Environmental Protection Agency

FY 2003 Annual Performance Plan and Congressional Justification

Clean Air

Strategic Goal: The air in every American community will be safe and healthy to breathe. In particular, children, the elderly, and people with respiratory ailments will be protected from health risks of breathing polluted air. Reducing air pollution will also protect the environment, resulting in many benefits, such as restoring life in damaged ecosystems and reducing health risks to those whose subsistence depends directly on those ecosystems.

Resource Summary
(Dollars in thousands)

	FY 2001 Actuals	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Clean Air	**$560,547.8**	**$593,961.8**	**$597,977.3**	**$4,015.5**
Attain NAAQS	$441,056.4	$458,311.8	$458,856.3	$544.5
Reduce Air Toxics Risk	$101,548.2	$114,658.9	$118,023.2	$3,364.3
Reduce Acid Rain.	$17,943.2	$20,991.1	$21,097.8	$106.7
Total Workyears	1,794.8	1,830.7	1,820.0	-10.7

Background and Context

The average American breathes over 3,000 gallons of air each day. Air pollution contributes to illnesses such as cancer and to respiratory, developmental, and reproductive problems. Children are at greater risk because they are more active outdoors and their lungs are still developing. The elderly also are more sensitive to air pollution because they often have heart or lung disease.

Certain pollutants (such as some metals and organic chemicals) that are emitted from industrial and other sources can be deposited into water bodies and magnified through the food web, adversely affecting fish-eating animals and humans. Currently, about 2,500 water bodies are under fish consumption advisories resulting from chemicals such as PCBs, chlordane, dioxins and mercury. Air pollution also makes soil and waterways more acidic, reduces visibility, and accelerates corrosion of buildings and monuments.

The air pollution problem is national and international in scope. Air pollution regularly crosses local and state lines and, in some cases, crosses our borders with Canada and Mexico. This causes problems not only for the majority of the population who live in expanding urban areas, but also for less populated areas and national parks. Federal assistance and leadership are essential for developing and implementing cooperative state, local, Tribal, regional, and international programs to prevent and control air pollution; for ensuring that national standards are met; and for providing tools for states, Tribes, and local communities to use in preparing their clean air plans.

Criteria pollutants. To protect public health and the environment, EPA develops standards that limit concentrations of six widespread pollutants (known as criteria pollutants) that are linked to many serious health and environmental problems:

- Ground-level ozone (smog). Ozone can irritate and inflame airways. Health effects attributed to exposures to ozone, generally while individuals are engaged in moderate or heavy exertion, include significant decreases in lung function and increased respiratory symptoms such as chest pain and cough. Exposures to ozone result in lung inflammation, aggravate respiratory diseases such as asthma and may make people more susceptible to respiratory infection. Children active outdoors are most at risk of experiencing such effects. Other at-risk groups include adults who are active outdoors such as outdoor workers and individuals with respiratory disorders such as asthma. Ground-level ozone interferes with the ability of plants to produce and store food, which reduces crop and forest yields by making plants more susceptible to disease, insects, other pollutants and harsh weather. It damages the leaves of trees and other plants, affecting the appearance of cities, national parks and recreation areas.

- Sulfur dioxide (SO_2). Peak levels of SO_2 can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposure to a combination of SO_2 and fine particles can cause respiratory illness, alter the defense mechanisms of lungs, and aggravate cardiopulmonary disease. People who may be most susceptible to these effects include individuals with cardiovascular disease or chronic lung disease, as well as children and the elderly. SO_2 is also a major contributor to acidic deposition.

- Nitrogen dioxide (NO_2). Exposure to NO_2 causes respiratory symptoms such as coughing, wheezing, and shortness of breath in children and adults with respiratory diseases, such as asthma. Even short exposures to NO_2 affect lung function. NO_2 also contributes to acidic deposition, eutrophication in coastal waters, and visibility problems.

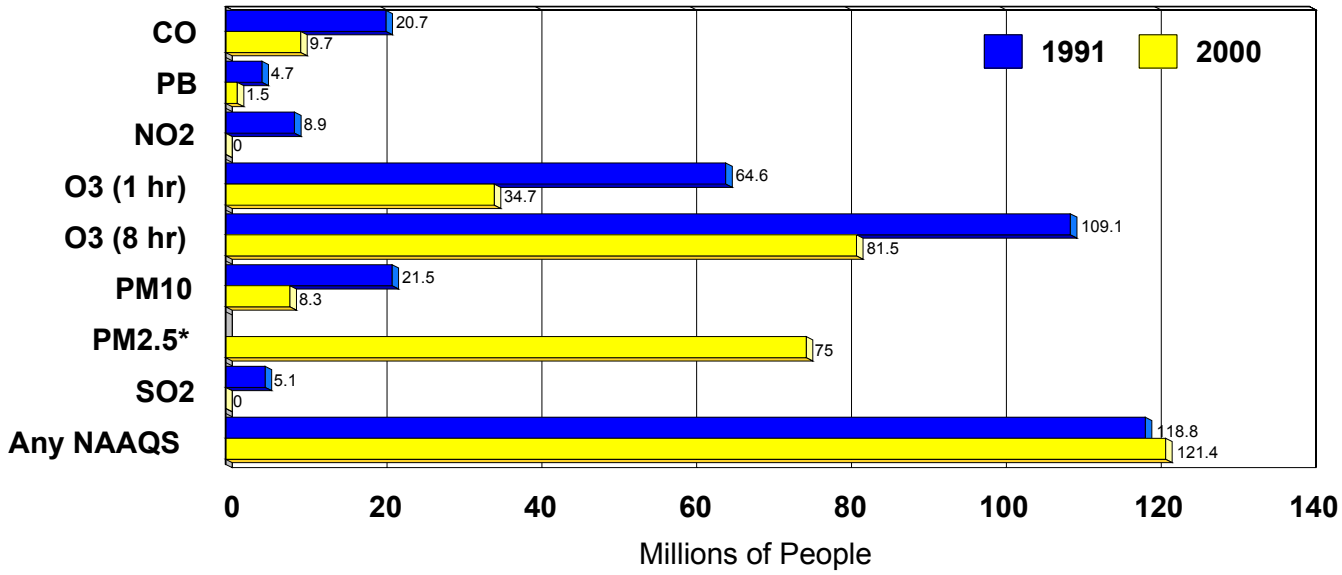
- Carbon monoxide (CO). The health threat from lower levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise. Even healthy people can be affected by high levels of CO. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks.

- Lead. Lead causes damage to the kidneys, liver, brain and nerves, and other organs. Excessive exposure to lead causes seizures, mental retardation, behavioral disorders, memory problems, and mood changes. Low levels of lead damage the brain and nerves in fetuses and young children, resulting in learning deficits and lowered IQ.

- Particulate matter (PM). PM causes a wide variety of health and environmental problems. When exposed to PM, people with existing lung or heart diseases - such as asthma, chronic obstructive pulmonary disease, congestive heart disease, or coronary

artery disease - are at increased risk of health problems requiring hospitalization or of premature death. When exposed to PM, children and people with existing lung disease may not be able to breathe as deeply or vigorously as they normally would and they may experience symptoms such as coughing and shortness of breath. PM can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis, causing more use of medication and more doctor visits. PM is also the major cause of reduced visibility in parts of the U.S., including many of our national parks. Particles can be carried over long distances by wind and then settle on ground or water. The effects of this settling include: making lakes and streams acidic, changing the nutrient balance in coastal waters and large river basins, depleting the nutrients in soil, damaging sensitive forests and farm crops, and decreasing the diversity of ecosystems.

Populations of Counties with Air Quality Concentrations Above the NAAQS Level



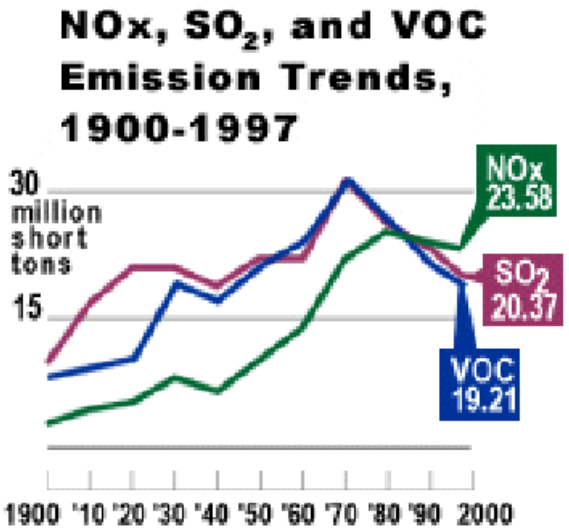
Hazardous air pollutants. Hazardous air pollutants (HAPs), commonly referred to as air toxics, are pollutants that are known or suspected to cause cancer or other serious health problems, such as reproductive effects or birth defects, or adverse environmental effects. EPA is working with state, local, and Tribal governments to reduce air releases of 188 pollutants listed in the Clean Air Act Amendments of 1990. Examples of air toxics include mercury and BTX. HAPs are emitted from literally thousands of sources. Adverse effects to human health and the environment due to HAPs can result from even low level exposure to air toxics from individual facilities, exposures to mixtures of pollutants found in urban settings, or exposure to pollutants emitted from distant sources that are transported through the atmosphere over regional, national, or even global airsheds.

Compared to information for the criteria pollutants, the information about the ambient concentrations of HAPs and their potential health effects is relatively incomplete. Most of the information on the potential health effects of these pollutants is derived from experimental animal data. Of the 188 HAPs, almost 60 percent are classified by the Clean Air Act (section 112.(f)(2)(A)) as known, probable, or possible carcinogens. One of the often documented ecological concerns associated with toxic air pollutants is the potential for some to damage aquatic ecosystems. Deposited air pollutants can be significant contributors to overall pollutant loadings entering water bodies.

Acid rain. Emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) react in the atmosphere and fall to earth as acid rain, causing acidification of lakes and streams and contributing to the damage of trees at high elevations. Acid deposition also accelerates the decay of building materials and paints and contributes to degradation of irreplaceable cultural objects, such as statues and sculptures. NO_x deposition also contributes to eutrophication of coastal waters, such as the Chesapeake Bay and Tampa Bay. Before falling to earth, SO_2 and NO_x gases form fine particles that affect public health by contributing to premature mortality, chronic bronchitis, and other respiratory problems. The fine particles also contribute to reduced visibility in national parks and elsewhere.

Trends. The air in the U.S. is now the cleanest it has been during the 20 years that EPA has been tracking air quality. National air quality, measured at thousands of monitoring stations across the country, has shown improvements for all six principal pollutants: CO, lead, NO_2, SO_2, ozone, and PM. This means that during the past 20 years, Americans have been able to breathe a little easier, see a little better, and enjoy a cleaner environment. Additional steps still need to be taken, however, to bring remaining areas with unhealthful air fully into compliance with health-based air quality standards. The nation also faces a significant challenge in maintaining this historical trend of improving air quality, given expectations for future growth in the economy, the population, and highway vehicle use. In addition, ambient concentrations of many hazardous air pollutants remain high and continue to impose significant health risks on exposed individuals.

EPA tracks trends in key air pollutants through an Air Quality Index that reflects the number of days that any health-based standard is violated. As the chart shows, the percentage of days across the country that air quality violated a health standard has dropped from almost 10 percent in 1988 to 3 percent in 2000. Even on those days, the standard was generally violated only for a few hours, although these late afternoon hours tend to be when many children and adults are outside engaging in work and exercise that increases the severity of exposure to unhealthful air.



Nationwide, emissions of air toxics dropped approximately 30 percent between 1990 and 2000. For example, perchloroethylene monitored in 16 urban sites in California showed a drop of 60 percent from 1989 to 1998. Benzene, emitted from cars, trucks, oil refineries, and chemical processes, is another widely monitored toxic air pollutant. Measures taken from 84 urban monitoring sites around the country show a 39-percent drop in benzene levels from 1993 to 1998. Since implementation of EPA's acid rain program in 1995, there have been dramatic reductions (10 to 25 percent) in sulfates deposited in many of the most acid sensitive ecosystems located in the Northeastern U.S.

Although substantial progress has been made, it is important not to lose sight of the magnitude of the air pollution problem that still remains. Despite great progress in improving air quality, over 160 million tons of air pollution were released into the air in 2000 in the U.S. Approximately 121 million people lived in counties where monitored air was unhealthy because of high levels of the six principal air pollutants. Some national parks, including the Great Smoky Mountains and the Shenandoah, have high air pollution concentrations resulting from the transport of pollutants many miles from their original sources. In 2000, for the third consecutive year, rural 1-hour ozone (smog) levels were greater than the average levels observed for urban sites, but they are still lower than levels observed at suburban sites.

Means and Strategy

Strategy. EPA's overall goals for the air quality program include: improving air quality and addressing highest health and environmental risks, while reducing program costs; getting better results in less burdensome ways; and increasing the roles of state Tribal, and local governments. The Clean Air Act provides the principal framework for national, state, Tribal, and local efforts to protect and improve air quality and reduce risks. Under the Clean Air Act, EPA has a number of responsibilities:

- Ensuring continued protection of public health and the environment through regular review of National Ambient Air Quality Standards (NAAQSs) for the six criteria pollutants and revision of the NAAQSs, if necessary, based on the latest scientific information available.

- Ensuring that the NAAQSs are met by developing and carrying out national regulatory and non-regulatory programs that reduce air pollution from vehicles, factories, and other sources, and by working in partnership with state, Tribal, and local governments on implementing their clean air programs.

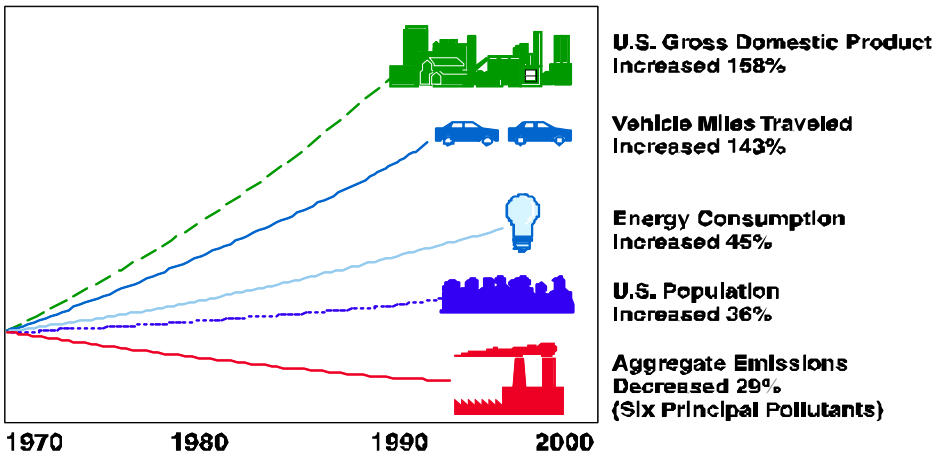
- Assessing public health risks from air toxics and reducing public exposure to pollutants that cause or may cause cancer and other adverse human health effects through pollution prevention and reduction of toxic emissions.

- Reducing acid rain through a market-based approach that provides flexibility to electric utilities and other large sources of SO_2 and NO_x in how they meet emission reduction requirements.

- Protecting and enhancing visibility across large regional areas, including many of the Nation's most treasured parks and wilderness areas, by reducing pollutants such as PM, SO_2, and NO_x.

- Providing a strong scientific basis for policy and regulatory decisions and exploring emerging problem areas through a coordinated, comprehensive research program.

Comparison of Growth Areas and Emission Trends (Between 1970 and 2000)



Between 1970 and 2000, gross domestic product increased 158 percent, energy consumption increased 45 percent, vehicle miles traveled increased 143 percent, and U.S. population increased 36 percent. At the same time, total emissions of the six principal air pollutants decreased 29 percent.

One constant across the titles of the Clean Air Act is that they all are designed to get the most cost-effective pollution reductions early on. The problems that remain are some of the most difficult to solve. EPA has developed strategies to help address this difficult increment and overcome the barriers that have hindered progress towards clean air in the past. The Agency will use flexible approaches, where possible, instead of hard-and-fast formulas or specific technology requirements. Also, the Agency will work with areas that have the worst problems to develop strategies that address unique local conditions and achieve real risk reductions that matter to communities.

- Multi-pollutant strategies. The many inter-relationships among ozone, fine PM, regional haze, and air toxics problems provide opportunities for developing integrated strategies to reduce pollutant emissions. EPA has encouraged states, Tribes, and local governments to coordinate the work they are doing to maximize the effectiveness of control strategies.

- Economic incentives. EPA has provided increased flexibility to industry through the use of economic incentives and market-based approaches. Emissions trading, averaging, and banking have become standard tools in the Agency's air programs. The acid rain program uses allowance trading and early reduction credits to cut control costs and reduce pollution faster. The Tier II and diesel programs allow manufacturers to produce a mix of vehicles that collectively meet emission reduction targets. EPA's economic incentive programs include a variety of measures designed to increase flexibility and

efficiency, while maintaining the accountability and enforceability of traditional air quality management programs.

- Consensus building. In implementing the Clean Air Act, the Agency has emphasized consensus building, and broad stakeholder involvement. Examples include:
  - Working cooperatively with industry on toxics standards (e.g., the regulatory-negotiation with the coke oven industry).
  - Working with industry to implement innovative approaches (e.g., the auto industry voluntarily agreeing to meet National Low Emission Vehicle standards).
  - Meeting with the refining industry, the auto industry, and state officials to balance the many concerns in the Tier II rulemaking and promulgating a complicated and groundbreaking national program supported by a wide range of stakeholders.

- Systems approach**.** Tier II also is a good example of how the Agency looks at air quality problems from a broader perspective and takes advantage of the potential synergies. As catalyst technology requires low-sulfur fuel, the Agency is regulating fuels and vehicles as one system, to give pollution control manufacturers the incentive to develop even cleaner technologies. This results in a greater reduction in pollution -- at less cost -- than by addressing fuels and vehicles separately.

- Innovative technology**.** EPA increasingly incorporates incentives and performance-based approaches into regulations to spur new technologies that will help meet ambitious goals more cost-effectively (sometimes at even less cost than EPA has predicted). The Agency also is building partnerships that help develop and deploy these new technologies. The report prepared to meet the requirements of section 812 of the Clean Air Act includes a list of the technologies that have been developed since the 1990 Amendments. The advances have been remarkable. Technologies like SCR on power plants, ultra-low NO_x burners, or advanced catalysts now have entered the mainstream, at far less cost than anyone predicted.

Research

EPA's NAAQS-related research supports the Agency's Clean Air Goal to meet national clean air standards for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NO_X), lead, tropospheric ozone, and particulate matter (PM). This research provides methods, models, data, and assessment criteria on the health risks associated with these and other pollutants, alone and in combination, focusing on the exposures, health effects, mechanisms of injury, and identifying components of particulate matter (PM). In addition, this research provides NAAQS implementation tools to support efforts by industry, and state, Tribal, and local regulators, to develop and improve State Implementation Plans (SIPs) to attain the NAAQS.

Research on air toxics investigates the root causes of the environmental and human health problems in urban areas related to these pollutants. These efforts provide the necessary health effects data, measurements, methods, models, information, assessments, and technical support to EPA, state, Tribal, and local regulators to estimate human health effects and aggregate exposures to hazardous air pollutants. Research also supports atmospheric and emission modeling in order

to estimate fate, ambient concentrations, and mobile source emissions of air toxics at a more refined scale. With this information the Agency will be in a better position to determine risk and develop alternative strategies for maximizing risk reductions.

Strategic Objectives and FY 2003 Annual Performance Goals

Attain NAAQS

- Maintain healthy air quality for 44.1 million people living in monitored areas attaining the ozone standard; certify that 2 areas of the remaining 45 nonattainment areas have attained the 1-hour NAAQS for ozone thus increasing the number of people living in areas with healthy air by 1.0 million.

- Maintain healthy air quality for 7.2 million people living in monitored areas attaining the PM standards; increase by 81 thousand the number of people living in areas with healthy air quality that have newly attained the standard.

- Maintain healthy air quality for 52.7 million people living in monitored areas attaining the CO, SO2, NO2, and Lead standards; increase by 4.1 million the number of people living in areas with healthy air quality that have newly attained the standard.

Reduce Air Toxics Risk

- Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by an additional 3% of the updated 1993 baseline of 6.1 million tons (for a cumulative reduction of 40% from the 1993 level of 6.1 million tons per year.)

Reduce Acid Rain

- Maintain or increase annual SO2 emission reduction of approximately 5 million tons from the 1980 baseline. Keep annual emissions below level authorized by allowance holdings and make progress towards achievement of Year 2010 SO2 emissions cap for utilities.

- 2 million tons of NOx from coal-fired utility sources will be reduced from levels that would have been emitted without implementation of Title IV of the Clean Air Act Amendments.

Highlights

Continue progress toward NAAQSs attainment. For FY 2003**,** EPA will implement the President's National Energy Policy; continue the regular reviews of the NAAQSs; carry out programs to meet NAAQSs and regional haze requirements; and continue the research, air quality monitoring, and laboratory analyses that provide the scientific and technical bases for the NAAQS program.

C Multi-pollutant legislation. President Bush has directed EPA in his National Energy Policy to work with the Congress to develop legislation that would establish a flexible, market-based approach to significantly cap and reduce emissions of NO_x, SO_2, and mercury from the power generation sector. The legislation would build on the successful acid rain program and on the NO_x allowance trading program for the Northeast. Reducing emissions of NO_x and SO_2 will reduce levels of ground-level ozone and PM, as well as acid deposition.

C New Source Review reform. Also as part of the implementation of the National Energy Policy, EPA will work with states, Tribes and local agencies to put in place revised New Source Review programs. EPA is working with stakeholders to explore options that are both fairer and more effective and provide more certainty for the regulated communities.

- Review of NAAQS. By the end of FY 2002, EPA will make available to the public a comprehensive assessment of recent scientific findings on the health and environmental risks associated with PM. Following completion of this assessment and a staff paper that evaluates the policy implications of the scientific findings, EPA will propose a decision on whether to retain or revise the PM NAAQS. This proposal is scheduled for late FY 2003 or early FY 2004.

- Implementation of existing NAAQSs. On the national level, EPA will work with states, Tribes, and local governments on developing and implementing measures to meet clean air standards. The Agency will continue technical support for implementing the 1-hour ozone NAAQS. EPA also will support states and Tribes in developing innovative, voluntary programs that will help to achieve early reductions in the transition to the 8-hour ozone standard. The Agency also will develop a strategy and guidance for transition from the PM-10 standard to a fine particulate standard. We will work to promote and expand the use of voluntary, and smart growth and other innovative approaches to provide emission reductions.

- Public information. EPA and states will expand outreach efforts to promote public awareness of the Air Quality Index.

- Vehicle, engine, and fuels standards. EPA will establish and implement Federal standards to require cleaner motor vehicles, fuels, and non-road equipment that are cost-effective and technically feasible. The Agency will continue implementation of the Tier II and gasoline sulfur standards. The Agency also will continue work on the 2007 heavy-duty highway engine and diesel sulfur requirements. In addition, EPA will develop a proposed rule establishing new standards for heavy-duty, non-road, land-based diesel engines and vehicles.

- Testing for compliance. EPA will continue research, monitoring and laboratory analysis of industry compliance to national air quality standards. By 2003, a dramatic change in the type and amount of testing will be required at EPA's National Vehicle and Emissions Laboratory (NVFEL) to ensure meeting the goals of the Tier II and Heavy Duty Engine regulations, as well as to proceed with advancements in vehicle emission control

technologies. To meet this challenge, EPA will require an investment for essential emission measurement system upgrades at the NVFEL in order to (1) fully implement and enforce the new Tier II emission standards and test procedures for all passenger cars and light trucks beginning with the FY 2004 model year; (2) implement and enforce the model years 2004 and 2007 Diesel Engine Standards for all on-highway heavy-duty engines; and (3) develop digital and computer-based emission measurement system upgrades required to accurately measure the next generation of emission control systems.

Reduce public exposure to air toxics. In FY 2003, EPA will develop strategies and rules to help states and Tribes reduce emissions and exposure to hazardous air pollutants, particularly in urban areas, and reduce harmful deposition in water bodies. The Agency also will target source characterization work, especially development and improvement of emissions information, that is essential for the states, Tribes, and local agencies to develop strategies to meet the standards. EPA will look closely at urban areas to determine the various sources of toxics that enter the air, water, and soil, and determine the best manner to reduce the total toxics risk in these urban areas. Some specific activities and initiatives in this program for FY 2003 include:

- Air toxics monitoring. EPA will work with states to expand the toxic air monitoring network operated by state, Tribal, and local agencies. This expansion will help assess the success of EPA's comprehensive air toxics strategy as well as the multi-pollutant strategy. Such monitoring data will also enable EPA to benchmark its models and to track ambient trends for inhalation-risk air toxics and toxic components of particulate matter such as BTX. In the long term, assessments of ambient air toxics will help achieve a reduction in the incidence of cancer attributable to exposure to hazardous air pollutants emitted by stationary sources of hazardous air pollutants of not less than 75 percent, considering control of emissions of hazardous air pollutants from all stationary sources and resulting from any measures implemented by EPA or by the states.

- Air toxics rules. EPA will continue the extensive residual risk analyses for already promulgated Maximum Achievable Control Technology (MACT) standards to determine if additional standards are necessary to reduce the remaining risks from these sources.

- Mobile sources air toxics. In FY 2001, EPA issued a rule to address emissions of air toxics from mobile sources. In the rule, the Agency identified 21 mobile source air toxics and established new gasoline toxic emission performance standards. The rule established a Technical Analysis Plan to conduct research and analysis on mobile source air toxics. Based on the results of that research, EPA will consider future rulemaking in 2004 in which EPA will revisit the feasibility and need for additional controls for non-road and highway engines and vehicles and their fuels. To prepare for this review, in FY 2003, EPA will continue gathering emissions data, conducting exposure analyses, and evaluating the need for additional controls. EPA also will incorporate toxics emissions data into the mobile source models.

Implement Market-based acid rain program.

For FY 2003 EPA will continue to carry out the market-based acid rain program, tracking emissions, auditing and certifying monitors, recording transfers of allowances, and reconciling emissions and allowances.

- Phase II implementation. EPA will continue to implement the trading system, tracking transfers of emission allowances from the expanded number of electric utility units covered by the Phase II requirements of the Clean Air Act.

- Monitoring and assessment. EPA will manage the operation of the Clean Air Status and Trends Network (CASTNet), a wet deposition network, and provide operational support for the National Atmospheric Deposition Program (NADP), a dry deposition network. The Agency will use the monitoring results, along with other information, to help assess the effectiveness of the acid rain program in reducing health and environmental risks.

Research

EPA's NAAQS-related research program will develop new information and assess existing studies to support statutorily mandated reviews of the NAAQS and will upgrade methods and models needed to guide development of state implementation plans (SIPs), used to achieve the NAAQS. In FY 2003, tropospheric ozone research will evaluate and refine emissions and air quality models to support efforts by Agency, state, Tribal and local regulators, as well as industry, to improve SIPs for tropospheric ozone. The particulate matter (PM) research program will continue work to strengthen the scientific basis for the periodic review of the PM NAAQS, including conducting epidemiological and exposure studies. The PM program will also develop tools and methods for use by states, Tribal, and local regulators to assess control options to improve PM NAAQS implementation plans that will move the Agency toward its objective of reducing Americans' exposure to PM. Also included under this objective will be research to support review of the lead, carbon monoxide, sulfur dioxide, and nitrogen oxide NAAQS.

Air toxics research provides information on effects, exposure, source characterization, as well as other data to quantify existing emissions and to identify key pollutants and strategies for cost effective risk management. In FY 2003, research will focus on completing health assessments for some of the highest priority hazardous air pollutants, and providing the science and technical support to Agency, state, Tribal and local regulators to estimate health effects and exposures to hazardous air pollutants both indoors and outdoors and to reduce risks.

External Factors

Stakeholder participation. To achieve clean air, EPA relies on the cooperation of Federal, state, Tribal, and local government agencies; industry; non-profit organizations; and individuals. Success is far from guaranteed, even with the full participation of all stakeholders. EPA has significant work to accomplish just to reach the annual targets that lead to the longer term health and environmental outcomes and improvements that are articulated in the Clean Air

goal. Meeting the Clean Air goal necessitates a strong partnership among all the stakeholders, but in particular among the states, Tribes, and EPA; the Environmental Council of States; and organizations of state and local air pollution control officials. EPA will be working with various stakeholders to encourage new ways to meet the challenges of "cross regional" issues as well as to integrate programs to address airborne pollutants more holistically.

Environmental factors. In developing clean air strategies, states, Tribes, and local governments assume normal meteorological patterns. As EPA develops standards and programs to achieve the Clean Air goal, it has to consider weather as a variable in the equation for implementing standards and meeting program goals. For example, even if an area is implementing a number of air pollution control programs under normal meteorological patterns, a hot humid summer may cause an area to exceed standards for days at a time, thereby exposing the public to unhealthy air.

Litigation. In July 1997, EPA published revised, more protective NAAQSs for ozone and PM. The standards are currently under litigation. In February, 2001, the U.S. Supreme Court issued an opinion largely upholding EPA's position on several key issues related to these standards. The Supreme Court sent the case back to the U.S. Court of Appeals for the District of Columbia Circuit to address unresolved issues that challengers had raised before the D.C. Circuit. The D.C. Circuit had not addressed these issues before because it had remanded the standards to EPA based primarily on its finding that the Clean Air Act, as EPA had interpreted it, was unconstitutional -- a finding the Supreme Court has now reversed.

A decision from the D.C. Circuit on the unresolved issues related to the 1997 standards is expected in Spring 2002. Currently, EPA is evaluating the Supreme Court opinion, the opinions of the D.C. Circuit, and several legislative provisions to determine how to proceed. The Agency believes that the standards are necessary to protect public health and nothing in the decisions undercuts that belief. We are evaluating our programs to determine how best to secure necessary public health protections while still respecting the courts' decisions. This litigation does not affect standards that were in place prior to July 1997.

Environmental Protection Agency

FY 2003 Annual Performance Plan and Congressional Justification

Clean Air

Objective: Attain NAAQS

Reduce the risk to human health and the environment by protecting and improving air quality so that air throughout the country meets national clean air standards by 2005 for carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead; by 2012 for ozone; and by 2018 for particulate matter (PM). To accomplish this in Indian country, the tribes and EPA will, by 2005, have developed the infrastructure and skills to assess, understand, and control air quality and protect Native Americans and others from unacceptable risks to their health, environment, and cultural uses of natural resources.

Resource Summary
(Dollars in Thousands)

	FY 2001 Actuals	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Attain NAAQS	**$441,056.4**	**$458,311.8**	**$458,856.3**	**$544.5**
Environmental Program & Management	$130,946.1	$119,768.2	$118,516.4	($1,251.8)
Hazardous Substance Superfund	$0.0	$24.1	$21.5	($2.6)
Science & Technology	$119,599.5	$138,553.0	$146,851.9	$8,298.9
State and Tribal Assistance Grants	$190,510.8	$199,966.5	$193,466.5	($6,500.0)
Total Workyears	1,330.5	1,363.0	1,357.1	-5.9

Key Program
(Dollars in Thousands)

	FY 2001 Enacted	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Administrative Services	$1,264.2	$0.0	$0.0	$0.0
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$185,647.6	$199,966.5	$193,466.5	($6,500.0)
Carbon Monoxide	$4,062.3	$4,258.4	$4,025.1	($233.3)
Congressionally Mandated Projects	$21,903.7	$14,492.5	$0.0	($14,492.5)
EMPACT	$1,797.9	$0.0	$0.0	$0.0
Facilities Infrastructure and Operations	$20,363.1	$18,978.9	$19,198.2	$219.3
Homeland Security	$0.0	$1,120.5	$0.0	($1,120.5)
Lead	$329.5	$342.2	$339.6	($2.6)
Legal Services	$5,145.8	$5,487.3	$5,973.1	$485.8
Management Services and Stewardship	$3,572.1	$4,395.3	$4,568.7	$173.4
Nitrogen Oxides	$1,379.4	$1,325.5	$1,399.0	$73.5

	FY 2001 Enacted	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Ozone	$68,106.3	$68,455.1	$77,498.8	$9,043.7
Particulate Matter	$55,617.3	$52,302.7	$62,624.3	$10,321.6
Particulate Matter Research	$65,457.3	$65,468.2	$66,662.0	$1,193.8
Regional Haze	$2,305.9	$2,535.9	$2,408.1	($127.8)
Regional Management	$252.6	$349.5	$310.1	($39.4)
Sulfur Dioxide	$12,158.1	$12,318.5	$13,624.7	$1,306.2
Tropospheric Ozone Research	$6,551.0	$6,514.8	$6,758.1	$243.3

2003 Request

Under the Clean Air Act, EPA must set and periodically review National Ambient Air Quality Standards (NAAQSs) for pollutants that are widespread, endanger human health and the environment, and originate from numerous and diverse sources. These pollutants include: ozone, particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead. Each pollutant and the programs that reduce it are described separately below. This objective also includes cross-pollutant preconstruction and operating permit programs. For each pollutant, EPA sets "primary" standards to protect human health, and "secondary" standards to protect the environment (e.g., crops, vegetation, wildlife, visibility, buildings, and monuments).

States and Tribes must develop and carry out strategies and measures to attain the NAAQSs. These strategies and measures are included in State Implementation Plans (SIPs) and Tribal Implementation Plans (TIPs). EPA works in partnership with Federally-recognized Tribes to carry out Federal trust responsibilities and implement those provisions of the Act that most effectively address air quality management concerns on Tribal lands. The Clean Air Act also requires states to develop programs to protect and improve visibility in national parks and wilderness areas. In addition, EPA establishes, implements, and enforces emissions reduction programs for source categories, such as motor vehicles and fuels, that are most effectively addressed at the national level.

In July 1997, EPA published revised, more protective NAAQSs for ozone and PM. The standards are currently under litigation. In February 2001, the U.S. Supreme Court issued an opinion largely upholding EPA's position on several key issues related to these standards. The Supreme Court sent the case back to the U.S. Court of Appeals for the District of Columbia Circuit to address unresolved issues that challengers had raised before the D.C. Circuit. The D.C. Circuit had not addressed these issues before because it had remanded the standards to EPA, based primarily on its finding that the Clean Air Act, as EPA had interpreted it, was unconstitutional -- a finding that the Supreme Court reversed.

EPA currently is evaluating the Supreme Court opinion, the opinions of the D.C. Circuit, and several legislative provisions to determine how to proceed. The Agency continues to believe that the revised standards are necessary to protect human health, and nothing in the decisions of the Courts changes that belief. EPA is resolving technical issues and developing guidance for

states and Tribes to begin implementing the 8-hour ozone standard, incorporating new innovative approaches to achieve early reductions that will help new areas attain the standard sooner.

The D.C. Circuit Court's 1999 decision did not affect the ozone and PM NAAQSs that were in place before July 1997. These NAAQS have not yet been met in a number of areas. To protect against backsliding during the litigation, EPA has reinstated the 1-hour ozone standard in those areas where it was revoked when the 8-hour ozone standard was established. EPA will continue to complete mid-course reviews for serious and severe areas under the 1-hour standard, review data for reclassification to attainment, review attainment date extensions, and provide oversight and guidance for other SIP revisions.

Ozone

Ozone can impair normal functioning of the lungs in healthy people, as well as in those with respiratory problems. Relatively low levels of ozone can cause coughing, shortness of breath, and pain, especially when taking a deep breath. Ozone also can worsen chronic lung diseases, such as asthma, and is associated with increased medication use, visits to emergency rooms, and hospital admissions. Ozone can inflame and damage the lining of the lung. Animal studies suggest that repeated occurrence of this type of inflammation over a long time period (e.g., months, years, a lifetime), may permanently scar lung tissue, causing reduced lung elasticity, permanent loss of lung function, and a lower quality of life. More people are exposed to unhealthful levels of ozone than to any other air pollutant. EPA estimates that meeting the new 8-hour ozone standard will protect 13 million more children living in areas where unhealthful levels of smog occur than under the previous standard.

Adverse ecosystem effects are known to occur for various species of vegetation and are likely to extend to entire ecosystems. Ozone damage to plants is extensive, with major impacts on commercial crops of wheat, corn, soybeans, cotton, and commercial forestry.

Working with States and Tribes

Unlike most other pollutants, ozone is not emitted directly into the air by specific sources, but is created by sunlight acting on nitrogen oxides (NO_x) and volatile organic compounds (VOCs). Some common sources that emit one or more of these pollutants include: motor vehicles, power plants, chemical manufacturing facilities, petroleum refineries, and printing/coating operations. Emissions of ozone precursors can be carried hundreds of miles from their origins and result in high ozone concentrations over very large areas of the country. This "transport" often affects the ability of states to attain the NAAQS through traditional SIP programs. To address this persistent and widespread problem, EPA will effect compliance under the NO_x SIP Call, implementing control measures through NO_x SIPs or Federal Implementation Plans (FIPs). The Agency expects this program to reduce total summertime emissions of NO_x by about 25 percent or 1.1 million tons beginning in FY 2004 in the affected 22 states and the District of Columbia.

EPA will administer the national program to implement the 1-hour NAAQS for ozone, providing oversight, coordinating among Regions and with states and Tribes to provide national

consistency, and developing policy and guidance to resolve major issues. States will continue to implement the 1-hour ozone standards. For nonattainment areas classified as "severe," states must conduct mid-course reviews to determine if the areas are on track to achieve attainment and revise control strategies if the area is not expected to achieve necessary emission reductions. EPA will review air quality data for areas classified "serious" and "severe" to determine if "bump-ups" to a higher classification are necessary and work with states, local agencies, and Tribes to identify additional control measures, as necessary.

EPA will continue technical support for the 1-hour ozone NAAQS program. The Agency will analyze 10-year trends in ozone concentrations for major U.S. cities, with adjustments for year-to-year variations in meteorological conditions. EPA will complete example applications for "mid-course review" of 1-hour ozone plans based on model applications, trends analyses, and other factors that can be used as part of a weight-of-evidence for demonstrating progress in attainment during FY 2004. In addition, the Agency will develop an example application demonstrating implementation modeling techniques to show attainment of the 8-hour ozone NAAQS.

EPA is working with states and Tribes on the development of implementation rules and guidance for the 8-hour ozone standard. EPA has begun a program to foster innovative approaches and new programs such as cool cities, pollution prevention efforts, smart growth options, and an ozone flex policy for the current 1-hour ozone standard. These programs are aimed at early voluntary reductions that can assist in the transition from the 1-hour to the 8-hour ozone standard, particularly for those areas that are just meeting the 1-hour standard and may not be meeting the 8-hour standard. By implementing early reductions through some of these innovative programs, areas may be able to attain the 8-hour standard prior to designations occurring. The Agency will continue to work with states, local governments, and Tribes to adapt these approaches to specific urban areas.

Section 183(e) of the Clean Air Act requires EPA to list those categories of consumer or commercial products that the Administrator determines, based on a study, account for at least 80 percent of VOC emissions, on a reactivity-adjusted basis, from consumer or commercial products in areas that violate the NAAQS for ozone. The Act requires EPA to divide the list into four groups, establishing priorities for regulation based on specific factors listed in section 183(e). Every two years after promulgating the list, EPA must regulate one group of categories until all four groups are regulated. On March 23, 1995, EPA published the section 183(e) product category list and schedule for regulation that established the four groups and the deadlines for their regulation. Groups I through III regulations were due in March of 1997, 1999, and 2001, respectively, and Group IV regulations are due March, 2003.

On March 18, 1999, EPA published a revised schedule for regulation that moved some categories to later groups. To date, the Agency has regulated only the categories in Group I. In July 2001, the Sierra Club filed a total of seven complaints in the D.C. District Court alleging failure of EPA to meet statutory deadlines in the Clean Air Act, including the requirements of section 183(e)(3)(A). Group II includes flexible package printing materials and Group III includes aerosol spray paints, industrial cleaning solvents, flatwood paneling coatings, and

lithographic printing materials. Although there is no consent agreement on addressing this requirement, EPA will focus efforts on developing these proposed rules in FY 2003.

In FY 2003, EPA will continue to assess the science of reactivity of VOCs in the atmosphere and to develop a comprehensive policy that addresses the impact of reactivity on ozone, PM, and toxics emission reduction programs. EPA will provide guidance on SIP program requirements and will continue to work with the Federal Aviation Administration on airport emissions and with other Federal agencies on applicability of the general conformity rule. EPA also will review 1-hour data for redesignation to attainment and work with areas eligible for redesignation to develop maintenance plans. The Agency will continue to work with Tribes, completing VOC and NOx emission inventories, developing TIP requirements, and addressing issues unique to Tribal lands.

To better assess the causes of the ozone problem, EPA will continue to collect ambient air measurements for a target list of VOCs (precursors to both ozone and PM), as well as for nitrogen compounds, ozone, and both surface and upper air meteorological conditions. National and local analyses of the data provides: 1) insight into how ozone precursors and toxic pollutants contribute to the ozone problem; 2) a trends assessment of ozone, ozone precursors, and toxic pollutants; 3) an evaluation of pollutant management programs; and, 4) a database for developing control strategies. EPA also will explore and implement improvements to emissions testing and monitoring approaches for VOCs, including better and less expensive continuous monitors and more reliable techniques for analysis of water-based coatings, inks, and other solvents. EPA also will work to improve emissions testing and monitoring of NO_x emissions required in SIPs.

Urban and regional-scale numerical grid models (i.e., UAM-IV, UAM-V, CAMx, etc) continue to be used extensively for analysis of ozone issues and preparation of SIPs during FY 2002 and are expected to continue into FY 2003 and beyond. In addition, the use of other modeling systems (i.e., REMSAD and Models-3) will continue in support of Regional Planning Organizations (RPOs) for addressing regional haze and for $PM_{2.5}$. The applicability of such models will also benefit such programs as the Great Lakes Initiative, U.S./Mexico Border, U.S./ Canada, and the air toxics program. EPA, states, Tribes, and RPOs will work collaboratively in developing the capability to use these models, evaluate their accuracy and applicability to complex air quality issues, test and analyze emission control alternatives, as well as share information on model input data and estimates of ambient concentrations. Models-3 is expected to be the focus of significant efforts for evaluation, testing, and application to multi-pollutant programs. EPA will focus extensively on public outreach and information to provide high quality information for general and technical audiences to facilitate public understanding, so that individuals can make choices about activities that might decrease personal risk on days when air pollution levels are high. Improved information quality and access will enable citizens and users to obtain "real-time" air quality information and enable EPA to better track environmental indicators and assess progress.

Development of an integrated, multi-pollutant emissions model, the Sparse Matrix Operator Kernel Emissions (SMOKE), will be completed in FY 2003. The SMOKE model is an emissions model that prepares an emission inventory for subsequent air quality modeling by providing the specific emission inputs needed for other modeling. The SMOKE model runs

mobile and biogenics emissions models to produce the required inputs for these emission inventories. EPA is updating these emission models to use new data sets. These data sets include land use and census data. The Agency is working to improve these data sets by getting more updated data (e.g., 2000 census data), and looking for additional land use categories that would better reflect the spatial distribution of emission sources within a county.

Applications of a "one-atmosphere" modeling system (Models-3/CMAQ) also will be completed for assessing the impact of new national rules and policy assessments (e.g., multi-pollutant, non-road, PM NAAQS Regulatory Impact Assessment, toxics deposition, U.S./Canada transboundary issues) on multiple pollutants and their species components. Model outputs will be used to assess the impact of the rules on attainment of standards, support for regulatory/legal actions, and benefits analyses. This activity will be supported through continued partnerships with the Office of Research and Development (ORD) in operating a Center for Community Modeling to support, maintain, and enhance Models-3/CMAQ within the scientific community.

In FY 2003, linkages between global and regional air quality and climate change would be assessed using hemispheric and regional scale modeling tools. The impact of emissions changes on the global and regional distribution of ozone and PM will be estimated. Control strategies will be modeled and recommendations made for reducing the impacts of foreign and domestic emissions increases/reductions on the intercontinental transport of these pollutants and their implications for regional air quality and global climate change.

Mobile Source Ozone Controls

To address the need for further reductions in motor vehicle emissions to help attain and maintain the current as well as the new NAAQS, the Agency will implement current motor vehicle and fuel standards and develop new programs. In calendar year 1996, light-duty vehicles (LDVs) and light-duty trucks (LDTs) contributed more than 22 percent of national NO_x emissions and 25 percent of VOC emissions. Heavy-duty trucks and buses also contribute greatly to the nation's air quality problems, accounting in calendar year 2000 for about one-third of NO_x emissions from mobile sources. To address these issues, in FY 2000, the Agency promulgated the Tier II program for LDVs/LDTs to begin in model year 2004. This program established new tailpipe standards for all passenger vehicles and new limits for sulfur in gasoline. The new standards will reduce NO_x emissions by 2 million tons per year by calendar year 2020 and nearly 3 million tons annually by calendar year 2030. In FY 2003, EPA will continue the implementation of the Tier II regulations for LDVs, LDTs, and medium-duty passenger vehicles. This will allow manufacturers to certify they meet Tier II standards under early opt-in provisions for Tier II. In addition, EPA will continue work to implement the new gasoline sulfur standards.

In FY 2001, the Agency promulgated new standards for heavy-duty vehicles and engines. Before these standards were promulgated, gasoline trucks in FY 1997 and reaffirmed in FY 2000 were required to be 78 percent cleaner and diesel trucks to be more than 40 percent cleaner than today's models. These requirements were designed to reduce NOx emissions by 2.4 million tons annually when the program is fully implemented in calendar year 2030 and thereafter. The new 2001 standards established a comprehensive national program that will regulate trucks and buses

and diesel fuel as a single system with the new emission standards taking effect in model year 2007. Under this program, new trucks and buses will be more than 90 percent cleaner than current models, resulting in a reduction of 2.6 million tons of NO_x emissions in calendar year 2030.

In FY 2003, the Agency will continue work to implement the new 2007 heavy-duty highway engine and diesel sulfur requirements. This includes continued assessment of the development of engine after-treatment technology and its sensitivity to diesel fuel sulfur levels. In addition, EPA will continue work on a rulemaking to establish new standards for heavy-duty non-road, land-based diesel engines and vehicles, potentially including new sulfur requirements for non-road diesel fuel. Additionally in FY 2003, the Agency, as part of the implementation of the existing Tier I and National Low Emission Vehicle (NLEV) programs, will continue to ensure that emission benefits from these programs are achieved through vigorous compliance programs.

The National Vehicle and Fuels Emissions Laboratory (NVFEL) will continue to conduct vehicle emission tests as part of the pre-production tests, certification audits, in-use assessments, and recall programs to support mobile source clean air programs. In FY 2003, EPA will continue conducting testing activities for fuel economy, LDV and heavy-duty engine (HDE) characterization, Tier II testing, reformulated gasoline, future fleets, OBD evaluations, certification audits and recall programs. EPA also will continue to conduct separate in-use testing on heavy-duty diesel engines to ascertain compliance with consent decrees related to violations of defeat device prohibitions and will expand its in-use presence to include non-consent decree engines and non-road diesel engines as well. EPA will continue testing of heavy-duty diesel engines to support implementation of 2007 requirements, non-road diesel engine rulemaking activities, and development of Portable Emission Measurement Systems (PEMS). In addition, NVFEL will conduct energy efficiency tests of electric vehicles in collaboration with the Department of Energy (DOE) and non-road vehicle emission testing in support of non-road regulatory development.

To support confirmatory and compliance programs, the NVFEL will conduct 400 certification and fuel economy tests on LDV, LDT and Light Heavy-Duty Vehicles (LHDV) and will conduct 240 compliance tests on in-use LDVs and LDTs. NVFEL will also conduct an approximately equivalent amount of testing of LDV and heavy-duty engines.

To ensure achievement of the goals of the Clean Air Act through Tier II and the 2004 and 2007 Heavy-Duty Engine Regulations, EPA will require an investment of $14 million to upgrade EPA's vehicle and engine testing capabilities at the NVFEL. This funding will provide essential laboratory equipment to perform new, highly sophisticated, emissions testing on vehicles and engines to ensure compliance with these more stringent regulations**.**

The NVFEL provides critical support to EPA, the states, the fuels industry, and the automobile industry by testing vehicles and engines for compliance with Federal clean air standards. Tests are conducted on motor vehicles, heavy-duty engines, non-road engines, and fuels to: (1) certify and/or confirm that vehicles and engines meet Federal air emissions and fuel economy standards; (2) ensure engines comply with in-use requirements; and (3) ensure fuels,

fuel additives, and exhaust compounds meet Federal standards. By FY 2003 a dramatic change in the type and amount of testing will be required at the NVFEL as a result of new Federal regulatory standards (Tier II and Heavy-Duty Engine) becoming effective and advancements in vehicle emission control technologies.

An investment of $14 million in laboratory modernization will address three critical areas:

- Tier 2 Emission Standards Compliance Testing - $8.5 million for emission measurement system upgrades required to fully implement and enforce the new Tier 2 emission standards and test procedures for all passenger cars and light trucks beginning with the 2004 model year. This includes the capability to compliance test new vehicle designs at extremely low emission levels prior to issuing a certificate allowing production and sale of compliant vehicles. It also provides the capability to confirm in-use vehicle or engine emissions performance by conducting in-use vehicle testing programs for enforcement purposes.

- Heavy-Duty Engine Emission Standards Testing - $3.0 million for emission measurement system upgrades required to implement and enforce the model year 2004 and 2007 Diesel Engine Standards for on-highway, heavy-duty engines. This includes the capability to measure NOx emissions at extremely low levels in order to compliance test new model year 2004 heavy-duty engine designs. In addition, the upgrade includes the capability to measure PM emissions at extremely low levels in order to compliance test new model year 2007 heavy-duty engine designs prior to issuing a certificate allowing production and sale of compliant vehicles. Although the low PM standards are not required until the 2007 model year, EPA expects some manufacturers will introduce clean engines sooner to generate early reduction credits. The system upgrades also will provide the capability to confirm in-use engine performance by carrying out in-use engine testing programs for enforcement purposes.

- Next Generation Emission Measurement Systems Testing - $2.5 million for digital and computer-based emission measurement system upgrades required to accurately measure the next generation of emission control systems.

The ability to perform these tests will ensure fulfillment of the goals of the Clean Air Act to protect the health of all Americans. EPA calculates that when fully implemented in 2030, the final Tier II rule will prevent as many as 4,300 deaths, more than 10,000 cases of chronic and acute bronchitis, and tens of thousands of respiratory problems a year. The Tier II program will allow 120 million Americans now living in areas with dangerous pollution levels to enjoy cleaner air.

The emission reductions resulting from the Heavy-Duty Engine Regulations will prevent as many as 8,300 premature deaths, more than 9,500 hospitalizations, and 1.5 million work days lost. Diesel engines emit large amounts of NO_x and PM, both of which contribute to serious public health problems in the U.S., including lung cancer, aggravation of respiratory and cardiovascular disease, aggravation of existing asthma, acute respiratory symptoms, chronic

bronchitis, and decreased lung function. With both ozone and PM, children and the elderly are most at risk.

In FY 2002, EPA plans to promulgate regulations addressing emissions from a range of unregulated non-road sources, including industrial spark-ignition engines (e.g., forklifts and generators), recreational vehicles, and recreational marine engines. These standards will significantly reduce emissions, carbon monoxide, toxics, and other emissions that contribute to ozone formation. In FY 2003, the Agency will start work to implement these new standards.

EPA will continue implementing other mobile source programs addressing ozone precursor emissions. The first two phases of emission standards for locomotives, which will result in more than a 60 percent reduction in locomotive NO_x emissions, were implemented in calendar years 2000 and 2002, respectively. The next phase of locomotive standards will take effect in calendar year 2005. In FY 2003, the Agency will continue to evaluate certification test data to ensure locomotive designs comply with standards.

Another recent program that EPA will continue implementing in FY 2003 is the Phase 2 standards for small spark-ignition handheld engines (e.g., trimmers, brush cutters, and chainsaws). The phase in schedule of these new standards began with the 2002 model year. This program will reduce hydrocarbon (HC) and NO_x emissions by 70 percent. This is equivalent to an annual reduction of 500,000 tons of HC and NO_x by the calendar year 2027. This reduction is accompanied by an overall reduction in fuel consumption.

Using an existing portable emission measurement system that was developed by EPA for measuring real world in-use emissions – the Real-time On-board Vehicle Emission Reporter (ROVER) -- the Agency began in FY 2001 to test trucks on-highway for compliance with emission standards. EPA screened 41 separate engine families for high NO_x emissions. This program was extended in FY 2002 and expanded to include state participation. In FY 2003, EPA will continue the program and will obtain the participation of additional states interested in monitoring heavy-duty diesel emissions.

An important element of the Agency's work on controlling emissions is to ensure emission data is obtained from the different categories of mobile sources. In FY 2000, the Agency increased its focus on the development of a portable emission measurement system that will allow the Agency to acquire in-use emission data in a cost-effective manner. In FY 2001-2002, EPA refined its in-use NO_x measurement capability. In FY 2003, EPA will continue further testing and development of the complete system to include PM and toxics measurement capability. The Agency plans to continue using portable systems to characterize in-use emissions from light-duty vehicles, heavy-duty highway vehicles, and non-road equipment. The newly acquired emission data will enhance EPA's emission models. In the long-term, portable sampling systems will find widespread application by EPA, states, and industry for compliance and in-use emission monitoring purposes.

The Agency also will emphasize improvements in its transportation emission models in FY 2003. In FY 2002, EPA developed an architectural framework for a new generation model that will greatly improve the Agency's ability to support the development of emission control

programs, as well as providing support to the states in their determination of program needs to meet air quality standards. The Agency will continue developing the new transportation emission model in FY 2003, as well as providing guidance and training in the use of mobile source models.

EPA will partner with states, Tribes, and local governments to create a comprehensive compliance program to ensure that vehicles and engines are clean. EPA will use advanced in-use measurement techniques and other sources of in-use data to monitor the performance of on-board diagnostic (OBD) systems on vehicle models to make sure that OBD is a reliable check on the emissions systems as part of vehicle Inspection and Maintenance (I/M) programs. With this information, EPA will work to establish an integrated information system that allows for assessment and action on those vehicles and engines that present the greatest environmental risk. Additionally, EPA will continue its public education and outreach efforts to ensure that the public and vehicle repair technicians understand OBD.

In FY 2002, 34 states are operating I/M programs. EPA will continue providing technical and programmatic guidance to states and local agencies for implementing these programs. Beginning in FY 2002, EPA is assisting the states in incorporating OBD inspections into operating I/M programs. EPA will support states in the evaluation of I/M programs, as directed by the Clean Air Act and the National Highway System Designation Act.

As part of implementing the ozone standard and regional haze rule, EPA's Transportation Air Quality Center, in cooperation with the Department of Transportation, will continue assistance to states and local governments including implementation of the transportation conformity requirements. EPA will continue to ensure national consistency in adequacy findings for motor vehicle emissions budgets in air quality plans.

In addition, EPA will work with states and local governments to ensure the technical integrity of the mobile source controls in the SIPs. EPA will assist areas in identifying the most cost-effective control options available.

EPA will continue to develop partnerships that emphasize the development of innovative transportation control strategies and voluntary mobile source programs. The Agency will continue providing technical guidance for implementing the National Low Emission Vehicle program.

The Agency will continue implementing Phase II of the reformulated gasoline (RFG) program, which will result in additional VOC, NO_x, and toxic emission reductions in 17 states and the District of Columbia, and will provide technical and programmatic guidance to states implementing clean fuel programs. RFG is designed to substantially reduce vehicle emissions of ozone-forming and toxic pollutants and it is estimated to reduce VOC emissions nationally by 27 percent, toxic emissions by 22 percent, and NO_x emissions by 6.8 percent. This is the equivalent of taking 16 million vehicles off the road. EPA will continue to address issues associated with the use of oxygenates (e.g., MTBE and ethanol) in RFG. EPA will process approximately 100,000 fuel quality reports and review 156 fuel surveys with 17,000 samples.

The President's National Energy Policy (NEP) directs EPA to study opportunities to maintain or improve environmental benefits of state and local "boutique" clean fuel programs. A total of 11 states have banned and 12 more are considering banning MTBE as a gasoline additive. This threatens to encourage proliferation of "boutique" fuel requirements, which, in times of disruption, can create fuel production and distribution system logistical problems. EPA is currently evaluating options to fulfill this NEP directive, while exploring ways to increase flexibility in the fuels production and distribution system.

The mobile source compliance program will oversee more than 225 original equipment manufacturers to ensure that vehicles and engines (both on-highway and non-road) will meet the applicable emission standards throughout their useful life. The program issues nearly 2,200 certificates of conformity annually. Compliance is audited and ensured through pre-production certification and confirmatory testing, assembly line testing, various special audit programs, and in-use testing and recall. For light-duty vehicles and trucks, there also is a fuel economy compliance program, which in FY 2003 will issue 1,000 fuel economy consumer labels, data for the EPA/DOE Gas Mileage Guide and "gas guzzler" tax collection, and data to calculate the Corporate Average Fuel Economy (CAFÉ) values for all light-duty manufacturers. The mobile source fees program will collect approximately $11 million in FY 2003, offsetting costs of the certification, recall, selective enforcement audit, and fuel economy programs. This fee program will be updated through a rulemaking that will eventually offset the entire cost of the above compliance programs.

The FY 2003 model year will be the third year of mandatory participation in the Agency's new compliance assurance program (CAP 2000). CAP 2000 will simplify and streamline the current procedures for pre-production certification of new motor vehicles. Manufacturers are projected to save $55 million each year under the CAP 2000 program. Under CAP 2000, manufacturers are required to supply in-use test data for each class of vehicle sold. These data will be an important tool for the Agency in targeting its recall testing investigations.

Particulate Matter

PM is the term for solid or liquid particles found in the air. Some particles are large enough to be seen as soot or smoke. Others are so small that they can be detected only with an electron microscope. The PM NAAQS were revised in 1997 in part to separately address both the coarse and fine fractions of inhalable particles. Because particles originate from a variety of mobile and stationary sources (diesel trucks, wood stoves, power plants, etc.), their chemical and physical compositions vary widely. PM can be directly emitted or can be formed in the atmosphere when gaseous pollutants, such as SO_2, VOCs, and NO_x, react to form fine particles.

Both coarse and fine particles can accumulate in the respiratory system and are associated with numerous health effects. Coarse particles can aggravate respiratory conditions such as asthma. Exposure to fine particles is associated with several serious health effects, including premature death. Health effects have been found to be associated with PM exposures that occur both over short-term periods (such as a day) and long-term periods (a year or more). When exposed to PM, people with existing heart or lung diseases—such as asthma, chronic obstructive pulmonary disease, congestive heart disease, or ischemic heart disease—are particularly

vulnerable and may be at increased risk of premature death or admission to the hospital or emergency room. The elderly also are sensitive to PM exposure. They are at increased risk of admission to hospitals or emergency rooms and, perhaps, premature death from heart or lung diseases. When exposed to PM, children and people with existing lung disease may not be able to breathe as deeply or vigorously as they normally would, and they may experience symptoms such as coughing and shortness of breath. PM can increase susceptibility to respiratory infections and aggravate existing respiratory diseases, such as asthma and chronic bronchitis, causing increased medication use and increased doctor visits.

In FY 2002, as part of the regular NAAQS reviews required by the Clean Air Act, EPA will complete and make available to the public a comprehensive assessment of the recent scientific findings regarding air quality, exposure, and health and environmental effects of PM in the PM Criteria Document. Based on the scientific information in the PM Criteria Document, EPA is preparing a Staff Paper that will evaluate the policy implications of the available scientific information and identify critical elements that should be considered in the Administrator's decision whether to retain or revise the PM NAAQS. The Criteria Document and Staff Paper will be reviewed by the Clean Air Scientific Advisory Committee (CASAC) and made available for public comment. Following completion of these documents, EPA will propose whether to retain or revise the PM NAAQS.

In FY 2003, EPA will continue to assist states, local governments, and Tribes in maintaining existing control programs and in devising stationary source and mobile source strategies to reduce PM. EPA will provide guidance on SIP requirements, the impact of fire and agricultural processes on PM levels, and benefits to PM implementation of regulations designed for controlling toxics. EPA will provide guidance that integrates any future implementation of PM standards with implementation of the regional haze rule.

EPA and states will expand outreach efforts to promote public awareness of the Air Quality Index. The Agency will develop a strategy for transition from the old PM_{10} standard to the new $PM_{2.5}$ standard and a series of guidance documents for implementing the new standards. These guidelines will resolve technical issues and establish early reduction strategies similar to those used for ozone implementation.

EPA will work with partners to develop improved emission factors (including gathering improved activity data bases and utilization of GIS and satellite remote sensing where possible) for key point source, area source combustion and fugitive dust source categories and global emission events. EPA will coordinate with stakeholders on the development of a real time data system to catalogue wildland fire events, improve emission models for these fires, and demonstrate ways to reduce agricultural emissions. The Agency also will respond to inventory needs identified by the National Academy of Sciences review of CAFO ammonia emissions.

EPA is better characterizing $PM_{2.5}$ concentrations, sources and emissions by assisting states and Tribes in establishing and maintaining a nationwide monitoring network and carrying out source characterization analyses. Since promulgating the new $PM_{2.5}$ standards, EPA has been working with states and Tribes to install monitors and obtain data on $PM_{2.5}$ particle emissions. This compliance network was fully operational as of December 31, 1999. EPA also

will promote the use of continuous PM monitoring and improved PM test methods. States and Tribes will use the air quality data and chemical speciation data to identify PM sources and "hot spots" for purposes of developing future SIPs and TIPs. As recommended by NAS, EPA is discussing with the Clean Air Scientific Advisory Committee ways to increase the usefulness of the resultant monitoring data to PM health researchers. Monitoring data for PM_{10} will continue to be used to characterize emission sources, evaluate air quality models, and contribute to the regular scientific review of the standard.

EPA will carry out statistical analysis and source apportionment techniques that provide understanding of the spatial and temporal distribution of $PM_{2.5}$ and its constituents. The main focus of the analysis will be to support decisions and development of decision tools on $PM_{2.5}$ nonattainment boundaries. In addition, enhancement of real time air quality forecasting for PM based on applications of numerical grid models will be fostered and a regular forecast program implemented for a limited area. Additionally, web-based analysis tools on EPA's AMTIC Web site will be implemented. These tools will provide routine plots and tables based on user input. This will add to the analytical tools (e.g. PMF, UNMIX) that are now being used to analyze $PM_{2.5}$ data.

To ensure the source and ambient monitoring measurements are credible, EPA will continue to develop and conduct quality assurance protocols. Currently efforts are focused on the quality assurance of the ambient $PM_{2.5}$ monitoring network because of its recent establishment. In FY 2002 and beyond, EPA also will improve source testing and monitoring methods for PM emissions from stationary sources. These method improvements are needed at this time for characterization of $PM_{2.5}$ emissions. The improved methods will also be available for determining compliance with any future $PM_{2.5}$ SIP emission limits that may be needed.

Levels of PM caused by mobile sources may rise in the future due to the projected increases in the number of individual mobile sources and in motor vehicle travel. The Agency will continue to seek further reductions in motor vehicle emissions to attain and maintain the NAAQSs through the review of current motor vehicle and fuel standards and the development of new programs. Heavy-duty trucks and buses today account for one-quarter of PM emissions from mobile sources. In some urban areas, the contribution is even greater. In FY 2001, EPA promulgated the new diesel fuel standards and heavy-duty vehicle and engine standards that will significantly reduce emissions from diesel trucks and buses. The new program will result in a fleet of trucks and buses with PM emission levels that are 90 percent below those of their 2000 model year counterparts. By 2030, the program will reduce annual emissions of PM by 109,000 tons. In FY 2003, the Agency will continue working toward implementing these standards. This includes continued assessment of the development of new emission control technology. In addition, EPA will continue work on new standards for heavy-duty non-road, land-based diesel engines and vehicles, including potentially new diesel fuel sulfur requirements.

In FY 2003, EPA will continue to help create voluntary diesel retrofit projects to reduce PM from older, high-polluting trucks and buses. In some cases, EPA will help fund the costs of purchasing emission control devices, such as PM filters and oxidation catalysts. EPA also will increase efforts to promote the use of emerging retrofit emission control technology and will

partner with states, EPA Regional offices, local governments, private fleets, and industry members.

The President's National Energy Policy directs EPA and the Department of Transportation (DOT) to develop a program to address the concern of idling trucks at truck stops and other rest areas. To address this directive, EPA will develop partnership agreements with truck fleets, the truck stop industry, manufacturers of idle control technologies, and local and state governments to create incentives for implementation of idle control technologies, and remove barriers that truckers have identified. EPA also will create interstate corridor projects where truckers can use alternatives such as truck stop electrification at their regular stop-overs. Idling strategies will be used in conjunction with other programs in EPA's Freight Management Partnership initiative to get the trucking industry to achieve substantial fuel savings and emission reductions. The long-term emission reductions from these demonstration projects alone will result in fewer cases of premature death, hospitalization, and respiratory problems.

In FY 2003, EPA will continue implementing other mobile source programs addressing PM emissions. The emission standards for locomotives, which will result in more than 40 percent reduction in PM, began in 2000 (Tier 0). Tier 1 standards took effect in FY 2002 and Tier 2 standards will take effect in FY 2005. In FY 2003, the Agency will continue to evaluate certification test data to insure locomotive designs comply with standards.

As discussed earlier for ozone, an important element of the Agency's work in controlling emissions is to ensure the accuracy of emission data from the different categories of mobile sources. In 2000, the Agency increased its focus on development of a portable emission measurement system that will allow the Agency to acquire in-use emission data in a cost-effective manner. In FY 2001-2002, EPA refined its in-use NO_x measurement capability. In FY 2003, EPA will continue the testing and development of this system to include PM and toxics measurement capability. The Agency plans to continue using this portable system to characterize in-use emissions from light-duty vehicles, heavy-duty highway vehicles, and non-road equipment. The newly acquired emission data will enhance our emission models.

Improving EPA models is another area that the Agency will be addressing in FY 2003. In FY 2001, EPA started the development of an architectural framework for a new generation model that will greatly improve the Agency's ability to support the development of emission control programs, as well as providing support to the states in their determination of program needs to meet air quality standards. The Agency will continue the development of the new model in FY 2003. The Agency also will continue providing guidance and training in the use of mobile source models.

EPA will develop a series of guidance documents for the particulate matter program to provide infrastructure for implementing the new standards. EPA will continue public outreach activities, especially to create materials for the general public on fine PM.

In FY 2002, EPA will complete development of a PM measuring system for use with its portable emission monitoring systems described above. In FY 2003, the Agency will put the new technology to use in monitoring and enforcing compliance with diesel PM standards.

Visibility

Visibility impairment, caused by the presence of tiny particles in the air, is most simply described as the haze that obscures clarity, color, texture, and form. The Clean Air Act gives special protection to natural areas that Americans want to preserve for future generations, such as national parks and wilderness areas.

EPA promulgated a final regional haze rule in FY 1999. Because of regional variations in natural conditions that combine with man-made pollution to produce regional haze, EPA believes that regional haze should be addressed through a region-specific program that accounts for these variations. EPA worked with states to establish five regional planning organizations. EPA is working closely with the Regional Planning Organizations (RPOs) to develop the technical basis for future policy decisions and tailor programs that take into account the varying conditions in the different geographical areas.

In FY 2001, EPA proposed Best Available Retrofit Technology (BART) rules that would require certain larger, older utilities and other industrial plants to install BART as part of a state's strategy for improving visibility. The proposal provides guidelines to states in selecting the plants where BART should be applied and determining the type of controls to be installed. The proposal will undergo a public comment period and should be finalized in FY 2002. In FY 2003, EPA will be working closely with RPOs to develop plans for implementing this rule.

In FY 2002, EPA is releasing two guidance documents to assist states and Tribes in implementing the regional haze rule. The Tracking Progress guidance document is intended to provide a consistent way to evaluate changes in visibility impairment in Class I areas under the regional haze program. The purpose of the Natural Visibility guidance document is to provide guidance to the states and Tribes in implementing the regional haze program.

In FY 2003, the EPA would continue providing funding to the National Park Service (NPS) to run the IMPROVE network and supplementary state and tribal protocol ($PM_{2.5}$ speciation) sites. EPA will also continue its coordination role with states, Tribes and the NPS to facilitate better visibility monitoring.

EPA will continue to support RPOs concerned with regional haze and PM impacts through the set up and application of regional scale models (e.g., CMAQ & REMSAD). Included in this activity will be preparation of meteorological models and data bases for calendar year 1999-2001, preparation of emissions inputs to models and development of emissions projections, and evaluation of model accuracy based on the latest years of speciated PM data. These model applications will serve as a preliminary basis to assess regional emission control strategies necessary for $PM_{2.5}$ SIPs and regional haze goals. Training in the use of these models will be continued on a basis of need.

Implementation of NAAQS and Visibility Requirements

Ground-level ozone, fine PM, and regional haze have many similarities. Both ozone and PM (and the resulting regional haze) remain in the atmosphere for days, leading to regional scale transport that can affect broad areas of the country. Both pollutants are formed under certain atmospheric conditions by gases, such as NO_x and VOCs, emitted by the same types of sources. There are similar health effects associated with exposure to ozone and PM (e.g., increased respiratory symptoms and increased hospital admissions and emergency room visits for respiratory causes). The similarities between the pollutants and the regional haze problem provide opportunities for integrated strategies for reducing pollutant emissions in the most cost-effective ways.

EPA also recognizes the increased burden on state and local agencies in controlling multiple pollutants. To address this EPA is developing technologies to help states form control strategies to address the multiple pollutants with NAAQSs. One of the activities EPA is currently engaged in is developing an integrated ambient monitoring strategy to determine the optimal number of monitors and associated work-hours needed for each pollutant, given the competing needs of measuring the other pollutants. As states, Tribes, or local agencies determine the need to add monitors or change location of monitors in the network, they can use this strategy to minimize any increase in resources needed.

The strategy for implementing any new ozone and particulate matter standard together with regional haze requirements will be targeted at maintaining air quality protection efforts currently underway and building on the agreements and progress already made by communities and businesses. In carrying out the implementation strategy, EPA will seek to reward state, Tribal, and local governments and businesses that take early action to reduce air pollution levels through cost-effective approaches and address pollution that travels across jurisdictional lines. EPA will work with states and Tribes to develop innovative strategies and control programs that employ regulatory flexibility to minimize economic impacts on businesses to the greatest possible degree consistent with protecting human health and the environment. EPA also will attempt to minimize regulatory burdens for states, Tribes, local governments, and businesses and ensure that air quality planning and related Federal, Tribal, state, and local planning are coordinated.

Carbon Monoxide

CO is a colorless, odorless gas that enters the bloodstream and interferes with the delivery of oxygen to the body's organs and tissues. The health threat from exposure to ambient concentrations of CO is most serious for those who suffer form cardiovascular disease. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, decreased learning ability, and difficulty in performing complex tasks.

In FY 2001, the NAS began a two-year study for EPA of CO episodes associated with meteorological and topographical problem areas and strategies for these nonattainment areas.

In FY 2002, EPA will issue new standards for a range of unregulated, non-road sources, including industrial spark-ignition engines (e.g., forklifts and generators), recreational gasoline engines (e.g., snowmobiles and off-road motorcycles), and recreational marine gasoline and diesel engines. These new emission standards will reduce emissions from engines that potentially expose people to high concentrations of harmful exhaust pollutants.

EPA currently is reviewing the NAAQS for CO and has completed the CO criteria document. The Agency anticipates completing the Staff Paper in FY 2002. After taking into account Clean Air Science Advisory Committee review and public comment, EPA expects to propose a decision whether to retain or revise the standards in FY 2003 and issue a final decision in FY 2004.

In FY 2003, EPA will continue to assist states, Tribes, and local agencies in implementing strategies to reduce CO, review data for redesignations to attainment, and assist states in developing plans, as necessary, to maintain compliance with CO standards. As a result of these efforts, EPA expects an additional four areas to attain the NAAQS for CO in FY 2003.

Sulfur Dioxide

SO_2 belongs to the family of gases called sulfur oxides (SO_x). These gases are formed when fuels (mainly coal and oil) containing sulfur are burned and during metal smelting and other industrial processes. The major health concerns associated with exposure to high concentrations of SO_2 include effects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Children, the elderly, and people with asthma, cardiovascular disease, or chronic lung disease (such as bronchitis or emphysema) are most susceptible to adverse health effects associated with exposure to SO_2. In the atmosphere, SO_2 can react to form fine particles that may aggravate respiratory disease and lead to premature death. SO_2 is also a precursor to sulfates, which are associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, and reduced visibility.

EPA will continue to ensure that all areas are in compliance with the standard and will review the standard, as the Clean Air Act mandates, to ensure that it adequately protects human health. The D.C. Circuit Court of Appeals has remanded for further explanation EPA's most recent decision not to revise the SO_2 NAAQS for a better explanation of why the Agency did not set a 5-minute SO_2 standard. In a January 9, 2001 Federal Register notice, EPA announced it would await a Supreme Court decision on the ozone and PM NAAQS before responding to the SO_2 remand. Since the Supreme Court decision remanded the case back to the D.C. Circuit Court for further proceedings, EPA's response to the remand on the SO_2 NAAQS will await a decision from that court. In the same notice, EPA provided new 5-minute data and analyses of that data. In FY 2002, EPA will collect 5-minute monitoring data from areas selected in consultation with regions/states/locals and the American Lung Association. This data will be analyzed in FY 2003. Following analysis of the data, EPA will make a determination whether to finalize the intervention level program previously proposed. This program gives states guidance on identifying and addressing high, short-term peaks that occur for short durations (five minutes) but that can cause bronchial constriction in asthmatics, a serious health concern. In FY 2003, EPA will increase efforts to reduce the more pervasive sulfur oxide emissions through the acid

rain, PM, and regional haze programs that are described under those objectives. These efforts will result in nine additional areas coming into compliance with the SO_2 NAAQS in FY 2003.

Nitrogen Dioxide

NO_2 belongs to a family of highly reactive gases called nitrogen oxides. Nitrogen oxides form when fuel is burned at high temperatures and result primarily from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. NO_2 is the most widespread and commonly found nitrogen oxide and is a matter of public health concern. With regard to human health effects, NO_2 can cause respiratory symptoms such as coughing, wheezing, and shortness of breath in children and adults with respiratory disease, such as asthma. Even short exposures to NO_2 affect lung function. In children, repeated short-term exposures can increase the risk of respiratory illness. Animal studies suggest that long-term exposure to lower levels of NO_2 may increase susceptibility to respiratory infection and may cause permanent structural changes in the lungs. Nitrogen oxides can also serve as precursors to ozone and PM. Nitrogen oxides react with VOCs in the presence of sunlight to form smog. NO_2 can be converted into fine nitrate aerosols, a constituent of fine particles ($PM_{2.5}$). In addition, it is a strong oxidizing agent and reacts in the air to form corrosive nitric acid as well as toxic organic nitrates. They can also have adverse effects on both terrestrial and aquatic ecosystems, contributing to acid rain and eutrophication in coastal waters.

EPA has made progress toward reducing the emissions of nitrogen oxides and achieving the goal of having all areas in attainment for NO_2 by 2005. Over the next several years, the Agency will continue to work to maintain air at safe levels of NO_2. The Agency also will review the standard to assure that it continues to protect human health and welfare.

Because NO_2 is a tropospheric ozone precursor, control of NO_2 is a way to reduce ozone. As described in the preceding ozone section, efforts are underway to reduce the more pervasive nitrogen oxides in the acid rain and mobile source programs, encouraging market-based, low-cost pollutant trading. These programs will simultaneously address nitrogen oxides, tropospheric ozone, and fine particulate matter.

Lead

Exposure to lead mainly occurs through inhalation of air and ingestion of lead found in dust, food, paint, water, or soil. Lead accumulates in the body in blood, bone, and soft tissue. Because it is not readily excreted, lead also can affect the kidneys, liver, nervous system and other organs. Excessive exposure to lead may cause kidney disease, reproductive disorders, and neurological impairments such as seizures, mental retardation, and/or behavioral disorders. Fetuses and children are especially susceptible to low doses of lead, often suffering central nervous system damage or slowed growth.

Thanks largely to reduced use of leaded gasoline, human exposure to lead in ambient air has been greatly reduced. Today, smelters and battery plants are the major sources of lead in the air. EPA will continue a relatively low level of existing work, emphasizing the few nonattainment areas near smelters. Mandating the use of unleaded gasoline will continue to be

the most effective way to prevent airborne lead. Two additional areas are expected to come into compliance with the NAAQS in FY 2003.

Cross-Pollutant Operating Permits and New Source Review (NSR).

Following the promulgation of the Part 70 operating permit rules, EPA will provide technical support to Regions, states, Tribes and local agencies on permit program revisions. By the end of FY 2003, EPA intends, with assistance from state and local permitting authorities, to complete the first round of Part 70 permits. The Agency will continue to monitor the permitting program implementation efforts. The Agency will continue and expand training and technical support efforts to ensure smooth incorporation into operating permits of the Compliance Assurance Monitoring, Maximum Achievable Control Technology (MACT) standards, and other rules that have recently become effective. The Agency also will continue to be involved in and expand, as needed, efforts to reform and streamline permitting programs and train citizens to effectively review Title V and new source review (NSR) permits.

In FY 2003, the RACT/BACT/LAER Clearinghouse (RBLC) will continue to maintain, operate, and enter new information into its data base. In FY 2002 the RBLC will complete data collection and entry for missing permits issued in the last 10 years and implement most improvements identified through RBLC public workshops. The RBLC also will implement an on-line tutorial, establish an interface with EPA's public access GIS data base (to relate the proximity of permitted sources to Class I and other sensitive areas), and complete its first technical bulletins on new and emerging air pollution technologies in FY 2002. New initiatives are planned to be completed in FY 2003 to implement more complex system improvements, establish an emerging technology data base, accommodate final NSR Reform rules, and interconnect the RBLC Web data base with other EPA data bases that contain facility data.

The regulatory modeling program will be continued. This includes implementation of new modeling systems (e.g., AERMOD, PRIME, CALPUFF) to support NSR/PSD (Prevention of Significant Deterioration) applications. New standardized methods for evaluation of models and for QA/QC of model applications will be developed. Also, support and outreach to the air regulatory modeling community through Internet websites, Model Clearinghouse, training, and workshops will continue.

Homeland Security

In FY 2002, resources will be used to procure equipment that will allow EPA to do air monitoring in emergency situations. Resources will allow EPA to develop and maintain the capability to quickly provide relevant air pollution monitoring and health effects information in response to a terrorist incident. EPA equipment would supplement permanent state and local monitoring networks providing more comprehensive, site-specific information.

Research

EPA's NAAQS-related research program has a two-fold purpose: (1) to support the periodic review and revision as needed of the NAAQS (i.e., risk assessment, exposure, and

effects research); and (2) to support implementation and attainment of the NAAQS (i.e., atmospheric chemistry, air quality models, and risk management research). The FY 2003 request focuses on research to address the two NAAQS pollutants that are believed to pose the greatest risk to human health: tropospheric ozone and particulate matter (PM).

Tropospheric Ozone and Related NAAQS

Continuing research efforts in FY 2003 will develop measurement methods and observations-based assessments to provide a reliable means of determining state and local emissions reductions. EPA will develop techniques to measure ozone precursors and their transformation during meteorological transport. Ongoing regional field studies have been developing observation-based methods (OBM) to complement emissions-based, physical theory modeling (EBM). In FY 2003 methods to combine EBM and OBM techniques for developing ozone control strategies will be demonstrated, so that the Agency, states, Tribes, and the public can accurately and reliably predict ambient ozone concentrations.

In the area of atmospheric chemistry and modeling, EPA will examine the causes of NAAQS non-attainment (e.g., chemical constituents, sources and source regions, and meteorological variables). Research will also develop data about key missing features of the atmospheric chemistry of ozone formation and use these data to improve atmospheric chemistry models. Developing, evaluating, and applying atmospheric models for projecting the impacts of alternative control strategies will also continue to be a priority in FY 2003.

Research to improve the accuracy of emissions estimates from biogenic (i.e., naturally occurring) and mobile sources will continue in FY 2003. Biogenic emissions research will develop improved emissions factors for compounds that are highly reactive with ozone and hydroxide because current inventories may under represent these emissions. Field measurements will also be conducted to validate estimates of oxygenated volatile organic compound (OVOC) emissions from agricultural, arid land, and forest OVOC sources. Activity (such as land use) algorithms that influence these estimates will be studied to enhance the reality and accuracy of the estimates. Work will also be conducted to help determine how emissions change between seasons. Accurate estimates of emissions from biogenic sources are critical in estimating background oxidant potential and formulating cost-effective anthropogenic pollution control strategies.

Mobile emissions research will further the development and validation of the Mobile Emissions Assessment System for Urban and Regional Evaluation (MEASURE), which provides more accurate emissions estimates of CO, NO_x, and VOCs – ozone precursors. MEASURE takes into account how a vehicle's mode of operation, such as acceleration, influences emissions. Studies will be performed to enhance MEASURE's capability to estimate emissions from the Light Truck fleet (LDGT 1's and LDGT 2's) because the data used for these sources is limited. In addition, efforts will continue to integrate the MEASURE model into the MOBILE6 model now used by states to develop estimates for ozone SIPs. The data generated from this research will help federal, state, Tribal, and local regulators develop and evaluate attainment strategies.

Research activities related to NAAQS pollutants other than tropospheric ozone will include the development of an External Review Draft for the NOx AQCD as part of the periodic NAAQS review of this pollutant.

Particulate Matter Research

EPA's particulate matter research portfolio is aligned with the ten priority topics identified by the National Academy of Sciences (NAS) in a series of reports, the most recent issued in January 2001 (*Research Priorities for Airborne Particulate Matter: Early Research Progress*). The next report, due near the end of FY 2002, will provide the NAS, customers, and interested stakeholders with the opportunity to evaluate an extensive body of research results. The NAS recommendations describe a research program that would resolve issues of scientific uncertainty regarding (a) the science underlying the 1996 Air Quality Criteria Document for Particulate Matter, (b) our scientific knowledge regarding susceptible subpopulations and hazardous PM components, and (c) the implementation of the current PM standards. The EPA research plan also addresses several critical research issues which are included in multiple NAS topics. These include:

1. Potential confounding of PM health effects with other pollutants in the air. The EPA research program is sequenced such that much initial effort has gone towards identifying specific components of PM. Once health effects of specific components are determined, it will be possible to ascertain the contribution of other pollutants to health effects associated with PM and it components. This plan is in agreement with the NAS timeline for research on PM and co-pollutants. Although EPA is far from understanding the health effects associated with all PM components, enough progress has been made that EPA will now initiate studies formally examining the role played by co-pollutants. Epidemiologic research under this topic will assess the consequences of PM and co-pollutant exposures in at-risk populations including the relative toxicity of specific PM constituents from various emission sources and the role of gaseous co-pollutants (such as nitrogen dioxide and carbon monoxide) in PM health effects.

2. Attribution of the PM health effects to specific constituents (e.g., sulfates versus nitrates versus organic and elemental carbon, and metals). The new monitoring network, which includes the supersites and speciation sites, is providing information about specific PM components. Future epidemiology studies will associate health effects with these components. Current and planned toxicology studies are also linking health effects with specific PM components found in ambient PM, and attempting to further link specific components with sources that produced them in an effort to link health effects with pollution sources.

3. The quantitative relationship between exposure to different particles and various health effects. The assessment of the hazards associated with PM has proceeded in line with the NAS Risk Assessment Paradigm of 1993. This paradigm initially establishes the existence of a hazard (i.e., Hazard ID) and its 'biologic plausibility,' and then ascertains the attributes of dose (concentration)-response. The preponderance of data to date correlates exposure to PM mass with many different health effects, including cardio-

respiratory mortality and morbidity, and life-shortening. Since these outcomes occur at levels previously thought to be "safe" a high priority must now be placed on establishing dose-response models in epidemiology and toxicology studies. Only with established dose (concentration) - response relationships between particles (and their components) with potentially adverse health effects, will appropriate and credible assessment of the true risks and impact to human health be determined**.**

NAS Priority Topic 1- *Outdoor measures vs. actual human exposures to PM*: As the NAS time line suggests, exposure related research in FY 2003 is moving from Topic 1 to Topic 2, measuring exposure to specific PM components.

NAS Priority Topic 2 - *Exposure of susceptible subpopulations to toxic PM components*: Research under this NAS Topic, as well as under NAS Topic 1, will investigate exposure of both the general population and susceptible subpopulations to PM and the components of PM suspected to pose the greatest health risks. Specifically, this research includes measurements to generate PM human exposure data and the development of modeling tools needed to estimate exposures to PM and its components. Work will continue to develop models that predict exposure, and to link these exposure models to atmospheric and lung deposition models.

NAS Priority Topic 3- *Characterization of PM emission sources*: This work will: (1) develop new or improved methods and models to quantify or estimate emissions; (2) provide data on the size distribution of the particles emitted; and (3) provide updated and augmented data on the chemical composition of PM from a variety of sources. Research on gaseous PM precursors will focus on improving ammonia emission factors for different types of animal husbandry operations (swine and poultry) and on-road light-duty vehicles. Ammonia emissions are currently not well quantified and air quality models require improved ammonia emissions data to accurately predict secondary PM formation both close to the sources of ammonia and farther downwind in more highly populated areas. This research will reduce uncertainties in emissions estimates and increase the likelihood that strategies in State Implementation Plans (SIPs) will achieve the emissions reductions required to comply with the NAAQS.

NAS Priority Topic 4 - *Air quality model development and testing*: EPA atmospheric measurement and modeling research in support of NAS Priority Topic 4 will evaluate the processes that control the chemical composition of PM and develop urban-to-regional scale emissions-based air quality models and source apportionment models. Additional research will be conducted to determine accurately the physical properties, chemistry, and composition of atmospheric aerosols and to develop and evaluate measurement methods needed for applying and evaluating complex models that simulate atmospheric processes. These efforts will increase understanding of atmospheric processes (including meteorology) and chemistry that affect the secondary formation, transport, and fate of PM to support NAAQS implementation planning, as well as the evaluation of alternative risk management options. Improved methodologies and models will allow us to do more accurate and complete analyses than currently possible.

NAS Priority Topic 5 - *Assess hazardous PM components:* EPA will determine physical, chemical, and biological characteristics (e.g., size, chemical composition) of particles responsible for adverse health effects, as well as dose-response relationships between PM

constituents and adverse health effects. This research will involve an integrated, multi-disciplinary approach in which emission characterization and health information will guide chemical speciation research. Well-characterized PM samples from sources of concern (oil and coal-fired boilers, diesel trucks, open burning) will be provided for toxicological testing. The emphasis of this research will be on simulating mixtures of PM that people are actually exposed to in the ambient environment in such a way that effects of specific PM components can be evaluated individually and in combination.

NAS Priority Topic 6 – Deposition and Fate of Particle in the Respiratory Tract: Because work in this area is focusing on the differences between normal and susceptible individuals, it has been merged with NAS Topic 8, Susceptible Populations.

NAS Priority Topic 7 - *Effects of PM and co-pollutants*: Continuing research efforts to understand and disentangle the effects of PM and co-pollutants include studies of interactions between PM and other air pollutants, as well as toxicological and clinical studies to investigate effects of co-pollutants on PM health effects. Additional research under this topic will include epidemiological studies to assess the consequences of PM and co-pollutant exposures in at-risk populations.

NAS Priority Topic 8 - *Identify susceptible subpopulations*: Health effects research will identify subpopulations with enhanced sensitivity to the adverse effects of PM and determine how host susceptibility factors influence dose-response relationships. This work will also develop animal models of human susceptibility and conduct studies identifying morbidity effects on vulnerable population subgroups. Dosimetry research continues to be a high priority area because recent studies have shown that PM is deposited in greater amounts, and in different pulmonary locations, in people with lung disease than in healthy people.

NAS Priority Topic 9 - *Toxicological mechanisms of injury*: Research will identify underlying mechanisms of toxicity responsible for adverse health outcomes. This research will also determine physical, chemical, and biological characteristics of particles responsible for adverse health effects.

NAS Priority Topic 10 - *Analysis and measurement*: Research will support development of methods for the use of alternative indicators of exposure to PM, which can be correlated with morbidity and mortality outcomes.

In FY 2003, EPA will also continue supporting five university-based research centers conducting particulate matter research. These research centers, established in FY 1999, advance the scientific understanding of the health effects of PM through integrated exposure and health effects studies addressing all ten high-priority research areas identified by the NAS. Research at these centers includes exposure studies, the development of dosimetry models, toxicological studies, and acute effects epidemiological studies.

In addition, EPA's PM research program will continue to coordinate activities in the Supersites monitoring network, which provides detailed air quality information to support atmospheric chemistry and modeling efforts, evaluation of new and emerging monitoring

methods, as well as toxicological and epidemiological studies that will support both future NAAQS decision-making and NAAQS implementation.

Finally, EPA's PM research program also includes support for the development of methods to measure PM and its components and to evaluate options to manage PM risks. This research will include support for the development of Federal Reference Methods (FRM) needed to implement the PM NAAQS and will investigate continuous monitoring methods for both PM mass and speciated PM.

FY 2003 Change from FY 2002 Request

EPM

- (-$600,000) Resources for the FY 2002 Homeland Security Supplemental, used for one-time equipment purchases, are not continued in FY 2003.

- (-$7,150,000) The FY 2002 Request is $7,150,000 below the FY 2001 Enacted budget level due to Congressional earmarks received during the FY 2002 appropriations process which are not included in the FY 2003 President's Request.

- (-$764,900) Resources, dollars and FTE, associated with rent are allocated in proportion to Agency-wide FTE located in each goal, objective. Resources, dollars and FTE, associated with utilities, security and human resource operations are allocated in proportion to Headquarters FTE located in each goal, objective. Changes reflect shifts in FTE between goals and objectives. Resources, dollars and FTE, associated with contracts and grants are allocated in proportion to Headquarters' contracts and grants resources located in each goal, objective. Changes in these activities reflect shifts in resources between goals and objectives. *(Total changes - rent: -$3,569,400, utilities: +$3,468,000, Security: -$9,103,900. Nominal increases/decreases occurred in human resource operations, grants and contracts related activities.)*

STAG

- (-$6,500,000) Redirected state grant funds from the NAAQS program to the air toxics program to help states develop a national air toxics monitoring network.

S&T

- (-$5,100,000) The FY 2002 Request is $5,100,000 below the FY 2001 Enacted budget level due to Congressional earmarks received during the FY 2002 appropriations process which are not included in the FY 2003 President's Request.

- (+$14,000,000) This increase is for the implementation of equipment upgrades required to accurately measure the emissions of Tier II vehicles and low-emission heavy-duty diesel engines. This level includes: (1) $8.5 million for emission measurement system upgrades required to fully implement and enforce the new Tier 2 emission standards and

test procedures for all passenger cars and light trucks beginning with the 2004 model year; (2) $3.0 million for emission measurement system upgrades required to develop the model year 2004 and 2007 Diesel Engine Standards and to subsequently implement and enforce these standards for all on-highway heavy-duty engines; and (3) $2.5 million for digital and computer-based emission measurement system upgrades required to accurately measure the next generation of emission control systems.

Research

S&T

- (+$3,580,300) Resources will be redirected within the Objective from long-term PM health effects studies supporting multiple NAS-identified high priority research topics to additional research focusing on the combined effects of PM and gaseous pollutants (NAS 7), and mechanisms of injury (NAS 9). Very little data is available on the actual mechanisms of PM toxicity. Research on the mechanisms of injury is needed to better understand the causal link between PM exposures and adverse health outcomes in support of risk assessments. In addition, most PM risk assessments currently address the effects of specific pollutants separately, and research on combined effects will allow for a more complete assessment of the human health risks associated with the direct effects of exposure to PM in combination with other air pollutants.

- (-$3,580,300) Resources will be redirected within the Objective from long-term PM health effects studies (multiple NAS research topics) to work focusing on combined effects of PM and gaseous pollutants, and mechanisms of injury. This multi-year program will continue to focus on assessing the health impacts of long-term exposures to PM and its constituents, and a substantial base remains to continue this program.

- (+$800,000) Resources will be shifted within the Objective to support Federal Reference Method (FRM) development. The current FRM is outdated and states have requested newer continuous monitoring technologies. Special emphasis is needed on a Federal Reference Method (FRM) for continuous sampling of PM, including coarse PM, development of speciation techniques, and resolution of issues related to pollutant speciation.

- (-$800,000) Resources will be shifted within the Objective to support FRM development. This research focused on field and modeling research on the generation and control of ozone, fine particles, and photochemical processes in the southern United States. The program was scheduled to expire in FY 2002.

- (+$658,800, +2.0 FTE) This change represents a shift of resources within the Objective from emissions characterization research for toxicology support (NAS 3) to increase support for state efforts to develop attainment strategies. This work will focus on PM source profiling and characterization for mobile sources (also NAS 3), including research to improve or develop new methods to quantify the size distribution and chemical composition of fine PM and gaseous precursor emissions from off-road sources.

- (-$658,800, -2.0 FTE) This shift of resources within the Objective will reduce resources for emissions characterization research (NAS 3) supporting PM toxicology work. There will be a modest delay in providing data for use in toxicology studies.

- (+$490,600, +6.9 FTE) Resources will be redirected within the Objective to PM exposure measurement and modeling (NAS 1& 2), including the development of exposure data and models to predict exposure. Planned research related to homeland security will conclude in FY 2002.

- (-$490,600, -6.9 FTE) Planned research related to homeland security in the area of health effects and exposures at the World Trade Center will conclude in FY 2002. Resources will be redirected to PM exposure measurement and modeling (NAS 1& 2).

- (+$400,000) This increase augments PM exposure measurements research (NAS 2) to provide data for PM mass and toxic components. The results from this research will be representative of the general population and selected subpopulations and will focus on areas that include quantifying the relationship between ambient measures and personal exposure, as well as directly quantifying the magnitude, frequency, and duration of exposure.

- (+$66,500, +0.3 FTE) This increase in resources will be used to coordinate EPA scientific participation in regulatory development with program offices on major rules.

- (-$2,242,500) The FY 2003 Request is $2,242,500 below the FY 2002 Enacted budget level due to Congressional earmarks received during the FY 2002 appropriations process which are not included in the FY 2003 President's Request.

Annual Performance Goals and Measures

Reduce Ozone and Ozone Precursors

In 2003 Maintain healthy air quality for 44.1 million people living in monitored areas attaining the ozone standard; certify that 2 areas of the remaining 45 nonattainment areas have attained the 1-hour NAAQS for ozone thus increasing the number of people living in areas with healthy air by 1.0 million.

In 2002 Maintain healty air quality for 41.7 million people living in monitored areas attaining the ozone standard; certify 10 areas of the remaining 55 nonattainment areas have attained the 1-hour NAAQS for ozone, thus increasing the number of people living in areas with healthy air by 2.5 million.

In 2001 EPA maintained healthy air quality for 38.2 million people living in 43 areas attaining the ozone standard, increased by 3.5 million the number of people living in areas with healthy air quality that have newly attained the standard by certifying that 3 new areas have attained the 1-hour standard.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Total Number of People who Live in Areas Designated to Attainment of the Clean Air Standards for Ozone	41,679,000	44,146,000	45,167,000	People
Areas Designated to Attainment for the Ozone Standard	3	10	2	Areas
Additional People Living in Newly Designated Areas with Demonstrated Attainment of the Ozone Standard	3,475,000	2,467,000	1,021,000	People
VOCs Reduced from Mobile Sources	1,659,000	1,755,000	1,852,000	Tons
NOx Reduced from Mobile Sources	1,189,000	1,319,000	1,449,000	Tons

Baseline: As a result of the Clean Air Act Amendments of 1990, 101 areas with a population of 140,015,000 were designated nonattainment for the 1-hour standard. Through 2001, 46 areas with a population of 41.7 million have been redesignated to attainment and 55 areas remain in nonattainment. (Population estimates based on 2000 census.) The 1995 baseline for VOCs reduced from mobile sources is 8,134,000 tons and 11,998,000 tons for NOx, both ozone precursors.

Reduce Particulate Matter

In 2003 Maintain healthy air quality for 7.2 million people living in monitored areas attaining the PM standards; increase by 81 thousand the number of people living in areas with healthy air quality that have newly attained the standard.

In 2002 Maintain healthy air quality for 3.4 million people living in monitored areas attaining the PM standards; increase by 3.7 million the number of people living in areas with healthy air quality that have newly attained the standard.

In 2001 EPA maintained healthy air quality for 1.189 million people living in 9 areas attaining the PM standards and increased by 2.249 million the number of people living in areas with healthy air quality that have newly attained the standard.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Total Number of People who Live in Areas Designated in Attainment with Clean Air Standards for PM	3,438,000	7,181,000	7,262,000	People
Areas Designated to Attainment for the PM-10 Standard	8	6	8	Areas
Additional People Living in Newly Designated Areas with Demonstrated Attainment of the PM Standard	2,249,000	3,743,000	81,000	People
PM-10 Reduced from Mobile Sources	22,000	23,000	25,000	Tons
PM-2.5 Reduced from Mobile Sources	16,500	17,250	18,000	Tons

Baseline: As a result of the Clean Air Act Amendments of 1990, 84 areas with a population of 31,114,000 were designated non-attainment for the PM-10 standard. Since that time, EPA has split Pocatella into 2 areas thereby revising the baseline to 85 with a population of 31,114,000. Through 2001, 17 areas with a population of 3.4 million have been redesignated to attainment. (Population estimates based on 2000 Census.) The 1995 baseline for PM-10 reduced from mobile sources is 880,000 tons and 659,000 for PM-2.5.

Reduce CO, SO2, NO2, Lead

In 2003 Maintain healthy air quality for 52.7 million people living in monitored areas attaining the CO, SO2, NO2, and Lead standards; increase by 4.1 million the number of people living in areas with healthy air quality that have newly attained the standard.

In 2002 Maintain healthy air quality for 36.7 million people living in monitored areas attaining the CO, SO2, NO2, and Lead standards; increase by 16 million, the number of people living in areas with healthy air quality that have newly attained the standard.

In 2001 EPA maintained healthy air quality for 36.3 million people living in 56 areas attaining the CO, SO2, NO2, and Lead standards and increased by 418,000 the number of people living in areas with healthy air quality that have newly attained the standard.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Total Number of People Living in Areas Designated in Attainment with Clean Air Standards for CO, SO2, NO2, and Pb	36,721,000	52,725,000	56,732,000	People
Areas Designated to Attainment for the CO, SO2, NO2, and Pb Standards	9	8	15	Areas
Additional People Living in Newly Designated Areas with Demonstrated Attainment of the CO, SO2, NO2, and Pb Standards	418,000	16,005,000	4,007,300	People
CO Reduced from Mobile Sources	10,672,000	11,002,000	11,333,000	Tons
Total Number of People Living in Areas with Demonstrated Attainment of the NO2 Standard	14,944,000	14,944,000	14,944,000	People

Baseline: For SO2, NO2, Lead, and CO, 107 areas with a population of 67,573,000 were classified as non-attainment or were unclassified in 1990. Through 2001, 65 of those areas with a population of 36.7 million have been redesignated to attainment. (Population estimates based on 2000 census.) The 1995 baseline for mobile source emissions for CO was 70,947,000 tons.

Air Quality Index

In 2003 The three year average of the total number of days nationwide that any city reports air quality index (AQI) values greater than 100 in the nation's 94 largest metropolitan areas will drop from 1,548 in 1997-1999 to 1,290 in 2001-2003, which is 3.7% of total days.

In 2002 The three year average of the total number of days nationwide that any city reports air quality index (AQI) values greater than 100 in the nation's 94 largest metropolitan areas will drop from 1,548 in 1997-1999 to 1,390 in 2000-2002, which is 4.0% of total days.

In 2001 Three year trend data not available until late 2002.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Number of Area Days Greater than 100	Data Lag	1,390	1,290	Area Days

Baseline: The AQI provides information on pollutant concentrations for ground level ozone (O3), particulate matter (PM-10), carbon monoxide (CO), sulfur dioxide (SO2), and nitrogen dioxide (NO2). Of these 5 pollutants, only 4 (CO, O3, PM-10, and SO2) generally contribute to the AQI value. Ozone contributes 98% of the AQI days over 100 due to ozone in 1999. The proposed measure is a three year running average of the total metropolitan statistical area days (msa-days) above an AQI value of 100. This averaging helps to account for the variability (upward and downward swings) associated with the significant effect of meteorology on this metric. Since 1993, the running 3 year average of AQI msa-days > 100 has fluctuated with a high of 1,586 for 1993-1995, a low of 1,414 for 1997-1999 and the mean of the average number of msa-days from the three year periods 1991-1993 through 1998-2000 at 1,490. This is a new measure for 2003, EPA will use the mean for the previous 7 three year periods (1,490) as its estimate for 2001 and targeted a reduction of 100 total msa-days each year through 2003.

Research

PM Effects Research

In 2003 Describe health effects of PM and its components in normal and susceptible populations, mechanisms by which PM exerts adverse health effects, and analyze ambient and personal exposure to PM so that EPA has the necessary information to develop NAAQS that protect human health.

In 2002 Provide data on the health effects and exposure to particulate matter (PM) and provide methods for assessing the exposure and toxicity of PM in healthy and potentially susceptible subpopulations to strengthen the scientific basis for reassessment of the NAAQS for PM.

In 2001 EPA provided new information on the atmospheric concentrations, human exposure, health effects and mechanisms of toxicity of particulate matter.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Complete PM longitudinal panel study data collection and report exposure data.	1			study
Report on health effects of concentrated ambient PM in healthy animals and humans, in asthmatic and elderly humans, and in animal models of asthma and respiratory infection.	1			report
Final PM Air Quality Criteria Document completed.	0			final AQCD
Report on the effects of concentrated ambient PM on humans and animals believed most susceptible to adverse effects (e.g., elderly, people with lung disease, or animal models of such diseases).		1		report
Publish report on effects of particulate matter and volatile organic chemical air pollutants on children.		1		report
Publish report on the empirical and theoretical lung deposition dose of ultrafine, fine, and coarse particles in elderly and mild asthmatic subjects under various breathing conditions.			1	report
Publish report on the toxic effects of metallic and ultrafine PM constituents on lung cells and animals, and the molecular and biochemical mechanisms through which they occur.		1		report
Publish report on a series of studies of model and ambient PM effects in animal models of systemic hypertension, advanced cardiovascular disease, and chronic lung disease (asthma, COPD).		1		report
Report on animal and clinical toxicology studies using Utah Valley particulate matter (UVPM) to describe biological mechanisms that may underlie the reported epidemiological effects of UVPM.		1		report
Longitudinal PM exposure panel study final report.		1		report
Complete 3rd External Review Draft for the PM AQCD for public comment and CASAC review.		1 draft		report
Report on statistical associations of mortality/morbidity with source categories and other alternative indicators of PM exposure.		1		report
Capstone report on the physical, chemical, and toxicological characteristics of PM from heavy oil and coal combustion. The report provides data on the linkage between emissions and health effects.		1		report
Describe the relative importance of PM attributes (physical, chemical, and biological) on health outcomes in laboratory animals and humans.			1	evaluation
Ascertain attributes of susceptibility contributing to the responsiveness of cardiovascular- and pulmonary-compromised humans and laboratory animals.			1	analysis
Describe biochemical and neurogenic mechanisms by which PM modulates cardiovascular, hematological, and pulmonary functions.			1	evaluation
Report on the acute respiratory health effects of particulate matter and co-pollutants among asthmatic children in seven U.S. communities.			1	report

Baseline: At present, there is substantial evidence from epidemiological studies that increased levels of particulate matter (PM) are associated with increased frequency of death and disease, especially in the elderly, in individuals with cardiopulmonary disease, and in children. We still do not understand which PM components are responsible for increased mortality and morbidity, nor do we fully understand whether personal exposure to PM is reflective of exposure information obtained from fixed site monitoring. Our understanding of the biological mechanisms underlying these associations, and a fuller understanding of populations which may be susceptible to PM are also only now beginning to emerge. As noted by the National Research Council, the EPA research program is well targeted to address these critical knowledge gaps and is well integrated with the extensive ambient air monitoring programs managed by state and local agencies. The results of the research efforts in 2003 will include development

and application of new methods for assessing human exposure, identifying susceptible populations and major PM components responsible for toxicity, and characterizing mechanisms of toxicity leading to PM health effects, all of which will yield an improved scientific basis for setting National Ambient Air Quality Standards (NAAQS) for PM.

PM Measurement Research

In 2003 Provide updated data on PM source emissions, technology costs and performance, and air quality models so that States will have improved PM emissions inventories and compliance strategies for attaining the PM NAAQS and safeguarding public health.

In 2001 Provided new information on particulate matter source emissions, measurements, methods, and emissions-based air quality models to guide State Implementation Plan (SIP) development under the PM NAAQS.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Publish a report on the size distribution of particles emitted from diesel trucks under various on-road conditions to improve source inventories for NAAQS implementation.	1			report
Publish peer reviewed documentation of the PM components of Models-3/CMAQ.	1			documentation
Prepare a report evaluating a new PM control technology, electrostatic fabric filtration, for use on coal-fired boilers.			1	report
To support the OAR PM regulatory program, produce a paper on emissions of ammonia from hog waste lagoons, both before and after application of mitigation techniques.			1	paper
Complete analysis of organic compounds in PM samples from combustion sources. Data will be used to update an OAR database used by states to determine sources of ambient PM.			1	compendium

Baseline: There are existing databases, measurement methods, models, and other tools used to support decisions concerning implementation of the NAAQS for PM. Recent scientific advances and proposed changes to the PM standard require additional research to update and validate the existing tools and to develop new tools. While much is known about the emissions and concentrations of sulfur oxides and nitrogen oxides that contribute to formation of PM in the ambient air, less is known about other variables such as emissions of ammonia and directly emitted PM, how to measure the organic and elemental fractions of PM, and the myriad atmospheric reactions that lead to PM formation. Improvements are needed to measure various PM components at high time resolution and better specificity and to determine the physical properties of PM including size fractions and composition in ambient monitoring networks. Improvements are also needed to better understand the effect of meteorological parameters and other factors that may bias the measurements. Studies to validate and upgrade emission based and receptor models are also needed to ensure these tools produce the best results possible to support NAAQS compliance decisions. Key needs include studies to validate PM concentrations generated by the model against actual field measurements, improved data on the composition of directly emitted PM to identify unique tracers that relate emissions from a specific source, and improvements in our understanding of PM formation in clouds and fogs and transport processes at the surface and aloft to upgrade model algorithms that calculate atmospheric PM formation. Finally, as new PM and multi-pollutant control technologies are developed, technical and economic assessments are needed to assess their viability. Federal, state, and local air quality officials will use the upgraded models, methods and other tools to design and implement existing and new PM and visibility standards.

Verification and Validation of Performance Measures

Performance Measures: **NAAQS**

- Areas Designated for the 1-hour Ozone Standard and Associated Populations
- Areas Redesignated/ Areas Maintaining Healthful Standards for CO, SO2, NO2, and Lead and Associated Populations
- Areas Designated for PM 10 Standard and Associated Populations

Performance Databases:

- AIRS- Aerometric Information Retrieval System is comprised of two major subsystems: 1) the Air Quality Subsystem (AQS) stores ambient air quality data (used to determine whether nonattainment areas have the three years of clean air data needed for redesignation), and 2) the Airs Facility Subsystem (AFS) stores emissions and compliance/enforcement information for facilities.

C FREDS-The Findings and Required Elements Data System is used to track progress of states and regions in reviewing and approving the required data elements of the State Implementation Plans (SIP). SIPs define what actions a state will take to improve the air quality in areas that do not meet national ambient air quality standards.

Data Source:

C AIRS: State and local agency data from State and Local Air Monitoring Stations (SLAMS).

C FREDS: Data are provided by EPA's Regional offices.

QA/QC Procedures:

C AIRS: The Quality Assurance and Quality Control (QA/QC) of the national air monitoring program have several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

• FREDS: No formal QA/QC procedures.

Data Quality Review:

C AIRS: No external audits have been done in the last 3 years.

C FREDS: None.

Data Limitations:

C AIRS: Potential data issues: 1) incomplete or missing data (e.g., some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (e.g., faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (e.g., non-calibrated and non-operational monitors).

C FREDS: Potential data issue is incomplete or missing data from Regions.

Data issues are all subject to the QA/QC procedures listed above and therefore are resolved or accounted for depending on how the data will be used.

New/Improved Data or Systems:

C AIRS: AQS, which stores ambient air quality data from over 5000 sites across the country, is a user-friendly, Windows-based Oracle relational database. State and local

agencies routinely upload air quality data to AQS on a quarterly basis, which the public can access through the web. Fiscal Year 2002 efforts will begin the process of moving AQS from a client-server application to a web application, allowing agencies to submit data to AQS via the Agency's Central Data Exchange (CDX). AFS, a mainframe system that the Office of Air Quality Planning and Standards (OAQPS) used for many years for managing its national emissions database has been replaced by the National Emissions Trends (NET) database. NET is an ORACLE database accessible through the Internet. Both systems will be enhanced to include the data standards (*e.g.,* latitude/longitude, chemical nomenclature) developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in the NET database can be linked with environmental data in other Agency databases for the same facility.

C FREDS: None

Performance Measure: **Reductions in Mobile Source VOC Emissions and Reduction in Mobile Source NOx Emissions**

Performance Database: AIRS

Data Source: AIRS: State and local agency data from State and Local Air Monitoring Stations (SLAMS).

QA/QC Procedures: AIRS: The Quality Assurance and Quality Control (QA/QC) of the national air monitoring program have several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and recordkeeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

Data Quality Review: AIRS: No external audits have been done in the last 3 years.

Data Limitations: AIRS: Some potential issues: 1) incomplete or missing data (*e.g.,* some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.,* faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.,* non-calibrated and non-operational monitors).

Data issues are all subject to the QA/QC procedures listed above and therefore are resolved or accounted for depending on how the data will be used.

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractors obtain some necessary information directly from other sources; for example, weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions for future years. When the method for estimating emissions changes significantly, EMD usually revises its older estimates of emissions in years prior to the most recent year, to avoid a sudden discontinuity in the apparent emissions trend. EMD publishes the national emission estimates in hardcopy; county-level estimates are available electronically.

It is useful to understand just what mobile source information is updated in Trends each year. An input is updated annually only if there is a convenient source of annual data for the input. Generally, VMT, the mix of VMT by type of vehicles (FHWA types, not EPA types, however), temperatures, gasoline properties, and the designs of Inspection/Maintenance (I/M) programs are updated each year. The age mix of highway vehicles is updated, using state registration data; this captures the effect of fleet turnover, assuming emission factors for older and newer vehicles are correct. Emission factors for all mobile sources and activity estimates for non-road sources are changed only when Office of Transportation and Air Quality requests that this be done and is able to provide the new information in a timely manner.

The limitations of the inventory estimates for mobile sources comes from limitations in the modeled emission factors in grams per mile (g/mile) and also the estimated vehicle miles traveled for each vehicle class. For nonroad emissions, the estimates come from a model using equipment populations, emission factors per hour or unit of work, and an estimate of usage. These input data are frequently revised with newer data. Any limitations in the input data such as emission factors (based on emission factor testing and models predicting overall fleet emission factors such as in g/mile), vehicle miles traveled (which are derived from Department of Transportation data), and other factors will carry over into limitations in the emission inventory estimates.

New/Improved Data or Systems: AIRS: AQS, which stores ambient air quality data from over 5000 sites across the country, is a user-friendly, Windows-based Oracle relational database. State and local agencies routinely upload air quality data to AQS on a quarterly basis, which the public can access through the web. Fiscal Year 2002 efforts will begin the process of moving AQS from a client-server application to a web application, allowing agencies to submit data to AQS via the Agency's Central Data Exchange (CDX). AFS, a mainframe system that the Office of Air Quality Planning and Standards (OAQPS) used for many years for managing its national emissions database has been replaced by the National Emissions Trends (NET) database. NET is an ORACLE database accessible through the Internet. Both systems will be enhanced to include the data standards (*e.g.,* latitude/longitude, chemical nomenclature) developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification

standards will be included so that air emission data in the NET database can be linked with environmental data in other Agency databases for the same facility.

Performance Measure**: Reductions in Mobile Source PM 10 Emissions and PM 2.5 Emissions**

Performance Database: AIRS

Data Source: AIRS: State and local agency data from State and Local Air Monitoring Stations (SLAMS).

QA/QC Procedures: AIRS: The QA and QC of the national air monitoring program have several major components: the Data Quality Objective (DQO) process, reference and equivalent methods program, the precision and accuracy of the collected data, EPA's National Performance Audit Program (NPAP), system audits, and network reviews. To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and siting criteria; 2) each site must provide adequate QA assessment, control, and corrective action functions according to minimum program requirements; 3) all sampling methods and equipment must meet EPA reference or equivalent requirements; 4) acceptable data validation and record keeping procedures must be followed; and 5) data from SLAMS must be summarized and reported annually to EPA. Finally, there are system audits that regularly review the overall air quality data collection activity for any needed changes or corrections.

Data Quality Review: AIRS: No external audits have been done in the last 3 years.

Data Limitations: AIRS: Some potential data issues : 1) incomplete or missing data (*e.g.,* some values may be absent due to incomplete reporting, and some values subsequently may be changed due to quality assurance activities); 2) inaccuracies due to imprecise measurement and recording (*e.g.,* faulty monitors; air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area); and 3) inconsistent or non-standard methods of data collection and processing (*e.g.,* non-calibrated and non-operational monitors).

Data issues are all subject to the QA/QC procedures listed above and therefore are resolved or accounted for depending on how the data will be used.

EPA does make estimates of mobile source emissions, for both past and future years. The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by OAQPS's Emissions, Monitoring, and Analysis Division (EMD). The Assessment and Modeling Division is the coordinator within the Office of Transportation and Air Quality for providing EMD information and methods for making the mobile source estimates. In addition, EMD's contractors obtain some necessary information directly from other sources; for example, weather data and the Federal Highway Administration's (FHWA) Vehicle Miles Traveled (VMT) estimates by state. EMD always creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with 31 line items representing mobile sources. Usually, EMD also creates estimates of emissions for future years. When the method for estimating emissions changes significantly, EMD usually revises its older estimates of emissions in years prior to the

most recent year, to avoid a sudden discontinuity in the apparent emissions trend. EMD publishes the national emission estimates in hardcopy; county-level estimates are available electronically.

It is useful to understand just what mobile source information is updated in Trends each year. An input is updated annually only if there is a convenient source of annual data for the input. Generally, VMT, the mix of VMT by type of vehicles (FHWA types, not EPA types, however), temperatures, gasoline properties, and the designs of Inspection/Maintenance (I/M) programs are updated each year. The age mix of highway vehicles is updated, using state registration data; this captures the effect of fleet turnover, assuming emission factors for older and newer vehicles are correct. Emission factors for all mobile sources and activity estimates for non-road sources are changed only when Office of Transportation and Air Quality requests that this be done and is able to provide the new information in a timely manner.

The limitations of the inventory estimates for mobile sources comes from limitations in the modeled emission factors in g/mile and also the estimated vehicle miles traveled for each vehicle class. For nonroad emissions, the estimates come from a model using equipment populations, emission factors per hour or unit of work, and an estimate of usage. These input data are frequently revised with newer data. Any limitations in the input data such as emission factors (based on emission factor testing and models predicting overall fleet emission factors such as in g/mile), vehicle miles traveled (which are derived from Department of Transportation data), and other factors will carry over into limitations in the emission inventory estimates.

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AIRS: AQS, which stores ambient air quality data from over 5000 sites across the country, is a user-friendly, Windows-based Oracle relational database. State and local agencies routinely upload air quality data to AQS on a quarterly basis, which the public can access through the web. Fiscal Year 2002 efforts will begin the process of moving AQS from a client-server application to a web application, allowing agencies to submit data to AQS via the Agency's Central Data Exchange (CDX). AFS, a mainframe system that the Office of Air Quality Planning and Standards (OAQPS) used for many years for managing its national emissions database has been replaced by the National Emissions Trends (NET) database. NET is an ORACLE database accessible through the Internet. Both systems will be enhanced to include the data standards (*e.g.,* latitude/longitude, chemical nomenclature) developed under the Agency's Reinventing Environmental Information (REI) Initiative. Facility identification standards will be included so that air emission data in the NET database can be linked with environmental data in other Agency databases for the same facility.

Coordination with Other Agencies

EPA cooperates with several other Federal, state and local agencies in achieving goals related to ground level ozone and PM. EPA continues to work closely with the Department of Agriculture and the Forest Service in developing its burning policy and reviewing practices that can reduce emissions. EPA, the Department of Transportation (DOT), and the Army Corps of Engineers work with State and local agencies to integrate transportation and air quality plans, reduce traffic congestion, and promote livable communities. EPA continues to work with the Department of the Interior, National Park Service, in developing its regional haze program and deploying the IMPROVE visibility monitoring network. The operation and analysis of data

produced by the PM monitoring system is an example of the close coordination of effort between the EPA and State and Tribal governments.

EPA is working with the National Aeronautics and Space Administration (NASA) on technology transfer for using satellite imagery for pollution assessments and transports. We work with the Department of the Army, Department of Defense, on advancing emission measurement technology. We also work with the National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, for meteorological support for our modeling and monitoring efforts.

The Department of Energy (DOE) and DOT fund research projects to better understand the size, source, and causes of mobile source pollution. The DOT's mobile source projects include TRANSIMS (TRansportation ANalysis and SIMulation System) and other transportation modeling projects; DOE is funding these projects through the National Renewable Energy Lab. EPA also works closely with the DOE on refinery cost modeling analyses for EPA's clean fuel programs. For mobile sources program outreach, the Agency is participating in a collaborative effort with DOT's Federal Highway Administration and the Federal Transit Administration designed to educate the public about the impacts of transportation choices on traffic congestion, air quality and human health. This community-based public education initiative also includes the Centers for Disease Control. In addition, EPA is working with DOE to identify opportunities in the Clean Cities program. We will also work with other Federal agencies such as the U.S. Coast Guard on air emission issues.

Research

Tropospheric Ozone Research Program. Other than Criteria Document preparation, which is EPA's responsibility alone, the Agency's core tropospheric ozone research program is coordinated with other agencies' research efforts, including the Departments of Energy and Commerce, and the National Science Foundation, and planned to achieve the most important overarching unmet research needs that draw upon EPA's expertise. All exposure and risk management research in this area is coordinated through the efforts of the North American Consortium for Atmospheric Research in Support of Air Quality Management (NARSTO), a public/private partnership whose membership spans governments, utilities, industry, and academia throughout Mexico, the United States, and Canada.

Particulate Matter Research Program. The National Academy of Sciences PM research plan serves as the principal guideline for EPA's PM research program. EPA coordinates with other Federal agencies (e.g., the National Institutes of Health and the Department of Energy) to review ongoing PM research activities and, where appropriate, re-focus activities so as to be consistent with the NAS plan. The EPA has chosen to take a broad-based approach to PM research planning and program development, which includes participation by the private sector.

The PM science planning community has pointed to the need to conduct its health effects, exposure, and monitoring research in close coordination, so that PM toxicological, epidemiological, and exposure research are done in combination. EPA will continue to focus on such coordination and pursue a number of avenues to achieve public/private coordination and cooperation, including: (1) playing a lead role in coordinating all Federal agency research on PM

health, exposure, and atmospheric processes under the Air Quality Research Subcommittee of the President's Committee on Environment and Natural Resources (CENR/AQRS); (2) creating an open inventory of all public and private ongoing PM research; and (3) completing a Research Strategy for PM which will benefit all organizations engaged in PM-related research.

One key opportunity for coordinating research supporting State efforts to implement the PM NAAQS is through the expansion of NARSTO, which has broadened its mission to include PM-related efforts. Complementary Federal/private coordination of effects-related research is under development, including that of the CENR/AQRS, and is being closely coordinated with the NARSTO expansion.

Statutory Authorities

Clean Air Act (42 U.S.C. 7401-7671q)

Motor Vehicle Information and Cost Savings Act and Alternative Motor Fuels Act of 1988 (AFMA)

National Highway System Designation Act

Research

Clean Air Act (CAA) (42 U.S.C. 7401-7671q)

Clean Air

Objective: Reduce Air Toxics Risk

By 2020, eliminate unacceptable risks of cancer and other significant health problems from air toxic emissions for at least 95 percent of the population, with particular attention to children and other sensitive subpopulations, and substantially reduce or eliminate adverse effects on our natural environment. By 2010, the tribes and EPA will have the information and tools to characterize and assess trends in air toxics in Indian country.

Resource Summary
(Dollars in Thousands)

	FY 2001 Actuals	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Reduce Air Toxics Risk	**$101,548.2**	**$114,658.9**	**$118,023.2**	**$3,364.3**
Environmental Program & Management	$48,479.1	$56,402.2	$56,913.9	$511.7
Science & Technology	$25,785.4	$27,466.3	$23,818.9	($3,647.4)
State and Tribal Assistance Grants	$27,283.7	$30,790.4	$37,290.4	$6,500.0
Total Workyears	377.7	375.2	371.4	-3.8

Key Program
(Dollars in Thousands)

	FY 2001 Enacted	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Administrative Services	$185.5	$0.0	$0.0	$0.0
Air Toxics Research	$19,077.0	$18,923.4	$19,883.7	$960.3
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$29,877.0	$30,790.4	$37,290.4	$6,500.0
Congressionally Mandated Projects	$3,161.7	$4,095.0	$0.0	($4,095.0)
EMPACT	$309.7	$0.0	$0.0	$0.0
Facilities Infrastructure and Operations	$4,288.9	$5,430.0	$5,249.3	($180.7)
Hazardous Air Pollutants	$53,290.2	$52,225.3	$52,622.4	$397.1
Homeland Security	$0.0	$353.5	$0.0	($353.5)
Legal Services	$1,462.7	$1,552.6	$1,713.0	$160.4
Management Services and Stewardship	$620.1	$1,288.7	$1,264.4	($24.3)

FY 2003 Request

Toxic air pollutants, also known as hazardous air pollutants (HAPs), pose significant risks to public health by causing cancer and other serious health problems, such as reproductive disorders, birth defects, and damage to the nervous system. People who live near certain major industrial plants may face even higher risks.

The Clean Air Act Amendments of 1990 list 188 HAPs that are emitted from a variety of sources including: mobile sources, major stationary sources, and area stationary sources. Emission rates vary across sources and by locale. For example, the 1996 National Toxics Inventory indicates that mobile sources account for approximately 45 percent of the total air toxic emissions in urban areas, and that stationary sources make up the remaining 55 percent. For several individual air toxics (e.g., benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and diesel particulate matter), mobile sources may contribute from 50 to70 percent of the total inventory.

The 1990 Amendments contain a variety of provisions that address air toxics from all categories of sources. Title II of the Amendments calls on EPA to develop standards to control HAPs from motor vehicles and vehicle fuels. Vehicle and fuel standards must reflect the greatest degree of emission control that is technologically feasible, taking into account lead time, cost, noise, energy, and safety factors. Title III of the Amendments lists the 188 HAPs and requires EPA to develop Maximum Achievable Control Technology (MACT) standards for major stationary sources of these pollutants. Within eight years after promulgating the MACT standards, EPA must evaluate the residual risk posed by the sources and promulgate additional, risk-based standards, if needed, to provide an ample margin of safety to protect public health and the environment or to prevent, taking in consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

Title III of the Amendments also requires EPA to develop a national urban air toxics strategy that achieves mandated cancer and non-cancer risk reduction goals, to identify at least 30 hazardous air pollutants that present the greatest risk in urban areas, to develop MACT or Generally Available Control Technology (GACT) standards for area sources that emit those 30 or more pollutants, and to encourage and work with state and local air pollution programs to reduce risks in urban areas. In addition, the Clean Air Act Amendments require EPA, through the Great Waters Program, to study the effect of air toxics on ecosystems, particularly important water bodies. Finally, Title III mandates control of air toxics from combustion sources and analysis of emissions from fossil-fueled electric utilities.

To meet Clean Air Act requirements, EPA carries out an integrated air toxics program that includes: characterizing the air toxics problem through air monitoring, emission inventories, and the National Air Toxics Assessment (NATA); reducing air toxics emissions through developing and implementing Federal source-specific and sector-based standards; addressing multi-media and cumulative risks through national, regional, and community-based initiatives; and providing public education and outreach.

EPA now is close to completing the first, technology-based phase of the air toxics program and is moving to the second, risk-based phase. The second phase focuses on mobile and stationary source emissions that affect urban areas and large water bodies and the health and environmental risks that remain after the first-phase controls are in place. In this second phase, the Agency will:

- Monitor and characterize air toxics problems and identify the mobile and stationary sources of the most toxic chemicals that are transported through the air and affect cumulative exposure, particularly in urban areas and major water bodies.

- Continue to implement strategies to reduce health and ecological risks from air toxics, targeting urban areas and major water bodies where exposure to and risks from air toxics are the greatest.

Characterizing Air Toxics

For FY 2003, EPA will continue to invest in improved and innovative monitoring and modeling, emissions inventories, and risk assessment tools to better characterize urban and local scale problems and to address multi-media issues and multi-pathway exposures. EPA now is completing development of information and tools to broadly characterize the air toxics problem on a national scale and measure progress in improving public health and reducing environmental effects. For example, the Agency has developed a modeling tool to combine the emission estimates of stationary, mobile, and area sources and project future emissions that account for economic growth. These efforts will allow the Agency to better characterize the risks from air toxics and to establish a baseline for measuring changes in risk, as the Agency carries out the Government Performance and Results Act (GPRA) requirements to assess progress in meeting national goals. This work also will aid in future efforts to characterize and quantify the benefits of air toxics program activities.

EPA is working with states, Tribes, and local agencies to create a national monitoring and inventory program that better characterizes public exposures to hazardous air pollutants. In general, existing monitoring programs measure concentrations of only a limited number of toxic compounds and only at limited locations. EPA is continuing to work with other agencies to expand air toxics monitoring, particularly in urban areas and around major water bodies. A major investment is requested in this area. The Agency will establish a centralized database on toxic compounds in urban areas including in air, water, and solid waste; and update and improve the air toxics emission inventories. In addition, the Agency is establishing and updating databases for toxics deposition, and supporting deposition monitoring studies. Finally, EPA is working with the Department of Defense (DOD) and the Department of Energy (DOE), to evaluate and advance the development of new and improved continuous source monitoring technology for emissions of air toxics.

EPA will refine ongoing work with urban risk models to better estimate the human exposure to air toxics through various media and the risk to the public resulting from this exposure. As a first step, EPA developed a national-scale air quality model, the Assessment System for Population Exposure Nationwide (ASPEN). The 1996 National Air Toxics

Assessment (NATA) uses the ASPEN model with a more detailed emission inventory for the year; evaluates the model with expanded ambient monitoring information; and integrates an exposure model, the Hazardous Air Pollutant Exposure Model (HAPEM), to better assess public health effects. The application of ASPEN and HAPEM provides one basis for evaluating the effectiveness of the nation's air toxics programs. In FY 2003, EPA will update NATA with a 1999 emissions database using the ASPEN model for 33 pollutants. In response to comments from the Science Advisory Board, the Agency will implement enhanced methods for identification of more sensitive pollutants. Also, the Agency will complete analyses to document the uncertainty and variability associated with NATA inputs and models and their effects on risk estimates and characterizations. The uncertainty and variability analysis will be coordinated with relevant state agencies.

In FY 2003 EPA plans increased data collection efforts focusing on local hot spots and providing support in environmental justice issues. The Agency will evaluate and improve local-scale modeling efforts to support local evaluations and try to make them more resource efficient. EPA also plans to model air deposition emissions on a national scale using REMSAD (Regulatory Modeling System for Aerosols and Deposition). The output from this assessment will be used to provide information to other programs, including states, that can then use the information in evaluating options for air toxic emissions reductions.

In FY 2003, EPA will make further progress in linking release and exposure information from the various media programs to estimate multi-media toxics exposure and to develop cross-media strategies to more effectively reduce urban exposures to toxic emissions. One of the tools that is being developed to aid EPA in estimating multi-media exposures and risk is the Total Risk Integrated Methodology (TRIM). TRIM is designed, in response to scientific recommendations and Agency guidelines and policies, for the evaluation of health and environmental from air toxics and criteria pollutants. In FY 2003, the Agency expects to use TRIM to evaluate the residual risk for certain pollutants. The intent is that public release be accompanied by updated documentation and guidance for users. EPA will continue to identify patterns in exposures to air toxics to develop more effective strategies.

In FY 2003, EPA will develop guidance materials and training for Consolidated Emissions Reporting (CERR) for HAPs. The Agency will work with partners to develop improved emission factors. This effort will include gathering improved activity databases and use of geographic information systems (GISs) and satellite remote sensing, where possible, for key point source, area source, combustion, and fugitive dust source categories, and global emission events. EPA will coordinate with stakeholders on the development of a real time data system to catalogue wildland fire events and improve emission models for these fires.

The Agency also will continue to evaluate health testing results and protocols from the motor fuels industry to increase information on public health risks. The Fuels and Fuel Additives Registration (FFAR) program will provide for the review and screening of potential toxic substances, prior to introduction into motor vehicle fuel supplies. The FFAR program will continue involving approximately 2,000 fuel manufacturers, 3,000 gasoline and diesel fuel registrations, and 6,000 additive registrations. Approximately 10,000 registration reports will be

submitted. EPA will continue fuel additive health testing activities for Methylcyclopentadienyl Manganese Tricarbonyl (MMT) and Methyl Tertiary-Butyl Ether (MTBE).

In support of EPA regulatory efforts under Title II of the Act, the Agency will continue to assess the need for and the feasibility of further controlling emissions of toxic air pollutants associated with motor vehicles and fuels. In FY 2001, EPA issued a rule to address emissions of air toxics from mobile sources. This program identified 21 mobile source air toxics, which include several volatile organic compounds and metals, as well as diesel particulate matter and diesel exhaust organic gases. The rule evaluated the effectiveness of existing mobile source emission control programs in reducing highway emissions of the identified mobile source toxics. The analysis showed that significant reductions of mobile source air toxics are expected from existing programs that reduce ozone and particulate matter (PM), including: the reformulated gasoline program, the national low emission vehicle program, the emission standards for passenger vehicles and gasoline sulfur control requirements (Tier 2), and the 2007 heavy-duty vehicle standards and diesel fuel sulfur control requirements.

Because the Agency recognizes that additional research and evaluation are needed to fully understand the extent of the mobile source air toxics problem, the rule established a Technical Analysis Plan that outlines our plans for additional research into toxics emissions from nonroad vehicles and equipment, estimation of exposure in microenvironments, consideration of the range of total public exposure to air toxics, and effectiveness and costs of control measures. This research will inform a future rulemaking, to be completed no later than July 1, 2004, in which EPA will revisit the feasibility and need for additional controls for nonroad and highway engines and vehicles and their fuels. To prepare for this review, in FY 2003 EPA will continue gathering emissions data, conducting exposure analyses, and evaluating the need for additional control. These activities will contribute to an improved characterization of the mobile source air toxics problem, as well as the continued enhancement of emissions and exposure models.

Reducing Emissions and Risk from Stationary and Mobile Sources

Under Title III of the Clean Air Act Amendments, EPA has completed all of the two-year, four-year, and seven-year MACT standards. Through September 2001, the Agency has proposed twenty-one and promulgated four (of the total 53 standards covering 94 source categories) 10-year standards. Once fully implemented by the states, the MACT standards, including those yet to be completed, are expected to reduce air toxics emissions by some 1.5 million tons per year and reduce risks to the public for cancer and other serious health problems.

In FY 2003 and FY 2004, EPA will focus its efforts on completing the remaining 10-year MACT standards. To date, the Agency has delisted five MACT standards, and has finalized four MACT standards. Current Agency plans are to finalize 13 MACT standards in FY 2002, 19 in FY 2003, and 12 in FY 2004. EPA expects to have all but 9 MACT standards proposed by May 2002. The states and industry can use the proposed standard, or presumptive MACT, as boilerplate language to prepare and approve permit applications.

In FY 2003, EPA also will be working on implementing, delegating, and addressing issues such as process changes that may result in amendments to promulgated MACTs. EPA

believes that Federal standards for controlling emissions of HAPs from area and major stationary sources are most effectively implemented by states, Tribes, and local agencies. EPA delegates its implementation authority and provides tools and guidance to ensure smooth and consistent implementation. EPA will publish guidance, provide support in issue resolution, and conduct outreach activities to help sources comply. To this end, EPA will use emissions testing and, where feasible and cost-effective, continuous emission monitoring to measure compliance with MACT and other air toxics standards. EPA also will develop capabilities for greater community right-to-know access (e.g., using the Internet) to air toxics data.

In FY 2003, EPA will continue the extensive residual risk analyses for already promulgated MACT standards to determine if additional standards are necessary to reduce the remaining health and environmental risks from these sources. For those source categories where EPA determines that additional control is needed, the Agency will then develop residual risk standards. To determine whether additional standards are needed requires significant data and analyses to determine the residual risks (emissions, source characterization, exposures, etc.) as well as potential control options for reducing the risks.

EPA currently is working on risk assessments to help with residual risk decision making for eight source categories. An EPA decision on the first category, coke ovens, is expected early in calendar year 2002 with decisions for an additional six categories coming due in FY 2002. Decisions on nine more source categories will be due in FY 2003, and EPA will be initiating assessment activities for these in the next few months. EPA plans to refocus resources from the MACT program to support these assessment activities.

In addition to these standards, EPA determined in December 2000 that regulation was necessary and appropriate for coal- and oil-fired electric utility steam generating units. According to the existing settlement agreement, EPA will propose these regulations in December 2003, and promulgate them in December 2004. Section 129 of the Clean Air Act, as amended in 1990, also requires the establishment of performance standards for four categories of waste incinerators: municipal waste combustors (MWC); health, infectious, medical waste incinerators (HIMWI); commercial and industrial waste incinerators (CISWI); and other solid waste incinerators (OSWI). The large MWC category reached compliance in December 2000, and the small MWC and CISWI regulations were promulgated in 2000. Regulations for HIMWI are currently in remand from the D.C. Circuit Court, and OSWI regulations are due in November 2005. Currently, the Agency is being litigated on the MWC, CISWI, and OSWI regulations. The Agency will be taking a voluntary remand on CISWI to address the issues in the current and previous litigations. The Federal Plans for small MWC units was proposed in FY 2001; the final is planned for FY 2002. The Federal Plan for CISWI units is scheduled for proposal in late FY 2002 with final promulgations planned for FY 2003. In the July 2001 Sierra Club suit, EPA is also cited for failure to meet the requirement to review and revise the MWC rule within five years. In FY 2003, EPA will propose MACT regulations for steam generating units and will continue to develop responses for ongoing litigation on the section 129 regulations.

The Integrated Urban Air Toxics Strategy, released in 1999, identified the HAPs that pose the greatest threat in the largest number of urban areas and the area source categories that emit these pollutants. EPA must assure that 90 percent of air toxic emissions from urban area

sources are subject to regulation. The strategy contains a schedule of activities to: substantially reduce non-cancer health risk; reduce cancer incidence by 75 percent; focus on disproportionate risk; reduce mobile source emissions contributions; and encourage state, local, and Tribal programs to develop strategies for their communities. EPA is working on an initial list of 13 source categories which address some of the largest emission sources. When the list is finalized to meet the 90 percent requirement, it may contain more source categories.

In FY 2003, EPA will continue to develop the state, local, and Tribal component of the strategy so that these entities can address emission issues that are of concern on a state-wide, area-wide, or community-wide basis. In addition, EPA will continue to support community assessment and risk reduction projects. First, the Agency will provide information to states and communities through case examples, documents, websites, and workshops on tools to help them in conducting assessments and identifying risk reduction strategies. Second, the Agency will compile and analyze the information from local assessments and use it to better characterize risk and assess priorities for further action. The Agency will then complete its reassessment of the area source category list and begin development of urban area source standards. Area source standards will be developed for hazardous air pollutants judged to pose the greatest threat to public health in the largest number of urban areas.

EPA's existing engine certification, compliance, and fuel quality requirements will continue to provide reductions of toxic air pollutants as well as criteria air pollutants. Under these requirements, engine/vehicle manufacturers are required to certify that any engine/vehicle entered into commerce in the U.S. meets the emission limits set by EPA. Fuel refineries demonstrate compliance by submitting survey data to EPA. In addition to these implementation requirements many state and local agencies supplement these requirements with vehicle inspection and maintenance programs and local fuel testing.

EPA will continue its efforts to address and prevent adverse effects of atmospheric deposition of toxics and nitrogen compounds in the Great Waters. This work involves collaboration within EPA offices and with the National Oceanic and Atmospheric Administration (NOAA). In FY 2003, EPA will continue to implement, and will revise as needed, the air/water interface work plan, a framework for the EPA's air and water offices to address air/water issues. Efforts in this work plan include the development and support of multi-media regulatory approaches to reduce risk and achieve water quality standards, such as enhancing technical tools and developing demonstration projects that facilitate Federal, state, Tribal and regional deposition reduction strategies. For example, EPA will analyze national scale modeling assessments of deposition, taking into account the recent inventory and air rules, to determine where additional reductions may be necessary to address the remaining risk and water quality concerns. EPA also will provide up-to-date information regarding air deposition through education and outreach efforts. These include synthesizing current trends information and sponsoring workshops and conferences.

During FY 2003, EPA will continue work begun in FY 2001 to evaluate CAFOs in an effort to characterize the industry, identify sources of air emissions and control practices, and estimate air emissions. In conjunction with the U.S. Department of Agriculture (USDA), the Agricultural Air Quality Task Force (AAQTF), and other stakeholders, EPA will develop a 4- to

5-year research plan to collect information necessary to implement these various approaches. In FY 2003, EPA will conduct studies and gather data to carry out the research plan.

In 2001 the Inspector General completed a report concerning EPA's actions to address the asbestos exposure to citizens in Libby, Montana. The exposure to asbestos in Libby was a result of the mining of asbestos contaminated vermiculite. One of the recommendations from the Inspector General was for the Agency to consider the need for regulation of contaminant asbestos under the Clean Air Act through a National Emission Standard for Hazardous Air Pollutants (NESHAP). As a first step in implementing this recommendation, EPA will produce an Asbestos Action Plan in FY 2002. The Action Plan will outline the steps necessary to determine if a NESHAP is necessary for ores contaminated with asbestos. The implementation of the plan will continue into FY 2003 regarding decisions on the need for a NESHAP. If a NESHAP is necessary, then work in this area will continue for several years as the NESHAP is developed.

Finally, as part of its reinvention efforts, the Agency will continue to investigate opportunities for coordinated data gathering and rulemaking efforts considering releases across media and pollution prevention opportunities. EPA will bring together ongoing efforts such as the Persistent Bioaccumulative Toxics (PBT) program to develop and implement national action plans for priority pollutants, and continue to develop integrated strategies to reduce toxics for major area and mobile sources.

Research

For FY 2003, the focus of air toxics research will be on risks humans experience from exposures to hazardous air pollutants (HAPs) from both outdoor (mobile, point, and area) and indoor sources. The primary goal of this research is to improve the Agency's capability to support future national, regional, and local scale assessments of air toxic sources, exposures and risks to human health. This research will lead to an improved understanding of the activities and factors that affect human exposure, the development of dose-response information necessary to determine health effects from individual HAPs, mixtures of HAPs, and to identify and determine the risks of HAPs exposures to susceptible populations. Thus, air toxics research will include an emphasis on understanding cumulative risks resulting from exposures to HAPs from varied sources.

Research will continue to improve techniques to characterize HAPs emissions from outdoor and indoor sources, and identify innovative low-cost approaches to control or prevent emissions. Ongoing studies are being conducted to refine estimates of toxic emissions from all classes of highway vehicles, and to improve the techniques used to measure emissions from point and area (dispersed) sources. Additional studies are developing an improved understanding of chemical reactions between toxic pollutants in the indoor environment and developing improved methods and models to quantify sources of indoor HAP emissions.

Research will also continue to focus on improving our understanding of how HAPs are formed and can be prevented in industrial and combustion processes and how to appropriately measure these emissions on a continuous basis. The emissions data produced by this research

will be incorporated into multi-media human exposure models and air quality models used to evaluate potential implementation strategies. Information on risk management options will support development and implementation of future urban HAPs regulations, and compliance with any residual risk standards.

Continuing health effects research will characterize exposure-dose-response and health effects of HAPs through the development of biomarkers, modes-of-action information, and models. This research supports the reduction of large uncertainties in quantitative estimates of the health effects of HAPs compounds by developing models to extrapolate from animals to humans, and from studied HAPs to less understood HAPs that react in a similar manner. The range of health effects of high priority HAPs and their mixtures (including VOCs and mobile source-related pollutants) will be determined under various exposure scenarios. Health effects methodology work will focus on high priority urban HAPs including fuel and fuel additives, and indoor pollutants.

Research in air quality modeling will expand the Models3/Community Multiscale Air Quality (CMAQ) modeling system to include specific HAPs and will continue to develop neighborhood scale modeling capabilities to support urban and local scale assessments. To improve the fate and transport component of EPA's air quality models, air chemistry research will be conducted to characterize the lifetime and fate of urban HAPs.

A critical piece of the Agency's National Air Toxics Assessment (NATA), which will prioritize the HAPs posing the greatest health risks, is to estimate actual human exposure. Exposure research will combine modeling and measurement efforts to provide tools and data to estimate human exposure to air toxics with greater certainty. Exposure models will use stochastic approaches to measure average exposures as well as the maximum exposed individual. The models will also be useful in determining acute and chronic exposures. These activities will provide information on the relationships between ambient, indoor, and personal concentrations for several HAPs and identify key microenvironments and human activities which influence personal exposure.

Assessment activities planned for FY 2003 will develop cancer unit risk and chronic non-cancer inhalation reference concentrations (RfC), oral reference doses (RfD), and non-cancer acute reference exposure (ARE) values. Cancer and non-cancer dose-response assessment methodologies will also be refined to reduce uncertainty in human health risk assessments. Testing data from fuel/fuel additives will be reviewed and associated assessments developed.

Technical support under the air toxics research program includes consulting (e.g., on listing/delisting petitions and reports to Congress), evaluating alternative fuel and fuel additive testing results, and performing assessments and consulting on fuels and fuel additives. Research support activities will also provide review and consultation for residual risk assessments, national scale assessments, and indoor air assessments. The Air Risk Information Support Center (Air RISC) will continue to supply information on air pollution to state, Tribal, local, and Federal offices of environmental health protection.

FY 2003 Change from FY 2002 Enacted

Research

S&T

- (+$353,500; +2.3 FTE) Resources will be redirected within the Objective to air toxics exposure, methods modeling and emissions characterization. Planned research related to homeland security will conclude in FY 2002.

- (-$353,500; -2.3 FTE) Planned research related to homeland security looking at the flow characteristics and dispersion patterns of toxic air pollutants will conclude in FY 2002. Resources will be redirected to air toxics exposure, methods modeling and emissions characterization.

- (+$199,500) These resources from Goal 2, Objective 1, are for the purpose of developing additional dose-response assessments for mobile source air toxics.

- (+$71,600; +0.3 FTE) These resources will be used to coordinate EPA scientific participation in regulatory development with program offices on major rules.

- (-$4,095,000) The FY 2003 Request is $4,095,000 below the FY 2002 Enacted budget level due to Congressional earmarks received during the FY 2002 appropriations process which are not included in the FY 2003 President's Request.

STAG

C (+$6,500,000) This increase will result in expanded and improved state, Tribal, and local agency monitoring of air toxics to help assess the effectiveness of EPA's integrated air toxics program, as well as the multi-pollutant strategy. In FY 2003, EPA will provide state, Tribal, and local agencies with grant funds to put in place a network approximately 20 additional air toxics monitoring sites. The resultant monitoring data will provide a resource of enormous scientific value. The ambient air toxics data will be useful in near-term and future activities such as:
  - identifying changes in local air toxics exposures and individual risks;
  - improving and updating estimates of nationwide inhalation exposures and risks (e.g., EPA's National Air Toxics Assessment);
  - tracking trends in emissions and concentrations of air toxics, as well as progress in reducing risks from air toxics exposures;
  - evaluating the effectiveness of EPA, state, Tribal, and local air toxics programs;
  - providing a "reality check" on actual emission reductions and ambient concentrations versus model-derived estimates;
  - providing inputs for other models that include or require air toxics information, including multi-media and cross-media exposure models.

Annual Performance Goals and Measures

Reduce Air Toxic Emissions

In 2003	Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by an additional 3% of the updated 1993 baseline of 6.1 million tons (for a cumulative reduction of 40% from the 1993 level of 6.1 million tons per year.)
In 2002	Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by 5% from 2001 (for a cumulative reduction of 40% from the 1993 level of 4.3 million tons per year.)
In 2001	End-of-year FY 2001 data will be available in late 2004 to verify that air toxics emissions nationwide from stationary and mobile sources combined will be reduced by 5% from 2000 (for a cumulative reduction of 35% from the 1993 level of 4.3 million tons.)

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Combined Stationary and Mobile Source Reductions in Air Toxics Emissions	5	5	3	Percent
Federal Register Publication of Final MACT Standards	4	13	19	Notices
Number of proposed MACT standards.	13	15	9	Proposed

Baseline: In 1993, the last year before the MACT standards and mobile source regulations developed under the Clean Air Act were implemented, stationary and mobile sources are now estimated to have emitted 6.1 million tons of air toxics. (EPA's prior estimate was 4.3 million tons.) Air toxics emission data are revised every three years to generate inventories for the National Toxics Inventory. Reductions are estimated from regulatory controls in the years between the three year updates. Using revised inventories and improved models, the estimate has been revised up from the previous estimate of 4.3 million tons.

Verification and Validation of Performance Measures

Performance Measure: **Combined Stationary and Mobile Source Reductions in Air Toxics Emissions**

Performance Database: National Toxics Inventory (NTI)

Data Source: The NTI includes emissions from large industrial or point sources, smaller stationary area sources, and mobile sources. The baseline NTI (for base years 1990 - 1993) includes emissions information for 188 hazardous air pollutants from more than 900 stationary sources. It is based on data collected during the development of Maximum Achievable Control Technology (MACT) standards, state and local data, Toxics Release Inventory (TRI) data, and emissions estimates using accepted emission inventory methodologies. The 1996 and the 1999 NTI contain facility-specific, non-point source, and mobile source estimates and are used as input to National Air Toxics Assessment (NATA) modeling. (ASPEN, a dispersion model, contributes to NATA modeling.) The primary source of data in the 1996 NTI is state and local data. The 1996 and 1999 state and local facility data are supplemented with data collected during the development of the MACT standards and TRI data.

QA/QC Procedures: Because the NTI is primarily a database designed to house information from other primary sources, most of the QA/QC efforts have been to identify duplicate data from the different data sources and to supplement missing data. When a discrepancy among data sources is found, EPA tries to determine the best primary source data. Mobile source data are validated by using speciated test data from the mobile source emission factor program, along with peer-reviewed models which estimate national tons for the relevant year.

Data Quality Review: EPA staff, state and local agencies, and industry have reviewed the NTI. To assist in the review of the 1999 NTI, the EPA provided a comparison of data from the 3 data sources (MACT, TRI, and state and local inventories) for each facility.

Data Limitations: The NTI contains data from other primary references. Because of the different data sources, not all information in the NTI has been compiled using identical methods. Also, for the same reason, there are likely some geographic areas with more detail and accuracy than others. Because of the lesser level of detail in the 1993 NTI, it is not suitable for input to dispersion models.

New/Improved Data or Systems: The 1996 and 1999 NTI are a significant improvement over the baseline NTI because of the added facility-level detail (e.g., stack heights, latitude/longitude locations, etc.), making it useful for dispersion model input. Future inventories (2002, and later years) are expected to improve significantly because of increased interest in the NTI by regulatory agencies, environmental interests, and industry, and the greater potential for modeling and trend analysis.

Coordination with Other Agencies

EPA coordinates with many other agencies and organizations to achieve reductions of risk from air toxics. EPA works with the Department of Energy (DOE) on several fuels programs. Other programs targeted to reduce air toxics from mobile sources are coordinated with the Department of Transportation (DOT). These partnerships can involve policy assessments and toxic emission reduction strategies in different regions of the country. Other Federal agency partnerships have been created to share costs for researching health effects and collecting ambient air toxic monitoring data.

EPA also is forming partnerships with the Department of Defense (DOD) in the development of new continuous source monitoring technology for toxic metals emitted from smokestacks. This partnership will provide a new source monitoring tool that will streamline source monitoring requirements that a number of DOD incinerators are required to meet and improve the operation of DOD incinerators with real-time emissions information resulting in reduced releases of air toxics to the environment. In time, this technology is expected to be available for use at non-DOD facilities.

EPA also works closely with the DOE on refinery cost modeling analyses for EPA's clean fuel programs. For mobile sources program outreach, the Agency is participating in a collaborative effort with DOT's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) designed to educate the public about the impacts of transportation choices on traffic congestion, air quality, and public health. This community-based public education initiative also includes the Centers for Disease Control (CDC). In addition, EPA is working with DOE to identify opportunities in the Clean Cities program.

The Agency is continuing to work closely with the Department of Labor's Occupational Safety and Health Administration (OSHA) to coordinate the development of EPA and OSHA

standards, where necessary, to ensure that MACT standards designed to reduce air toxic emissions do not inadvertently increase worker exposures. EPA also works closely with other health agencies such as the Department of Health and Human Services' (HHS) CDC and the National Institute of Environmental Health Sciences (NIEHS) on health risk characterization. To assess atmospheric deposition and characterize ecological effects, EPA works with the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and the Department of the Interior's U.S. Fish and Wildlife Service.

The Agency has worked extensively with the Department of Health and Human Services (HHS) on the National Health and Nutritional Evaluation Study (NHANES) to identify mercury accumulations in humans. EPA also has worked with DOE on the 'Fate of Mercury' study to characterize mercury transport and traceability in Lake Superior.

During FY 2003, EPA will continue to work closely with the USDA through the joint USDA/EPA Agricultural Air Quality Task Force (AAQTF). The AAQTF is a workgroup set up by Congress to oversee agricultural air quality- related issues. The AAQTF is working to determine the extent to which agricultural activities contribute to air pollution and to develop cost-effective ways in which the agricultural community can improve air quality. In addition, the AAQTF coordinates research on agricultural air quality issues to avoid duplication and ensure data quality and sound interpretation of data.

Research

EPA's Air Toxics Research Program works with other Federal agencies, such as the National Institute of Environmental Health Sciences (NIEHS) and the National Toxicology Program (NTP), on an ad hoc basis to identify and coordinate research needs. The Agency also interacts with other organizations that conduct air toxics research. The Health Effects Institute conducts complementary research related to air toxics that is coordinated with EPA activities.

Statutory Authorities

Clean Air Act Title I, Part A and Part D, Subparts 3 and 5 (42 U.S.C. 7401-7431, 7512-7512a, 7514-7514a) (15 U.S.C. 2605)

Clean Air Act Amendments, Title II (42 U.S.C. 7521-7590)

Clean Air Act Amendments, Title IV (42 U.S.C. 7651-7661f)

Research

Clean Air Act (CAA) (42 U.S.C. 7401-7671q)

Environmental Protection Agency

FY 2003 Annual Performance Plan and Congressional Justification

Clean Air

Objective: Reduce Acid Rain.

By 2005, reduce ambient nitrates and total nitrogen deposition to 1990 levels. By 2010, reduce ambient sulfates and total sulfur deposition by up to 30 percent from 1990 levels.

Resource Summary
(Dollars in Thousands)

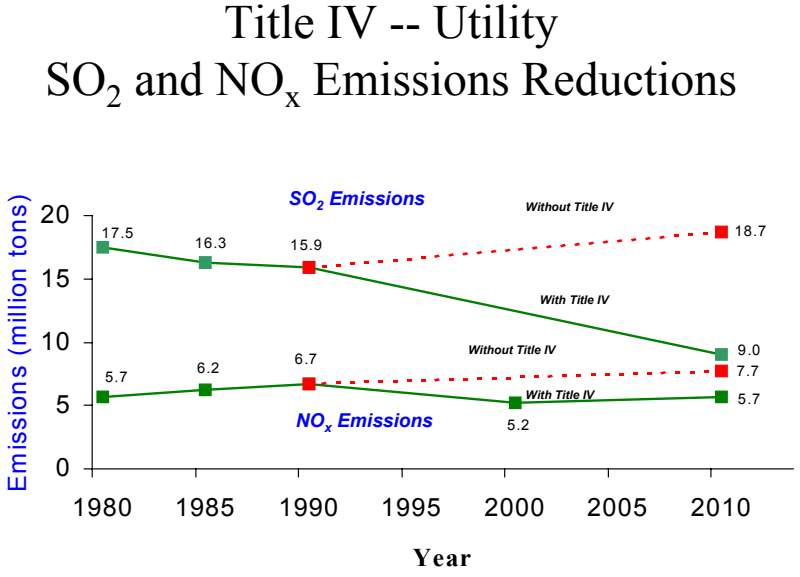
	FY 2001 Actuals	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Reduce Acid Rain.	**$17,943.2**	**$20,991.1**	**$21,097.8**	**$106.7**
Environmental Program & Management	$13,472.0	$14,922.2	$15,278.9	$356.7
Science & Technology	$4,015.2	$4,241.2	$3,991.2	($250.0)
State and Tribal Assistance Grants	$456.0	$1,827.7	$1,827.7	$0.0
Total Workyears	86.6	92.5	91.5	-1.0

Key Program
(Dollars in Thousands)

	FY 2001 Enacted	FY 2002 Enacted	FY 2003 Request	FY 2003 Req. v. FY 2002 Ena.
Acid Rain -CASTNet	$3,991.2	$3,991.2	$3,991.2	$0.0
Acid Rain -Program Implementation	$12,248.7	$12,500.2	$12,790.4	$290.2
Administrative Services	$170.0	$0.0	$0.0	$0.0
Air,State,Local and Tribal Assistance Grants: Other Air Grants	$4,060.0	$1,827.7	$1,827.7	$0.0
Congressionally Mandated Projects	$249.4	$250.0	$0.0	($250.0)
Facilities Infrastructure and Operations	$0.0	$1,311.3	$1,292.6	($18.7)
Legal Services	$1,040.3	$834.7	$923.5	$88.8
Management Services and Stewardship	$135.6	$276.0	$272.4	($3.6)

FY 2003 Request

Emissions of sulfur dioxide (SO_2, mostly from power plants and other industrial sources) and nitrogen oxides (NO_x, mostly from power plants and motor vehicles) react in the atmosphere and fall to earth as acid rain, causing acidification of lakes and streams and contributing to the damage of trees at high elevations. Acid rain also accelerates the decay of building materials and paints, and contributes to degradation of irreplaceable cultural objects, such as statues and sculptures. NO_x emissions are also a major precursor of ozone, which affects human health and damages crops, forests, and materials. NO_x deposition also contributes to eutrophication of coastal waters, such as the Chesapeake Bay and Tampa Bay. Additionally, before falling to earth, SO_2 and NO_x gases form fine particles that could affect human health by contributing to premature mortality, chronic bronchitis, and other respiratory problems. The fine particles also contribute to reduced visibility, including at national parks.



The Acid Rain Program, authorized under Title IV of the Clean Air Act Amendments of 1990, focuses primarily on SO_2 and NO_x emissions from electric utilities, and has numerous statutory deadlines. Title II of the Clean Air Act Amendments requires reductions in NO_x emissions from mobile sources. The United States also is committed to reductions in SO_2 and NO_x emissions under the United States-Canada Air Quality Agreement of 1991. EPA's Acid Rain Program uses market-based approaches to achieve these emission reductions. The Program provides affected sources with flexibility to meet required emission reductions at the lowest cost (both to industry and government). The SO_2 component features tradeable units called "allowances" (one allowance authorizes the emission of one ton of SO_2), accurate and verifiable measurements of emissions, and a cap on total emissions. The Acid Rain Program continues to be recognized as a model for flexible and effective regulation, both in the U.S. and abroad.

Major Acid Rain Program activities include: measurement, quality assurance, and tracking of SO_2, NO_x, and CO_2 emissions, as recorded by Continuous Emissions Monitors (CEMs) or equivalent continuous monitoring methods at more than 2,500 electric utility units; conducting field audits and certifying emissions monitors; recording transfers of emission allowances in the SO_2 allowance tracking system; reconciling emissions and allowances for all affected sources to ensure compliance; and processing permit actions.

The Acid Rain Program was developed through two phases. Phase I of the Program began in FY 1995, requiring SO_2 reductions from approximately 400 electric utility units. Phase I also required approximately 250 of these units to make NO_x reductions beginning in FY 1996. Phase II of the Program began in FY 2000 and required reductions in SO_2 emissions from more than 2,500 electric utility units (gas-fired, oil-fired, and coal-fired) and reductions in year-round NO_x emissions from approximately 1,000 coal-fired units. Despite this increase in affected units, the number of quarterly emission reports processed (8,000 per year) has not increased as dramatically because Phase II electric utility units were already required to report their emissions.

There has been more than a four-fold increase in the number of units for which EPA will conduct an annual reconciliation of allowances with measured emissions. Concurrently, there has been a significant increase in SO_2 allowance trading activities in Phase II of the Program. EPA processed more than 1,000 private allowance transfers per year in Phase I, and expects this number to triple during Phase II. In addition, the number of subject sources has increased steadily as new capacity is built into the system to meet the Nation's expanding energy demands.

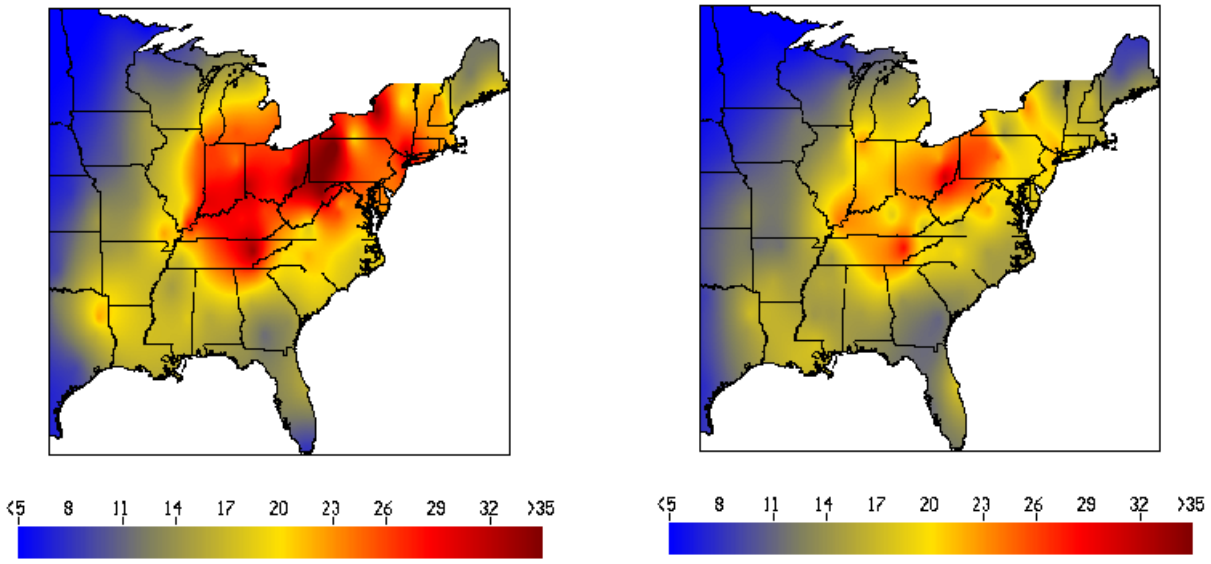
In addition to these operational activities, the Acid Rain Program is responsible for managing the Clean Air Status and Trends Network (CASTNet), a dry deposition monitoring network, as well as for providing critical operational support for the National Atmospheric Deposition Program (NADP), a wet deposition network. These monitoring efforts play a crucial role in the Program's ongoing assessment activities, including reporting outcomes under the Government Performance and Results Act (GPRA), and fulfilling assessment responsibilities under the United States-Canada Air Quality Agreement and Title IX of the Clean Air Act Amendments. In addition, the Program provides analytical support for the National Acid Precipitation Assessment Program (NAPAP), which was reauthorized under the Clean Air Act Amendments of 1990. NAPAP coordinates Federal acid deposition research and monitoring of emissions, acidic deposition, and their effects, including assessing the costs and benefits of Title IV. In FY 2003, the Acid Rain Program will continue analyzing the costs and benefits of the Program for inclusion in NAPAP's 2004 Integrated Assessment Report. In addition, the Program will initiate an integrated assessment of its effectiveness in addressing visibility, fine particle, and ozone impacts resulting from Phase II operations for the Ozone Transport Region.

States also carry out activities to implement the SO_2 and NO_x portions of the Acid Rain Program, including certification and re-certification of CEMs, field audits of CEMs, and permitting activities. Some states have elected to use their acid rain grant funds for monitoring activities to help assess the effectiveness of the program in reducing environmental risks.

The Acid Rain Program will produce significant benefits in terms of lowered surface water acidity and less damage to materials and high elevation forests. Nevertheless, after full implementation of the current program, significant residual risks will remain to human health, ecological systems, and quality of life. Thus, analysis to support a clean power legislative initiative will continue in FY 2002 to address this deficiency as well as issues related to visibility impairment and attainment of the national air quality standards for ozone and fine particles.

Sulfate Deposition in Acid Rain Reduced (kg/ha)

1989-91 **1995-97**



These maps represent snapshots of wet sulfate deposition over time. As illustrated in the 1995-1997 map, following the 1995 implementation of the Acid Rain Program, total sulfur deposition fell in a dramatic and unprecedented reduction of up to 25 percent over a large area of the Eastern United States.

FY 2003 Change from FY 2002 Enacted Budget

S&T

C (-$250,000) The FY 2003 Request is $250,000 below the FY 2002 Enacted Budget level due to Congressional earmarks received during the FY 2002 appropriations process which are not included in the FY 2003 President's Request.

Annual Performance Goals and Measures

Reduce SO2 Emissions

In 2003 Maintain or increase annual SO2 emission reduction of approximately 5 million tons from the 1980 baseline. Keep annual emissions below level authorized by allowance holdings and make progress towards achievement of Year 2010 SO2 emissions cap for utilities.

In 2002 Maintain or increase annual SO2 emission reduction of approximately 5 million tons from the 1980 baseline. Keep annual emissions below level authorized by allowance holdings and make progress towards achievement of Year 2010 SO2 emissions cap for utilities.

In 2001 End-of-year FY 2001 data will be available in late 2002 to verify that 2 million tons of NOx from coal-fired utility sources were reduced from levels that would have been emitted without implementation of Title IV of the Clean Air Act Amendments.

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
SO2 Emissions	On track	5,000,000	5,000,000	Tons Reduced

Baseline: The base of comparison for assessing progress on the annual performance goal is the 1980 emissions baseline. The 1980 SO2 emissions inventory totals 17.5 million tons for electric utility sources. This inventory was developed by National Acid Precipitation Assessment Program (NAPAP) and used as the basis for reductions in Title IV of the Clean Air Act Amendments. This data is also contained in EPA's National Air Pollutant Emissions Trends Report. Statutory SO2 emissions cap for year 2010 and later is at 8.95 million tons which is approximately 8.5 million tons below 1980 emissions level. "Allowable SO2 emission level" consists of allowance allocations granted to sources each year under several provisions of the Act and additional allowances carried over, or banked, from previous years.

Reduce NOx Emissions

In 2003 2 million tons of NOx from coal-fired utility sources will be reduced from levels that would have been emitted without implementation of Title IV of the Clean Air Act Amendments.

In 2002 2 million tons of NOx from coal-fired utility sources will be reduced from levels that would have been emitted without implementation of Title IV of the Clean Air Act Amendments.

In 2001 End-of-year FY 2001 data will be available in late 2002 to verify that NOx emissions during ozone season from participating utility and industrial sources were below allowable level authorized by allowance (approximately 50% reduction from 1990 baseline).

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
NOx Reductions	On track	2,000,000	2,000,000	Tons Reduced

Baseline: Performance Baseline: The base of comparison for assessing progress on this annual performance goal is emissions that would have occurred in the absence of Title IV of the Clean Air Act Amendments. These emissions levels are calculated using actual annual heat input and the baseline (uncontrolled) NOx emission rates by boiler type from the preamble to the final rule (61 FR 67112, December 19, 1996).

Reduce Ozone Season NOx Emissions

In 2003 Control NOx emissions during ozone season from participating utility and industrial sources to below allowable level authorized by allowances.

In 2002 Control NOx emissions during ozone season from participating utility and industrial sources to below allowable level authorized by allowances.

In 2001 End-of-year FY 2001 data will be available in late 2002 to verify that NOx emissions during ozone season from participating utility and industrial sources were below allowable level authorized by allowance (approximately 50% reduction from 1990 baseline).

Performance Measures:	FY 2001 Actual	FY 2002 Enacted	FY 2003 Request	
Ozone Season NOx Reductions	Data Lag	220,000	220,000	Tons Reduced

Baseline: Performance Baseline: The base of comparison for assessing performance on annual performance goals is the 1990 emissions baselines adopted in the state rules. The ozone season is 5 months long, May 1 to September 30. "Allowable NOx emissions level" is defined by the sum of allowance allocations authorized by various provisions in enabling state rules and allowances carried over, or banked, from previous years discounted by the Progressive Flow Control ratio. An allowance authorizes a source to emit one ton of NOx during the ozone season.

Verification and Validation of Performance Measures

Performance Measure: **SO_2 and NO_X emission reductions**

Performance Database: Emissions Tracking System (ETS), SO_2 and NO_X emissions collected by Continuous Emission Monitoring Systems (CEMS), CASTNet (dry deposition), National Atmospheric Deposition Program (NADP) (wet deposition)

Data Source:

- On a quarterly basis ETS receives hourly measurements of SO_2, NO_x, volumetric flow, CO_2, and other emission-related parameters from more than 2,000 units affected by Title IV.
- CASTNet measures particle and gas acidic deposition chemistry. Specifically, CASTNet measures sulfate and nitrate dry deposition and meteorological information at approximately 70 active monitoring sites. CASTNet is primarily an eastern, long-term dry deposition network funded, operated and maintained by EPA's Office of Air and Radiation (OAR).
- NADP is a national long-term wet deposition network that measures precipitation chemistry and provides long-term geographic and temporal trends in concentration and deposition of major cations and anions. Specifically, NADP provides measurements of sulfate and nitrate wet deposition at approximately 200 active monitoring sites. EPA, along with several other federal agencies, states, and other private organizations, provides funding and support for NADP. The Illinois State Water Survey/University of Illinois maintains the NADP database.

QA/QC Procedures:

- QA/QC requirements dictate performing a series of quality assurance tests of CEMS performance. For these tests, emissions data are collected under highly structured, carefully designed testing conditions, which involve either high quality standard reference materials or multiple instruments performing simultaneous emission measurements. The resulting data are screened and analyzed using a battery of statistical procedures, including one that tests for systematic bias. If CEMS fails the bias test, indicating a potential for systematic underestimation of emissions, either the problem must be identified and corrected or the data are adjusted to minimize the bias.

- CASTNet has established data quality objectives and quality control procedures for accuracy and precision.

- NADP has established data quality objectives and quality control procedures for accuracy, precision and representativeness. The intended use of these data is to establish spatial and temporal trends in wet deposition and precipitation chemistry.

Data Quality Review:

- The ETS provides instant feedback to sources to identify any data reporting problems.

  EPA staff then conduct data quality review on each quarterly ETS file. In addition, states or EPA staff conduct random audits on selected sources' data submission.
- CASTNet recently underwent formal Agency peer review by an external panel.
- NADP methods of determining wet deposition values have undergone extensive peer review, handled entirely by the NADP housed at the Illinois State Water Survey/University of Illinois. Assessments of changes in NADP methods are developed primarily through the academic community and reviewed through the technical literature process.

Data Limitations: None

New/Improved Data or Systems: In order to improve the spatial resolution of the Network (CASTNet), additional monitoring sites are needed.

Coordination with Other Agencies

EPA participates with NAPAP, which coordinates Federal acid rain research and monitoring under the auspices of the National Science and Technology Council Committee on Environment and Natural Resources. As required by Title IX of the 1990 Clean Air Act Amendments, NAPAP prepares a biennial report that evaluates the costs, benefits, and effectiveness of the Acid Deposition Control Program under Title IV of the 1990 Clean Air Amendments. The NAPAP assessment is a multi-agency effort requiring cooperation and coordination among EPA, the Department of Energy, the Department of Agriculture, the Department of the Interior, the National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration.

Statutory Authorities

Clean Air Act Amendments, Title I (42 U.S.C. 7401-7514a)

Clean Air Act Amendments, Title IV (42 U.S.C. 7651-7661f)

Clean Air Act Amendments, Title IX (42 U.S.C. 7403-7404)