Commonwealth of Pennsylvania
Department of Environmental Protection

REQUEST FOR REDESIGNATION
AS ATTAINMENT

SCRANTON/WILKES-BARRE
EIGHT-HOUR OZONE NONATTAINMENT AREA

JUNE 2007

Bureau of Air Quality
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INTRODUCTION

Maintaining concentrations of ground-level ozone below the health-based standard is important because ozone is a serious human health threat, and also can cause damage to important food crops, forests, and wildlife.

Repeated exposure to ozone pollution may cause a variety of adverse health effects for both healthy people and those with existing conditions including difficulty in breathing, chest pains, coughing, nausea, throat irritation, and congestion. It can worsen bronchitis, heart disease, emphysema, and asthma, and reduce lung capacity. Asthma is a significant and growing threat to children and adults. Ozone can aggravate asthma, causing more asthma attacks, increased use of medication, more medical treatment and more frequent visits to hospital emergency clinics. Because ozone pollution usually forms in hot weather, anyone who spends time outdoors in the summer may be affected, particularly children, the elderly, outdoor workers and people exercising. Children are most at risk from exposure to ozone because they are active outside, playing and exercising, during the summertime when ozone levels are highest.

Ozone is one of the most pervasive and detrimental pollutants known to affect vegetation, causing more injury to trees and crops than any other air pollutant in the United States. Ozone interferes with photosynthesis, the process by which plants convert water and sunlight to food. Ozone makes plants more susceptible to disease, insects, other pollutants, and harsh weather. It damages the foliage of trees and other plants, ruining the landscape of cities, parks and forests, and recreation areas. Research has shown that current ozone concentrations result in reductions in wood growth in forests of the Northeast of over 10 percent. There is strong scientific evidence showing that current levels of ozone are reducing crop yields, particularly in sensitive species - soybean, cotton, and peanuts. Annual crop loss from ozone for soybeans alone in Illinois, Indiana and Ohio has been calculated to fall between $199 million and $345 million. The U.S. Environmental Protection Agency (EPA) has estimated national crop yield losses due to ozone in excess of $1 billion annually. One of the key components of ozone, oxides of nitrogen (NO_x), contributes to fish kills and algae blooms in sensitive waterways, such as the Chesapeake Bay.

Ozone is not emitted directly to the atmosphere, but is formed by photochemical reactions between volatile organic compounds (VOCs) and NO_x in the presence of sunlight. The long, hot, humid days of summer are particularly conducive to ozone formation, so ozone levels are of concern primarily during the months of May through September. The primary sources of man-made VOCs and NO_x, the ozone precursors, are the evaporation of fuels and solvents (gasoline and consumer products), combustion of fuels (motor vehicles, power plants and non-road engines), and industrial processes.

The EPA has established the maximum limit for ozone pollution allowed in the ambient air. EPA's National Ambient Air Quality Standard (NAAQS) for ozone is 0.08 parts per million (ppm) averaged over eight hours.

In June 2004, EPA designated the Scranton/Wilkes-Barre area (Scranton Area) as nonattainment for the eight-hour ozone NAAQS based on data from 2001-2003. This nonattainment area consists of Lackawanna, Luzerne, Monroe and Wyoming counties. The subsequent analyses clearly demonstrate that the ambient air quality in the Scranton Area now meets the eight-hour ozone NAAQS and that the emission reductions responsible for the air quality improvement are both permanent and enforceable. This analysis and the maintenance plan submitted concurrently to EPA demonstrates that the Scranton Area satisfies all criteria set forth in Section 107(d)(3)(E) of the Clean Air Act (CAA) and should be officially redesignated as attainment.

Section 107(d)(3)(E) of the CAA states that an area can be redesignated to attainment if the following conditions are met:

- The NAAQS has been attained; (Section 1)

- The applicable implementation plan has been fully approved under Section 110(k) and the state has met all applicable requirements for the area under Section 110 and Part D; (Section 2)

- The improvement in air quality is due to permanent and enforceable reductions in emissions; and (Section 1 and Section 3)

- A maintenance plan with contingency measures has been fully approved under Section 175A. (Section 4)

This redesignation request describes how the Scranton eight-hour ozone nonattainment area satisfies each of the Clean Air Act's Section 107(d)(3)(E) criteria for redesignation to attainment.

Requirements for a public comment process are set forth in Section 110(a)(2) of the CAA and 40 CFR Section 51.102(d). The Department of Environmental Protection (Department) held a public hearing on the maintenance plan, 2002 base year inventory and the request to redesignate the Scranton Area to attainment for the eight-hour ozone standard on Wednesday, May 23, 2007. Notice of the hearing was published in the *Pennsylvania Bulletin* and in the *Scranton Times Tribune* and *The Times Leader* newspapers at least 30 days prior to the date of the hearing. The public comment period closed on May 25, 2007. No comments were received.

SECTION 1

AMBIENT AIR QUALITY ANALYSIS

On April 30, 2004, the EPA promulgated its final nonattainment designations for the eight-hour ozone NAAQS (69 *Fed. Reg*. 23858). Designations became effective on June 15, 2004. Seventeen areas in Pennsylvania were designated as eight-hour ozone nonattainment areas. These nonattainment areas include 37 counties in Pennsylvania as well as certain additional counties in portions of the States of New Jersey, Delaware, Maryland and Ohio.

EPA designations were based on air-quality monitoring data for 2001, 2002 and 2003. Air quality in the Scranton Area has improved since the EPA's original designations. The Scranton nonattainment area's 2006 design value (based on data from 2004, 2005 and 2006) is 75 parts per billion (ppb). Following EPA criteria, a design value below 85 ppb is considered to be attainment. The Scranton Area design value of 75 ppb thus is below the 85 ppb threshold for attainment of the eight-hour ozone standard. Concentrations are expected to remain below this level over the next decade.

A. DESIGN VALUE DETERMINATION

The Scranton Area is composed of four counties: Lackawanna, Luzerne, Monroe and Wyoming. Historically there have been a total of 6 monitors operating in the Scranton nonattainment area. Ozone monitors have operated in Lackawanna, Luzerne and Monroe counties. There are currently four monitors operating along the I-81 corridor in Lackawanna and Luzerne counties.

This ambient air-quality analysis is based on ozone data measured at the six historical ozone monitors that have operated in the Scranton Area since the mid 1970s. The ambient air-quality data analysis for ozone was completed using the appropriate regulations and guidance documents. Monitoring procedures were determined in accordance with 40 CFR Part 58 (Ambient Air Quality Surveillance). Eight-hour ozone design values were calculated in accordance with EPA's Guideline on Data Handling Conventions for the Eight-Hour Ozone NAAQS (1998).

B. TRENDS ANALYSIS

1. Design Values

Ozone monitoring began in the Scranton Area during the 1974 ozone season. The Wilkes-Barre monitor (42-079-1101) currently has the highest eight-hour ozone design value (75 ppb). Trends in ozone design values were analyzed from 1988 through 2006. These were all of the years in which the monitors in the Scranton nonattainment area met

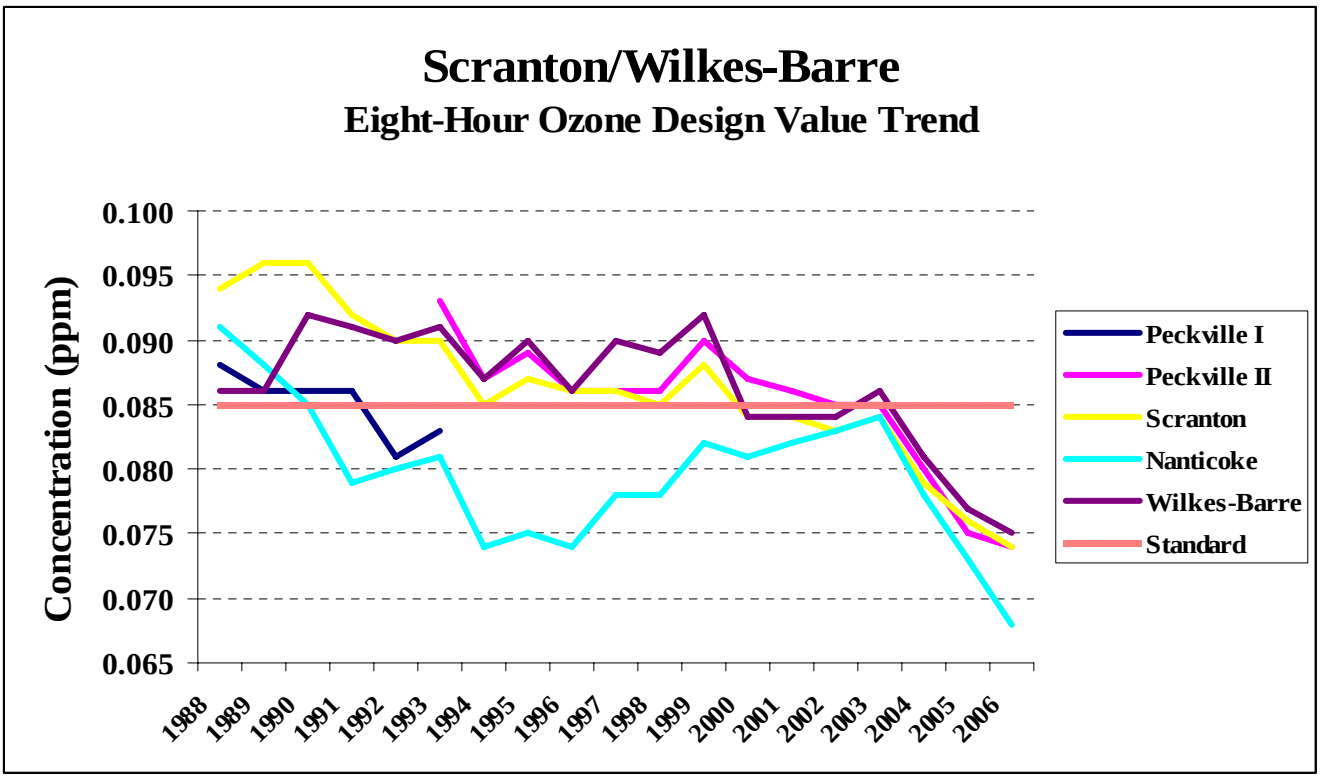
EPA's completeness requirements. Years prior to 1988 generally had less than 90% valid data over the entire ozone season (April 1 through October 31).

Table 1-1 lists the Wilkes-Barre monitor's eight-hour ozone design values from 1988 through 2006. Design values for the entire Scranton/Wilkes-Barre nonattainment area are presented in graphic form in Chart 1-1. Design values have generally fallen over the last two decades (~13% overall) with the bulk of the decline occurring over the last five years.

Table 1-1
Wilkes-Barre Monitor
(Scranton Nonattainment Area)
Eight-Hour Ozone Statistics

YEAR	% VALID DAYS	DESIGN VALUE (PPM)	4^{TH} HIGH (PPM)	EXCEEDANCES
1986	86.9%		0.084	3
1987	87.4%		0.075	2
1988	96.7%	0.086	0.101	18
1989	93.9%	0.086	0.082	2
1990	94.9%	0.092	0.094	9
1991	97.2%	0.091	0.098	10
1992	88.8%	0.090	0.080	3
1993	93.9%	0.091	0.097	8
1994	86.9%	0.087	0.085	4
1995	95.8%	0.090	0.089	10
1996	97.7%	0.086	0.085	4
1997	93.9%	0.090	0.096	8
1998	98.1%	0.089	0.088	7
1999	96.7%	0.092	0.093	9
2000	98.1%	0.084	0.073	1
2001	96.7%	0.084	0.088	7
2002	98.6%	0.084	0.092	7
2003	99.1%	0.086	0.078	2
2004	98.1%	0.081	0.073	0
2005	97.7%	0.077	0.081	1
2006	93.9%	0.075	0.073	0

Chart 1-1
Eight-Hour Ozone Design Values

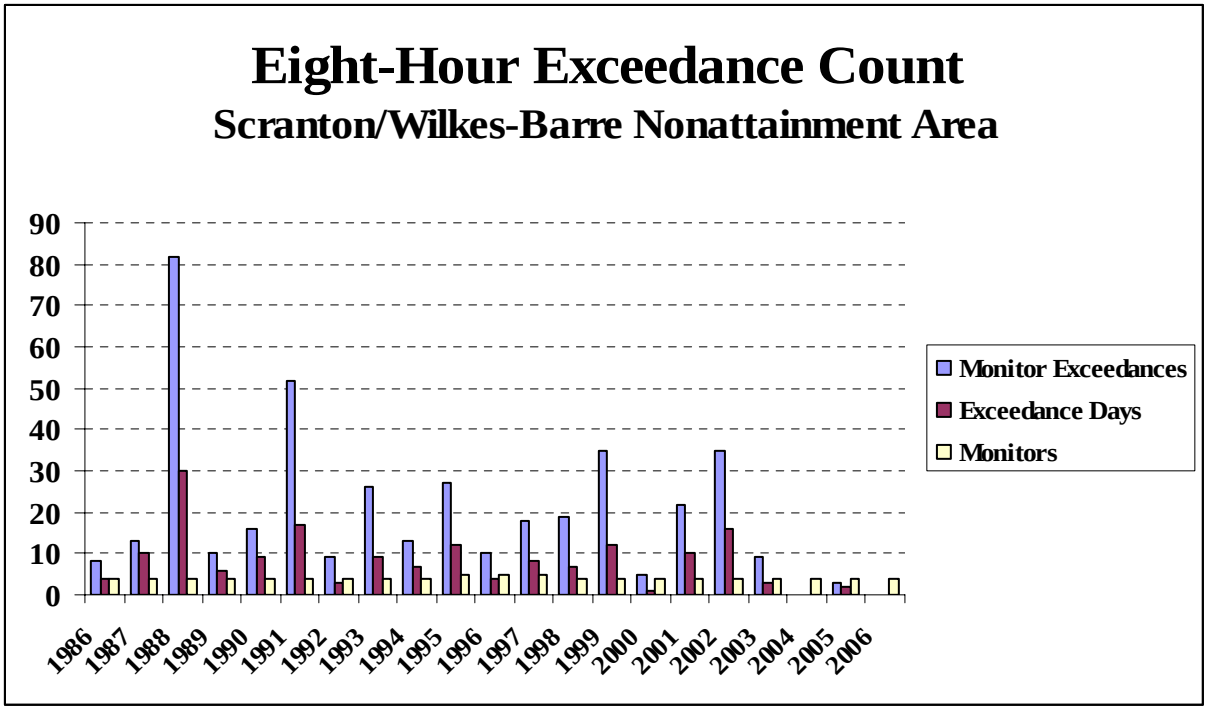


2. Exceedances

Exceedance trends were examined over the 1986-2006 time period. This time period generally met the 90% valid days requirement outlined in the EPA guideline. Exceedances were examined using two matrices since the Scranton Area has multiple monitors operating in it. These included the total number of monitored exceedances and exceedance days.

Monitored exceedances are counted for each monitor with a valid eight-hour ozone concentration greater than 84 ppb. An exceedance day is defined as any day at least one monitor recorded a valid eight-hour ozone concentration greater than 84 ppb. For example, in 2005 there were two days in the Scranton Area in which at least one monitor recorded an eight-hour ozone concentration greater than 84 ppb. On one of those days, three monitors in the Scranton Area recorded eight-hour ozone concentrations greater than 84 ppb and on the other day only one monitor exceeded the eight-hour ozone standard. Therefore for 2005, the number of monitor exceedances in the Scranton nonattainment area was four (4) and the number of exceedance days was two (2). Monitor exceedances and exceedance days for the Scranton Area are listed in Table 1-2 and graphed in Chart 1-2.

Chart 1-2
Exceedance Summary for the Scranton Ozone Nonattainment Area



The location and number of ozone monitors in the Scranton nonattainment area have changed over the 1986-2006 time period. The number of monitors has ranged between four and six over the last twenty years. The location of the Peckville monitor changed in 1990 and a monitor operated in southwestern Monroe County between 1997 and 1999 (this monitor did not meet EPA's completeness criteria to establish a design value).

Exceedance days have generally declined over the 1986-2006 time period. The Scranton Area has had on average 8.7 exceedance days per ozone season and an average of 22.0 monitor exceedances per ozone season. The bulk of exceedance days and monitor exceedances occurred between 1988-91 and 1997-99; exceedances during the 1997-99 time frame were mainly attributed to the Monroe County monitor (Kunkletown).

3. 4th High Eight-Hour Ozone Trends

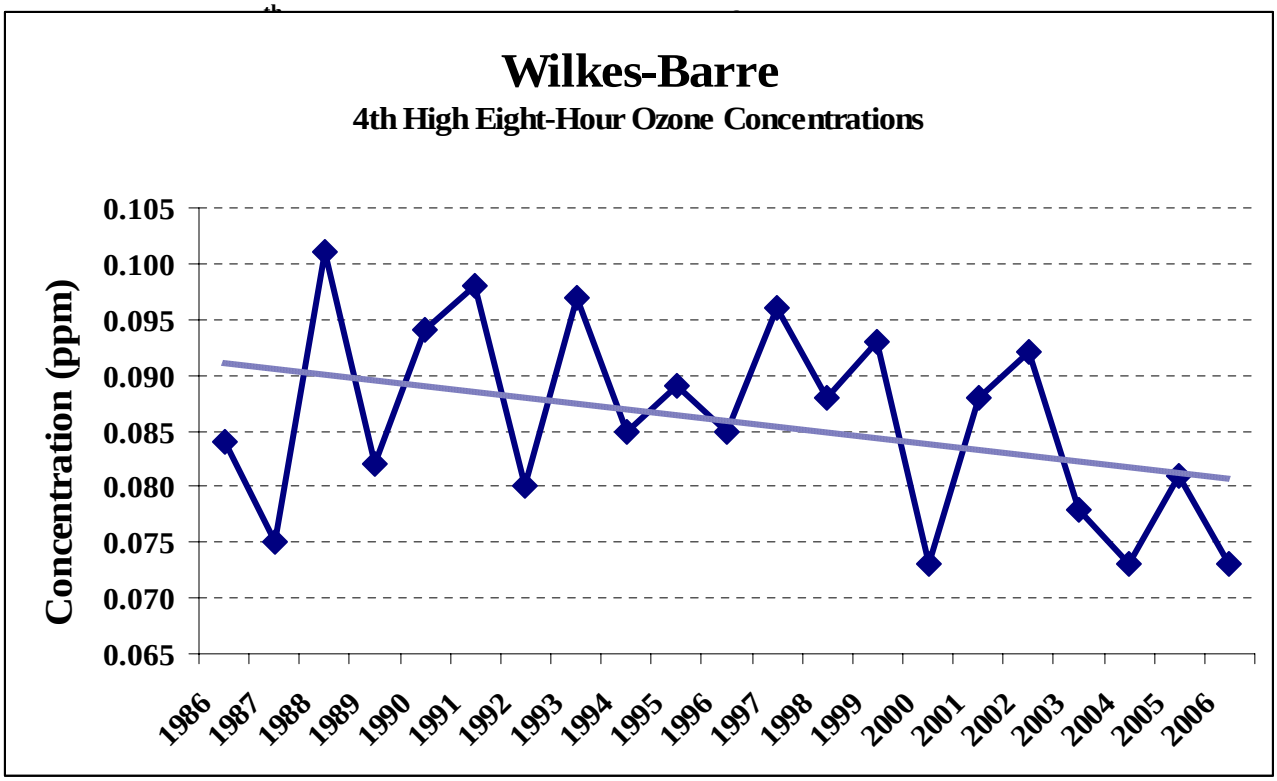
Eight-hour ozone design values are based on the 4th highest concentrations at a particular monitor over a three-year time period. An analysis of yearly "4th highs" yields an understanding of why design values change over time. Again, only years meeting EPA's completeness criteria (1986-2006) are included in this analysis. The Wilkes-Barre monitor's 4th high values are listed in Table 1-1.

Table 1-2
Scranton/Wilkes-Barre Nonattainment Area
Eight-Hour Ozone Exceedance Statistics

	Monitor Exceedances	Exceedance Days	Monitors
1986	8	4	4
1987	13	10	4
1988	82	30	4
1989	10	6	4
1990	16	9	4
1991	52	17	4
1992	9	3	4
1993	26	9	4
1994	13	7	4
1995	27	12	5
1996	10	4	5
1997	33	16	6
1998	33	3	4
1999	55	20	4
2000	5	1	4
2001	22	10	4
2002	35	16	4
2003	9	3	4
2004	0	0	4
2005	3	2	4
2006	0	0	4

Wilkes-Barre's 4th high values have varied considerably over the last two decades (See Chart 1-3). Some of this variability may be due to local meteorology. Concentrations remained relatively steady until the last few ozone seasons. Drops in the nonattainment area's design values and the number of monitor exceedances and exceedance days mirror this decrease in 4th high values over the same time period.

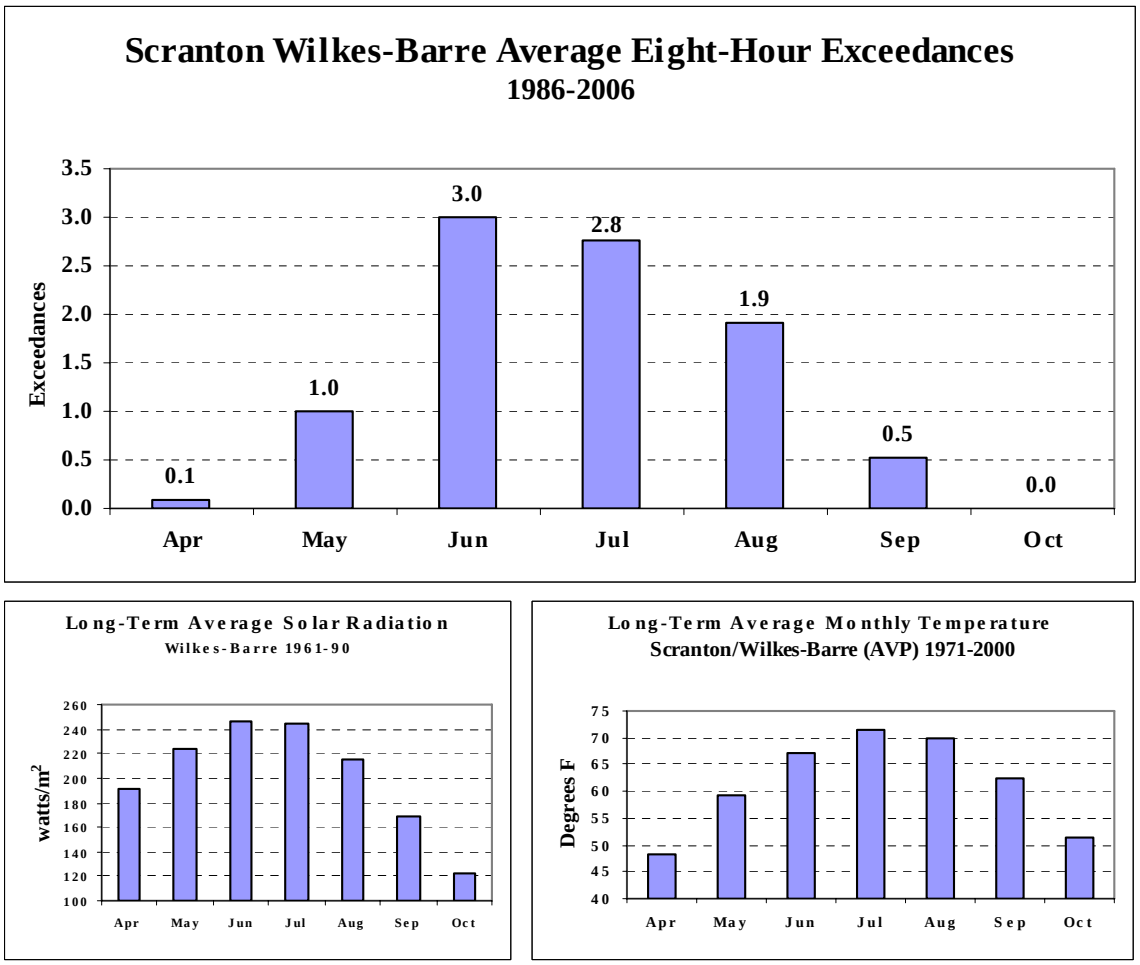
Chart 1-3


Wilkes-Barre
4th High Eight-Hour Ozone Concentrations
Concentration (ppm)
0.105
0.100
0.095
0.090
0.085
0.080
0.075
0.070
0.065
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006

C. CLIMATE TRENDS ANALYSIS

Daily ozone concentrations are heavily influenced by local meteorological conditions. Ozone is a secondary pollutant formed from oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. Since ozone chemistry is driven by solar insolation, peak ozone concentrations generally occur when solar insolation values are the strongest (mid summer). Chart 1-4 illustrates the relationship between solar insolation, ozone exceedances and average monthly temperatures. Exceedances in the Scranton Area occur most frequently in the months of June, July and August (JJA) when peak solar insolation values and peak temperatures occur.

Chart 1-4
Relationship between Eight-Hour Ozone Exceedances, Solar Insolation and Temperature

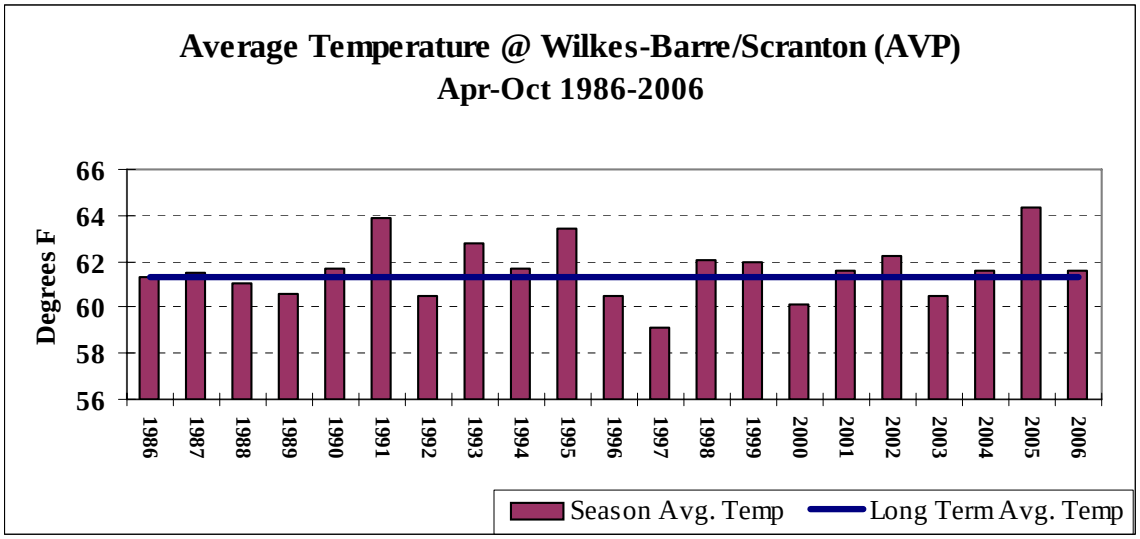


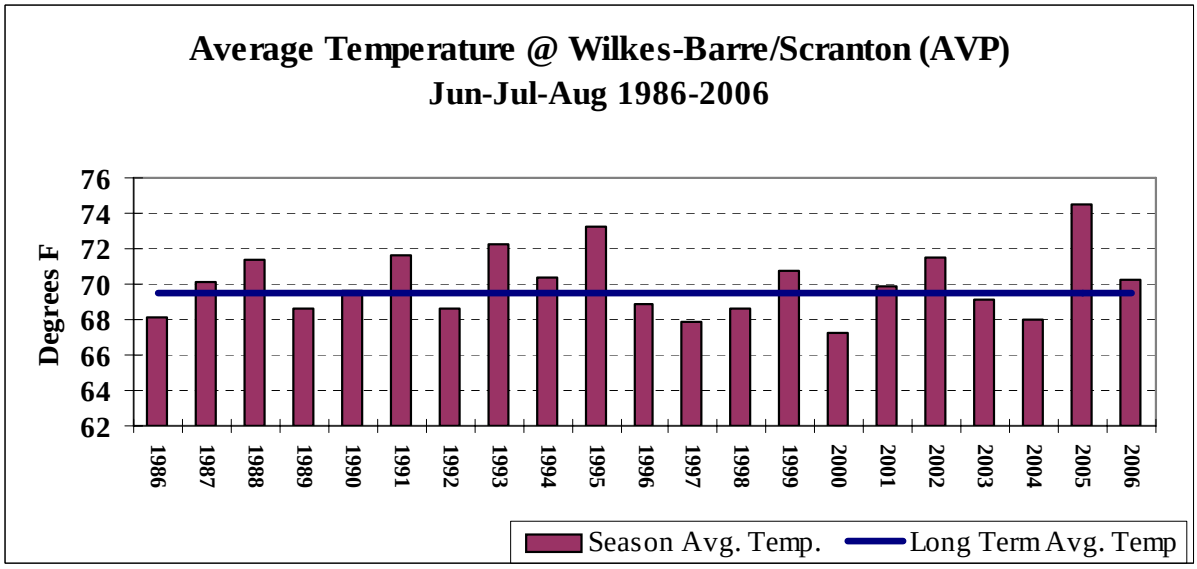
1. Temperature Trends

Temperature trends were examined over the same time period as the ozone trends to determine if there were similar trends in temperatures and ozone concentrations. Average temperatures as well as the number of 90º days from the Scranton/Wilkes-Barre International Airport were examined. The Scranton/Wilkes-Barre airport provides a consistent reporting site that had proper instrument siting and QA/QC activities during the time period in question. Data is publicly available from the National Climatic Data Center

Chart 1-5 shows the Scranton/Wilkes-Barre Airport's average temperatures from 1986 through 2006. Average temperature charts for the entire ozone season (Apr 1 through Oct 21) and JJA are shown. Long-term averages are also included on the charts to help define which years were warmer or cooler than normal.

Chart 1-5
Average Temperatures at Scranton/Wilkes-Barre Int'l Airport

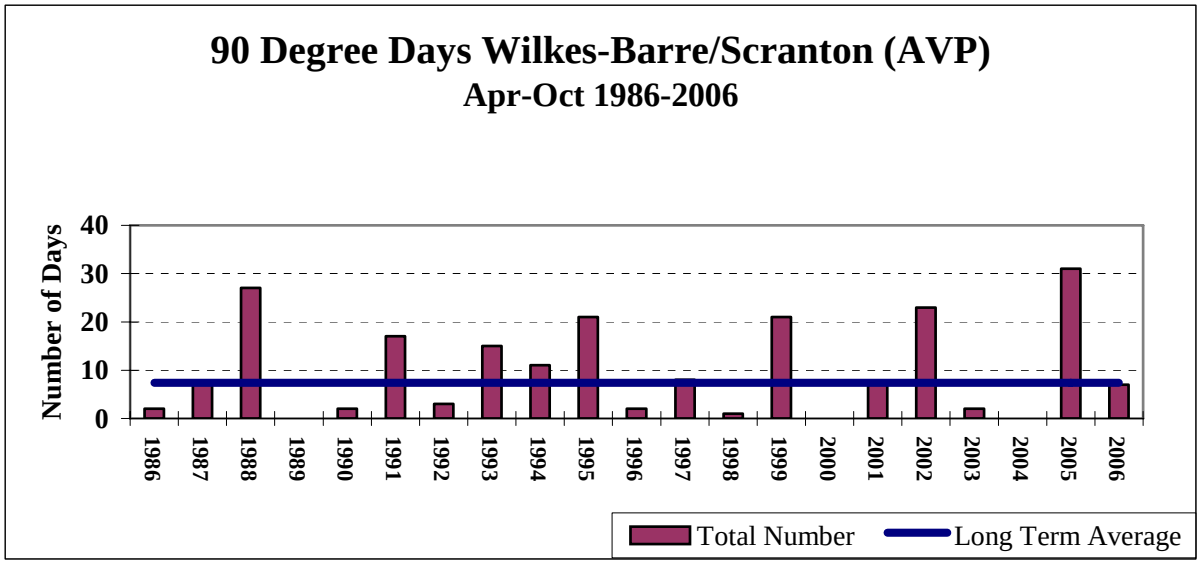


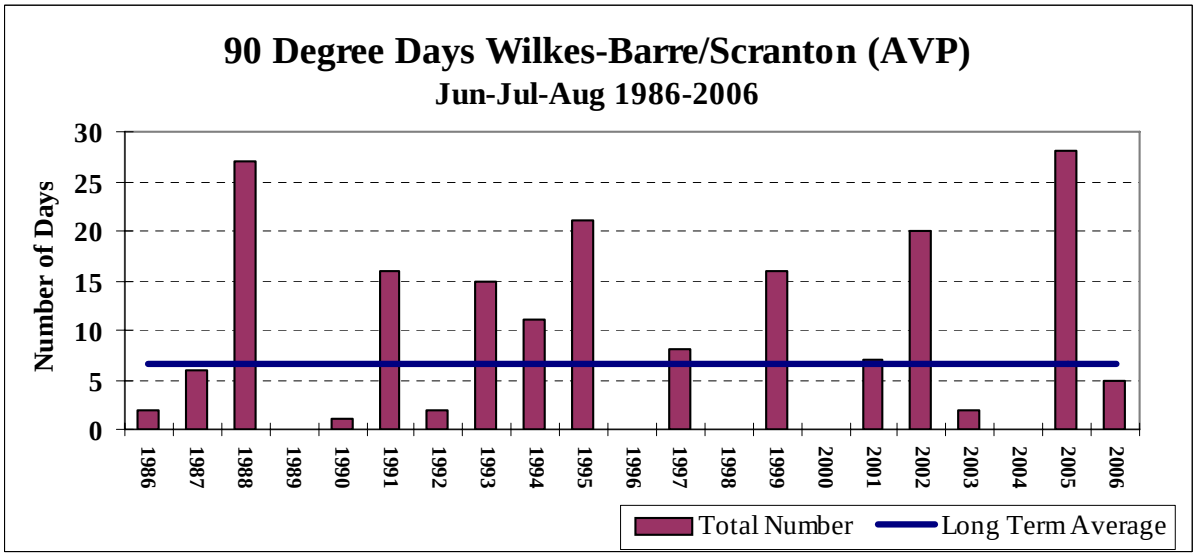


Ozone concentrations tend to peak during periods of extreme heat. One way to gauge this effect is to examine the number of 90º days. The more 90º days that occur during an ozone season the better the chance that ozone concentrations will be high. Higher ozone concentrations could lead to more exceedances and influence a monitor's 4th high and consequently its eight-hour ozone design value.

Chart 1-6 graphically displays the number of 90º days at the Scranton/Wilkes-Barre Airport over the 1986-2006 time period. Two graphs are included; one for the entire ozone season and one for the JJA time frame. For the time period in question, if the season had an above average number of 90º degree-days, then it had an above average number of 90º degree-days during the JJA time period and visa versa.

Chart 1-6
Number of 90º Degree Days at the Scranton/Wilkes-Barre Int'l Airport

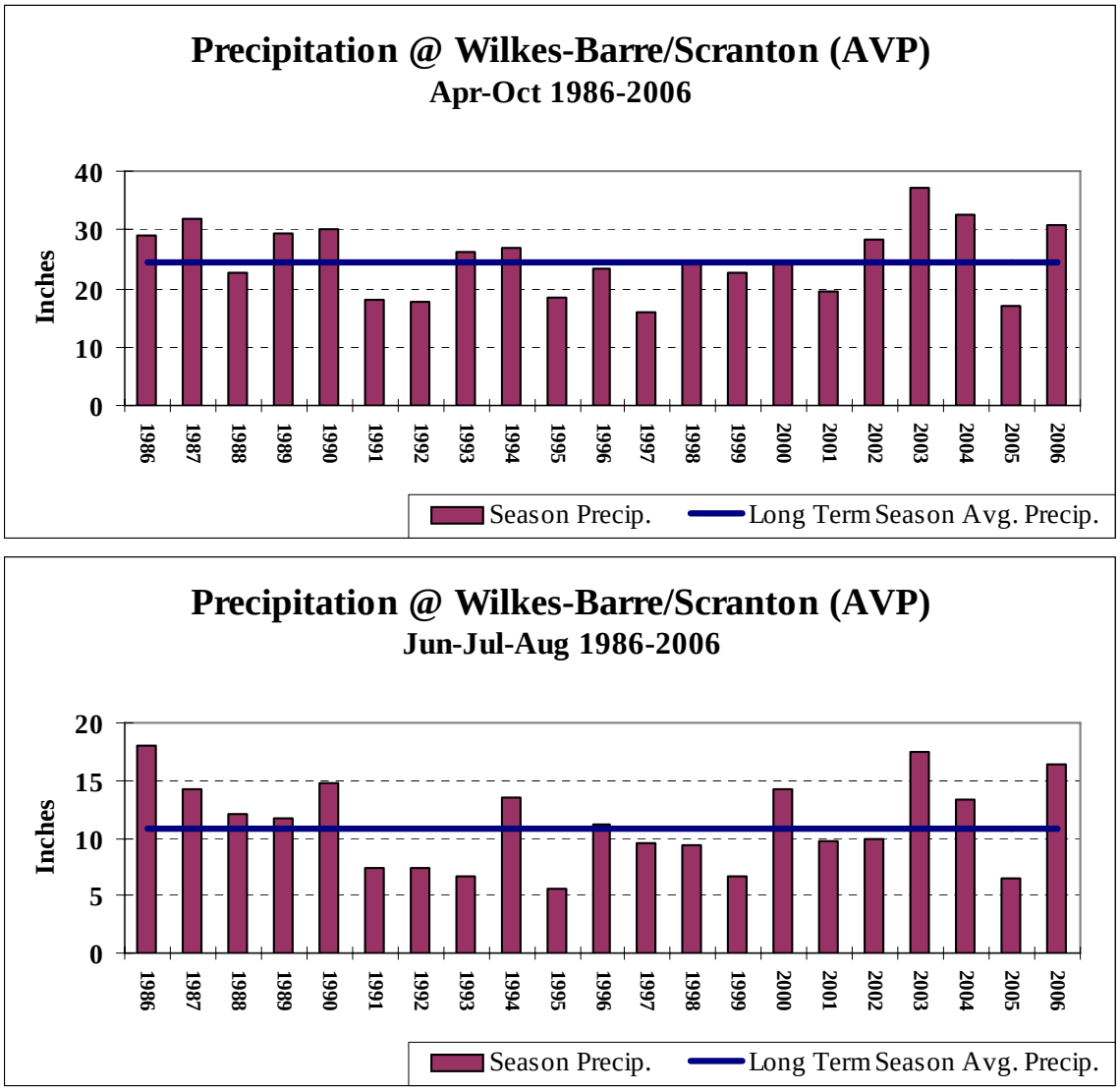




2. Precipitation Trends

Precipitation trends at the Scranton/Wilkes-Barre Airport were analyzed over the 1986-2006 time period. Precipitation amounts for the entire ozone season and the JJA time periods were examined. Chart 1-7 graphically shows precipitation amounts over the 1986-2006 time period.

Chart 1-7
Precipitation Totals (inches) at the Scranton/Wilkes-Barre Int'l Airport



D. ADDITIONAL TRENDS

1. Population Trends

The Scranton Area includes Lackawanna, Luzerne, Monroe and Wyoming counties. Total population in the four-county nonattainment area has risen approximately 5% overall, athough population changes in each county vary significantly. Luzerne and Lackawanna counties comprise the majority of the nonattainment area's population. The populations of both of these counties have decreased over the last several decades.

Wyoming County is the least populated county in the nonattainment area and has had a slight growth in population. Monroe County has experienced significant growth over the last two decades, doubling its population from ~70,000 in 1980 to ~169,000 in 2000.

The Scranton Area's estimated labor force has grown much faster than its population over the last 25 years. Chart 1-8 shows the Scranton Area's population change and estimated labor force change since 1980. A larger labor force could lead to more driving and increased infrastructure demands. This in turn could lead to higher emissions. Increases in the nonattainment area's labor force also contribute to overall increases in economic activity (greater family income/spending).

2. Economic Trends

Economic trends could have impacts on emissions and thus ozone concentrations in redesignating the Scranton Area. The two factors considered here include estimated labor force changes in the Scranton Area (provided by the Pennsylvania Labor Department) and overall economic activity in Pennsylvania (measured by the Economic Activity Index published by the Philadelphia Reserve Bank and shown in Chart 1-9).

Chart 1-8
Scranton Nonattainment Area Population and Estimated Labor Force

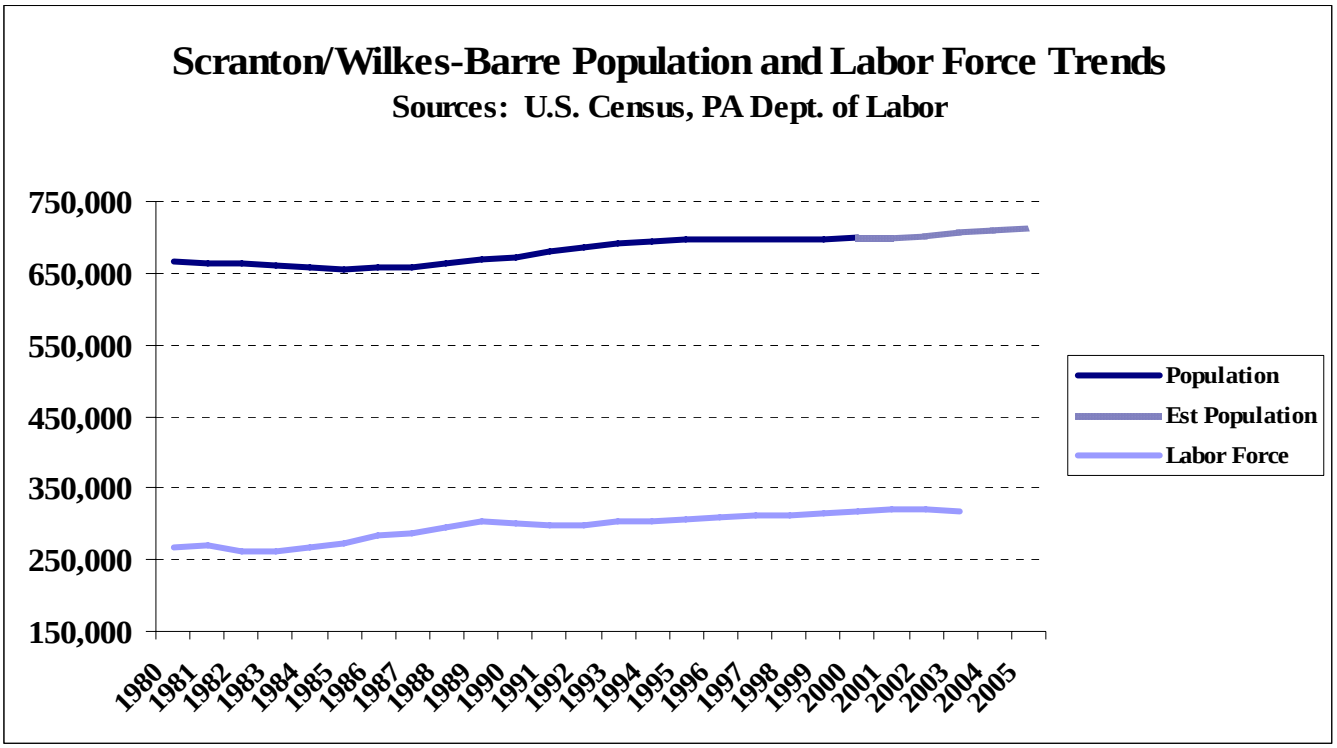
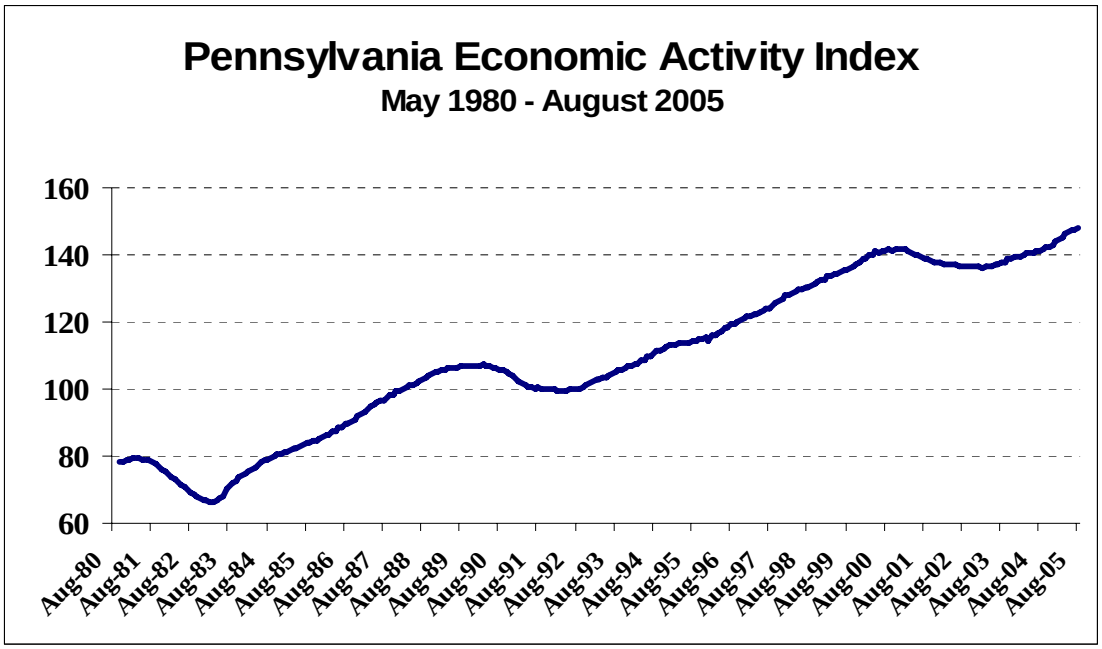


Chart 1-9
Pennsylvania Economic Activity Index from the Philadelphia Federal Reserve Bank



E. OZONE TRANSPORT

Ozone transport has a significant effect in the Scranton nonattainment area. Ozone transport, however, is highly variable and gauging the effects on design values, exceedances and peak ozone concentrations is quite difficult because of the large amount of data that has to be analyzed.

1. HYSPLIT Trajectory Analysis

One way to gauge the impact of the transport of ozone or its precursors on the Scranton nonattainment area is to examine air-parcel trajectories during periods of elevated ozone concentrations. Trajectories from the National Oceanic and Atmospheric Administration's HYSPLIT trajectory model were run for each exceedance day between 1999 and 2006. If multiple monitors exceeded the eight-hour ozone standard then the monitor with the highest oconcentrations was used as the starting point for the trajectory. Twenty-four hour back trajectories were run for 21Z (4 PM EDT) at 500 meters, 1000 meters and 1500 meters. End points for all of the 500-meter trajectories (52 days) were plotted on a map of the northeastern states (Figure 1-1). The end points are color coded according to the eight-hour ozone concentration on the day of the trajectory.

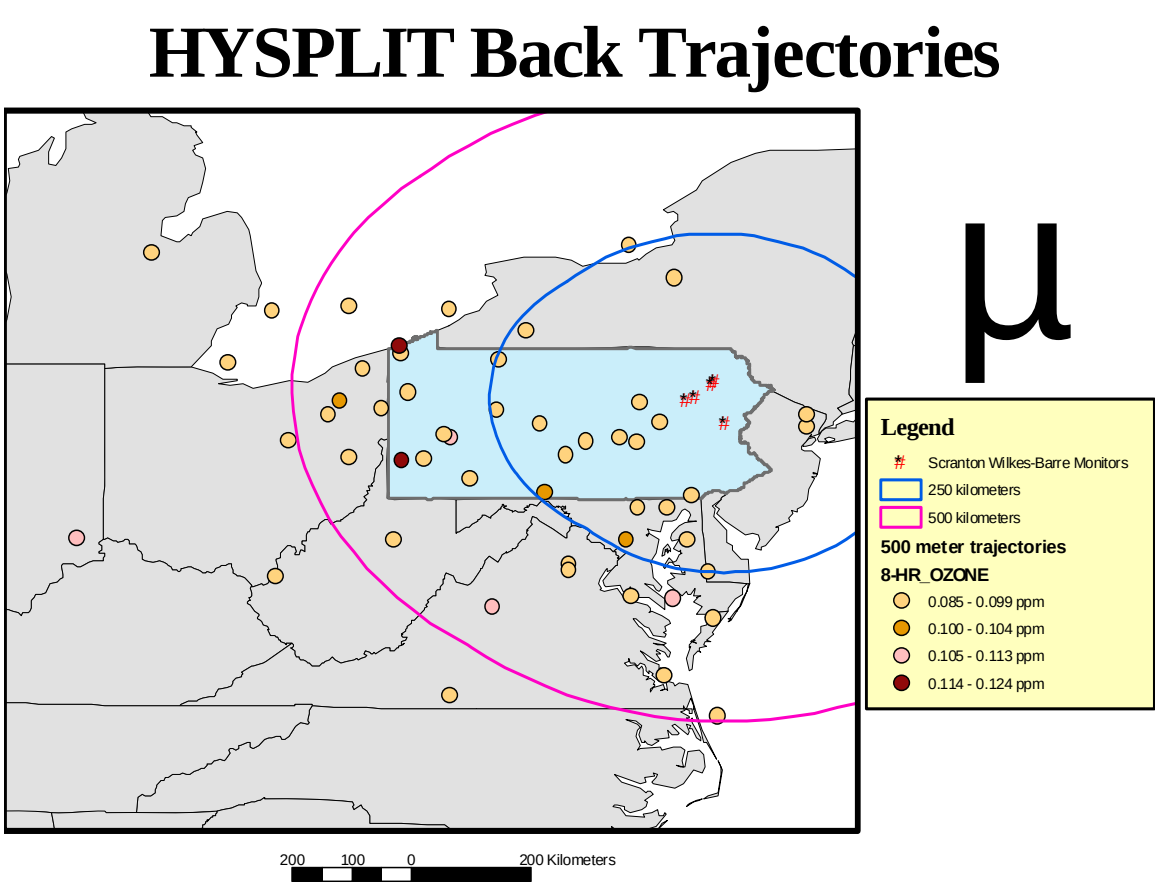
Trajectory results indicate a substantial number of upwind trajectories originated outside of Pennsylvania and the Ozone Transport Region (OTR) on days when the Scranton

Area's ozone concentrations exceeded the eight-hour ozone standard (see Table 1-2). The bulk of the upwind trajectory start points lie to the west and south of the Scranton Area. Trajectories in some instances exceed 500 kilometers in length. This indicates the potential for substantial contributions from areas well upwind from the Scranton nonattainment area.

Table 1-2
Summary of Scranton Nonattainment Area Trajectory Start Points
All Exceedance days 1999 through 2006 (52 days)

	500 meter	%	1000 meter	%	1500 meter	%
Outside OTR	19	36.5 %	32	61.5 %	35	67.3 %
Outside PA	33	63.5 %	40	76.9 %	43	82.7 %

Figure 1-1
HYSPLIT Back Trajectory Analysis



F. MODELING ANALYSIS

Modeling results for the EPA's Clean Air Interstate Rule (CAIR) were examined to determine if the model results support redesignating the Scranton nonattainment area to attainment. Model results were outlined by the EPA in its technical support document for CAIR (TSD for Final CAIR, Air Quality Modeling, 2005). Results for the monitors in the Scranton Area (Lackawanna and Luzerne counties) indicated modeled ozone concentrations will be below the eight-hour ozone standard. According to the Appendix E of the TSD, Lackawanna and Luzerne counties' modeled ozone concentrations are between 72 and 74 ppb for both the 2010 Base run and the 2010 CAIR run. These results support redesignating the Scranton Area to attainment for the eight-hour ozone NAAQS.

SECTION 2

SIP APPROVALS AND APPLICABLE REQUIREMENTS

In order for EPA to approve a redesignation of a nonattainment area to attainment, the applicable State Implementation Plan (SIP) revision must be fully approved under Section 110(k) of the CAA. In addition, the state must have met all requirements applicable to the area under CAA Section 110 and Part D Plan Requirements for Nonattainment Areas. The specific requirements applicable to the Scranton Area can be found in sections 110(a)(2), and Part D sections 172(c), 173(a), 176 and 182(a) of the CAA.

All requirements for redesignation have thus been fulfilled for the Scranton Area. The dates of EPA approval for regulatory requirements are indicated in parentheses.

A. REGULATORY REQUIREMENTS

The Commonwealth's regulations for Air Resources can be found in 25 Pa. Code Subpart C, Article III. Sections are specified below. EPA's approval of these regulations is codified in 40 CFR Part 52, Subpart NN, section 52.2020.

- Correction of deficiencies in pre-1990 existing rules for several VOC sources (surface coating, pneumatic rubber tire manufacturing, graphic arts and Synthetic Organic Chemical Manufacturing Industry equipment leaks) as part of the Reasonably Available Control Technology (RACT) "fix-up" requirement of Section 182. In a December 22, 1994 final rule, EPA determined that Pennsylvania corrected all deficiencies (59 FR 65971).

- Implementation of RACT for all major sources of VOCs not covered by the guideline documents for which EPA has defined RACT. Such sources included the manufacture of surface-active agents, organic liquid cargo vessel loading and ballasting and others. These sources are covered by Standards for Sources, Stationary Sources of NOx and VOCs, (25 *Pa. Code* Sections 129.51-129.82).

- Implementation of RACT for all major sources of NOx. These sources are covered by Standards for Sources, Stationary Sources of NOx and VOCs, (25 *Pa. Code* Sections 129.91-129.95).

- Stationary air pollution sources are subject to the regulations of the Commonwealth of Pennsylvania, Pennsylvania Code in Title 25 Environmental Resources (25 *Pa. Code* Chapters 121-145). These regulations include:

  - Standards of Performance for New Stationary Sources promulgated by EPA under the Clean Air Act;
  - Standards for Contaminants (25 *Pa. Code* Chapter 123)

- National Emission Standards for Hazardous Air Pollutants (25 *Pa. Code* Chapter 124);
- Construction, Modification, Reactivation and Operation of Sources, including plan approval, prevention of significant deterioration, new source review, operating permit program (25 *Pa. Code* Chapter 127);
- Standards for Sources (25 *Pa. Code* Chapter 129)
- Annual Emission Statements and required reporting to the Department, (25 *Pa. Code* Chapter 135)

These permitting, stationary source monitoring and reporting, preconstruction review, offset ratios and enforceable emission limitations requirements were adopted to implement the federally mandated requirements in sections 110, 172, 173 and 182(a) of the CAA. EPA has approved all of these regulations as SIP revisions as indicated.

- The Reasonable Available Control Technology (RACT) provisions in 25 *Pa. Code* sections 129. 91-129.95 (relating to Stationary Sources of NOx and VOCs) continues to have "limited approval." The Department has submitted SIP revisions to EPA for all subject RACT sources. On June 16, 2006, EPA proposed to convert this "limited approval" to a full approval. (71 FR 34864)

- The Department adopted and incorporated EPA's general conformity rule (40 CFR Part 93, Subpart B) by reference in its entirety. The general conformity regulation describes procedures to determine if federally-financed, non-transportation projects are in conformity with air quality plans (25 *Pa. Code* Section 127.802).

B. NONREGULATORY REQUIREMENTS

- EPA and the U.S. Department of Transportation (DOT) have issued regulations regarding criteria and procedures for demonstrating and assuring conformity of transportation improvement programs (TIP or program), long range plans (LRP or plan), and individual transportation projects with the requirements of the CAA and the SIP for the specific nonattainment area. Affected transportation planning organizations are complying with all federal laws, regulations and guidance for transportation conformity.

- The Department has an ongoing program to monitor and analyze ambient air quality and submits ambient air quality to EPA as required. The program is conducted in accordance with regulations in 40 CFR Part 58.

- The Department conducts and submits periodic inventories in accordance with EPA's Consolidated Emission Reporting Rule (40 CFR Part 51, Subpart A).

- The Department has adequate personnel funding and authority to carry out the implementation of all applicable requirements and provisions of its SIP.

The Scranton Area thus has no pending SIP requirement or obligations for a requirement applicable in this area. In consideration of the above, the applicable implementation plan will have been fully approved by EPA under Section 110 of the CAA and all applicable requirements are fulfilled.

SECTION 3

DEMONSTRATION OF PERMANENT AND ENFORCEABLE IMPROVEMENT

This section provides an assessment of the ozone precursor emissions at the time the Scranton Area was originally designated as nonattainment for ozone, and at the time when this area attained the 8-hour ozone NAAQS. A 2002 (base year) inventory of VOC and NO_x emissions is used to represent emissions during the ozone nonattainment designation period. A 2004 inventory of VOC and NO_x emissions is used to identify ozone precursor emissions during the period when the Scranton Area demonstrated that it attained the eight-hour ozone NAAQS. Detailed information is presented in the Maintenance Plan by sector.

The section first describes these ozone precursor emission estimates for this area. These inventories have been developed in accordance with EPA emission inventory preparation guidance. Then, it presents information about the permanent and enforceable control measures that have been implemented in the Scranton Area to produce the VOC and NO_x emission reductions that have occurred between these years.

A. BASE YEAR (2002) EMISSION INVENTORY

An emissions inventory for the base year, 2002, was developed for ozone precursors in accordance with EPA guidance. This year represents the emissions present when the Scranton Area did not meet the ozone standard. The inventory contains information for these sectors:

- "Stationary sources" (or "point" sources) refer to those sources for which the Department collects individual emissions-related information. Generally they represent major stationary sources but may be smaller.
- "Stationary area sources" are industrial/commercial/residential sources too small or too numerous to be handled individually, such as commercial and residential open burning, architectural and industrial maintenance coatings application and clean-up, consumer product use, and vehicle refueling at service stations. Where there is overlap between stationary point sources and stationary area sources, the area source values are adjusted to remove any double counting.
- "Highway vehicles" include passenger cars and light-duty trucks, other trucks, buses and motorcycles.
- "Nonroad" covers a diverse collection of engines including outdoor power equipment, recreational vehicles, farm and construction machinery, lawn and garden equipment, industrial equipment, recreational marine, commercial marine vessels, locomotives, ships, aircraft and many other applications.

Table 3-1 below summarizes emissions for the 2002 base year. The Technical Appendices to the Maintenance Plan for the Scranton Area contain more detailed information for each sector the emissions for 2002 by source category. Totals may vary due to rounding. Stationary point emissions do not include banked emission reduction credits described in Appendix A.

B. ATTAINMENT YEAR (2004) EMISSION INVENTORY

A 2004 inventory of VOC and NO_x emissions for the Scranton Area is used to identify ozone precursor emissions during the period when attainment of the 8-hour ozone NAAQS was demonstrated for the Scranton Area. Stationary area sources were estimated based on 2002 emissions because factors used to develop emissions were not yet available for 2004.

Table 3-1
VOC and NO_x Emissions Summary: 2002 and 2004
(tons per summer day)

	VOC Emissions	
	2002	**2004**
Stationary Point Sources	4.6	3.8
Stationary Area Sources	36.0	35.3
Highway Vehicles	36.6	31.6
Nonroad Engines/Vehicles	19.0	18.9
TOTAL	**96.2**	**89.6**

	NOx Emissions	
	2002	**2004**
Stationary Point Sources	8.4	7.0
Stationary Area Sources	3.8	3.9
Highway Vehicles	74.4	66.1
Nonroad Engines/Vehicles	11.3	10.9
TOTAL	**97.9**	**87.9**

The Maintenance Plan describes how the 2004 inventory was compiled. The Technical Appendices to the Maintenance Plan contain more detailed information for each sector.

C. CONTROL MEASURES

Along with the analysis of ambient air quality and contributing factors in Section 1 of the redesignation request, this section describes the measures to which decreases in emissions and thus ozone concentrations can be attributed from 2002 to 2004. From 2002 to 2004, VOC emissions decreased by 6.8 percent. From 2002 to 2004, NOx emissions decreased by 10.2 percent.

1. Stationary Point Sources

Interstate Pollution Transport Reduction. In response to the Federal NOx SIP call rule, the Department (and other covered states) adopted NOx control regulations for large industrial boilers and internal combustion engines, electric generating units, and cement plants. The regulation covering industrial boilers and electric generators required emission reductions to commence May 1, 2003, while the regulation covering large internal combustion engines and cement plants required emission reductions to commence May 1, 2005.

2. Stationary Area Source Measures

Solvent Cleaning. The Department adopted revisions to the volatile organic compound (VOC) requirements for solvent cleaning operations in 25 Pa. Code Section 129.63 (relating to degreasing operations) that became effective beginning on December 22, 2001. For heated solvent cleaning machines, in most respects the provisions of 25 Pa. Code Section 129.63 reflect the technology and operating requirements in the federal maximum achievable control technology (MACT) requirements for solvent cleaning machines. Inasmuch as essentially all of the heated solvent cleaning machines in the Commonwealth use solvents regulated under the MACT, only a slight VOC emission reduction was achieved by the requirements for heated solvent cleaning machines. The more important emission reduction component of the revised solvent cleaning regulation was the requirement related to solvent vapor pressure for solvent used in cold cleaning machines. This component of the revised solvent cleaning requirements resulted in an estimated 66 percent reduction of the VOC emissions from this category of sources. The provisions requiring the use of low vapor pressure solvents in cold cleaning machines became effective on December 22, 2002. The emission reductions resulting from this requirement would be reflected in the 2004 inventory. The regulation was submitted to EPA as a SIP revision on February 13, 2002. EPA approved the revision to the SIP on January 16, 2003 (68 FR 2206).

Portable Fuel Containers. The Department adopted a portable fuel container regulation, 25 Pa. Code Chapter 130, Subchapter A, to address VOC loss resulting from permeation through portable gasoline containers, evaporative loss through container openings, and from spillage during the filling of small tanks on machines such as lawn mowers, chain saws, jet skis and the like. This regulation requires that portable fuel containers

manufactured after January 1, 2003 for sale in Pennsylvania meet certain requirements. (A "sell-through" provision allowed the sale during 2003 of containers manufactured before January 1, 2003.) The Department predicted, as part of the one-hour ozone SIP demonstration for the Southeast Pennsylvania area, that the portable fuel container regulation would be fully phased in over a 10-year period, i.e. approximately 10 percent of the existing containers would be replaced each year. Emission reduction estimates for the program reflect this phased-in replacement of the containers. The regulation was submitted to EPA as a SIP revision on March 26, 2003 and approved on December 8, 2004 (69 FR 70983).

3. Highway Vehicle Sources

While vehicle miles traveled (VMT) increased between 2002 and 2004, highway vehicle emissions decreased. These decreases can be attributed to the Federal Motor Vehicle Control Programs (an increased proportion of cleaner (federal Tier 1) light-duty vehicles in the fleet, an increased proportion of cleaner heavy-duty highway vehicles (federal 1998+ and 2002/2004 standards)) and implementation of the vehicle emission inspection program.

Table 3-2
VMT and Emissions

YEAR	VMT	VOC (tpsd)	NOX (tpsd)
2002	20,125,640	36.6	74.4
2004	20,744,258	31.6	66.1

Federal Motor Vehicle Control Programs (FMVCP). The emission reductions from the programs covering fleet turnover are permanent reductions. The effects of fleet turnover between 2002 and 2004 (that is, more vehicles subject to tighter tailpipe standards became part of Pennsylvania's fleet) produced emission reductions between 2002 and 2004.

Tier 1 tailpipe standards established by the CAA Amendments of 1990 include NOx and VOC limits for light-duty gasoline vehicles and light-duty gasoline trucks. These standards began to be phased in starting in 1994. Evaporative VOC emissions are also being reduced in gasoline-powered cars starting with model year 1998. In 1999, more stringent new light-duty vehicle standards became effective in the Ozone Transport Region in 1999 with the National Low Emission Vehicle (NLEV) Program. The Department's New Motor Vehicle Control Program regulations (25 Pa. Code Chapter 126, Subchapter D (relating to new motor vehicle emissions control program) were approved by EPA on December 28, 1999 (64 FR 72564). These regulations allowed automobile manufacturers to comply with NLEV instead of the incorporated California Low Emission Vehicle (CA LEV) requirements through model year 2005. These

regulations affected vehicles 6,000 pounds and less and were the ones in effect for new motor vehicles in the baseline year, 2002.

In 1999, EPA promulgated regulations more stringent than NLEV (Tier 2), which were effective starting with the 2004 model year. The New Motor Vehicle Control Program (25 *Pa. Code* Section 126 Subchapter D) adopted in 1998 includes the Pennsylvania Clean Vehicles Program, which incorporated the California Low Emission Vehicle Program by reference. The regulation allowed automakers to comply with the NLEV program as an alternative to this Pennsylvania program until MY 2006. In order to participate in NLEV, Pennsylvania was required to adopt language that extended its "commitment" to NLEV until MY 2006. Because automobile manufacturers had to comply with the more stringent regulations (NLEV vs. Tier 2), the federal Tier 2 program governs new vehicles sold in Pennsylvania in the attainment year, 2004.

The same EPA regulation required the reduction of sulfur in gasoline beginning in 2004. In the first year of the program, sulfur levels are capped at 300 parts per million (ppm) and annual refinery corporate averages must be no more than 120 ppm. This analysis uses the default assumptions provided in MOBILE6 for all gasoline parameters for conventional fuel.

EPA has promulgated national regulations for heavy-duty engines and vehicles (over 14,000 pounds) starting with model year 2004. In addition, a consent decree with the major heavy-duty engine manufacturers required, among other terms, that diesel engines made by these companies comply with these 2004 standards two model years early, in model year 2002. The Department includes these programs, as provided in the MOBILE model, for the base year 2002 and for 2004.

Vehicle Emission Inspection/Maintenance Program. In early 2004, Pennsylvania expanded its Vehicle Emission Inspection/Maintenance (I/M) Program into the Scranton Area. A vehicle emissions inspection program is not required in Monroe or Wyoming counties. (See the following section on Vehicle Safety Inspection Program that applies to those two counties.) For Lackawanna and Luzerne counties, the program applies to gasoline-powered vehicles 9,000 pounds and under, model years 1975 and newer. The program consists of an annual visual inspection of pollution control devices to ensure they are present, connected and the proper type for the vehicle and a gas cap pressure test. These regulations can be found in 67 *Pa. Code* Chapter 177. Pennsylvania submitted the expanded emissions program as a SIP revision on December 1, 2003. EPA approved the SIP revision on October 6, 2005.

Changes to Vehicle Safety Inspection Program. In November 2003, Pennsylvania amended its vehicle safety inspection program to include a visual inspection of certain pollution control components in the 42 counties, which includes Monroe and Wyoming counties, for which a separate vehicle emissions inspection program is not required. These regulations can be found in 67 *Pa. Code* Chapter 175. Pennsylvania submitted that portion of the amended safety inspection program as a revision to its State Implementation Plan on December 1, 2003. EPA approved the SIP revision on October 6, 2005 (70 FR 58313).

4. Nonroad Sources

EPA has adopted a series of regulations affecting new diesel-powered ("compression ignition") and gasoline-powered ("spark ignition") nonroad engines of various sizes (horsepower) and applications. Information on these federal rules, including their implementation dates, can be found at www.epa.gov/nonroad . The Department used the federal control measure assumptions built into the NONROAD model to estimate emissions for all milestone years. No control programs were anticipated to affect aircraft and railroad locomotive emissions between 2002 and 2004. These requirements are codified at 40 CFR Parts 89-91. See the Technical Appendix D for more information.

SECTION 4

MAINTENANCE PLAN

The Maintenance Plan for the Scranton Area is being submitted concurrently to EPA for approval as a SIP revision with this request for redesignation. The Maintenance Plan shows that the NAAQS for eight-hour ozone will be maintained for at least 10 years after redesignation. Eight years following redesignation, the Commonwealth will submit a revised plan that ensures attainment through 2028.

In accordance with EPA guidance, the Maintenance Plan shows that emission levels over the 10 years following redesignation will remain below the emissions level in 2004, while allowing for growth in population and vehicle miles traveled. The following state and federal programs will ensure the continuing decline of VOC and NOx emissions:

- Clean Air Interstate Rule (CAIR)
- Interstate Pollution Transport Reduction
- Portable Fuel Containers
- Consumer Products
- Architectural and Industrial Maintenance (AIM) coatings
- Federal Motor Vehicle Control Programs (light-duty and heavy-duty)
- Vehicle emission inspection/maintenance program
- Cleaner gasoline (federal program)
- Cleaner highway diesel (federal program)
- Cleaner nonroad diesel (federal program)
- Pennsylvania Clean Vehicles Program
- Pennsylvania Heavy-Duty Diesel Emissions Control Program
- Federal programs for nonroad engines

The Department has provided assurances that it will continue to operate the ambient air quality monitoring network in order to track maintenance of the standard and to evaluate emissions inventories periodically compared to the projections provided in the plan. The Department has also provided a list of potential contingency measures that it would consider to correct any violation of the eight-hour ozone NAAQS that occurs after redesignation of the area.

ACRONYMS AND ABBREVIATIONS

CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CA LEV	California Low Emission Vehicle (program)
DOT	Department of Transportation (U.S.)
EPA	U.S. Environmental Protection Agency
FMVCP	Federal Motor Vehicle Control Program
I/M	Inspection and Maintenance
JJA	June, July and August
NAAQS	National Ambient Air Quality Standard
NLEV	National Low Emission Vehicle (program)
NEOPS	North East Oxidant and Particle Study
NO_x	Oxides of Nitrogen
OTR	Ozone Transport Region
ppb	parts per billion
ppm	parts per million
RACT	Reasonably Available Control Technology
SIP	State Implementation Plan
TSD	Technical Support Document
tpsd	tons per summer day
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound