgomery, PA	7526.57	54,576	11,758	1,201
Chester, PA	4414.36	10,568	17,870	12,976
Bucks, PA	5249.59	31,892	2,754	493
Northampton, PA	2399.15	244	66	16
Berks, PA	3320.25	702	505	157
Lancaster, PA	4391.88	607	615	523
Lehigh, PA	3374.14	578	171	22
Gloucester, NJ	2621.22	13,778	3,179	1,662
Camden, NJ	4668.91	32,961	3,232	1,286
Burlington, NJ	4901.56	17,661	1,771	597
Ocean, NJ	3366.62	491	118	45
Atlantic, NJ	3234.23	1,359	314	175
Monmouth, NJ	6229.76	622	66	40
Mercer, NJ	2667.73	1,574	244	139
Cumberland, NJ	1264.16	618	105	171
Salem, NJ	1012.51	615	486	3,258
Cecil, MD	1192.63	254	373	14,059

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

Factor 5: Expected Growth

County	2005 Population	2006 Population	% Growth 2005-2006
New Castle, DE	522,094	525,587	0.7
Kent, DE	143,462	147,601	2.9
Philadelphia, PA	1,456,350	1,448,394	1
Delaware, PA	554,393	555,996	5
Montgomery, PA	774,666	775,688	3
Chester, PA	473,723	482,112	7
Bucks, PA	619,772	623,205	4
Northampton, PA	287,334	291,306	13
Berks, PA	396,236	401,149	9
Lancaster, PA	489,936	494,486	6
Lehigh, PA	330,168	335,544	11
Gloucester, NJ	277,037	282,031	1.8
Camden, NJ	515,381	517,001	0.3
Burlington, NJ	449,148	450,627	0.3
Ocean, NJ	558,170	562,335	0.7
Atlantic, NJ	270,318	271,620	0.5
Monmouth, NJ	634,841	635,285	0.1
Mercer, NJ	366,070	367,605	0.4
Cumberland, NJ	152,905	154,823	1.3
Salem, NJ	66,054	66,595	0.8

Ocean, Gloucester, and Burlington Counties experienced low to moderate growth in New Jersey.

Factor 6: Meteorology

This factor did not play a significant role in the decision making process for the Southern New Jersey Counties.

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

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

Factor 7: Geography/Topography

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

Factor 8: Jurisdictional Boundaries

The current jurisdictional boundaries for the annual PM_{2.5} nonattainment area are adequate for the 24-hour PM_{2.5} nonattainment area. The area includes Gloucester, Camden, and Burlington counties in New Jersey, Bucks, Montgomery, Chester, Philadelphia counties in Pennsylvania and New Castle County in Delaware.

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 emissions is reflected in Factor 1.

Emissions of direct PM_{2.5}, NO_x, and SO₂ will continue to decrease in the future because of State and federal efforts that include Ozone Reasonably Available Control Technology rules that the NJDEP will propose to address emissions of volatile organic compounds and oxides of nitrogen, the federal Clean Air Interstate Rule, and PM_{2.5} Reasonably Available Control Technology.

Analysis of the New Jersey Portion of the Northern New Jersey/New York/Connecticut Nonattainment Area (Annual) for Consideration as a Nonattainment Area for the 24-Hour PM_{2.5} National Ambient Air Quality Standard

The New Jersey portion of the Northern New Jersey/New York/Connecticut nonattainment area for the annual PM_{2.5} NAAQS includes the counties of Passaic, Bergen, Morris, Essex, Hudson, Union, Somerset, Middlesex, Mercer, and Monmouth.

The NJDEP recommends that New Jersey portion of the current Northern New Jersey/ New York/Connecticut PM_{2.5} nonattainment area be designated as a 24-hour PM_{2.5} nonattainment area. The following is a brief summary of the nine-factor analysis for the Northern New Jersey region's air quality.

Factor 1: Air Quality Data

Violating monitors (based on 2004-2006 design value data) in New Jersey are found in Bergen, Essex, Hudson, and Union counties.

County	PM _{2.5} 2004-2006 Design Value (µg/m ³)
Orange, NY	28
Rockland, NY	NA
Westchester, NY	34
Bronx, NY	39
Queens, NY	34
Nassau, NY	33
Kings, NY	37
Richmond, NY	34
Suffolk, NY	
New York, NY	41
Putnam, NY	No monitor
Dutchess, NY	No monitor
Ulster, NY	No monitor
Sullivan, NY	No monitor
Bergen, NJ	37
Middlesex, NJ	34.0
Monmouth, NJ	No monitor
Essex, NJ	38
Mercer, NJ	34
Hudson, NJ	42.6
Union, NJ	40.9
Morris, NJ	31
Passaic, NJ	35.0
Somerset, NJ	No monitor
Ocean, NJ	31
Hunterdon, NJ	No monitor
Sussex, NY	No monitor
Warren, NJ	34
Fairfield, CT	36
New Haven, CT	38

All counties with design values above the standard are in counties that are currently designated nonattainment for the annual PM_{2.5} standard. Middlesex, Mercer, Morris, Passaic, and Warren Counties had design values approaching the standard in New Jersey.

Factor 2: Emissions in the New York and New Jersey Counties Included in the Northern New Jersey/New York/Connecticut (Annual) Nonattainment Area and Adjacent Counties

The following table shows total emissions (in tons per year) for New York and New Jersey Counties included in the Northern New Jersey/New York/Connecticut nonattainment area (annual) and adjacent counties. (Data source: 2002 MANE-VU Modeling Inventory).

County	2002 PM _{2.5} (tons)	Proj 2009 PM _{2.5} (tons)	02-09 % change	2002 SO ₂ (tons)	Proj 2009 SO ₂ (tons)	02-09 % change	2002 NO _x (tons)	Proj 2009 NO _x (tons)	02-09 % change
Orange, NY	1,523	2,467	62	23,007	24,148	5	20,030	14,272	-29
Rockland, NY	734	1,031	40	10,242	2,086	-80	14,165	9,072	-36
Westchester, NY	1,832	1,796	-2	4,846	4,495	-7	48,464	20,357	-58
Bronx, NY	1,202	1,199	0	3,182	2,952	-7	16,056	11,101	-31
Queens, NY	3,112	2,603	-16	9,614	5,206	-46	42,659	27,580	-35
Kings, NY	2,492	2,398	-4	6,747	4,561	-32	28,296	21,083	-25
Richmond, NY	872	840	-4	2,104	873	-59	10,099	7,607	-25
Nassau, NY	2,432	2,311	-5	5,773	4,691	-19	38,626	24,814	-36
Suffolk, NY	4,729	4,226	-11	50,269	18,682	-63	64,398	39,672	-38
Ulster, NY	1,667	1,596	-4	3,374	3,275	-3	7,526	5,209	-31
Sullivan, NY	916	890	-3	1,007	957	-5	2,658	1,777	-33
New York, NY	3,997	3,785	-5	11,664	8,964	-23	40,284	30,330	-25
Dutchess, NY	1,311	1,274	-3	4,856	4,971	2	9,900	6,597	-33
Putnam, NY	521	478	-8	1,218	1,134	-7	7,268	3,578	-51
Bergen, NJ	1,801	1,698	-6	1,739	1,064	-39	26,840	16,862	-37
Middlesex, NJ	1,977	1,811	-8	2,115	1,239	-41	26,835	16,704	-38
Monmouth, NJ	1,640	1,481	-10	1,669	810	-51	17,925	11,291	-37
Essex, NJ	1,520	1,246	-18	4,316	3,331	-23	24,594	14,123	-43
Mercer, NJ	1,236	1,653	34	15,508	4,270	-72	25,520	9,957	-61
Hudson, NJ	2,002	1,646	-18	21,409	12,064	-44	22,047	10,866	-51
Union, NJ	1,380	1,293	-6	3,503	2,189	-38	18,850	11,746	-38
Morris, NJ	1,663	1,536	-8	1,234	894	-28	15,708	9,586	-39
Passaic, NJ	1,021	930	-9	760	533	-30	9,836	6,019	-39
Somerset, NJ	1,556	1,457	-6	636	416	-35	10,365	6,535	-37
Ocean, NJ	2,256	2,023	-10	1,074	762	-29	10,421	7,300	-30
Hunterdon, NJ	1,168	1,047	-10	613	434	-29	6,613	3,942	-40
Sussex, NJ	1,196	1,111	-7	692	582	-16	3,799	2,495	-34
Warren, NJ	1,031	958	-7	565	464	-18	5,250	3,065	-42
Burlington, NJ	1,893	1,717	-9	3,429	1,314	-62	18,522	12,233	-34

Factor 3: Population/Population Density

County	2006 Population	2006 Population Density (population per sq mi)
Orange, NY	376,392	418
Rockland, NY	294,965	1,648
Westchester, NY	949,355	2,133
Bronx, NY	1,361,473	32,393
Queens, NY	2,255,175	20,644
Kings, NY	2,508,820	35,531
Nassau, NY	1,325,662	4,650
Richmond, NY	477,377	7,651
Suffolk, NY	1,469,715	1,556
New York, NY	1,611,581	70,191
Dutchess, NY	295,146	349
Putnam, NY	100,603	415
Sullivan, NY	76,588	76
Ulster, NY	182,742	158
Middlesex, NJ	786,971	2,420
Bergen, NJ	904,037	3,778
Monmouth, NJ	635,285	1,304
Essex, NJ	786,147	6,299
Mercer, NJ	367,605	1,552
Hudson, NJ	601,146	10,000
Union, NJ	531,088	5,073
Morris, NJ	493,160	1,003
Somerset, NJ	324,186	975
Passaic, NJ	497,093	2,644
Ocean, NJ	562,335	803
Hunterdon, NJ	130,783	284
Sussex, NJ	153,384	277
Warren, NJ	110,919	286

Source: US Census Bureau, 2006 Population Estimates, Census 2000, 1990 Census

Due to their large concentrated population and relative land area size, the counties within New Jersey (i.e., Middlesex, Essex, and Hudson counties) are moderately high for this factor (i.e., high population densities, high population relative to the remainder of the nonattainment area and adjacent counties).

Factor 4: Traffic and Commuting Patterns

The total Vehicle Miles Traveled (VMT) for 2005 is provided for each county in millions of miles.

County	VMT (Millions)	#Commuters to New York Co.	#Commuters to Bronx Co.	# Commuters to Union Co.	# Commuters to New Haven, CT
Orange, NY	4,696.12	9,610	2,414	147	29
Rockland, NY	2,731.10	17,025	6,245	350	56
Westchester, NY	9,166.01	79,643	27,053	327	343
Bronx, NY	4,720.60	159,664	168,903	586	56
Queens, NY	7,838.83	346,268	18,373	780	138
Kings, NY	4,899.46	341,155	11,365	1,567	112
Nassau, NY	11,919.85	94,485	6,274	187	90
Richmond, NY	2,002.10	53,249	1,095	1,486	11
Putnam, NY	3,084.98	4,416	2,021	30	181
New York, NY	4,378.20	631,132	20,775	967	178
Ulster, NY	2,208.47	1,565	1,565	0	11
Dutchess, NY	3,179.54	3,963	1,085	22	199
Bergen, NJ	9,123.92	61,253	5,353	5,124	74
Middlesex, NJ	8,014.09	25,765	355	26,653	51
Monmouth, NJ	6,229.74	22,425	313	8,319	32
Essex, NJ	5,611.09	28,076	782	24,052	10
Mercer, NJ	2,667.73	5,654	147	1,291	15
Hudson, NJ	2,543.18	58,423	1,214	6,740	23
Union, NJ	4,704.31	16,305	417	113,263	11
Morris, NJ	5,397.82	11,516	268	8,755	15
Somerset, NJ	2,702.02	6,243	87	11,835	14
Passaic, NJ	3,302.32	8,402	473	2,943	5
Ocean, NJ	3,366.62	2,964	115	4,567	13
Hunterdon, NJ	928.70	1,176	7	3,069	0
Sussex, NJ	888.93	1,449	94	967	13
Warren, NJ	1,342.37	562	5	991	0
Sullivan, NY	783.93	829	110	6	0
Fairfield, CT	7,648.71	24,831	1,258	56	21,900
New Haven, CT	6,947.70	1,584	183	23	290,098
Hartford, CT	7,951.25	460	36	11	16,948
New London, CT	3,181.29	126	19	9	1,638

The largest number of commuters to counties with violating monitors in 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 Middlesex, Bergen, Monmouth, Essex, Hudson, and Union Counties in New Jersey. The remaining counties in New York and New Jersey have low numbers of commuters to counties in the nonattainment area with violating monitors. Middlesex and Bergen in New Jersey score the highest for VMT when compared to the rest of the nonattainment area and adjacent counties.

Factor 5: Expected Growth

County	2005 Population	2006 Population	% Population Growth 2005-2006
Orange, NY	372,750	376,392	1.0
Rockland, NY	294,636	294,965	0.1
Westchester, NY	947,719	949,355	0.2
Bronx, NY	1,364,566	1,361,473	-0.2
Queens, NY	2,256,576	2,255,175	-0.1
Kings, NY	2,511,408	2,508,820	-0.1
Nassau, NY	1,331,620	1,325,662	-0.4
Richmond, NY	475,014	477,377	0.5
Suffolk, NY	1,472,086	1,469,715	-0.2
New York, NY	1,606,275	1,611,581	0.3
Ulster, NY	182,433	182,742	0.2
Dutchess, NY	294,509	295,146	0.2
Putnam, NY	100,528	100,603	0.1
Sullivan, NY	76,155	76,588	0.6
Middlesex, NJ	789,283	786,971	-0.3
Passaic, NJ	496,985	497,093	-
Bergen, NJ	902,308	904,037	0.2
Monmouth, NJ	634,841	635,285	0.1
Essex, NJ	789,166	786,147	-0.4
Mercer, NJ	366,070	367,605	0.4
Hudson, NJ	602,970	601,146	-0.3
Union, NJ	530,710	531,088	0.1
Morris, NJ	490,084	493,160	0.6
Somerset, NJ	319,830	324,186	1.4
Ocean, NJ	558,170	562,335	0.7
Hunterdon, NJ	130,042	130,783	0.6
Sussex, NJ	152,726	153,384	0.4
Warren, NJ	110,317	110,919	0.5

Based upon an analysis of this factor, Somerset County has been identified as experiencing either significant recent growth on a percentage or absolute basis. Middlesex, Monmouth, Hudson, Morris, Hunterdon, Sussex, and Warren Counties experienced moderate growth. The remaining counties have very low growth.

Factor 6: Meteorology

Meteorology did not play a significant role in the decision making process for New Jersey Counties in the Northern New Jersey/New York/Connecticut nonattainment area (annual).

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 predominantly from the northwest, southwest, and northeast.

Factor 7: Geography/Topography

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

Factor 8: Jurisdictional Boundaries

Although this factor is considered as part of the analysis, this factor is not a dominant factor in the decision making process. This area includes Passaic, Bergen, Morris, Essex, Hudson, Somerset, Unions, Middlesex, Mercer, and Monmouth counties in New Jersey, Orange, Rockland, Westchester, Bronx, Queens, Kings, Richmond, Suffolk, and Nassau Counties in New York, and Fairfield and New Haven Counties in Connecticut.

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.

Emissions of direct PM_{2.5}, NO_x, and SO₂ will continue to decrease in the future because of State and federal efforts that include Ozone Reasonably Available Control Technology rules that the NJDEP will propose to address emissions of volatile organic compounds and oxides of nitrogen, the federal Clean Air Interstate Rule, and PM_{2.5} Reasonably Available Control Technology.

Analysis of the New Jersey Counties Adjacent to the Northampton/Lehigh County 24-Hour PM_{2.5} Nonattainment Area Proposed by the Pennsylvania Department of Environmental Protection

The New Jersey portion of this area includes Warren County and adjacent counties of Sussex, Hunterdon, and Morris counties. Based on the 2004-2006 design value in New Jersey, Warren County's monitor is 33.8 $\mu\text{g}/\text{m}^3$ and located in Phillipsburg.

The New Jersey Department of Environmental Protection recommends that Knowlton Township in Warren County be designated as part of a multi-state nonattainment area including Northampton and Lehigh Counties in Pennsylvania as proposed by the Pennsylvania Department of Environmental Protection. The following is a brief summary of the nine-factor analysis for the Warren County and adjacent counties, as well as a discussion under Factor 2 that supports the nonattainment area recommendation being put forth by the NJDEP.

Factor 1: Air Quality Data

The air quality analysis is an examination of PM_{2.5} air quality monitoring data, including the daily design value calculated for each area based on air quality data for a 3-year period.

County	PM _{2.5} 2004- 2006 Design Value ($\mu\text{g}/\text{m}^3$)
Northampton, PA	36.6
Lehigh, PA	Monitor was shut down in 2006
Berks, PA	37.3
Schuylkill, PA	No Monitor
Carbon, PA	No Monitor
Monroe, PA	No Monitor
Bucks, PA	33.2
Hunterdon, NJ	No Monitor
Sussex, NJ	No Monitor
Morris, NJ	31.5
Warren, NJ	33.8

Pennsylvania's Northampton and Berks County have a violating monitor whereas Warren County and Morris County monitors are slightly below the 24-hour standard.

As a condition of an October 31, 2001 Administrative Consent Order between Roche Vitamins Inc. (later became DSM) and the NJDEP, a supplemental environmental project was implemented to establish an ambient air monitoring program in the vicinity of the Town of Belvidere and White Township in Warren County, New Jersey. The program was called the Warren County Air Monitoring Program (WCAMP), monitored the air for levels of sulfur dioxide (SO₂), fine particulate matter (PM_{2.5}), mercury, selected volatile organic compounds and specified meteorological parameters. The primary purpose of the WCAMP was to obtain and report air quality information from Belvidere and surrounding areas.

The WCAMP began operation in October 2002 and achieved full operation in December 2002. Data generated by this program were sent to the DSM Community Advisory Panel and the Warren-Northampton Regional Air Quality Advisory Panel (AIRQAP) for review, and posted on AIRQAP's website for review by the public. This data has helped greatly in characterizing the extent to which the region is in compliance with National Ambient Air Quality Standards (NAAQS) for sulfur dioxide and fine particles and with New Jersey's health-based benchmarks for volatile organic compounds. Although there were 24-hour averages that exceeded the current $35\mu\text{g}/\text{m}^3$ standard the 98th percentile value was $31.8\mu\text{g}/\text{m}^3$ and $32.8\mu\text{g}/\text{m}^3$ for 2003 and 2004, respectively.

Factor 2: Emissions in Proposed Northampton/Lehigh County Nonattainment Area, Warren County and Adjacent Counties in Pennsylvania and New Jersey.

The following table shows total 2002 emissions (in tons per year) and projected 2009 emissions for Pennsylvania's Northampton, Lehigh, Berks, Schuylkill, Carbon, Monroe, and Bucks counties. New Jersey's included counties are Warren, Hunterdon, Sussex, and Morris. (Data source: 2002 MANE-VU Modeling Inventory.)

County	2002 PM _{2.5} (tons)	Proj 2009 PM _{2.5} (tons)	02-09 % change	2002 SO ₂ (tons)	Proj 2009 SO ₂ (tons)	02-09 % change	2002 NO _x (tons)	Proj 2009 NO _x (tons)	02-09 % change
Northampton, PA	2,995.62	6,340	112	58,796.58	39,973	-32	24,518.02	6,340	-74
Lehigh, PA	1,510.82	1,568	4	3,761.99	3,796	1	14,525.00	9,589	-34
Berks, PA	2833	3949	39	17593	12843	-27	22221	15638	-30
Schuylkill, PA	1245	1371	10	7271	17368	139	8701	6981	-20
Carbon, PA	617	727	18	1465	2012	37	4460	3542	-21
Monroe, PA	1192	1279	7	1084	902	-17	7675	5280	-31
Bucks, PA	2170.35	2158	-1	3837.34	3588	-6	20195.10	14400	-29
Hunterdon, NJ	1167.93	1047	-10	613.34	434	-29	6612.99	3942	-40
Sussex, NJ	1196.31	1111	-7	691.84	582	-16	3799.29	2495	-34
Morris, NJ	1663.40	1536	-8	1234.39	894	-28	15708.30	9586	-39
Warren, NJ	1,030.96	958	-7	565.44	464	-18	5,250.16	3,065	-42

The projected 2009 PM_{2.5} emissions show that all the Pennsylvania counties with the exception of Bucks County have increasing emissions whereas all New Jersey Counties have a decrease in emissions.

A major source of PM_{2.5} emissions in Northampton County, Pennsylvania, is the Portland Generating Plant. Because of the close proximity to Warren County, New Jersey, the NJDEP performed a PM_{2.5} air quality modeling analysis of the Portland Generating Plant. The Portland Generating Plant is located in Upper Mount Bethel Township along the Delaware River on the Pennsylvania/New Jersey border. The impact of primary PM_{2.5} emissions and secondary PM_{2.5} particulates formed from sulfur dioxide and nitrogen oxides emissions were modeled to show that this facility's emissions increase the concentrations of PM_{2.5} in areas of Warren County, New Jersey. New Jersey's Phillipsburg PM_{2.5} monitor is too away to detect the maximum impact

of the PM_{2.5} concentrations coming from the Portland Generating Plant. The modeling concentrations when added to background PM_{2.5} concentrations showed that the combined concentrations were predicted to exceed the new 24-hour PM_{2.5} standard of 35 µg/m³. A more extensive explanation of the air quality modeling is provided in **Attachment B**.

Factor 3: Population/Population Density

County	2006 Population	2006 Population Density (population per sq mi)
Northampton, PA	291,306	714
Lehigh, PA	335,544	899
Berks, PA	401,149	435
Schuylkill, PA	147,405	
Carbon, PA	62,567	
Monroe, PA	165,685	
Bucks, PA	623,205	985
Hunterdon, NJ	130,783	284
Sussex, NJ	153,384	277
Morris, NJ	493,160	1,003
Warren, NJ	110,919	286

Source: US Census Bureau, 2006 Population Estimates, Census 2000, 1990 Census

Due to the low population density in this area, this factor does not play a significant role in the designation.

Factor 4: Traffic and Commuting Patterns

The total Vehicle Miles Traveled (VMT) for 2005 is provided for each county in millions of miles.

County	VMT (Millions)	# of Commuters to Northampton, PA	# of Commuters to Lehigh, PA	# of Commuters to Warren, PA	# of Commuters to Hunterdon	# of Commuters to Somerset	# of Commuters to Morris
Northampton, PA	2399.15	68,449 (54)	30,180 (24)	7,192 (6)	3,879 (3)	2,376 (2)	1,515 (1)
Lehigh, PA	3374.14	18,040 (12)	110,302 (75)	Less than 1%	Less than 1%	Less than 1%	Less than 1%
Berks, PA	3320.25	Less than 1% if any	6,538 (4)	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Schuylkill, PA	1353.08	Less than 1% if any	1,742 (3)	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Carbon, PA	698.90	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Monroe, PA	1555.69	3,467 (6)	1,618 (3)	1,359 (2)	Less than 1% if any	Less than 1% if any	3,329 (5)
Bucks, PA	1669.59	1,975 (8)	4,663 (18)	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any
Hunterdon, NJ	928.70	Less than 1% if any	Less than 1% if any	1,145 (2)	25,761 (41)	12,983 (21)	3,656 (6)
Sussex, NJ	888.93	Less than 1% if any	Less than 1% if any	1,410 (2)	Less than 1% if any	955 (1)	20,398 (28)
Morris, NJ	5397.82	Less than 1% if any	Less than 1% if any	Less than 1% if any	Less than 1% if any	8,954 (4)	138,737 (58)

Warren County workforce commuting within New Jersey

County	VMT (Millions)	# of Commuters within Warren Co. (% of workforce)	# of Commuters to Morris Co (% of workforce)	# of Commuters to Hunterdon Co (% of workforce)	# of Commuters to Somerset Co. (% of workforce)	# of Commuters to Essex Co (% of workforce)	# of Commuters to Middlesex Co (% of workforce)
Warren, NJ	1342.37	21,034 (42)	9,273 (18)	5,326 (11)	3,653 (7)	1,379 (3)	1,366 (3)

Warren County Workforce commuting outside of New Jersey

County	# of Commuters to Northampton Co. (% of workforce)	# of Commuters to Lehigh Co. (% of workforce)	# of Commuters to New York Co. (% of workforce)
Warren, NJ	1,803 (4)	602 (1)	562 (1)

Factor 5: Expected Growth

County	2005 Population	2006 Population	% Growth 2005-2006
Northampton, PA	287,334	291,306	13
Lehigh, PA	330,168	335,544	11
Berks, PA	396,236	401,149	9
Schuylkill, PA	146,996	147,405	22
Carbon, PA	61,876	62,567	40
Monroe, PA	162,415	165,685	21
Bucks, PA	619,772	623,205	4
Hunterdon, NJ	130,042	130,783	0.6
Sussex, NJ	152,726	153,384	0.4
Morris, NJ	490,084	493,160	0.6
Warren, NJ	110,317	110,919	0.5

Warren County along with the rest of the New Jersey counties shows low percentage growth.

Factor 6: Meteorology

Meteorology did not play a significant role in the decision making process for Warren County.

Factor 7: Geography/topography

The high terrain in the river valley in Warren County contributes to higher emission concentrations in localized areas.

Factor 8: Jurisdictional boundaries

New Jersey is recommending the municipality of Knowlton, Warren County be included in a multi-state nonattainment area that includes Northampton/Lehigh Counties, as proposed by the Pennsylvania Department of Environmental Protection. The reasons for this recommendation are discussed under Factor 2.

Factor 9: Level of control of emission sources

This factor played a significant role in the decision making. See the discussion under Factor 2.