**Environmental Protection Agency**
**2004 Annual Performance Plan and Congressional Justification**
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## Environmental Protection Agency

## FY 2004 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 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| **Clean Air** | **$602,190.0** | **$597,977.2** | **$617,415.1** | **$19,437.9** |
| Attain NAAQS | $466,814.5 | $458,856.2 | $468,437.2 | $9,581.0 |
| Reduce Air Toxics Risk | $113,811.7 | $118,023.2 | $127,747.1 | $9,723.9 |
| Reduce Acid Rain. | $21,563.8 | $21,097.8 | $21,230.8 | $133.0 |
| Total Workyears | 1,813.8 | 1,820.0 | 1,823.3 | 3.3 |

### 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 certain 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. 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 our borders. This causes problems not only for the population in urban areas, but also for less populated areas and national parks. Federal assistance and leadership are essential for developing and implementing cooperative 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 major pollutants (known as criteria pollutants) that are linked to serious health and environmental problems:

- Particulate matter (PM). PM causes a wide variety of health and environmental problems. When exposed to higher concentrations of fine 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. Similarly, 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. Fine 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 a major cause of reduced visibility in parts of the United States, 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 certain species of PM settling may include making lakes and streams acidic, changing the nutrient balance in coastal waters and watersheds, depleting the nutrients in soil, damaging sensitive forests and farm crops, and decreasing the diversity of ecosystems.

- Ground-level ozone (smog). When breathed at any concentration, ozone can irritate and inflame a person's 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 as concentrations rise. Exposures to ozone result in lung inflammation, aggravate respiratory diseases such as asthma, and may make people more susceptible to respiratory infection. Children who are active outdoors are most at risk for 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 many 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 even low levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart disease. 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 higher levels of CO can develop vision problems, experience reduced ability to work or learn, reduced manual dexterity, and have difficulty performing complex tasks. CO is most dangerous in enclosed or confined spaces and will cause death.

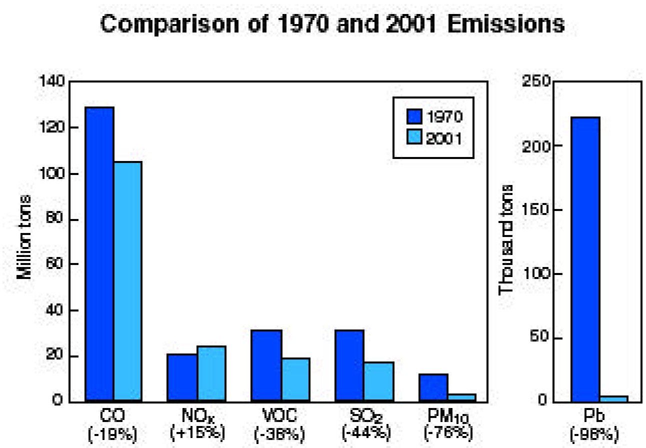
- Lead. Lead causes damage to the kidneys, liver, brain and nerves, and other organs. Excessive exposure to lead causes seizures, mental retardation, behavioral disorders, memory problems, and mood changes. Low levels of lead damage the brain and nerves in fetuses and young children, resulting in learning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

**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, benzene, toluene, and xylene (BTX). HAPs are emitted from literally thousands of sources, including automobiles, trucks and buses. 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 six 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 to damage aquatic ecosystems.

The Administration evaluated the Air Toxics program this past year using the Performance Assessment Rating Tool (PART). This evaluation found that the program's purpose is clear and the management of the program is good; however, the program has not clearly shown it is maximizing the program's net benefits and proposing the most cost-effective regulations. Furthermore, linkages are insufficient between annual performance goals and the long-term performance goal of protecting 95 percent of the United States population from unacceptable risks of cancer and other significant health problems from air toxic emissions. A moving baseline and data gaps for toxicity and actual population exposure limit the assessment of the program's results. In response to these findings, the Administration is requesting $7 million in increased funding for the Air Toxics program in state grants for monitoring to help fill these data gaps. In addition, the Administration will focus on maximizing programmatic net benefits, minimizing the cost per deleterious health effect avoided, and establishing better performance measures.

**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 are implicated in affecting 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 United States 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 major criteria pollutants: PM, ozone, SO2, NO2, CO, and lead. Over the last three decades, air pollution has declined by 25 percent, while our economy has grown over 160 percent. These gains have provided cleaner air for millions of people. There also have been dramatic reductions (10 to 25 percent) in sulfates deposited in many of the most acid sensitive ecosystems located in the Northeastern United States since implementation of EPA's acid rain program in 1995. 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 and to protect sensitive ecosystems. Thus the nation 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.

EPA tracks trends in six criteria air pollutants through an Air Quality Index that reflects the number of days that any health-based standard is violated. 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 violations tend to be in late afternoon hours when many children and adults are outside engaging in work and exercise that increases the impact of exposure to unhealthful air.

Nationwide, levels 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 95 urban monitoring sites across the country show a 47 percent drop in benzene levels from 1994 to 2000. In addition, ambient concentrations of many hazardous air pollutants remain high and continue to impose significant health risks on exposed individuals.

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 was released into the air in 2000 in the United States 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. To help implement these goals, the President has proposed the Clear Skies Act. Clear Skies was proposed in response to a growing need for an emission reduction plan that will protect the environment while providing regulatory certainty for the utility industry. Clear Skies would create a market-based program, with results guaranteed by caps instituted over a period of time that would dramatically reduce (about 70 percent) power plant emissions of $SO_2$, $NO_x$, and mercury. Clear Skies expands the successful Acid Rain program, which reduced pollution faster and at far less cost than any other Clean Air Act program. With guaranteed results, and elimination of costly regulation, litigation, inspection and enforcement actions, industry compliance is expected to be nearly 100 percent, as it has been in the Acid Rain program.

The Clean Air Act currently 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 (NAAQS) for the six criteria pollutants and revision of the NAAQS, if necessary, based on the latest scientific information available.

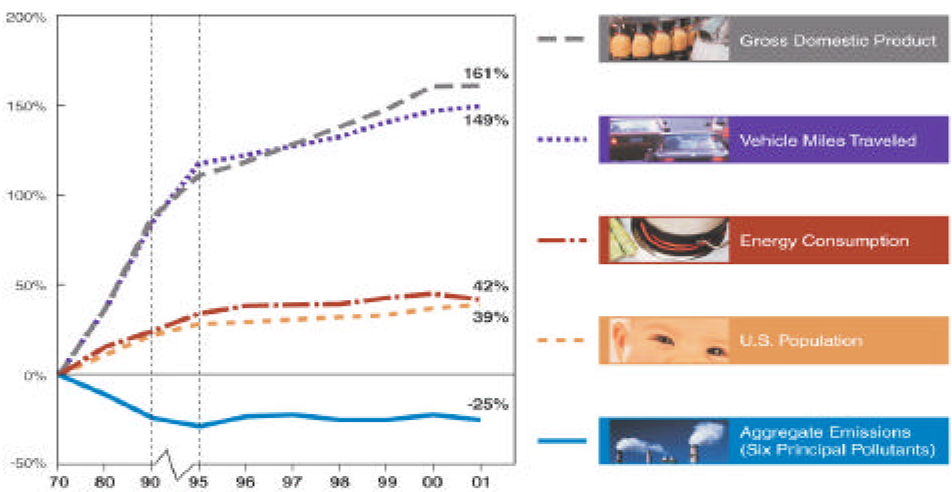
- Ensuring that the NAAQS are met by developing and carrying out national regulatory and non-regulatory programs that reduce air pollution from vehicles, factories, and other sources, and by working in partnership with state, Tribal, and local governments on implementing their clean air programs.
- Assessing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

- 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 Emissions




The air problems that now 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. Clear Skies provides a good example of how to take advantage of these opportunities. EPA also 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 -- which is the prototype for Clear Skies -- 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.

- Integrated strategies. We will continue working with states and local agencies on air pollution problems on a regional basis. We need to build on these relationships to ensure that regional approaches become institutionalized at the Federal, state and Tribal levels. Regional haze and $PM_{2.5}$ concentrations are often the products of the same pollutants and precursors. For this reason, we must coordinate the technical and scheduling requirements for the two programs to address both environmental problems in a coordinated fashion. Because many of the controls that will be needed to achieve the NAAQS for $PM_{2.5}$ also may be needed to meet reasonable progress targets for regional haze, we called for the development of strategies on a schedule which would maximize states' opportunities to establish a single set of requirements to address both programs.

- Systems approach. The Tier II and 2007 heavy-duty vehicle rulemakings referenced above are good examples of how the Agency looks at air quality problems from a broader perspective and takes advantage of the potential synergies. As catalyst and other advanced vehicle technologies require 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 selective catalytic reduction (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 National Ambient Air Quality Standards (NAAQS) related research supports the Agency's Clean Air Goal to protect human health and the environment by meeting 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 exposure to these pollutants, alone and in combination, focusing on exposures, health effects, mechanisms of injury, and identifying components of particulate matter (PM) that affect public health. In addition, this research provides implementation tools to support efforts by industry, 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 Federal, state, Tribal, and local regulators and industry 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 reduction.

Several mechanisms are in place to ensure a high-quality research program at EPA. The Research Strategies Advisory Committee (RSAC) of EPA's Science Advisory Board (SAB), an independently chartered Federal Advisory Committee Act (FACA) committee, meets annually to conduct an in-depth review and analysis of EPA's Science and Technology account. The RSAC provides its findings to the House Science Committee and sends a written report on the findings to EPA's Administrator after every annual review. Moreover, EPA's Board of Scientific Counselors (BOSC) provides counsel to the Assistant Administrator for the Office of Research and Development (ORD) on the operation of ORD's research program. EPA's scientific and technical work products must also undergo either internal or external peer review, with major or significant products requiring external peer review. The Agency's Peer Review Handbook (2nd Edition) codifies procedures and guidance for conducting peer review.

**Strategic Objectives**

**Attain NAAQS**

- The number of people living in areas with monitored ambient ozone concentrations below the NAAQS for the 1-hour ozone standard will increase by 1% (relative to 2003) for a cumulative total of 20% (relative to 1992).

- The number of people living in areas with monitored ambient ozone concentrations below the NAAQS for the 8-hour ozone standard will increase by 3% (relative to 2003) for a cumulative total of 3% (relative to 2001).

- The number of people living in areas with monitored ambient PM concentrations below the NAAQS for the PM-10 standard will increase by 1% (relative to 2003) for a cumulative total of 11% (relative to 1992).

- The number of people living in areas with monitored ambient PM concentrations below the NAAQS for the $PM_{2.5}$ standard will increase by less than 1% (relative to 2003) for a cumulative total of less than 1% (relative to 2001).

- The number of people living in areas with monitored ambient CO, $NO_2$, $SO_2$, or Pb concentrations below the NAAQS will increase by less than 1% (relative to 2003) for a cumulative total of 63% (relative to 1992).

- Increase the number of tribes monitoring air quality for ozone and/or particulate matter from 42 to 45 and increase the percentage of tribes monitoring clean air for ozone from 64% to 67% and particulate matter from 71% to 72%.

**Reduce Air Toxics Risk**

- Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by an additional 2% of the updated 1993 baseline of 6.0 million tons for a cumulative reduction of 37%.

**Reduce Acid Rain**

- Maintain or increase annual $SO_2$ 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 $SO_2$ emissions cap for utilities.

- 2 million tons of $NO_x$ 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 NAAQS attainment:** For FY 2004**,** EPA will move forward with the President's proposed Clear Skies Act, implement the National Energy Policy, continue the regular reviews of the various NAAQS, carry out programs to meet NAAQS 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.

- $PM_{2.5}$ and 8-hour Ozone Attainment. Further emission reductions in this country are necessary to achieve the Clean Air Act $PM_{2.5}$ and 8-hour ozone National Ambient Air Quality Standards (NAAQS) recently upheld in Federal court. EPA will be moving forward with full implementation of the standards. The activities included in the President's proposed Clear Skies Act are critical elements for implementation.

- Review of NAAQS. 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.

- Implementation of existing NAAQS. 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. In addition, the Agency will develop a strategy and guidance for transition from the $PM_{10}$ standard to a fine particulate ($PM_{2.5}$) 5standard. We will work to promote and expand the use of voluntary and other innovative approaches to provide emission reductions.

- Vehicle, engine, and fuels standards. EPA will establish and/or implement Federal standards to require cleaner motor vehicles, nonroad equipment, and fuels 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 rule establishing new standards for heavy-duty nonroad diesel engines and vehicles.

- Certification and compliance. EPA will continue to monitor industry compliance with vehicle, engine, and fuels standards and to proceed with advancements in vehicle emission control technologies. The capabilities to test vehicles at EPA's National Vehicle and Fuels Emissions Laboratory (NVFEL) is expanding greatly to keep pace with the more stringent and complex new regulations for cars, heavy-duty diesel engines, and gasoline and diesel fuels that take effect in FY 2004. For example, EPA will establish a credible compliance testing program to certify that heavy-duty engine manufacturers are meeting new emission standards program requirements.

- Sensitive Populations. EPA will expand voluntary partnerships and outreach efforts to reduce emissions from diesel engines, as part of a comprehensive strategy to address the risks that pollution poses to sensitive populations, especially children. Through the Voluntary Diesel Retrofit Program, EPA will develop a public campaign on anti-idling, early switching of buses to ultra-low sulfur diesel fuel, and retrofitting or retiring selected bus models. Because diesel engines last for 30 years, EPA's new heavy-duty diesel engine standards, applicable in 2004 and 2007, will take time to impact the fleet and achieve emission reductions. Thus, voluntary partnerships and outreach efforts, as part of a comprehensive strategy, are the primary ways to realize immediate air quality benefits from the older, heavy-duty diesel engines and protect the health of today's children and other sensitive populations.

**Reduce public exposure to air toxics:** In FY 2004, 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 2004 include:

- Air toxics monitoring. EPA will work with states to expand the air toxics 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 also will 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.

- Residual Risk. The 1990 Clean Air Act Amendments require EPA to set standards for 188 hazardous air pollutants on a 10-year schedule. In addition, the Amendments set detailed requirements for an air toxics program that includes a two-phased process consisting of technology-based standards for mobile and stationary sources, followed by a risk-based program approach. In FY 2004, as the final technology-based standards for stationary sources are being completed, EPA will work on a risk-based approach to protect public health from the remaining air toxics emissions. This approach includes targeting particular problems such as residual risks from already controlled sources and elevated risks in urban areas. The development of more stringent residual risk standards will reduce cancer and non-cancer related health risks in the vicinity of major industrial sources where risks from hazardous air pollutants are determined to be unacceptably high. This will also help the Agency make progress with respect to its long-term strategy goals of reducing cancer risks from stationary sources by 75% from 1990 levels and significantly reducing non-cancer related health risks.

- 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. In FY 2004, EPA will continue gathering emissions data, conducting exposure analyses, and evaluating the need for additional controls. This information will be used to support a rulemaking in which EPA will revisit the feasibility and need for additional controls for mobile sources and their fuels. EPA also will incorporate toxics emissions data into the mobile source models.

**Implement Market-based acid rain program:** For FY 2004 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 dry deposition network, and provide operational support for the National Atmospheric Deposition Program (NADP), a wet 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**

The Tropospheric Ozone and Particulate Matter (PM) Research Programs will develop new information and assess existing studies to support statutorily-mandated reviews of the NAAQS and will upgrade methods and models to guide states in the development of the state implementation plans (SIPs), used to achieve the NAAQS. In FY 2004, tropospheric ozone research will evaluate and refine emissions and air quality models to evaluate SIP attainment strategies. The 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 to characterize PM sources and health effects 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 NAAQS for lead, carbon monoxide, sulfur dioxide, and nitrogen oxide NAAQS.

Air toxics research provides information on effects, exposure, and 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 2004, 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.

New, related research efforts in Goal 8 supporting the Air Research program will include a Clear Skies initiative focusing on identifying tools to optimize mercury emissions reductions in order to increase the effectiveness of mercury reduction programs. This research, which also supports the President's multi-pollutant initiative, will provide the science needed to reduce the uncertainties limiting the Agency's ability to assess and manage health risks from mercury. It will also assist decision-makers in choosing the best technology to reduce mercury emissions to implement the final rule to regulate mercury and other air toxics emitted from power generation facilities.

**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 more protective NAAQS for ozone and PM. The standards were litigated. After extensive litigation in the Supreme Court and the Court of Appeals for the District of Columbia Circuit, both standards are still in effect. The $PM_{2.5}$

standard adopted in 1997 was completely affirmed by the courts and is not subject to further litigation. However, the revised $PM_{10}$ standard was vacated, resulting in reinstatement of the prior $PM_{10}$ standard. The 1997 ozone standard was also largely upheld by the D.C. Circuit's and the Supreme Court's decisions although the Supreme Court remanded ozone implementation issues to EPA. In response to the Supreme Court's decision, the Agency is conducting a rulemaking on the issue of how to implement the new 8-hour ozone standard in light of the Clean Air Act's provisions on the old 1-hour standard. This rulemaking does not affect the validity of the 8-hour standard. The litigation did not affect standards that were in place prior to July 1997.

## 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 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| **Attain NAAQS** | **$466,814.5** | **$458,856.2** | **$468,437.2** | **$9,581.0** |
| Environmental Program & Management | $123,418.6 | $118,516.3 | $126,326.9 | $7,810.6 |
| Hazardous Substance Superfund | $0.0 | $21.5 | $2.1 | ($19.4) |
| Science & Technology | $140,808.0 | $146,851.9 | $148,626.3 | $1,774.4 |
| State and Tribal Assistance Grants | $202,587.9 | $193,466.5 | $193,481.9 | $15.4 |
| Total Workyears | 1,347.0 | 1,357.1 | 1,357.5 | 0.4 |

**Key Program**
(Dollars in Thousands)

| | FY 2002 Enacted | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| Air, State, Local and Tribal Assistance Grants: Other Air Grants | $199,966.5 | $193,466.5 | $193,481.9 | $15.4 |
| Carbon Monoxide | $4,258.4 | $4,025.1 | $3,887.0 | ($138.1) |
| Congressionally Mandated Projects | $14,492.5 | $0.0 | $0.0 | $0.0 |
| Facilities Infrastructure and | $18,870.3 | $19,198.1 | $20,024.6 | $826.5 |

| | FY 2002 Enacted | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| Operations | | | | |
| Homeland Security-Critical Infrastructure Protection | $0.0 | $0.0 | $1,102.9 | $1,102.9 |
| Homeland Security-Preparedness, Response and Recovery | $820.5 | $0.0 | $910.2 | $910.2 |
| Homeland Security-Protect EPA Personnel/Infrastructure | $0.0 | $0.0 | $600.0 | $600.0 |
| Lead | $342.2 | $339.6 | $349.5 | $9.9 |
| Legal Services | $5,487.3 | $5,973.1 | $6,184.5 | $211.4 |
| Management Services and Stewardship | $4,503.9 | $4,568.7 | $5,305.1 | $736.4 |
| Nitrogen Oxides | $1,325.5 | $1,399.0 | $1,436.9 | $37.9 |
| Ozone | $68,455.1 | $77,498.8 | $69,497.9 | ($8,000.9) |
| Particulate Matter | $52,302.7 | $62,624.3 | $74,787.8 | $12,163.5 |
| Particulate Matter Research | $65,468.2 | $66,662.0 | $65,709.4 | ($952.6) |
| Planning and Resource Management | $0.0 | $0.0 | $929.3 | $929.3 |
| Regional Haze | $2,535.9 | $2,408.1 | $2,453.8 | $45.7 |
| Regional Management | $349.5 | $310.1 | $650.2 | $340.1 |
| Sulfur Dioxide | $12,318.5 | $13,624.7 | $14,102.2 | $477.5 |
| Tropospheric Ozone Research | $6,514.8 | $6,758.1 | $7,024.0 | $265.9 |

**FY 2004 Request**

Under the Clean Air Act (CAA), EPA must set and periodically review National Ambient Air Quality Standards (NAAQS) for six major pollutants that endanger human health and the environment, and originate from numerous and diverse sources. States and tribes must then develop and implement plans to meet the standards. The pollutants are: particulate matter (PM), ground-level ozone (smog), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), and lead. EPA's comparative risk analyses ranked these six pollutants as high-risk for health and environmental effects. Children, the elderly, and persons with heart or lung diseases are especially susceptible to health effects. Fine particulate matter ($PM_{2.5}$) is linked with numerous health effects including increased symptoms or hospitalization for heart or lung disease and even premature mortality. Exposure to ozone causes lung inflammation and can aggravate respiratory diseases such as asthma. Ozone, at any concentration, impairs functioning of the lungs in healthy people, as well as in those with respiratory problems. Ozone also affects ecosystems, with an estimated $2-3 billion lost annually to crop damage.

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; repeated exposures may contribute to other cardiovascular effects. Exposure to lead may cause neurological impairment, mental retardation, behavioral disorders and, in extreme cases, death. 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. $NO_2$ can cause respiratory symptoms such as coughing, wheezing, and shortness of breath in children and adults with respiratory disease such as asthma.

Strategy

America has made great progress in reducing air pollution. Over the last three decades, air pollution has declined by 25 percent, while our economy has grown over 160 percent. These gains have provided cleaner air for millions of people. Our understanding of science, technology and markets has improved since the Clean Air Act was passed in 1970. We know more about the best and most cost-effective ways to reduce pollution.

In achieving clean air for all Americans, EPA has three overall program goals:

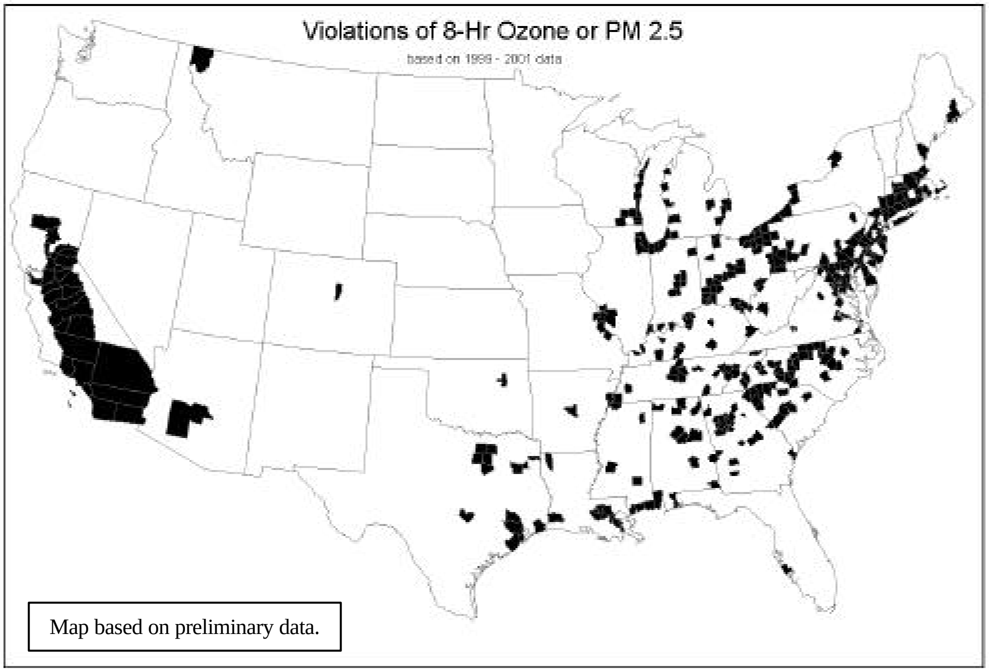
1. improve air quality and address highest risks, while reducing program costs;

2. get better results in less burdensome ways; and

3. increase the role for state, Tribal, and local governments.

EPA's strategy for achieving clean air includes a comprehensive, multi-pollutant approach with President Bush's proposed Clear Skies Act as a key element. EPA's NAAQS program will focus on implementation of the standards for $PM_{2.5}$ and ozone issued in 1997. EPA has estimated that attaining these standards will result in up to $100 billion in annual health and welfare benefits. This includes the value attributable to thousands of avoided premature deaths, 7,500 avoided cases of chronic bronchitis, and tens of thousands of avoided hospital admissions for respiratory and pulmonary causes per year. EPA will provide a reassessment of these benefits in conjunction with the proposed decision on whether to retain or revise the NAAQS for PM.

EPA anticipates that programs in place will result in a number of areas making progress toward attainment of the $PM_{2.5}$ and 8-hour ozone standards. For ozone, preliminary 1999-2001 data indicate there are 302 counties in the United States with monitors showing air quality in violation of the 8-hour standard (1997-1999 data indicated 333 counties in monitored violation). As a result of enactment and implementation of the Clear Skies Initiative, by the year 2010, we anticipate 232 of those counties will attain the standard, leaving only 70 counties predicted to monitor violation of the 8-hour standard. For $PM_{2.5}$, preliminary 1999-2001 data indicate there are 129 counties in the United States with monitors showing air quality in violation of the $PM_{2.5}$ standard (1999-2000 data indicated 173 counties monitoring violation). With Clear Skies, 141 of these counties are expected to attain the standard by 2010. The President's proposed Clear Skies Act would bring 10 additional counties into attainment with the 8-hour ozone standard in 2010 and an additional 34 counties into attainment with the $PM_{2.5}$ standard. Furthermore, Clear Skies provides flexible and cost-effective compliance with results guaranteed by caps instituted over a period of time. The initiative eliminates costly regulation, litigation, inspection, and enforcement actions while guaranteeing results with compliance rates similar to those of the Acid Rain program, which has compliance rates of nearly 100 percent.




Air quality monitoring is essential to providing a firm scientific basis for designing the national clean air program and measuring the results of Federal, state, Tribal, and local efforts. EPA will continue to oversee the national air quality monitoring network. The Agency is working with states, tribes, and local agencies to develop an integrated ambient monitoring strategy that will refocus the existing air monitoring program to current data collection needs for ozone, PM, and air toxics. This national monitoring strategy will provide agencies with more flexibility in designing their networks. To ensure source and ambient monitoring measurements are credible, EPA will continue developing quality assurance protocols and conducting quality assurance audits.

**Particulate Matter (PM)**

PM can cause adverse affects to human health and the environment. Particles that are small enough to get into the lungs (those less than or equal to 10 micrometers in diameter) can cause numerous health problems and have been linked with illnesses and deaths from heart and lung diseases. Various health problems have been associated with long-term exposures as well as daily exposures to particles. Particles can aggravate respiratory conditions, such as asthma and bronchitis, and have been associated with cardiac arrhythmias (heartbeat irregularities) and heart attacks. Particles of concern can include both fine and coarse-fraction particles, although fine particles have been more clearly linked to the most serious health effects. When exposed to elevated levels of fine 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 are at increased risk of premature death or admission to a hospital or emergency room. $PM_{2.5}$ 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. Fine particles have also been linked to adverse effects on the environment and contribute to reduced visibility (also known as regional haze), and to acid deposition. Particulate matter also can cause deterioration in paints and building materials, and can have adverse impacts on vegetation and ecosystems.

$PM_{2.5}$ can be directly emitted or can be formed in the air when gases such as $SO_2$, $NO_x$, and VOCs interact with other compounds to form fine particles. Fine particles in most United States cities are generated by combustion sources (motor vehicles, power plants, woodstoves, wildfires, agricultural burning, etc.) and some industrial processes. Coarser dust particles are generated by operations such as crushing and grinding, and dust from paved or unpaved roads.

**PM NAAQS Implementation**

$PM_{2.5}$, ground-level ozone, and regional haze have many similarities. The similarities provide opportunities for integrated strategies for reducing pollutant emissions in the most cost-effective ways. Both PM and ozone -- and the resulting regional haze -- are subject to long-range transport that can affect broad areas of the country. $NO_x$ and volatile organic compound (VOC) emissions both contribute to formation of $PM_{2.5}$ and ozone. The same types of sources emit these pollutants.

EPA=s strategy for meeting the ozone and PM NAAQS includes national programs for reducing emissions from electric utilities and mobile sources and state, Tribal, and local programs for reducing emissions from other sources. EPA, working with its state, Tribal, and local partners, will develop and issue the policies, rules, guidance, and technical tools needed to begin implementation of the $PM_{2.5}$ standard and the 8-hour ozone standard, and continue implementation of the PM standard for particles with a diameter of 10 micrometers or smaller ($PM_{10}$). EPA=s strategy for regional haze is to work with multi-state planning groups to develop strategies for reducing haze and with individual states to develop implementation measures to reduce emissions of PM and ozone precursors.

The Agency also will work with states, tribes, and local governments to implement voluntary and innovative programs focused on local problems. With new research showing an even stronger link between PM exposure and health impacts, EPA will take steps to reward state, Tribal, and local governments and businesses that take early action to reduce air pollution levels through cost-effective approaches and those who 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

A major focus of the PM program in FY 2004 will be to complete the assessment of $PM_{2.5}$ as it moves from point, area, and mobile sources and source regions to downwind areas and to identify major contributing sources of precursor pollutant emissions (e.g., $SO_x$, $NO_x$). Among the large point sources of emissions, electric utilities are a primary contributor. The need for further emission reductions from the power sector is one of the primary reasons for the

President's legislative proposal on the Clear Skies Initiative that was introduced in Congress in July 2002.

**Clear Skies Initiative**

The Clear Skies Initiative will take the best of what we have learned and modernize the existing Clean Air Act. Using a market-based approach, the Clear Skies Initiative will dramatically cut power plants' emissions of three of the worst air pollutants – sulfur dioxide ($SO_2$), nitrogen oxides ($NO_x$), and mercury (Hg). Reductions in $SO_2$ and $NO_x$ emissions also will reduce airborne $PM_{2.5}$. EPA's approach builds upon the success of the acid rain cap-and-trade program created in 1990. The acid rain program has reduced more pollution in the last decade than all other Clean Air Act command-and-control programs combined, and achieved these reductions at two-thirds of the cost.

The Clear Skies Initiative, as proposed, will achieve substantially greater reductions in air pollution from power plants, more quickly, and with more certainty than the existing Clean Air Act. The initiative requires mandatory cuts of $SO_2$, $NO_x$, and Hg by an average of 70% from today's levels and ensures that these levels are achieved and sustained through caps on emissions. The types of tools and assessments that the Agency would need to develop to implement the initiative and assist states include:

1. **Prepare the data and tools for implementing the initiative:** Design a cap-and-trade program and develop implementing tools and mechanisms

2. **Support the initiative rules with technical and economic analyses:** Determine control technology options and investigate the regulatory impacts on the US economy, environment, small business, and local communities.

3. **Develop baselines and prepare to assess program benefits:** Establish an integrated assessment program to include enhanced ambient and deposition monitoring and develop a baseline prior to implementation of the program.

4. **Ensure the program's credibility and results:** Successful trading programs require accurate and consistent monitoring of emissions from affected sources. Investigate monitoring alternatives (particularly as they relate to mercury), propose performance specifications, and develop mercury monitoring protocols.

Clear Skies, as currently proposed, is projected to bring a significant number of counties into attainment of the $PM_{2.5}$ and 8-hour ozone standards by 2010, and even more by 2020. Benefits to human health are projected to range from $11 billion to $100 annually by 2020, due primarily to avoided premature deaths. In addition, emission reductions resulting from the Clear Skies will help to significantly address several other of our nation's major air pollution-related environmental problems caused by fine particles, ozone, acid rain, nitrogen deposition, and visibility impairment. Visibility benefits in select national parks and wilderness areas are projected to be up to $3 billion annually. Clear Skies offers the opportunity to significantly reduce the collective cost to the state and Federal environmental agencies of developing and implementing programs to address $PM_{2.5}$ and regional haze issues, not to mention the cost of regulated entities under the current Clean Air Act programs.

**Other PM Strategies**

EPA will also review and propose the attainment/nonattainment area designation recommendations from the states and tribes. The Agency will complete the implementation rule that will guide the states and tribes in the development of their implementation plans. EPA also will work with states and local areas to develop control strategies to reduce emissions of $PM_{2.5}$ and its precursors. The focus will be on early reductions and innovative strategies that can provide the nation with public health benefits sooner.

In FY 2004, EPA will continue to provide technical support to the states and tribes through development of the national monitoring strategy, source characterization analyses, emission factors and emission inventories, statistical analyses and source apportionment techniques, quality assurance protocols and audits, and improved source testing and monitoring techniques. These tools will help implement and assess the effectiveness of alternative control strategies on local and regional air quality.

EPA also will continue to work with the United States Department of Agriculture (USDA) to develop a data system to develop and link wildland and prescribed fire emission tracking systems and supporting databases used to assess air quality impacts and improve emission models. EPA acknowledges the use of fire as an efficient and economical land management tool in maintaining the health of fire-tolerant and fire-dependent plant and animal ecosystems. EPA continues to work with Federal land management agencies to address the effective use of fire as a land management tool, while minimizing public health and air quality impacts. EPA also continues to work with USDA and the Department of the Interior to include EPA data needs in the national fire database. EPA collaborates with the Departments of Agriculture and Interior on identifying and developing innovative information technologies to provide the land management community with tools to improve burn planning and air quality management.

**PM Controls from Mobile Sources**

Projected increases in the number of individual mobile sources and in motor vehicle travel may increase future emissions of $PM_{2.5}$ and its precursors. The Agency will continue to seek further reductions in motor vehicle emissions to attain and maintain the NAAQS for PM 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 $PM_{2.5}$ emissions from mobile sources. In some urban areas, the contribution is even greater. In FY 2001, EPA promulgated 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 PM emission levels 90 percent below 2000 levels. By 2030, the program will reduce annual emissions of PM by 109,000 tons. In FY 2004, the Agency will be implementing these standards, including assessing the development of new emission control technology. In addition, EPA will promulgate in FY 2004 new emission standards for heavy-duty, nonroad diesel engines, including new diesel fuel sulfur requirements. This is an extremely important action as nonroad engines are the biggest contributors to the PM emission problem from mobile sources.

In FY 2004, EPA will expand its efforts to help create voluntary diesel retrofit projects to reduce PM from older, high-polluting trucks and buses. The Agency will focus its efforts on sensitive populations, such as children and the elderly. EPA will give particular emphasis to raising community awareness to the problems of children riding to school in older, high-emitting diesel vehicles**.** More than 24 million children in the US ride a bus to and from school every day. Researchers have found that children riding on school buses can be exposed to high levels of diesel exhaust. Idling school buses can compromise air quality on and around buses, including sidewalks, schoolyards, playgrounds, and even inside school buildings. School buses can be retrofitted with pollution controls through the use of ultra-low sulfur diesel fuel and the installation of PM filters. This approach can reduce PM emissions by more than 90 percent. Other strategies include anti-idling programs, which lower bus idling time and reduce harmful emissions. Although EPA recently promulgated new rules regulating diesel emissions, the benefits of these rules will not be realized for at least five years. In the meantime, older, dirtier vehicles, often on the road for a million miles or more, will continue to adversely affect the nation's health. To date, voluntary diesel retrofit projects have resulted in over 80,000 commitments to retrofit diesel engines, equivalent to reductions of approximately 12,500 tons of PM and 25,000 tons of $NO_x$. During FY 2002, through this program, EPA worked with fuel companies to begin delivering ultra-low sulfur diesel fuel to centrally fueled fleets throughout certain parts of the country - four years before it is required. EPA has also developed several emissions testing protocols that will provide potential purchasers of emission control technology a consistent, third party evaluation of emission control products. EPA has developed partnerships with state and local governments, industry, and private companies to create project teams to help fleet owners create the most cost-effective retrofit programs.

To address the concern of idling trucks at truck stops and other rest areas, EPA will continue to 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. Idling strategies will be used in conjunction with other programs in EPA's Green Transport Initiative to help the trucking industry 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 2004, 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 I standards took effect in FY 2002 and Tier II standards will take effect in FY 2005. In FY 2004, the Agency will continue to evaluate certification test data to ensure that locomotive designs comply with standards.

An important element of the Agency's work in controlling air emissions is to ensure the accuracy of emission data from the different categories of mobile sources. In FY 2000, the Agency increased its focus on development of a portable emissions measurement system (PEMS) that will allow the Agency to acquire in-use emission data in a cost-effective manner. From FY 2001 to FY 2003, EPA refined its in-use $NO_x$ measurement capability and developed its PM measurement capability. In FY 2004, EPA will continue the testing and development of this system to include air 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 nonroad equipment.

Improving EPA models is another area that the Agency will address in FY 2004. EPA has 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 provide support to the states in their determination of program needs to meet air quality standards. The Agency will continue to develop the new model in FY 2004. The Agency also will continue providing guidance and training in the use of other mobile source models.

**Ozone**

Ozone at any concentration can affect normal functioning of the lungs in healthy people, as well as in those with respiratory problems. Relatively low amounts of ozone can cause coughing, shortness of breath, and pain, especially when taking a deep breath. Ozone also can worsen incidence of chronic lung diseases and is associated with increased medication use, visits to emergency rooms, and hospital admissions. Ozone can inflame and damage the lining of the lung. Within a few days, the damaged cells are shed and replaced. Animal studies suggest that if this type of inflammation happens repeatedly over a long time period (e.g., months, years, a lifetime), lung tissue may become attenuated or permanently scarred, causing reduced lung elasticity, permanent loss of lung function, and a lower quality of life. More people are exposed to unhealthful levels of ozone in outside ambient air 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 less stringent 1-hour ozone standard.

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

Ozone is not emitted directly into the air but is formed by the reaction of VOCs and $NO_x$ in the presence of heat and sunlight. Ground-level ozone forms readily in the atmosphere, usually during hot summer weather. VOCs are emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer and commercial products, and other industrial sources. $NO_x$ are emitted from sources of combustion like motor vehicles, power plants, and industrial boilers. $NO_x$ and VOC emissions 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 State Implementation Plan (SIP) programs. To address this persistent and widespread problem, EPA will assure compliance under the $NO_x$ SIP Call that is expected to reduce total summertime emissions of $NO_x$ by about 25 percent beginning in FY 2004 in the affected 22 states and the District of Columbia.

In FY 2003, EPA will propose a rule for implementing the 8-hr ozone NAAQS and in FY 2004 plans to publish a final rule. States and tribes will submit recommendations for nonattainment and attainment areas in FY 2003. EPA will review and modify the recommendations (working with states and tribes) and prepare final designation rulemaking, which is scheduled to be completed in FY 2004.

In support of the states and tribes, EPA will continue to analyze ambient monitoring data to provide insight into how ozone precursors and toxic pollutants contribute to the ozone problem, evaluate pollutant management programs, develop emissions inventories to determine the most important sources of emissions, and conduct modeling to develop alternative national and/or local control strategies to attain the ozone standard. EPA, states, tribes, and Regional Planning Organizations will work collaboratively in developing and improving urban and regional-scale numerical grid models and evaluating their accuracy and applicability to complex air quality issues including international/border issues.

**Ozone--New Innovative Strategies and Programs**

EPA will work directly with areas having the greatest problem in meeting the standards and use new innovative approaches to achieve early emission reductions. These programs have the potential to provide substantial public health benefits as a result of early planning, implementation, and emissions reduction leading to expeditious attainment and maintenance of the ozone NAAQS. This would result in fewer incidences of illness, doctors' visits, and hospitalizations as a result of respiratory problems, particularly in susceptible populations.

Early Action Compacts for implementing the 8-hour ozone standard will play an important role in the national ozone management program for FY 2004. The purpose of this program is to support and reward voluntary, early emission reductions to reduce ozone around the country. Through these Early Action Compacts, EPA is supporting the innovative efforts of 34 communities around the country that have pledged to reduce air pollution ahead of the deadlines under the CAA. Communities with Early Action Compacts will voluntarily start reducing air pollution ahead of schedule. These communities will bring substantial, sustainable health and environmental improvements to their residents much sooner than would have been achieved without these agreements.

EPA will support the "cool cities" programs that show local governments how to reduce the polluting effects of heat build-up in cities and offer them regulatory credit for doing so. EPA will work in other areas of the country, such as Los Angeles, Chicago and Baton Rouge, by providing guidance and technical support for determining potential emission reduction benefits from implementation of heat island reduction strategies.

EPA will continue to work with the States of North Carolina (NC) and South Carolina (SC) and local officials in the Charlotte, NC/Rock Hill, SC region to develop a model integrated air quality plan for the Central Carolinas Region. EPA's goal for the pilot project is to integrate efforts to address multiple air quality problems -- ground-level ozone, particulate matter, and toxic air pollutants -- as well as energy, transportation, economic development, and land-use planning into a single, model plan that can be used in different areas across the country. EPA will provide technical support in air quality planning, transportation planning, modeling for criteria pollutants and air toxics, and decision support tools for testing various options for integrated planning for clean air.

In FY 2004, EPA plans to finalize a new policy for the control of VOCs. The policy will assign individual reactivity values, controlling the most reactive compounds more stringently, providing a more cost effective approach to reducing ozone levels from VOC precursors.

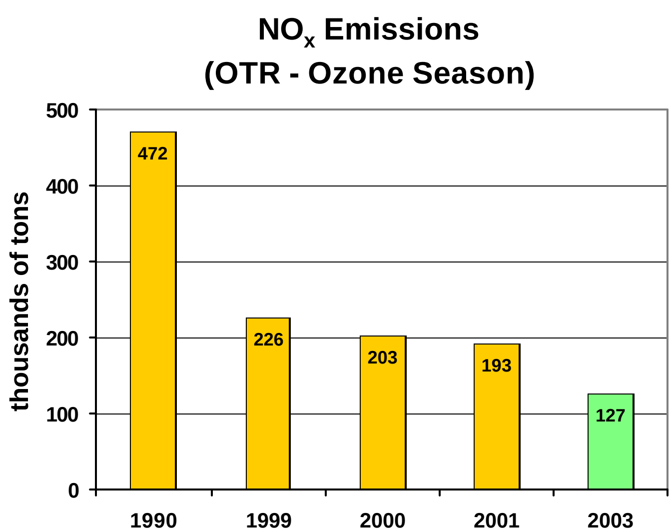
**1-hour Ozone Standard**

EPA will continue to implement the national program for the 1-hour ozone standard. EPA will provide technical support to states required to submit mid-course reviews in 2004. This includes preparing example model applications, 10-year trends analyses, and other factors that can be used as part of weight-of-evidence relative to demonstrating progress in attainment. EPA also will work with states required to submit SIP revisions based on the MOBILE6 model for estimating emission reductions from the Tier II vehicle standard.

EPA will review 1-hour data for the purpose of publishing determinations of attainment and to support redesignation from nonattainment. Where air quality data show that a nonattainment area has failed to meet its required attainment date, EPA will implement the reclassification provisions in the CAA. In FY 2004, EPA plans to promulgate new general conformity regulations to address issues raised by other Federal agencies.

**Ozone--$NO_x$ Regional Transport Budget Programs**

EPA will continue to operate the Ozone Transport Commission's (OTR) $NO_x$ emission reduction and trading program for the Northeast states (9 states plus DC). The OTR $NO_x$ Budget Program went into effect in the summer of 1999. In the 2001 ozone season, $NO_x$ emissions were reduced over 250,000 tons (or 60%) from the 1990 baseline. This program currently is the core effort to attain the NAAQS for ozone in the OTR and serves as the foundation upon which the broader regional $NO_x$ Budget Program (22 states plus DC) under the $NO_x$ SIP Call is based.




Implementation of the $NO_x$ SIP Call rule begins in 2004 for many states. EPA will assist the states with implementation, especially related to the emissions trading program, compliance supplement pool and monitoring, and will fully integrate it with the operation of the OTR trading program. During the 2003 and 2004 ozone seasons, EPA will conduct an analysis to assess and determine the actual emission reductions achieved. EPA will assist states in FY 2004 as they develop and adopt state rules in response to the Phase II $NO_x$ SIP Call that is to be finalized in

FY 2003. The initial emission reductions from this regional program are required to begin in the summer ozone season of 2004. $NO_x$ emission reductions from this program are projected to be approximately one million tons per season. EPA will also conduct an analysis to assess and determine the actual emission reductions achieved during the 2003 and 2004 ozone seasons. EPA will assist states in FY 2004 as they develop and adopt state rules in response to the Phase II $NO_x$ SIP Call that is expected to be finalized in FY 2003.

**Ozone Controls from Mobile Sources**

To help attain both the 1-hour and 8-hour ozone NAAQS, the Agency will implement current motor vehicle and fuel standards and develop new programs. In 1996, light-duty vehicles (LDVs) and light-duty trucks (LDTs) contributed more than 25 percent of hydrocarbon (HC) emissions and 22 percent of national $NO_x$ emissions. To address this, the Agency promulgated in FY 2000 the Tier II program for LDVs/LDTs to begin in 2004 and phasing-in to 2010. 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 74 percent (2 million tons per year by 2020 and nearly 3 million tons per year by 2030). In FY 2004, EPA will begin to fully implement the new Tier II standards for LDVs, LDTs, and medium-duty passenger vehicles as well as the new low sulfur gasoline standards.

Heavy-duty trucks and buses also contribute to the nation's air quality problems, accounting for about one-third of $NO_x$ emissions from mobile sources. To address this problem, the Agency has promulgated standards for heavy-duty vehicles and engines. The first phase of the program (promulgated in FY 1997 and reaffirmed in FY 2000) takes effect with model year 2004 and requires gasoline trucks to be 78 percent cleaner and diesel trucks to be more than 40 percent cleaner than today's models. This phase will reduce $NO_x$ emissions by 2.4 million tons annually when the program is fully implemented in 2030. As a result of a consent decree agreement, many diesel engine companies had to comply in October 2002. In FY 2001, EPA promulgated a second phase of standards that established a comprehensive national program that will regulate engines for trucks and buses and diesel fuel as a single system, with the new emission standards taking effect in 2007. The level of sulfur in highway diesel fuel will be reduced by 97 percent by mid-2006. As a result of this program, each new truck and bus will be more than 90 percent cleaner than current models resulting in a reduction of 2.6 million tons per year of $NO_x$ emissions by 2030. In FY 2004, 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 clean engine and fuel technology to meet our commitment of biennial technology reviews to evaluate progress toward implementation of the 2007 standards.

Because of the projected emission reductions from the Agency's mobile source programs described above (for LDVs/LDTs and heavy-duty trucks and buses), emissions from the nonroad sector will be the largest part of the mobile source inventory to be addressed in the coming years. Thus, the Agency is developing a program to establish new standards for heavy-duty nonroad diesel engines (e.g., engines used in construction and agricultural applications), including new sulfur requirements for nonroad diesel fuel. A final rule for nonroad engines and fuel is planned for 2004.

The Agency's National Vehicle and Fuels Emissions Laboratory (NVFEL) provides critical support to EPA, the states, the fuels industry, the automobile industry, and nonroad engine manufacturers by testing vehicles and engines for compliance with Federal clean air standards. The 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. Tests are conducted on motor vehicles, heavy-duty engines, nonroad 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. In FY 2004, EPA will continue to conduct testing activities for fuel economy, LDV and heavy-duty engine characterization, Tier II testing, reformulated gasoline, future fleets, on-board diagnostic (OBD) evaluations, certification audits, and recall programs. EPA will also 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 nonroad diesel engines as well. EPA will continue to test 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, including hybrids, in collaboration with the Department of Energy, as well as nonroad vehicle emission testing in support of non-road regulatory development. EPA also will continue testing hydrogen fuel cell vehicles.

To support on-going confirmatory and compliance programs, the NVFEL will conduct certification and fuel economy tests on LDV, LDT, and Light-Heavy Duty Vehicles (LHDV) and will conduct compliance tests on in-use LDVs and LDTs. NVFEL will also test LDV and heavy-duty engines for regulatory development.

The new Tier II (ultra-low emission vehicle standards) program and the CAP 2000 in-use verification program requirements will increase the annual costs of generating and maintaining compliance program data. These programs will create a completely new and different standards structure. The new Tier II program provides great flexibility including corporate fleet averaging standards, multi-year phase-in, and incentives for early innovation and extensive banking and trading provisions. These provisions give manufacturers flexibility, but increase the EPA program compliance program costs. EPA also intends to propose and finalize new durability provisions under the CAP 2000 program, in response to a D.C. Circuit Court of Appeals decision in FY 2002 that instructed the Agency to establish test methods and procedures by regulation.

Beginning in 2003-2004, manufacturers will shift product offerings toward extremely low emitting vehicles and cleaner diesel vehicles. Furthermore, new Federal test procedures to measure emissions over test cycles to characterize the appropriate acceleration rates, accessory loads, and evaporative system will take effect in 2003. These new requirements will require the NVFEL laboratory to achieve greater data measurement stability/accuracy at extremely low levels and to introduce new testing cycles and capabilities, resulting in increased annual operations and maintenance expenses for advanced testing systems and testing flexibilities. The new CAP 2000 database system to collect, process, store, and analyze a large volume of in-use data provided by the regulated industry also will result in new annual maintenance and upgrade costs. The regulated industry depends on NVFEL laboratory accuracy to benchmark its own laboratories and to ensure consistent compliance stringency in the marketplace.

To ensure achievement of the goals of the CAA through Tier II and the 2004/2007 Heavy-Duty Diesel Engine standards, EPA will complete its equipment upgrade of vehicle and engine testing capabilities at the NVFEL. With more stringent Tier II and Diesel standards for cars, heavy duty diesel engines, and gasoline and diesel fuels taking effect beginning in FY 2004, EPA will incur increased certification and compliance program costs of $8.0 million annually. The Agency has published a Notice of Proposed Rulemaking (NPRM) to increase the fees paid by manufacturers to cover these additional costs associated with the new services.

EPA must also put in place a credible compliance testing program to serve heavy-duty engine manufacturers certifying to the new 2004 emission standard requirements. This program must be as robust as the compliance program for light duty cars and trucks to prevent a recurrence of the cheating that has taken place in the past. All facility and testing operations and maintenance costs, as well as quality, safety, and information technology costs are part of the new recurring $8.0 million certification and compliance program costs. Heavy-duty engine manufacturers have requested that EPA establish a correlation program similar to the vehicle manufacturers' program. This will triple the size and operation of EPA's current correlation program.

In addition, non-road sources are a major certification and compliance workload priority as new standards are now taking effect. In 2004, EPA will issue 1,700 certificates for nonroad sources, up from zero in 1996. This will significantly increase program and testing costs. In FY 2002, EPA proposed the fee rule; we anticipate the rule will be finalized in late FY 2003. The proposed rule includes fees that for the first time will recover the costs of providing compliance services to off road engine manufacturers. Unique test procedures and range of products drive different testing, facility operation, and information technology costs to collect and process data and to calculate emissions levels.

For all mobile source industries, EPA will need to increase compliance and technical assistance. Since 1996 the number of manufacturers and the number of certificates issued by EPA has tripled. Complex requirements, phase-ins, and new test procedures have greatly increased the need for EPA-provided compliance and technical assistance to all mobile source industries including: cars, trucks, large and small nonroad equipment, forklifts, chainsaws, lawnmowers, generators, ground service equipment, recreational vehicles, commercial and recreational marine, and locomotives.

The ability to perform these tests will ensure fulfillment of the goals of the CAA to protect the health of all Americans. EPA calculates that, by 2030, compliance with 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 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 workdays lost. With both ozone and PM, children and the elderly are most at risk.

In FY 2002, EPA finalized regulations addressing emissions from a range of nonroad sources, including industrial spark-ignition engines (e.g., forklifts and generators), recreational vehicles, and recreational marine engines. The new standards are expected to reduce hydrocarbon (HC) and $NO_x$ emissions by nearly 80 percent when fully implemented. In FY 2004, the Agency plans to implement the new standards for commercial marine diesel engines used in ocean-going vessels.

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 2000 and 2002, respectively. The next phase of locomotive standards will take effect in 2005. In FY 2004, 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 2004 is the Phase II 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 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 2027. This reduction is accompanied by an overall reduction in fuel consumption.

An important element of the Agency's work in controlling air 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 PEMS that will allow the Agency to acquire in-use emission data in a cost-effective manner. From FY 2001 to FY 2003, EPA refined its in-use $NO_x$ measurement capability and developed its PM measurement capability. In FY 2004, EPA will continue to test and develop the complete system to include air 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 nonroad equipment. The newly acquired emission data will enhance EPA's emission models.

The Agency also will emphasize improvements in its transportation emission models in FY 2004. EPA has 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 provide 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 2004, as well as providing guidance and training in the use of other mobile source models.

EPA will partner with states, tribes, and local governments to create a comprehensive compliance program to ensure that vehicles and engines pollute less. EPA will use advanced in-use measurement techniques and other sources of in-use data to monitor the performance of 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. In FY 2003, basic and/or enhanced vehicle I/M testing was being performed in 34 states with technical and programmatic guidance from EPA. In FY 2004, EPA will continue to assist states in incorporating On-board Diagnostic (OBD) inspections into their I/M programs. EPA will also support states in evaluating I/M programs, as directed by the CAA and recommended by the National Academy of Sciences. 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.

As part of implementing the ozone standard and regional haze rule, EPA will continue to provide assistance to states and local governments, including implementation of the transportation conformity regulation. EPA also plans to propose and finalize changes to this regulation to address new air quality standards. 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 and technology-based 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 HC, $NO_x$, and toxic emission reductions in 17 states and the District of Columbia. RFG is designed to substantially reduce vehicle emissions of ozone-forming and toxic pollutants, which is estimated to reduce VOC emissions 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 that burn conventional gasoline off the road. EPA will continue to address issues associated with the use of oxygenates (e.g., MTBE and ethanol) in RFG and will review the industry's retail station survey plan.

The mobile source compliance program will oversee more than 225 original equipment manufacturers to ensure that vehicles and engines (both on-highway and nonroad) 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 2004 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.

**Visibility**

Visibility impairment, caused by the presence of tiny particles in the air, is more simply described as the haze that obscures the clarity, color, texture, and form of what we see. Because of regional variations in natural conditions, which 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 will continue supporting Regional Planning Organizations concerned with regional haze and PM impacts through the set up and application of regional scale models.

In July of 1999, EPA promulgated a Regional Haze rule to address this problem. On May 24, 2002, a decision by the DC Circuit Court vacated EPA's proposed Best Available Retrofit Technology (BART) requirements within the Regional Haze rule. As a result of this decision, BART guidelines are expected to be re-proposed in FY 2003, with a final rulemaking to be issued in FY 2004. The rulemaking will include guidance on determining individual facilities' contribution to haze versus cumulative contribution and on evaluating "reasonable progress" control strategies under the Regional Haze rule.

EPA will continue assisting states and tribes with regional scale models, including identifying meteorological and emissions inputs and developing emission projections. These model applications will provide the basis for assessing regional emission control strategies for $PM_{2.5}$, SIP and regional haze goals.

The strategies for improving visibility will provide additional health and welfare effects, since many of the pollutants that lead to visibility impairment also contribute to PM, ozone, and acidic deposition. EPA estimates that when the regional haze goals are fully achieved 60 years hence, these additional benefits, worth at least $20 billion per year, will be realized.

**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 low ambient concentrations of CO is most serious for those who suffer from cardiovascular disease. 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; repeated exposures may contribute to other cardiovascular effects. Healthy individuals are also affected, but only at higher levels of exposure.

EPA is currently reviewing the NAAQS for CO and has completed the CO criteria document. The Agency anticipates continuing work on the staff paper in FY 2003. After taking into account CASAC review and public comment, EPA will propose a decision whether to retain or revise the standards.

In FY 2004, 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.

**Other Pollutants (Sulfur Dioxide, Nitrogen Dioxide, Lead)**

Children and adults with asthma are most vulnerable to the health effects of $SO_2$ and $NO_2$. The primary effect they experience is a narrowing of the airways (called bronchoconstriction), which may cause symptoms such as wheezing, chest tightness, and shortness of breath. Symptoms increase as concentrations and/or breathing rates increase. Long-term exposure to both $SO_2$ and $NO_2$ can cause respiratory illness, alter the lung's defense mechanisms, and aggravate existing cardiovascular disease. In children, repeated short-term exposures to $NO_2$ can increase the risk of respiratory illness.

$SO_2$ converts to sulfates in the atmosphere and $NO_2$ is a strong oxidizing agent reacting in the air to form corrosive nitric acid as well as toxic organic nitrates. Both these pollutants have adverse effects on both terrestrial and aquatic ecosystems, contributing to acid rain and eutrophication of lakes and coastal waters.

Because $NO_2$ is a tropospheric ozone precursor, control of $NO_2$ is a way to reduce ozone. Both $SO_2$ and $NO_2$ form sulfites and nitrate aerosols, constituents of $PM_{2.5}$. Therefore, control of these pollutants is a way of reducing $PM_{2.5}$.

The D.C. Circuit Court of Appeals has remanded EPA's most recent decision not to revise the $SO_2$ NAAQS, asking EPA to further explain the criteria and basis of our decision. In a January 9, 2001 notice, EPA provided notice of availability of new 5-minute data and analyses of that data. In FY 2003, EPA will analyze the 5-minute monitoring data collected in FY 2002. Following this analysis, EPA will propose a response to the Court remand and then EPA will make a determination whether to finalize the intervention level program previously proposed. This program would give states guidance on identifying and addressing high, short-term peaks that occur for short durations (five minutes) and can cause bronchial constriction in asthmatics, a serious health concern. At that time, EPA will also consider this new information in determining an appropriate response to the court remand order.

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.

In large part due to the reduced use of leaded gasoline, human exposure to lead from ambient air has been greatly reduced. 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.

In FY 2004, EPA will continue to assist states, tribes, and local agencies in implementing strategies to reduce these pollutants, review data for redesignations to attainment, and assist states in developing plans, as necessary, to maintain compliance with the standards.

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

In FY 2003, EPA will continue efforts to propose changes to the procedures states use to revise Title V operating permits (Part 70) and continue to provide technical support to states, tribes, and local agencies on the permit program. By December 2003, EPA intends, with assistance from state and local permitting authorities, to complete the first round of Part 70 permits. In FY 2004, EPA plans to promulgate the Part 70 operating permit rules. EPA will continue and expand training and technical support efforts to ensure smooth incorporation into operating permits of rules that have recently become effective.

In FY 2003, EPA promulgated the Prevention of Significant Deterioration (PSD) and nonattainment New Source Review (NSR) rule. The rule addressed baseline emissions determination, actual-to-future-actual method, plant-wide applicability limitations, clean units and pollution control projects. The rule becomes effective on March 1, 2003. The 12 states with delegated PSD programs will implement the regulation in FY 2004. EPA regional offices will assist the additional 38 states in their implementation efforts. In FY 2003, EPA proposed a rule to clarify the definition of routine maintenance, repair, and replacement for the NSR program. EPA plans to promulgate the rule in FY 2004. In addition, EPA plans to address the issues of aggregation, debottlenecking, and plant-wide applicability limits. By the end of FY 2004, EPA will complete training of states that have delegated PSD programs.

In FY 2004, EPA will continue to maintain, operate, and enter new information into the RACT/BACT/LAER Clearinghouse. In FY 2003, the clearinghouse will complete the data collection and entry for missing permits issued in the last 10 years (begun in FY 2002). In FY 2002, EPA implemented many improvements to the clearinghouse. In FY 2003, EPA plans to implement more complex system improvements, establish an emerging technology database, accommodate final NSR Reform rules, and interconnect the clearinghouse Web database with other EPA databases that contain facility data.

**Ambient Air Monitoring for Homeland Security**

Ambient air monitoring plays an important role in the detection and response to threats from potential terrorist actions. EPA has identified 4 types of air emergency response scenarios; chemical threats, infrastructure and physical threats, radiological threats, and biological and pathogenic threats. The outdoor air and radiation program's role is primarily with incidents involving chemical or infrastructure/physical threats and radiological threats. While it is impossible to contemplate all possible contingencies and the threat scenarios may differ in scale and impact, there are common elements to the response that dictate the expertise and equipment needed for an effective and timely response. Common to all scenarios are:

1. Get on site with the right people and equipment;

2. Establish a monitoring plan;

3. Deploy monitors with real-time monitoring capabilities; and

4. Gather, analyze, and transmit the data from these monitors to appropriate decision points.

EPA will work closely with other Federal and state agencies with threat detection responsibilities to ensure that EPA's existing monitoring expertise, standards, capabilities, and data are appropriately integrated into their efforts to detect terrorist threats. The Agency has, and will continue to make historic data available to determine trends and background levels that will aid in setting baselines for detection. In addition, monitoring surveillance using EPA, state and Tribal monitoring assets, may provide valuable and timely data to detect anomalies in the ambient air that may, in conjunction with other environmental and health data, indicate if further, more detailed, analysis is warranted. EPA will work with other agencies and the private sector to support this effort, will discourage any unnecessary duplication, and will help ensure that detection methods and communication systems are optimized and standardized.

Research

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ozone, particulate matter (PM), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), and lead. The Act requires that these standards be reviewed and, if necessary, revised every five years. EPA's NAAQS research program is devoted to the mission of providing an improved scientific basis for: 1) periodic review and revision as needed of the NAAQS (*i.e.*, effects, exposure, and risk assessment); and 2) implementation and attainment of the NAAQS (*i.e.* emissions, air quality modeling, ambient measurement methods, and risk management approaches). NAAQS research currently addresses both of these areas for particulate matter, and implementation and attainment of the NAAQS for ozone. In the area of effects research, the program focuses on human health risks while ecological concerns are addressed primarily through research on associated ecological effects (i.e., acid deposition) under the Ecosystem Protection research programs in Goal 8.

In order to ensure the relevance of this program, research and assessment activities are guided by the draft PM Research Plan and the draft Tropospheric Ozone Research and PM Research Multi-Year Plans. These documents articulate the long-term goals, purpose, and priorities of these programs, and include a scheduled timeline of research and assessment activities and the expected products including annual performance goals and measures under the Government Performance and Results Act (GPRA). To maximize the quality of the research conducted under the NAAQS research program, products such as scientific publications, assessments, and documents undergo peer review, with major or significant products requiring external peer review. The Agency's Peer Review Handbook (2$^{nd}$ Edition) codifies the procedures and guidance for conducting peer review.

**Tropospheric Ozone and Related NAAQS**

In FY 2004, continuing atmospheric chemistry and modeling work to support the implementation of the tropospheric ozone NAAQS will include research to determine the causative agents responsible for non-attainment (*e.g.*, chemical constituents, sources and source regions, and meteorological variables). Research will also be conducted to describe key missing features of the atmospheric chemistry of ozone formation, information that will improve atmospheric chemistry models. Developing, evaluating, and applying comprehensive atmospheric models for projecting the impacts of emission control strategies, including flexible and innovative alternative strategies, will also be a priority.

Likewise, developing observational-based methods to complement emissions-based, physical theory modeling will continue to be a priority, as will research to develop the protocols, combining modeling and observational approaches, for use by the scientific community in conducting integrated multi-scale exposure assessments. Emissions profiles will be produced for mobile sources already being characterized for their contribution to air toxics and PM exposure. Tropospheric ozone air quality modeling utilizing the Agency's supercomputer will also continue in FY 2004 and falls under one of the Administration's interagency priorities, Networking and Information Technology Research and Development.

Research to support the development of measurement and modeling methods and observational-based assessments includes continuing efforts to provide a reliable means of assessing the results of state and local emissions reductions by developing techniques to measure ozone precursors and their transformation during meteorological transport. The Agency will complete recommendations in FY 2004 for monitoring strategy improvements for states to use observation-based methods in their NAAQS implementation strategies.

While estimates of both biogenic (naturally occurring) and mobile source (motor vehicles, engines, and their fuels) emissions have been improved significantly over the last five years, uncertainties remain. Research planned for FY 2004 will improve the accuracy of emission estimates generated using the Biogenic Emissions Inventory System (BEIS-III) and mobile emissions models that account for the effect of different vehicle operating modes on emissions (modal-based emissions models). The Agency will improve BEIS-III by upgrading the Biogenic Emissions Land use Database (BELD) for the United States, and other regions of North America where data are available. This improvement will be useful to state implementation plan (SIP) air quality modelers because it will allow them to make more informed decisions as they develop and implement the SIPs. It will be particularly useful in determining emissions involving complex mixes of land use/land cover, an area of considerable uncertainty in current criteria air pollutant modeling. Research planned for FY 2004 will also continue to develop improved emission factors and perform model validation studies for additional vegetative types.

Mobile emissions research will focus on further development and validation of the Mobile Emissions Assessment System for Urban and Regional Evaluation (MEASURE). This research includes studies to enhance MEASURE's capability to estimate the distribution of nitrogen oxide emissions from trucks and work to improve emission forecasts from light- and medium-duty delivery trucks and heavy-duty interstate truck travel. In addition, efforts will commence to validate MEASURE using ambient measurements capable of plume characterization and across-the-road ambient concentration measurements. Finally, testing will be performed on an approach for linking MEASURE with Models-3/Community Multi-Scale Air Quality model (CMAQ). The data generated from this research will be incorporated into the atmospheric chemistry models used by Federal, state, and local environmental officials use to evaluate attainment strategies.

**Particulate Matter Research**

EPA's Particulate Matter (PM) research program will continue work to strengthen the scientific basis for the periodic review of the PM NAAQS, including conducting epidemiological, toxicological, clinical, and exposure studies focused on understanding health effects of PM. 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. In addition it will provide recommendations on the key scientific uncertainties regarding implementation of the PM standards.

The PM program is designed to address the ten priority topics identified by the National Academy of Sciences (NAS). Most broadly, the NAS recommends that research programs work to resolve issues of scientific uncertainty regarding health effects of particulate matter, factors that make sub-populations especially susceptible to health effects, and the hazardous PM components and sources most responsible for health effects. Specific critical research issues included in multiple NAS topics are:

- Potential confounding of PM health effects with other pollutants in the air: While EPA is far from understanding the health effects associated with all PM components, sufficient progress has been made to initiate studies investigating hypotheses related to PM components and sources that include formally examining the role played by co-pollutants. 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 ozone, nitrogen dioxide, and carbon monoxide) in PM health effects.

- Attribution of the PM health effects to specific constituents (e.g., sulfates versus nitrates versus organic and elemental carbon, and metals): EPA's monitoring network, which includes the super sites and speciation sites, is providing information about specific PM components. Future epidemiology studies will associate health effects with these components. Current and planned clinical and toxicology studies are being coordinated with epidemiological studies and are 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.

- 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," research is needed to establish dose-response models in epidemiology and toxicology studies. Only with established dose-response relationships between particles (and their components) and potentially adverse health effects, will appropriate and credible assessment of the true risks and impact to human health be determined**.**

In order to address high priority research needs, the Agency will increase efforts to improve air quality modeling and to develop or improve methods to identify sources contributing to ambient PM concentrations. Increased efforts to improve the accuracy and processing speed of the Community Multi-Scale Air Quality model (CMAQ) will include research to improve predictions of secondary nitrate and secondary organic aerosol formation. This research will also support the development of a simplified chemistry module that will improve model speed to allow evaluations, in combination with the research above, of more SIP scenarios without a significant loss of accuracy. In addition, the Agency will augment research to improve ammonia emission factors for all types of agricultural production related to livestock and to develop a better understanding of the nature of ammonia sinks in order to provide more accurate inputs to air quality models in support of SIP development and evaluation. This work responds to needs identified by states and local air pollution control agencies.

Increased efforts to identify sources contributing to ambient PM concentrations will include research to provide for more accurate identification of gasoline, diesel, biogenic, and regional sources. This research, in combination with research to identify better marker compounds, will allow the Agency to more accurately determine the contribution of gasoline vehicle emissions to ambient PM concentrations. Research will also improve emissions and characterization data for open and prescribed burning, which will support more accurate emission inventories and air quality modeling results, and improved source profiles for more accurate identification of the contribution of these sources to ambient PM concentrations. Research to improve characterization of carbonaceous PM emissions from off-road mobile sources will yield data that can be used for improving emission inventories for air quality models and for improving source profiles to identify source-specific contributions to ambient PM concentrations, especially the relative levels of contributions from diesel and gasoline vehicles.

Continuing atmospheric measurement and modeling research in FY 2004 will improve our understanding of the processes and chemistry that affect the composition, formation, and fate of atmospheric PM, and will refine our ability to estimate the relative source contributions of measured PM. This research will evaluate the chemical and physical processes that control the organic and inorganic chemical composition of PM, determine accurately the physical properties, chemistry, and composition of atmospheric PM, and develop and evaluate measurement methods needed to determine compliance with the PM NAAQS and to apply and evaluate complex models that simulate atmospheric processes. Along with these activities, developing urban-to-regional scale emissions-based air quality models and source apportionment models will provide data, models, and measurement methods that states can use to develop effective SIPs to achieve the PM NAAQS.

PM emission characterization research will support: (1) development of new or improved methods and models to quantify or estimate emissions of primary fine particles and major gaseous precursors of secondary fine particles; (2) provision of data on the size distribution of the particles emitted; and (3) provision of updated and augmented data on the chemical composition of fine PM from a variety of sources. Research is being conducted to ensure that emissions methods include semi-volatile gases that form particles by condensing in the plume immediately downwind of the source.

In the area of emissions controls and reduction research, the Agency will work cooperatively with the Department of Energy and industry to develop and evaluate innovative particulate matter and multi-pollutant control options and provide summary data and reports that compare the cost and effectiveness of these risk management options. Multi-pollutant controls research will include laboratory and field studies to determine the performance of advanced fine PM control technologies including integrated systems that simultaneously reduce both primary and secondary gaseous precursors (nitrogen oxides, sulfur oxides). Data generated from laboratory and field studies conducted to determine the chemical composition of fine PM from a variety of sources will be used to update and develop more specific source profiles. The results will provide a better understanding of the relationship between sources, ambient concentrations, and human exposures and will enhance the capability of states to trace ambient particulate matter to its sources.

PM health effects research will continue to determine the physical, chemical, and biological characteristics of particles responsible for adverse health effects and dose-response relationships between PM constituents and adverse health effects. Efforts will focus on understanding the mechanisms of toxicity responsible for adverse health outcomes to identify responsible physical, chemical, and biological characteristics of particles. This includes efforts to use well-characterized PM samples from sources of concern (e.g., coal-fired boilers, diesel trucks, open burning) for toxicological testing. This simulates 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.

PM health effects research also focuses on identifying sub-populations at risk and factors of susceptibility for PM and co-pollutants. This includes continuing efforts to develop animal models of human susceptibility and research efforts designed to disentangle the effects of PM and co-pollutants including epidemiology, toxicology, and clinical studies of interactions between PM and other air pollutants to investigate effects of co-pollutants on PM health effects, deposition, and clearance. As part of these efforts, researchers will complete a report on the chronic respiratory health effects in children of intra-urban gradients of particulate matter and co-pollutants in El Paso, TX.

As more is learned of the acute effects (and constituents most responsible for those effects), PM health effects research will develop and apply animal models of systemic, heart, and lung diseases to understand health effects and mechanisms for PM susceptible subpopulations. The Agency will identify endpoints to be measured for long-term exposure studies, and develop methodologies for sub-chronic and chronic animal studies. These studies will focus on subtle systemic and cardiopulmonary disease processes that will shed light on the preliminary epidemiological evidence suggesting life-shortening and other long-term outcomes from PM exposure. In future years they will also link to clinical studies on potential endpoints of the effects of long-term exposure to PM and epidemiological studies to better characterize and quantify these effects and the constituents most responsible for the effects.

Understanding human exposure to PM is critical since it is the individual who actually experiences adverse health effects associated with elevated PM concentrations in ambient air. The approach for PM exposure research is to measure ambient, outdoor, indoor, and personal concentrations of PM (including its components and co-pollutants), collect data on personal activities and locations, and then characterize the relationships between these concentrations and evaluate the factors that influence the relationships. The human exposure data and models produced by this research will provide the critical link between the ambient monitoring data (some of which is used for regulatory purposes), inhalation models, and studies of adverse health effects. In addition, information on the relationship between ambient PM concentrations and personal exposure to ambient PM is required to evaluate the underlying assumptions and interrelations of epidemiological studies.

**NAAQS Technical Support**

The major area of technical support supplied by the NAAQS Research program is the revision of the air quality criteria document (AQCD) required every five years by the Clean Air Act. This involves compiling and assessing results from recent studies that bear on the underlying criteria for the NAAQS, and integrating these findings into criteria for use in interpreting, comparing, and contrasting similar and dissimilar study results. In addition, technical support includes the development and evaluation of reference methods to measure ozone and PM and evaluations of alternative "equivalent" methods.

**Homeland Security**

EPA's Homeland Security Research Program supports one of six Administration FY 2004 Interagency Research and Development Priorities. In FY 2004, Homeland Security rapid risk assessment research will focus on developing a population exposure modeling and forecasting system to simulate in real time the release, dispersion, transport, and fate of airborne agents, with a focus on particulate matter.

**FY 2004 Change from FY 2003 Request**

<u>EPM</u>

- (+$1,500,000) This increase will fund additional community-wide efforts to reduce diesel emissions and associated health effects, particularly for sensitive populations such as children and the elderly. As part of this initiative, we will work with state and local governments and other non-governmental organizations to reduce children's exposure to PM diesel emissions from buses and other sources by applying new, innovative diesel emission reduction technologies to the existing school bus fleet, promoting anti-idling strategies, and encouraging the use of low sulfur fuel.

  More than 24 million children in the US ride a bus to and from school every day. Researchers have found that children riding on school buses can be exposed to high levels of diesel exhaust. Idling school buses can compromise air quality on and around buses, including sidewalks, schoolyards, playgrounds, and even inside school buildings.

  School buses can be retrofitted with pollution controls through the use of ultra-low sulfur diesel fuel and the installation of PM filters. This approach can reduce PM emissions by more than 90 percent. Other strategies include anti-idling programs, which lower bus idling time and reduce harmful emissions.

- (+$1,102,900, +1 FTE) This increase is for EPA's ambient air monitoring data to be fully available to other Federal agencies, as needed, for Homeland Security responsibilities. EPA will begin enhancing its ability to collect ambient air monitoring data to provide to other Federal agencies. EPA will develop comprehensive mobile air rapid response laboratories (RRLs) to support OAR's air monitoring for general population exposures and coordination with local and state monitoring agencies on public health protection. In addition to air monitors, the RRLs will have advanced meteorological capabilities to support localized mixing, dispersion and transport forecasting. The RRLs will also be able to provide limited data on infiltration and transport of outdoor pollutants to indoor environments

- (+$1,869,000, +7.8 FTE) This increase is for 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: +$1,417,000, utilities: +$2,374,800, Security: +$3,425,000 and 75 FTE, Human Resources: +$870,400 and +5.4 FTE, Contracts: +$642,400 and -18.5 FTE, Grants: +$3,015,500 and +19.7 FTE)

<u>S&T</u>

- (-$14,000,000) This decrease reflects the completion of the FY 2003 investment in equipment upgrades of vehicle and engine testing capacities at the National Vehicle and Fuels Emissions Laboratory (NVFEL) to accurately measure the emissions of vehicles and low-emission heavy-duty diesel engines for compliance with the Tier II and Heavy-Duty Diesel Engine standards.

- (+$8,000,000) This increase is required to help ensure compliance with the more stringent and complex Tier II and Diesel regulations for cars, heavy-duty diesel engines, and gasoline and diesel fuels that will take effect beginning in FY 2004. EPA's certification and compliance activities and associated costs will increase for:

  - laboratory and field-testing of vehicles, engines, and equipment;

  - certification and compliance database maintenance and information management;

  - development of a credible heavy-duty compliance program;

  - increased testing operations and maintenance of new complex testing facilities;

  - certification and compliance of nonroad industries; and

  - increased compliance and technical assistance for nearly triple the number of manufacturers and certificates, particularly for the nonroad industries

- (+$6,245,300, +6.0 FTE) This increase will support the President's Clear Skies Initiative. Meeting the ozone and PM standards will require reductions in both transported and local air pollution. To help states and localities develop cost-effective strategies, the Agency will need to analyze the pollutant contributions from different sectors and provide assistance to states regarding the implementation of regional and local reductions. The types of tools and assessment we will develop for the Clear Skies Initiative are the following:

- conduct economic and technical feasibility analyses to evaluate policy options;
- quantify emissions from the most significant contributors of $PM_{2.5}$ precursors by expanding and updating databases and inventories that EPA has already developed;
- initiate development of a model cap and trade program that states can choose to use as a cost effective way of reducing precursors to $PM_{2.5}$;
- conduct modeling work to analyze the transport effect of $PM_{2.5}$;
- develop tools and analysis needed for implementation; and
- coordinate with states to develop tools that address their individual concerns.

Included in this total increase are resources redirected in FY 2004 ($1,245,300 and 6.0 FTE) to support the Clear Skies Initiative in FY 2004.

- (+$600,000) This increase is for increased personal security at the National Vehicles and Fuels Emissions Laboratory (NVFEL), which is managed by the Office of Air and Radiation (OAR). As a result of September 11, 2002, EPA upgraded the professionalism of guard service at this laboratory facility to Level 2 guards, more highly trained and professional than the Level 1 guards previously on duty. Unlike security hardware upgrades that have been made, increased costs for these guard services will become a permanent increased cost to the OAR that pays for these guard services as part of the fixed costs of this laboratory. This increased guard service provides a level of security that is seamless to the workforce to promote an environment that is safe and sound for the work conducted in the NVFEL. Beyond FY 2004, maintaining an adequate guard service to provide an environment where unique scientific knowledge work can be conducted is a tremendous benefit to the Agency.

<u>Research</u>

- (+$1,522,000) Resources will be shifted from PM exposure measurement and modeling and health effects research in order to address priority research needs. Resources will augment research to improve the accuracy and speed of the CMAQ air quality model used by the Agency and states to develop and evaluate SIPs and to improve methods to identify sources contributing to ambient PM concentrations in order to allow for more accurate identification of these sources.
- (+$888,000) This represents homeland security research that will be initiated in FY 2004 focusing on rapid risk assessment research with a concentration in particulate matter. Work will include developing practices and procedures that provide elected officials,

decision makers, the public, and first responders with rapid risk assessment protocols for chemical and biological threats.

- (+$307,500, +3.0 FTE) Resources will be shifted to tropospheric ozone research supporting criteria document development from lower priority air toxics and particulate matter research. An increase in personnel is needed for criteria document development due to the periodic review of the NAAQS.

- (-$147,750, -1.5 FTE) Personnel formerly conducting risk management research on short-term exposures to particulate matter will be shifted to conduct criteria document support in the Tropospheric Ozone Research program. Since the PM study supported by these workyears concluded in FY 2003, there will be no negative programmatic impacts.

- (-$301,200, -1.0 FTE) Resources will be shifted from the NAAQS Research Objective to the Air Toxics Research Objective. These resources will be combined with existing air toxics resources to support human exposure measurements designed to provide information on the relationship between ambient, outdoor, indoor and personal exposure concentrations of air toxics and PM and to identify factors which affect these relationships and personal exposures. The resources for these studies will be leveraged with PM exposure resources, thus the purpose of this shift in resources from PM to air toxics exposure is to evenly distribute the resource contributions from each program to reflect to the joint air toxics and PM study objectives.

- (-$551,600, -5.6 FTE) This reduction represents a shift of personnel and associated costs to support homeland security research activities in the Waste Research Program. NAAQS-related research that will be impacted includes delays in research identifying PM mechanisms of toxicity and in studies to characterize indoor-generated PM and efforts to develop information on the best ways to manage indoor exposures.

- (-$1,522,000) In order to augment higher–priority research to improve PM air quality modeling and to improve methods to identify sources contributing to ambient PM concentrations, resources will be shifted from PM exposure measurement and modeling and health effects research. This reduction will delay long-term epidemiological studies to resolve uncertainties related to PM health effects, health effects research to identify cardiopulmonary and systemic health endpoints, and research to identify health effects of specific PM constituents in susceptible populations. The shift also will reduce the scope of human exposure measurements and modeling research by eliminating measurements of how people are actually exposed to PM components, co-pollutants, and air toxics.

- There are additional increases for payroll, cost of living, and enrichment for new and existing FTE.

## GOAL: CLEAN AIR

## OBJECTIVE: ATTAIN NAAQS

## Annual Performance Goals and Measures

**Reduce Exposure to Unhealthy Ozone Levels - 1 Hour**

In 2004 The number of people living in areas with monitored ambient ozone concentrations below the NAAQS for the 1-hour ozone standard will increase by 1% (relative to 2003) for a cumulative total of 20% (relative to 1992).

In 2003 Maintain healthy air quality for 42 million people living in monitored areas attaining the ozone standard; certify that 7 areas of the remaining 54 nonattainment areas have attained the 1-hour NAAQS for ozone thus increasing the number of people living in areas with healthy air by 5.1 million.

In 2002 Maintained healthy air quality for 41.7 million people living in monitored areas attaining the ozone standard; and certified 1 area of the remaining 55 nonattainment areas attained the 1-hour NAAQS for ozone, thus increasing the number of people living in areas with healthy air by 326,000.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Cumulative Percent Increase in the Number of People who Live in Areas with Ambient 1-hour Ozone Concentrations Below the Level of the NAAQS as Compared to 1992 | | 19 | 20 | Percent |
| Cumulative Percent Increase in the Number of Areas with Ambient 1-hour Ozone Concentrations Below the Level of the NAAQS as Compared to 1992 | | 31 | 33 | Percent |
| Total Number of People who Live in Areas Designated to Attainment of the Clean Air Standards for Ozone | 42,026,000 | 47,105,000 | n/a | People |
| Areas Designated to Attainment for the Ozone Standard | 1 | 7 | 0 | Areas |
| Additional People Living in Newly Designated Areas with Demonstrated Attainment of the Ozone Standard | 326,000 | 5,079,000 | n/a | People |
| VOCs Reduced from Mobile Sources | 1,755,000 | 1,852,000 | 2,040,000 | Tons |
| NOx Reduced from Mobile Sources | 1,319,000 | 1,449,000 | 1,653,000 | Tons |

Baseline: At the time that the Clean Air Act Amendments of 1990 were enacted (for the period 1990 - 1992), 52 areas with a population of 118 million people had ambient ozone concentrations that were greater than the level of the NAAQS. For the period 1999 - 2001, 16 of these areas (31%) with a population of 24 million people (19%) had ambient ozone concentrations were below the level of the NAAQS. In 1990, 101 areas were designated in nonattainment for the 1-hour ozone standard. Through 2002, 47 areas have been redesignated to attainment and 54 areas remain in nonattainment. The 1995 baseline for VOCs reduced from mobile sources is 8,134,000 tons and 11,998,000 tons for NOx, both ozone precursors. Notes: Areas means nonattainment areas for comparisons with the 1-hour NAAQS. Comparisons of ambient air quality concentrations with the level of the NAAQS are based on a time period and statistic consistent with the NAAQS. For ozone, this means a 3 year time frame. Population estimates based on 2000 census.

**Reduce Exposure to Unhealthy PM Levels - PM-10**

In 2004 The number of people living in areas with monitored ambient PM concentrations below the NAAQS for the PM-10 standard will increase by 1% (relative to 2003) for a cumulative total of 11% (relative to 1992).

In 2003 Maintain healthy air quality for 6.1 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 Maintained healthy air quality for 3.4 million people living in monitored areas attaining the PM standards; and increased by 2.7 million the number of people living in areas with healthy air quality that have newly attained the standard.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Cumulative Percent Increase in the Number of People who Live in Areas with Ambient PM-10 Concentrations Below the Level of the NAAQS as Compared to 1992 | | 10 | 11 | Percent |
| Cumulative Percent Increase in the Number of Areas with | | 45 | 46 | Percent |

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Ambient PM-10 Concentrations Below the Level of the NAAQS as Compared to 1992 | | | | |
| Total Number of People who Live in Areas Designated in Attainment with Clean Air Standards for PM | 6,086,500 | 6,212,000 | | People |
| Areas Designated to Attainment for the PM-10 Standard | 4 | 8 | 8 | Areas |
| Additional People Living in Newly Designated Areas with Demonstrated Attainment of the PM Standard | 2,686,500 | 81,000 | | People |
| PM-10 Reduced from Mobile Sources | 23,000 | 25,000 | 18,000 | Tons |
| PM-2.5 Reduced from Mobile Sources | 17,250 | 18,000 | 13,500 | Tons |

Baseline: At the time that the Clean Air Act Amendments of 1990 were enacted (for the period 1990-1992), 58 areas (nonattainment areas for comparisons with the PM-10 NAAQS.) with a population of 38 million people had ambient PM-10 concentrations that were greater than the level of the NAAQS. For the period 1999-2001, 26 of these areas (45%) with a population of 4 million (10%) had ambient PM-10 concentrations below the level of the NAAQS. (Population estimates based on 2000 census.) Comparisons of ambient air quality concentrations with the level of the NAAQS are based on a time period and statistic consistent with the NAAQS. For PM-10, this means a 3 year time frame. As a result of the Clean Air Act Amendments of 1990, 84 areas were designated nonattainment for the PM-10 standard. Since that time, EPA has split Pocatella into 2 areas thereby revising the baseline to 85. Through 2002, 22 areas have been redesignated to attainment. The 1995 baseline for PM-10 reduced from mobile sources is 880,000 tons.

**Reduce Exposure to Unhealthy CO, SO2, NO2, Lead**

In 2004 The number of people living in areas with monitored ambient CO, NO2, SO2, or Pb concentrations below the NAAQS will increase by less than 1% (relative to 2003) for a cumulative total of 63% (relative to 1992).

In 2003 Maintain healthy air quality for 53 million people living in monitored areas attaining the CO, SO2, NO2, and Lead standards; increase by 1.1 million the number of people living in areas with healthy air quality that have newly attained the standard.

In 2002 Maintained healthy air quality for 36.7 million people living in monitored areas attaining the CO, SO2, NO2, and Lead standards; and increased by 16.5 million, the number of people living in areas with healthy air quality that have newly attained the standard.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Cumulative Percent Increase in the Number of People who Live in Areas with Ambient CO, SO2, NO2, or Pb Concentrations Below the Level of the NAAQS as Compared to 1992 | | 63 | 63 | Percent |
| Cumulative Percent Increase in the Number of Areas with Ambient CO, SO2, NO2, or Pb Concentrations Below the Level of the NAAQS as Compared to 1992 | | 74 | 77 | Percent |
| Total Number of People Living in Areas Designated in Attainment with Clean Air Standards for CO, SO2, NO2, and Pb | 53,190,000 | 54,181,000 | n/a | People |
| Areas Designated to Attainment for the CO, SO2, NO2, and Pb Standards | 12 | 11 | 13 | Areas |
| Additional People Living in Newly Designated Areas with Demonstrated Attainment of the CO, SO2, NO2, and Pb Standards | 16,490,000 | 1,118,800 | n/a | People |
| CO Reduced from Mobile Sources | 11,002,000 | 11,333,000 | 12,636,000 | Tons |
| Total Number of People Living in Areas with Demonstrated Attainment of the NO2 Standard | 14,944,000 | 14,944,000 | n/a | People |

Baseline: At the time the Clean Air Act Amendments of 1990 were enacted (for the period 1991-1992), 27 areas (counties comprising nonattainment areas for the comparisons with the NAAQS) with a population of 48 million people had ambient CO, SO2, NO2, or Pb concentrations (comparisons of ambient air quality concentrations with the level of the NAAQS are based on a time period and statistic consistent with each individual NAAQS) that were greater than the level of the NAAQS. For the period 2000-2001 (For some of the pollutants included in this measure, the number of years used to evaluate the ambient concentrations relative to the NAAQS may be less than the referenced time period: e.g. NO2 is evaluated over a single year.), 20 of these areas (74%) with a population of 30 million (63%) had ambient CO, SO2, NO2, or Pb concentrations less than the level of the NAAQS.

(Population estimates based on 2000 census.) The projected improvement in 2004 is estimated for a single area. Therefore, the increase by definition must occur in a single year interval. In addition, the population living in these areas of improved air quality is small relative to that for the remaining areas. Therefore the projected improvement in population is greater than zero but less than 1. For CO, SO2, NO2, and Pb, 107 areas were classified as nonattainment or were unclassified in 1990. Through 2002, 76 of those areas have been redesignated to attainment. The 1995 baseline for mobile source emissions for CO was 70,947,000 tons.

**Reduce Exposure to Unhealthy Ozone Levels - 8 Hour**

In 2004 The number of people living in areas with monitored ambient ozone concentrations below the NAAQS for the 8-hour ozone standard will increase by 3% (relative to 2003) for a cumulative total of 3% (relative to 2001).

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Cumulative Percent Increase in the Number of People who Live in Areas with Ambient 8-hour Concentrations Below the Level of the NAAQS as Compared to 2001 | | | 3 | Percent |
| Cumulative Percent Increase in the Number of Areas with Ambient 8-hour Ozone Concentrations Below the Level of the NAAQS as Compared to 2001 | | | 7 | Percent |

Baseline: For the period 1999-2001, 302 areas (counties) with a population of 115 million people had ambient 8-hour ozone concentrations above the level of the NAAQS. (Population estimates based on 2000 census.) Comparisons of ambient air quality concentrations with the level of the NAAQS are based on a time period and statistic consistent with the NAAQS. For ozone, this means a 3 year time frame.

**Reduce Exposure to Unhealthy PM Levels - PM-2.5**

In 2004 The number of people living in areas with monitored ambient PM concentrations below the NAAQS for the PM-2.5 standard will increase by less than 1% (relative to 2003) for a cumulative total of less than 1% (relative to 2001).

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Cumulative Percent Increase in the Number of People who Live in Areas with Ambient PM-2.5 Concentrations Below the Level of the NAAQS as Compared to 2001 | | | <1 | Percent |
| Percent Increase in the Number of Areas with Ambient PM-2.5 Concentrations Below the Level of the NAAQS as Compared to 2001 | | | 1 | Percent |

Baseline: For the period 1999-2001, 132 areas (counties) with a population of 66 million people had ambient PM-2.5 concentrations that were greater than the level of the NAAQS. (Population estimates based on 2000 census.) Comparisons of ambient air quality concentrations with the level of the NAAQS are based on a time period and statistic consistent with the NAAQS. For PM-2.5, this means a 3-year time frame. The 1995 baseline for PM-2.5 reduced from mobile sources is 659,000 tons.

**Increase Tribal Air Capacity**

In 2004 Increase the number of tribes monitoring air quality for ozone and/or particulate matter from 42 to 45 and increase the percentage of tribes monitoring clean air for ozone from 64% to 67% and particulate matter from 71% to 72%.

In 2003 Increase the number of tribes monitoring air quality for ozone and/or particulate matter from 37 to 42 and increase the percentage of tribes monitoring clean air for ozone from 62% to 64% and particulate matter from 68% to 71%.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Percent of Tribes with Tribal Lands Monitoring for Ozone and/or Particulate Matter | | 12 | 13 | Percent |
| Percent of Monitoring Tribes Monitoring Clean Air for Ozone | | 64 | 67 | Percent |
| Percent of Monitoring Tribes Monitoring Clean Air for Particulate Matter | | 71 | 72 | Percent |
| Number of Tribes Implementing Air Programs | | 25 | 30 | Tribes |

Baseline: There are 576 Federally recognized tribes with 347 tribes having tribal lands (Alaska Native Villages (tribes) number 229 entities, but only one 'reservation'). Through September 2002, there are 21 tribes implementing air programs; 37 tribes conducting monitoring for ozone and/or particulate matter; 8 tribes are currently monitoring clean air for ozone (of 13 total) and 25 tribes are currently monitoring clean air for particulate matter (of 37 total); and 15 tribes submitting quality assured data.

***Research***

**PM Effects Research**

In 2004 Provide reports to OAR and the scientific community that examine the health effects of high levels of air pollutants, especially particulate matter, in potentially susceptible populations so that PM standards protect human health to the maximum extent possible.

In 2002 EPA provided data on the health effects and exposure to particulate matter (PM) and provided 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.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| 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 |
| 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 |
| Report on the chronic respiratory health effects in children of intra-urban gradients of particulate matter and co-pollutants in El Paso, TX. | | | 1 | report |
| Report on epidemiologic studies examining acute cardiac and respiratory effects in the elderly and children exposed to particulate matter (PM) and co-pollutants. | | | 1 | report |

Baseline: There is currently considerable concern that increased levels of particulate matter (PM) may disproportionately affect certain susceptible groups, especially when exposures are long-term. One such group is children, particularly those with pre-existing asthma and related cardiopulmonary diseases. Children living in areas of high pollution such as on the U.S.-Mexico border are particularly at risk due to economic factors as well as exposure. The elderly with chronic lung disease comprise another susceptible group who may be more acutely affected. Which components of PM are responsible for health effects in either of these groups remains unclear, as does how exposure data from monitoring sites relates to their personal situations. As noted by the National Research Council, the issue of susceptibility and chronic health outcomes is of utmost importance. Completion of this APG in FY 2004 will provide critical information to enhance risk estimates needed for promulgating the PM NAAQS and will provide information to the Office of Air so that it may focus its Air Quality Index on those who are at greatest risk.

## Verification and Validation of Performance Measures

## FY 2004 Performance Measures:

- **Percent increase in the number of people who live in areas with ambient criteria pollutant concentrations that meet or are below the level of the NAAQS.**

- **Percent increase in the number of areas with ambient criteria pollutant concentrations that meet or are below the level of the NAAQS.**

- **Percent of areas with improved ambient criteria pollutant concentrations for the NAAQS.**

- **Percent increase in the number of people living in areas with improved ambient criteria pollutant concentrations for the NAAQS.**

- **Areas designated to attainment for the NAAQS.**

**Performance Databases:** AQS —The Air Quality Subsystem (AQS) stores ambient air quality data used to evaluate an area's air quality levels relative to the NAAQS.

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 are clean air plans and define what actions a state will take to improve the air quality in areas that do not meet national ambient air quality standards

**Data Sources:**
AQS: State & local agency data from State and Local Air Monitoring Stations (SLAMS).
Population: Data from Census-Bureau/Department of Commerce
FREDS: Data are provided by EPA's Regional offices.

**Methods, Assumptions, and Suitability:** Air quality levels are evaluated relative to the level of the appropriate NAAQS. Next the populations in areas with air quality concentrations above the level of the NAAQS are aggregated. This analysis assumes that the populations of the areas are held constant at 2000 Census levels. Data comparisons over several years allow assessment of the air program's success.

**QA/QC Procedures:** AQS: The QA/QC of the national air monitoring program has 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 (Available on the Internet: www.epa.gov/ttn/amtic/npaplist.html ) To ensure quality data, the SLAMS are required to meet the following: 1) each site must meet network design and site 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. Further information available on the Internet: http://www.epa.gov/cludygxb/programs/namslam.html and through United States EPA's Quality Assurance Handbook (EPA_600/4_77_022a, Section2.0.11)

Populations: No additional QA/QC beyond that done by the Census Bureau/Department of Commerce.

FREDS: No formal QA/QC procedures.

**Data Quality Review:**
AQS: No external audits have been done in the last 3 years. However, internal audits are regularly conducted.

Populations: No additional QA/QC beyond that done by the Census Bureau/Department of Commerce.

FREDS: None.

**Data Limitations:**
AQS: None known.
Populations: No additional QA/QC beyond that done by the Census Bureau/Department of Commerce.
FREDS: None known.

**Error Estimate:** At this time it is not possible to develop an error estimate. Uncertainty in projections (from modeling) and near term variations in air quality (due to meteorological conditions for example) exist.

**New/Improved Data or Systems:**
AQS: EPA recently completed the process of reengineering the AQS to make it a more user friendly, Windows-based system. As a result, air quality data will be more easily accessible via the Internet. AQS has been enhanced to include data standards (*e.g.*, latitude/longitude, chemical nomenclature) developed under the Agency's Reinventing Environmental Information (REI) Initiative.

Population: None

FREDS: None

**References:** For additional information about criteria pollutant data, non-attainment areas, and other related information, see: http://www.epa.gov/airtrends/ .

**FY 2004 Performance Measures:**

- **Estimated Mobile Source VOC Emissions**
- **Estimated Mobile Source NOx Emissions**
- **Estimated Mobile Source PM 10 Emissions**
- **Estimated Mobile Source PM 2.5 Emissions**
- **Estimated Mobile Source CO Emissions**

**Performance Database:** National Emissions Inventory Database. See: http://www.epa.gov/ttn/chief/trends/

**Data Source:** Mobile source emissions inventories.
Estimates for on-road, off-road mobile source emissions are built from inventories fed into the relevant models which in turn provide input to the National Emissions Inventory Database.

The MOBILE vehicle emission factor model is a software tool for predicting gram per mile emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, carbon dioxide, particulate matter, and toxics from cars, trucks, and motorcycles under various conditions.

The NONROAD emission inventory model is a software tool for predicting emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, particulate matter, and sulfur dioxides from small and large off road vehicles, equipment, and engines.

Certain mobile source information is updated annually. Inputs are updated annually only if there is a rationale and readily available source of annual data. Generally, Vehicle Miles Traveled (VMT), the mix of VMT by type of vehicle (FHWA types), temperature, 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 thereby capturing 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 the Office of Transportation and Air Quality requests that this be done and is able to provide the new information in a timely manner. This information includes data from the MOBILE6 model and the latest version of the nonroad model. Available respectively on the Internet

**Methods, Assumptions, and Suitability:** EPA issues emissions standards that set limits on how much pollution can be emitted from a given mobile source. Mobile sources include vehicles that operate on roads and highways ("on road" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, earthmoving equipment, lawn and garden power tools, ships, railroad locomotives, and airplanes. Vehicle and equipment manufacturers have responded to many mobile source emission standards by redesigning vehicles and engines to reduce pollution.

EPA uses models to estimate mobile source emissions, for both past and future years. The estimates are used in a variety of different settings. The estimates are used for rulemaking.

The most complete and systematic process for making and recording such estimates is the "Trends" inventory process executed each year by the Office of Air Quality Planning and Standards' (OAQPS) 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 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 creates and publishes the emission inventory estimate for the most recent historical year, detailed down to the county level and with over 30 line items representing mobile sources. Usually, EMD 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. Additional information about transportation and air quality related to estimating, testing for, and measuring emissions, as well as research being conducted on technologies for reducing emissions is available at http://www.epa.gov/otaq/research.htm

**QA/QC Procedures:** The emissions inventories are continuously improved.

**Data Quality Review:** The emissions inventories are reviewed by both internal and external parties.

**Data Limitations:** The limitations of the inventory estimates for mobile sources come from limitations in the modeled emission factors (based on emission factor testing and models predicting overall fleet emission factors in g/mile) and also in the estimated vehicle miles traveled for each vehicle class (derived from Department of Transportation data).http://www.epa.gov/otaq/m6.htm. 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. This nonroad emissions model accounts for over 200 types of nonroad equipment. Any limitations in the input data will carry over into limitations in the emission inventory estimates. Available on the Internet: http://www.epa.gov/otaq/m6.htm

It is important to have the current and future year emission reduction estimates generated using consistent methods. The EPA Emission Trends report dated December 1997 has mobile source emission inventories for the 1995 base year as well as estimates for years 2000, 2002, 2005, and 2007. The base year emissions in 1995 for mobile sources are 8,134,000 tons VOC; 70,947 tons CO; 11,998 tons NOx; 878,000 tons PM-10; and 659,000 tons PM. These data were used to predict the emission reductions in year 2000 and later.

**Error Estimate:** Additional information about data integrity is available on the Internet: http://www.epa.gov/otaq/m6.htm.

**New/Improved Data or Systems**: To keep pace with new analysis needs, new modeling approaches, and new data, EPA is currently working on a new modeling system termed the Multi-scale Motor Vehicles and Equipment Emission System (MOVES). This new system will estimate emissions for on road and off road sources, cover a broad range of pollutants, and allow multiple scale analysis, from fine scale analysis to national inventory estimation. When fully implemented, MOVES will serve as the replacement for MOBILE6 and NONROAD. The new system will not necessarily be a single piece of software, but instead will encompass the necessary tools, algorithms, underlying data and guidance necessary for use in all official analyses associated with regulatory development, compliance with statutory requirements, and national/regional inventory projections. Additional information is available on the Internet: http://www.epa.gov/otaq/ngm.htm

**References:** For additional information about mobile source programs see: http://www.epa.gov/otaq/.

**FY 2004 Performance Measures**

- **Percent of Tribes with Tribal Lands Monitoring for Ozone and/or Particulate Matter**

- **Percent of Monitoring Tribes Monitoring Clean Air for Ozone**

- **Percent of Monitoring Tribes Monitoring Clean Air for Particulate Matter**

**Performance Database:** The Tribal Monitoring database is maintained by OAR Headquarters in Washington D.C. The database details the number and types of monitors operated by tribes in each EPA Region, with Regional and National totals by type of monitor. The database contains all available historical and current information on tribal monitors. The data are more complete after 1996.

For those tribes with ambient air quality data, which have been quality assured following published procedures (see reference below), the data are reported to the Air Quality Subsystem (AQS) and used to evaluate a tribe's or an area's air quality levels relative to the National Ambient Air Quality Standards (NAAQS). http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm Because tribes are in the early stages of building monitoring capacity, only a subset of tribes report data to AQS. (For additional information about AQS, see the Verification and Validation Section for the NAAQS.)

**Data Source:** Data are compiled by EPA's Regional Offices and reported to Headquarters.

**Methods, Assumption, and Suitability:** N/A

**QA/QC procedures:** EPA's Regional Offices check performance data (e.g., percent of tribes) for accuracy.
**Data Quality Review:** N/A

**Data Limitations:** Data limitations are subject to the accuracy and timeliness of reported data. The performance data (e.g., percent of tribes) do not require mathematical interpretation or analysis and are not subject to bias or uncertainty.

**New/Improved Performance Data or Systems:** N/A

**Error Estimate:** N/A

**References:** The data are presented to the public at appropriate meetings, and are available upon request to any member of the public.
http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm

**FY 2004 Performance Measure: Number of Tribes Implementing Air Programs**

**Performance Database:** Output Measure. The Tribal Air Program database is maintained by OAR Headquarters in Washington D.C. The database details the air programs being implemented by tribes in each EPA Region, with Regional and National totals. The database contains all available historical and current information on tribal monitors. The data are more complete after 1996.

**Data Source:** Data are compiled by EPA's Regional Offices and reported to Headquarters.

**Methods, Assumption, and Suitability:** N/A

**QA/QC procedures:** N/A

**Data Quality Review:** N/A

**Data Limitations:** N/A

**New/Improved Performance Data or Systems:** N/A

**Error Estimate:** N/A

**References:** The data are presented to the public at appropriate meetings, and are available upon request to any member of the public.

**FY 2004 Performance Measure: Report on the chronic respiratory health effects in children of intra-urban gradients of particulate matter and co-pollutants in EL Paso, TX.**

**Performance Database:** Program output; no internal tracking system

**Data Source:** N/A

**Methods, Assumptions and Suitability:** N/A

**QA/QC Procedures:** N/A

**Data Quality Reviews:** Report

**Data Limitations:** N/A

**Error Estimate:** N/A

**New/Improved Data or Systems:** N/A

**References:** N/A

**FY 2004 Performance Measure: Report on epidemiological studies examining acute cardiac and respiratory effects in the elderly and children exposed to particulate matter (PM) and co-pollutants.**

**Performance Database:** Program output, no internal tracking system

**Data Source:** N/A

**Methods, Assumptions and Suitability:** N/A

**QA/QC Procedures:** N/A

**Data Quality Reviews:** Report

**Data Limitations:** N/A

**Error Estimate:** N/A

**New/Improved Data or Systems:** N/A

**References:** N/A

**Coordination with Other Agencies**

EPA cooperates with other Federal, state, Tribal, 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 United States Coast Guard on air emission issues.

<u>Research</u>

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 those of the Departments of Energy and Commerce, and the National Science Foundation. 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.

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, refocuses 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 that 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 (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 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| **Reduce Air Toxics Risk** | **$113,811.7** | **$118,023.2** | **$127,747.1** | **$9,723.9** |
| Environmental Program & Management | $56,147.2 | $56,913.9 | $59,095.2 | $2,181.3 |
| Science & Technology | $29,082.8 | $23,818.9 | $24,361.5 | $542.6 |
| State and Tribal Assistance Grants | $28,581.7 | $37,290.4 | $44,290.4 | $7,000.0 |
| Total Workyears | 375.9 | 371.4 | 378.5 | 7.1 |

**Key Program**
(Dollars in Thousands)

| | FY 2002 Enacted | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| Air Toxics Research | $18,923.4 | $19,883.7 | $20,342.4 | $458.7 |
| Air, State, Local and Tribal Assistance Grants: Other Air Grants | $30,790.4 | $37,290.4 | $44,290.4 | $7,000.0 |
| Congressionally Mandated Projects | $4,095.0 | $0.0 | $0.0 | $0.0 |
| Facilities Infrastructure and Operations | $5,430.0 | $5,249.3 | $5,911.0 | $661.7 |
| Hazardous Air Pollutants | $52,225.3 | $52,622.4 | $54,235.7 | $1,613.3 |
| Homeland Security-Preparedness, | $353.5 | $0.0 | $0.0 | $0.0 |

| | FY 2002 Enacted | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| Response and Recovery | | | | |
| Legal Services | $1,552.6 | $1,713.0 | $1,780.8 | $67.8 |
| Management Services and Stewardship | $1,288.7 | $1,264.4 | $1,147.3 | ($117.1) |
| Regional Management | $0.0 | $0.0 | $39.5 | $39.5 |

**FY 2004 Request**

Toxic pollutants in the air, or deposited on soils or surface waters, may have a number of health and environmental impacts. People exposed to certain toxic air pollutants at sufficient concentrations and for sufficient periods of time are at increased risk of cancer or other serious health effects. These health effects may include damage to the immune system, neurological system, reproductive system (i.e., reduced fertility), and/or developmental and/or respiratory problems. Like humans, animals can experience health problems if exposed to sufficient concentrations of air toxics for sufficient amounts of time. Numerous studies conclude that deposited air toxics contribute to birth defects, reproductive failure, and disease in animals, too. Finally, persistent toxic air pollutants are of particular concern in aquatic ecosystems because the pollutants accumulate in sediments and may biomagnify in tissues of animals at the top of the food chain to concentrations many times higher than in the water or air.

The Clean Air Act Amendments of 1990 (CAAA) contain a variety of provisions that address air toxics from all categories of sources. Title III provides authority to regulate stationary sources of hazardous air pollutants (HAPs). Title II calls on EPA to develop standards to control HAPs from motor vehicles and vehicle fuels. The CAAA list 188 HAPs that are emitted from mobile sources, major stationary sources, and area stationary sources. EPA also has classified diesel particulate matter and diesel exhaust organic gases as air toxics.

EPA's overall goals for the air toxics 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.

EPA's air toxics program has five elements:

1. developing source-specific and sector-based Federal standards;
2. carrying out national, regional, and community-based initiatives that focus on multi-media and cumulative risks;

3. using the actual, measured and modeled data to set priorities and guide programs;

4. filling toxicity data gaps; and

5. providing public education and outreach.

Priorities for the air toxics program include:

- completing MACT standards on a schedule that avoids case-by-case decisions by states,

- developing a residual risk program to address risks at facilities post-MACT standards; working to reduce toxics from mobile sources;

- working with stakeholders to identify and address the risk reductions that matter most to local citizens; and

- developing tools, training, handbooks, and websites to provide information on how to assess risks, convene multi-stakeholder groups to make local decisions, and steps to go through to reduce risks.

Regional responsibilities include working with states, tribes, and local agencies to:

- implement MACT and other air toxics standards;

- expand monitoring of air toxics and inventories of emissions; and

- carry out community-based air toxics initiatives that identify and address issues of concern.

**Progress to Date**

EPA has been implementing a two-phase program to reduce emissions of HAPs from major stationary sources. In the first phase, EPA established a program to set Maximum Achievable Control Technology (MACT) standards for approximately 180 source categories emitting one or more of the 188 HAPs listed in the Act. These MACT standards create a level playing field by requiring all major sources to achieve the level of control already being achieved by the better performing sources in each category. When all the MACT rules are fully implemented in addition to efforts by states and industry, toxic emissions from large industrial facilities will decrease by 1.7 million tons per year or 63%.

As of December 31, 2002, EPA had issued 66 standards for 108 source categories with plans to issue standards for approximately another 29 standards for 58 source categories by February 2004. The Agency has proposed the last group of MACT standards, due 10 years after the CAAA, and will issue final standards by February 2004.

Many industries containing sources in the remaining source categories are very concerned that EPA did not issue standards by the May 15, 2002 “hammer date” in the CAAA.

The Act then requires industry to submit lengthy Title V permit applications recommending case-by-case MACT to permitting authorities by that date. The EPA, however, alleviated this burden to sources and states by promulgating amendments on April 5, 2002, to the section 112(j) rule (subpart B of 40 CFR 63). These amendments created a two-part application process for affected industries, with Part 1 consisting of simple source identification information, due on the hammer date, and Part 2 providing more substantive information regarding emission points, pollutants, and controls, due 24 months later. In addition, the amendments no longer require the owner or operator of the source to determine in the application which MACT would have been applicable, as was required in the original rule, although they can still recommend it.

Following litigation challenging these amendments, EPA currently is taking comments on a revised proposal. Generally, a Part 2 application would be due 60 days after the scheduled promulgation date for a specific MACT standard, if the MACT standard had not been promulgated by that time. Amendments proposing this timing were published in the Federal Register on December 9, 2002. EPA fully expects that all MACT standards, except the hazardous waste combustion Phase II MACT, will be promulgated before applications are due.

EPA also must set technology-based standards for select area sources. To date, the Agency has listed 71 area source categories that were required to be finalized in 2000. We have litigation settlement discussions ongoing to establish promulgation dates for these.

The Act, in the second phase, requires the Agency to examine each MACT standard eight years after promulgation to determine if the risk remaining from each industrial category is considered safe. While completing the final MACT, EPA has begun work on a risk-based approach to protect public health from the remaining air toxics emissions. This approach includes targeting particular problems such as residual risks from already controlled sources and elevated risks in urban areas. EPA will develop more stringent residual risk standards when appropriate, to reduce cancer and noncancer health risks in the vicinity of major industrial sources of HAPs. These standards also will help the Agency make progress with respect to its long-term GPRA goals of reducing cancer risks from stationary sources by 75% from 1990 levels and significantly reducing noncancer health risks.

In FY 2001, EPA issued the Mobile Source Air Toxics Rule (MSAT) to address emissions of air toxics from mobile sources. This 2001 MSAT rule 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 MSAT rule also evaluated the effectiveness of existing mobile source emission control programs in reducing highway emissions of the identified mobile source toxics. Air toxic reductions of about 1.4 million tons are expected between 1996 and 2020 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 II and the 2007 on-highway 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 for additional research of 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. EPA is in the process of reevaluating this rule to determine if more can be done cost-effectively to reduce MSATs.

Reductions in the national toxics inventory provide only a crude indicator of reductions in population exposure and do not capture local scale risks. EPA has an ongoing comprehensive evaluation of air toxics called the National Air Toxics Assessment (NATA). NATA began with emissions data for 1996, estimated ambient concentrations for 33 HAPs in each of the approximately 62,000 census tracts nationwide, estimated average exposures to people, and calculated the potential cancer and noncancer risks associated with those exposures. This assessment has been reviewed by the Science Advisory Board (SAB) and by state and local agencies. The NATA information is used by the EPA air toxics program to help set priorities, measure progress against goals, and develop study plans for more detailed local assessments, which will help identify the potentially higher exposures (i.e., hotspots) that may exist in urban environments and link these concerns to local risk reductions. The NATA will be updated periodically.

In addition, EPA is working to develop improved annual goals and performance measures for the air toxics program. A particular focus is to identify measures that matter to individuals both within and outside the Agency. To direct this analysis, EPA is viewing the air toxics program holistically, determining the expected results, and then identifying appropriate measures to report on them. Viewing the myriad of activities underway through this performance framework may help clarify the connections between activities, outputs, and outcomes. These measures might include where that information could be compiled in the short or the long term.

**FY 2004 Plans**

Implementation of the national air toxics strategy is at a critical juncture as EPA begins to move from a technology-based to a risk-based control program. The Agency is still responsible for setting technology-based standards for area sources. An effective risk-based program will require a sound scientific foundation. EPA will have an air toxics research strategy ready for external review in late 2003. EPA also is working with state and local agencies in a joint Air Toxics Monitoring Steering Committee to design a national toxics monitoring network. The SAB has expressed clear support to the Agency's approach for developing this capacity through monitoring pilots carried out under the sponsorship of the joint committee. The data analysis phase of the initial assessment work, reflected in a 10-city air toxics monitoring pilot project, will be completed mid-2003. Data from this effort will lead to the completion of the design of a network for a national air toxics characterization by early calendar year 2004. Early indications are that a limited, strategic network of national sites, coupled with more extensive community-scale monitoring, will provide the most representative assessment of the nation's air toxic pollution and enable EPA to better gauge the success of Agency efforts in reducing overall risks from air toxics.

In FY 2004, EPA will, as required by the Act, continue the extensive residual risk analyses for already promulgated MACT standards to determine if additional standards are necessary to reduce the remaining risks from these sources. Under the residual risk program, the Agency must establish risk-based standards for any industrial source category that poses unacceptably high risks after a MACT standard is implemented. EPA is working to develop the significant amounts of information (e.g., emissions, source characterization, exposures) required to determine whether additional standards are needed. EPA also is developing an approach so that only those facilities within a source category that pose risks at a level of concern will have to comply with these standards. Guidance is being developed so facilities can perform facility-by-facility risk analyses to demonstrate they have low risks and are, therefore, already in compliance with the standards.

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 an existing settlement agreement, these regulations will be proposed in December 2003, promulgated in December 2004, and will bring these units into compliance by December 2007.

In FY 2004, EPA will continue to develop the state, local, and Tribal component of the Integrated Urban Air Toxics Strategy so that state, local, and Tribal agencies 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. EPA 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. We also will compile and analyze the information from local assessments and use it to better characterize risk and assess priorities for further action.

In FY 2004, EPA will assemble a national toxics inventory for the year 2002, which can be used by EPA, states, and others to analyze the public health risks from air toxics and strategies, and to manage that risk. The Agency will work with partners to develop improved emission factors. This effort will include gathering improved activity databases and using geographic information systems (GISs) and satellite remote sensing, where possible, for key point, area, mobile, and fugitive source categories and global emission events.

Through increased data collection efforts on air toxics in FY 2004, EPA also will be focusing on local hotspots and providing support on environmental justice issues. The Agency will evaluate and improve local-scale modeling efforts to support local evaluations. The EPA also plans to model air deposition emissions on a national scale using the Regulatory Modeling System for Aerosols and Deposition (REMSAD). The results of this assessment will be used to provide information to other programs, including states, which can then use the information in evaluating options for air toxic emissions reductions. The plan will also be used to identify national regulatory solutions to the air deposition problem.

EPA has continued its efforts under the Air-Water Interface Work Plan to address and prevent adverse effects of atmospheric deposition to coastal and inland waterways (i.e., Great Waters). This work involves collaboration within EPA offices and with the National Oceanic and Atmospheric Administration (NOAA). In FY 2003, EPA is updating the Air-Water Interface Work Plan and will continue to implement it in FY 2004. These efforts involve the development and support of multi-media 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. The EPA will also provide up-to-date information regarding air deposition, emission sources, monitoring technologies, and toxic effects through education and outreach efforts. Planned outreach efforts include both synthesizing current trends information and sponsoring workshops/conferences.

Urban encroachment on farming communities and a growing number of large concentrated animal feeding operations (CAFOs) have resulted in increased citizen complaints and rising concerns that air emissions from CAFOs may have impacts on the environment and public health. At the present time, the EPA does not have emission factors sufficient to support regulatory determinations for animal agriculture. In some cases, there may not even be adequate technical approaches for characterizing the emissions. The EPA is continuing to work cooperatively with the agricultural industry, the United States Department of Agriculture (USDA), and the Congressionally established Agricultural Air Quality Task Force (AAQTF) to develop scientifically valid emission estimates from CAFOs for PM, $PM_{10}$, $PM_{2.5}$, hydrogen sulfide, ammonia, and volatile organic compounds (VOCs).

The National Academy of Sciences (NAS) was contracted to review the scientific issues and make recommendations related to characterization of the swine, beef, dairy, and poultry CAFOs industries; measuring and estimating emissions; and analyzing potential best management practices, including costs and technological feasibility. EPA received the NAS findings in December 2002. In FY 2003 and FY 2004, the Agency will make an initial policy determination as to the applicability of current air toxics regulations for CAFOs, based on the best available information. In conjunction with the USDA, the AAQTF, and stakeholders, the EPA will also begin a short-term research program to fill data gaps in the emission estimates, investigate effective and affordable mitigation techniques, and develop approaches to reduce air emissions from CAFOs. These approaches could include voluntary measures, Agency guidance materials, training and outreach, regulatory standards, or some combination of these.

The Agency 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 provides for the review and screening of potential toxic substances, prior to introduction into motor vehicle fuel supplies. In FY 2004, industry will provide new and additional data. The FFAR program will continue to involve approximately 2,000 fuel manufacturers, 3,000 gasoline and diesel fuel registrations, and 6,000 additive registrations. In FY 2004, approximately 10,000 registration reports will be submitted. EPA will continue fuel additive health testing activities for motor fuels containing Methylcyclopentadienyl Manganese Tricarbonyl (MMT), Methyl Tertiary-Butyl Ether (MTBE), ethanol and other oxygenates as well as conventional non-oxygenated gasoline.

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 controlling emissions of unregulated toxic air pollutants associated with motor vehicles and fuels. The 2001 MSAT rule evaluated the effectiveness of existing highway mobile source emission control programs in reducing emissions of the identified toxics. Air toxic reductions of about 1.4 million tons are expected between 1996 and 2020 from existing programs that reduce ozone and particulate matter. In addition, the planned regulation of emissions from nonroad diesel equipment and fuel will result in substantial further reductions in diesel PM and other air toxic pollutants. The nonroad gasoline equipment rule

(Large Spark Ignition (SI)/Recreational Vehicles) also will result in substantial reductions of PM and air toxic pollutants from both exhaust and permeation emissions.

Because the Agency recognizes that additional research and evaluation are needed to fully understand the extent of the mobile source air toxics problem, the 2001 MSAT rule established a Technical Analysis Plan that outlines EPA's 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 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 2004 EPA will continue to gather emissions data, conduct exposure analyses, and evaluate the need for additional control, and propose a rule as appropriate.

EPA will analyze toxic emissions data currently being collected from nonroad diesel engines to assess impacts of engine type, fuel, and control systems on toxic emissions. The Agency has initiated a test program to better characterize metal emissions from motor vehicles. EPA also has initiated a project to better characterize potentially toxic PM emissions from gasoline engines. Also, the Agency has initiated or is participating in several projects to better characterize personal exposure to mobile source-related air toxics among asthmatic children in Fresno, CA, residents of Baltimore, MD, in ambient "hot spot" locations, children commuting in school buses in California, and diesel nonroad equipment operators.

The Agency also is conducting statistical analyses of existing personal exposure data to evaluate the potential contribution of mobile sources. In addition, EPA is developing a plan to assess exposures to evaporative emissions of air toxics from vehicles and equipment in attached garages. In FY 2004, EPA also will conduct modeling analyses to assess the costs of potential control strategies and their impacts on mobile source air toxic emissions, exposure, and risk.

Research

The focus of EPA's air toxics research is on risks humans experience from exposures to hazardous air pollutants (HAPs) emitted 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 and mixtures of HAPs, and the identification and determination of the risks of HAP exposures to susceptible populations. As outlined in the draft Air Toxics Research Strategy, research in FY 2004 will refine models used to estimate the sources of HAPs emissions, exposures to HAPs, and the health effects associated with those exposures.

In order to ensure the relevance of the program, research and assessment activities are guided by the draft Air Toxics Research Strategy and the draft Multi-Year Plan. These documents articulate the long-term goals, purpose, and priorities of the program, and include a scheduled timeline of research and assessment activities and the expected products including annual performance goals and measures under the Government Performance and Results Act (GPRA). To maximize the quality of the research conducted under the Air Toxics Research program, products such as scientific publications, assessments and documents undergo peer review, with major or significant products requiring external peer review. The Agency's Peer Review Handbook ($2^{nd}$ Edition) codifies the procedures and guidance for conducting peer review.

EPA research will continue to refine models to estimate air toxic emissions from highway vehicles, to improve the techniques used to measure emissions from small dispersed area sources, and to improve our understanding of chemical reactions between toxic pollutants emitted from specific indoor sources and other contaminants and compounds present indoors. 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 to evaluate innovative approaches to measure these emissions, including approaches that measure them on a continual 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.

The Community Multi-scale Air Quality (CMAQ) modeling system has been designed to approach air quality as a whole by including state-of-the-science capabilities for modeling multiple air quality issues, including tropospheric ozone, fine particles, toxics, acid deposition, and visibility degradation. In this way, the development of CMAQ involves the scientific expertise from each of these areas and combines the capabilities to enable a community modeling practice. CMAQ was also designed to have multi-scale capabilities so that separate models were not needed for urban and regional scale air quality modeling. Research in air quality modeling will expand CMAQ 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 an air toxics assessment is the estimation of actual human exposure to HAPs. Exposure research will combine modeling and measurement efforts to provide tools and data to estimate human exposure to air toxics with greater certainty. The effort will begin to provide information on the relationships between ambient, indoor, and personal air toxic concentrations for several HAPs of interest and identify key microenvironments and human activities that influence personal exposure.

Continuing health effects research will characterize dose-response and health effects of HAPs through the development of biomarkers, modes-of-action information, and exposure-dose-response information and models. This research supports the reduction of large uncertainties in quantitative estimates of the health effects of HAP compounds by developing models to extrapolate from animals to humans, and from studied HAPs to less understood HAPs that act in a biologically similar manner. The range of health effects of high priority HAPs and their mixtures (including volatile organic compounds or 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.

Assessment activities planned for FY 2004 will include developing cancer unit risk and chronic non-cancer inhalation reference concentrations (RfC), oral reference doses (RfD), and non-cancer acute reference exposure (ARE) values. Research will be conducted to determine whether cancer and non-cancer assessment methodologies need refinement, and 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.

**Homeland Security**

EPA's Homeland Security Research Program supports one of six Administration FY 2004 Interagency Research and Development Priorities. In FY 2004, Homeland Security rapid risk assessment research will focus on developing a population exposure modeling and forecasting system to simulate in real time the release, dispersion, transport, and fate of airborne agents, with a focus on air toxics.

**FY 2004 Change from FY 2003 Request**

EPM

- (+$746,900, -0.5 FTE) These increased resources, dollars, and FTE, associated with rent, are allocated in proportion to Agency-wide FTE located in each goal and objective. Resources, dollars, and FTE, associated with utilities, security, and human resource operations are allocated in proportion to Headquarters FTE located in each goal and 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 and objective. Changes in these activities reflect shifts in resources between goals and objectives. *(Total changes -> rent: +$1,417,000, utilities: +$2,374,800, Security: +$3,425,000 and 75 FTE, Human Resources: +$870,400 and +5.4 FTE, Contracts: +$642,400 and -18.5 FTE, Grants: +$3,015,500 and +19.7 FTE)*

STAG

- (+$7,000,000) Additional air toxics monitoring is necessary to: improve the scientific basis for understanding exposure to hazardous air pollutants; assess the resultant risk to human populations and ecosystems; and to design an integrated air toxics program. EPA worked with state and local agency representatives to develop an air toxics monitoring strategy concept paper, which was reviewed by the SAB. The SAB concluded that understanding air toxics in the environment is important, and that additional resources would aid the effort to assess air toxics concentrations and improve the scientific basis for understanding exposure to these chemicals and the resulting risk. In conforming to the SAB recommendations, further expansion of the national monitoring effort will result in significant improvements in the characterization of population exposure to air toxics. EPA is coordinating network expansion activities with state and local agency representatives, including: expanding pollutants measurement and characterization (e.g., characterizing diesel PM; expanding the number of air toxics; deploying real trends sites under the National Air Toxics Trends Stations (NATTS)); using mobile air toxic platforms to help characterize local and national control programs (e.g., mobile source controls; effects of natural gas or diesel retrofits on city-wide bus fleets); increasing PBT deposition monitoring efforts. These efforts are in addition to the continued work planned for improving models by comparing toxics monitoring and modeled data, analyzing pilot, archived, and FY 2003 NATTS data, and characterizing diesel components of urban NATTS cities.

S&T

Research

- (+$301,200, +1.0 FTE) Resources will be shifted to air toxics exposure studies from PM exposure research. These resources will be combined with existing air toxics exposure resources to support human exposure measurements that will provide information on the relationship between ambient, outdoor, indoor and personal exposure concentrations of air toxics and PM and to identify factors which affect these relationships and personal exposures. The resources for these studies will be leveraged with PM exposure resources. The purpose of this shift from PM to air toxics exposure is to more evenly distribute the resource contributions from each program to reflect to the joint air toxics and PM study objectives.

- (-$159,750, -1.5 FTE) Resources will be shifted from the air toxics research to NAAQS research in order to support criteria document development. This reduction will cause minor delays to mobile source air toxics research to improve estimates of toxic emissions from on-road heavy-duty diesel vehicles.

- (-$170,400, -1.6 FTE) This reduction represents a shift of personnel and associated costs to support homeland security research activities in the Waste Research Program. Impacts to the Air Toxics research program include minor delays in research to determine how ozone reacts with volatile organic compounds (VOC) mixtures indoors to form toxic compounds, and the refinement, using the results of these studies, of an indoor air quality model to improve estimates of air toxic exposures from indoor sources. There are additional increases for payroll, cost of living, and enrichment for FTE.

## GOAL: CLEAN AIR

## OBJECTIVE: REDUCE AIR TOXICS RISK

## Annual Performance Goals and Measures

**Reduce Air Toxic Emissions**

In 2004 Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by an additional 2% of the updated 1993 baseline of 6.0 million tons for a cumulative reduction of 37%.

In 2003 Air toxics emissions nationwide from stationary and mobile sources combined will be reduced by an additional 1% of the updated 1993 baseline of 6.0 million tons for a cumulative reduction 35%.

In 2002 End-of-year FY 2002 data will be available in late 2004 to verify that air toxics emissions nationwide from stationary and mobile sources combined will be reduced by 1.5% from 2001 for a cumulative reduction of 33.5% from the 1993 baseline of 6.0 million tons per year.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| Combined Stationary and Mobile Source Reductions in Air Toxics Emissions | Data Lag | 1 | 2 | Percent |
| Mobile Source Air Toxics Emissions Reduced | | .68 | .71 | Million Tons |
| Stationary Source Air Toxics Emissions Reduced | | 1.57 | 1.59 | Million Tons |
| Major Sources, Area and All Other Air Toxics Emissions Reduced | | +.12 | +.13 | Million Tons |

Baseline: In 1993, the last year before the MACT standards and mobile source regulations developed under the Clean Air Act began to be implemented, stationary and mobile sources are now estimated to have emitted 6.0 million tons of air toxics. (EPA's prior estimate was 4.3 million tons and was updated with improved inventory data.) Air toxics emission data are revised every three years to generate inventories for the National Toxics Inventory (NTI). In the intervening years between the update of the NTI, the model EMS-HAP (Emissions Modeling System for Hazardous Air Pollutants) is used to estimate and project annual emissions of air toxics. EMS-HAP projects emissions, by adjusting point, area and mobile emission data to account for growth and emission reductions resulting from emission reduction scenarios such as the implementation of the Maximum Achievable Control Technology (MACT) standards. The FY 2003 target does not have growth factored in. With growth, the target for 2003 is a 1% reduction from 2002 levels for a cumulative reduction of 35%.

## Program Assessment Rating Tool

Air Toxics

As part of the Administration's overall evaluation of effectiveness of Government programs, the Air Toxics program was evaluated with the following specific findings:

1. There is a clear purpose and design for the program.

2. The program has not shown it is maximizing net benefits, and proposing the most cost effective regulations.

3. There are inadequate linkages between annual performance and long-term goals that prevent it from demonstrating its impact on human health.

4. There are large data gaps for toxicity and on actual population exposure.

In response to these findings, the Administration will:

1. Increase funding for toxic air pollutant programs by $7 million in State grants for monitoring to help fill data gaps.

2. Focus on maximizing programmatic net benefits and minimizing the cost per deleterious health effect avoided.

3. Establish better performance measures (including an appropriate efficiency measure).

## Verification and Validation of Performance Measures

**FY 2004 Performance Measure:**

- **Combined Stationary and Mobile Source Reductions in Air Toxics Emissions**

- **Mobile Source Air Toxics Emissions Reduced**

- **Stationary Source Air Toxics Emissions Reduced**

- **All Other Air Toxics Emissions Reduced**

**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 and from mobile 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 baseline NTI contains county level emissions data and cannot be used for modeling because it does not contain facility specific data.

The 1996 and the 1999 NTI contain major industrial, area, and mobile source estimates that are used as input to National Air Toxics Assessment (NATA) modeling. The 1996 and 1999 NTI contain estimates of facility-specific HAP emissions and their source specific parameters necessary for modeling such as location and facility characteristics (stack height, exit velocity, temperature, etc.)

The primary source of data in the 1996 and 1999 NTI is state and local air pollution control agencies and tribes. These data vary in completeness, format, and quality. EPA evaluates these data and supplements them with data gathered while developing MACT and residual risk standards, industry data, and TRI data. To produce a complete model-ready national inventory, EPA estimates emissions for approximately 30 area source categories such as wildfires and residential heating sources not included in the state, local and Tribal data. Mobile source data are developed using data provided by state and local agencies and tribes and the most current onroad and nonroad models developed by EPA's Office of Transportation and Air Quality. The draft 1996 and 1999 NTI undergo extensive review by state and local agencies, tribes, industry, EPA, and the public. For more information and references on the development of the 1996 NTI, please go to the following web site: www.epa.gov/ttn/chief/nti/index.html#nti. For more information and references on the development of the 1999 NTI, please go to the following web site: www.epa.gov/ttn/chief/net/index.html#1999

**Methods, Assumptions and Suitability:** In the intervening years between the update of the NTI, the model EMS-HAP (Emissions Modeling System for Hazardous Air Pollutants) is used to estimate annual emissions of air toxics. EMS-HAP is an emissions processor that performs the steps needed to process an emission inventory for input into the model. These steps include: spatial allocation of area and mobile source emissions from the county level to the census tract level, and temporal allocation of annual emission rates to annually averaged (i.e., same rate for every day of the year) 3-hour emission rates. In addition, EMS-HAP can project future emissions, by adjusting point, area and mobile emission data to account for growth and emission reductions resulting from emission reduction scenarios such as the implementation of the Maximum Achievable Control Technology (MACT) standards. For more information and references on EMS-HAP, please go to the following web site: www.epa.gov/ttn/scram/tt22.htm#aspen

**QA/QC Procedures:** The NTI is a database designed to house information from other primary sources. The EPA performs extensive quality assurance/quality control (QA/QC) activities to improve the quality of the emission inventory. The EPA conducts a variety of internal activities to QC NTI data provided by other organizations including: (1) the use of an automated format QC tool to identify potential errors of data integrity, code values, and range checks; (2) use of geographical information system (GIS) tools to verify facility locations; and (3) content analysis by pollutant, source category and facility to identify potential problems with emission estimates such as outliers, duplicate sites, duplicate emissions, coverage of a source category, etc. The content analysis includes a variety of comparative and statistical analyses. The comparative analyses help reviewers prioritize which source categories and pollutants to review in more detail based on comparisons using current inventory data and prior inventories. The statistical analyses help reviewers identify potential outliers by providing the minimum, maximum, average, standard deviation, and selected percentile values based on current data. The EPA is currently developing an automated QC content tool for data providers to use prior to submitting their data to EPA. After investigating errors identified using the automated QC format and GIS tools, the EPA follows specific guidance on augmenting data for missing data fields. This guidance is available at the following web site: www.epa.gov/ttn/chief/emch/invent/qaaugmemo_final.pdf

The NTI database contains data fields that indicate if a field has been augmented and identifies the augmentation method. After performing the content analysis, the EPA contacts data providers to reconcile potential errors. The draft NTI is posted for external review and includes a README file, with instructions on review of data and submission of revisions, documentation, state-by-state modeling files with all modeled data fields, and summary files to assist in the review of the data. One of the summary files includes a comparison of point source data submitted by different organizations. During the external review of the data, state and local agencies, tribes, and industry provide external QA of the inventory. The EPA evaluates proposed revisions from external reviewers and prepares memos for individual reviewers documenting incorporation of revisions and explanations if revisions were not incorporated. All revisions are tracked in the database with the source of original data and sources of subsequent revision.

The external QA and the internal QC of the inventory have resulted in significant changes in the initial emission estimates, as seen by comparison of the initial draft NTI and its final version. For more information on QA/QC of the NTI, please refer to the following web site for a paper presented at the 2002 Emission Inventory Conference in Atlanta. “QA/QC - An Integral Step in the Development of the 1999 National Emission Inventory for HAPs”, Anne Pope, et al. www.epa.gov/ttn/chief/conference/ei11/qa/pope.pdf

**Data Quality Review:** EPA staff, state and local agencies, tribes, industry and the public 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, local and Tribal inventories) for each facility. For the 1999 NTI, two periods are available for external review - October 2001 - February 2002 and October 2002 - February 2003.

Both the full draft 1996 national air toxics assessment and several of the individual components of the assessment have been subjected to the scrutiny of leading scientists throughout the country in a process called "scientific peer review." This ensures that EPA uses the best available scientific methods and information. In 2001, EPA's Science Advisory Board (SAB) reviewed the 1996 national-scale assessment. The review was generally supportive of the assessment purpose, methods, and presentation; the committee considers this an important step toward a better understanding of air toxics. Many of the SAB comments related to possible improvements for future assessments (additional national-scale assessments are being planned for the base year 1999 and for every 3 years thereafter) and raised technical issues that would merit further investigation. EPA will follow up on these issues. Additional information is available on the Internet: www.epa.gov/ttn/atw/nata/peer.html.

The following describes the various scientific peer review activities that are associated with the 1996 national air toxics assessment:

- EPA's Science Advisory Board peer-reviewed the ASPEN dispersion model used in the Cumulative Exposure Project (CEP). The Science Advisory Board issued their report in 1996. It can be found at http://www.epa.gov/sab/fiscal96.htm.

- The HAPEM exposure model underwent a peer review by EPA scientists and an external peer review in the summer of 2000. While the peer review identified several limitations inherent in the current methodology, it is still acknowledged as an appropriate tool to help better understand the relation of human exposures to ambient concentration levels.

**Data Limitations:** The NTI contains data from other primary references. Because of the different data sources, not all information in the NTI has been developed 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 1993 NTI because of the added facility-level detail (e.g., stack heights, latitude/longitude locations), making it more 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. During the development of the 1999 NTI, all primary data submitters and reviewers were required to submit their data and revisions to EPA in a standardized format using the Agency's Central Data Exchange (CDX). For more information on CDX, please go the following web site: www.epa.gov/ttn/chief/nif/cdx.html

**References:** The NTI data and documentation are available at the following sites:

ftp site: ftp://ftp.epa.gov/EmisInventory/
Available inventories: 1996 NTI, 1999 NTI
Contents: Modeling data files for each state
Summary data files for nation
Documentation
README file
Audience: individuals who want full access to NTI files

Air DATA site: www.epa.gov/air/data/
Available inventories: 1996 NTI
Contents: Summary data files
Audience: the public

NEON: http://ttnwww.rtpnc.epa.gov/Neon/
Available inventories: 1996 NTI and draft 2002 version of the 1999 NTI
Contents: Summary data files
Audience: EPA staff

CHIEF: www.epa.gov/ttn/chief
1999 NTI data development materials
1999 Data Incorporation Plan - describes how EPA will compile the 1999 NTI
QC tool for data submitters
Data Augmentation Memo - describes procedures EPA will use to augment data
99 NTI Q's and A's - provides answers to frequently asked questions
NIF (Input Format) files and descriptions
CDX Data Submittal Procedures - instructions on how to submit data using CDX
Training materials on development of HAP emission inventories
Emission factor documents, databases, and models
Audience: state and local agencies, tribes, industry, EPA, and the public

**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.

EPA is also 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 works with DOE to identify opportunities in the Clean Cities program. EPA also works cooperatively with DOE to better characterize gasoline PM emissions and characterize the contribution of gasoline vehicles and engine emissions to ambient PM levels.

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 CDC, the National Institute of Environmental Health Sciences (NIEHS), and the National Institute for Occupational Safety and Health 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 and the Department of the Interior's United States 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 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 2004, EPA will continue to work closely with the USDA through the joint USDA/EPA 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 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 2004 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 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| **Reduce Acid Rain.** | **$21,563.8** | **$21,097.8** | **$21,230.8** | **$133.0** |
| Environmental Program & Management | $15,383.7 | $15,278.9 | $15,411.9 | $133.0 |
| Science & Technology | $4,321.0 | $3,991.2 | $3,991.2 | $0.0 |
| State and Tribal Assistance Grants | $1,859.1 | $1,827.7 | $1,827.7 | $0.0 |
| Total Workyears | 90.9 | 91.5 | 87.3 | -4.2 |

**Key Program**
(Dollars in Thousands)

| | FY 2002 Enacted | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| Acid Rain -CASTNet | $3,991.2 | $3,991.2 | $3,991.2 | $0.0 |
| Acid Rain -Program Implementation | $12,500.2 | $12,790.4 | $12,812.7 | $22.3 |
| Air, State, Local and Tribal Assistance Grants: Other Air Grants | $1,827.7 | $1,827.7 | $1,827.7 | $0.0 |
| Congressionally Mandated Projects | $250.0 | $0.0 | $0.0 | $0.0 |
| Facilities Infrastructure and Operations | $1,311.3 | $1,292.6 | $1,357.1 | $64.5 |
| Legal Services | $834.7 | $923.5 | $957.3 | $33.8 |
| Management Services and | $276.0 | $272.4 | $284.8 | $12.4 |

| | FY 2002 Enacted | FY 2003 Pres. Bud. | FY 2004 Request | FY 2004 Req. v. FY 2003 Pres Bud |
|---|---|---|---|---|
| Stewardship | | | | |

**FY 2004 Request**

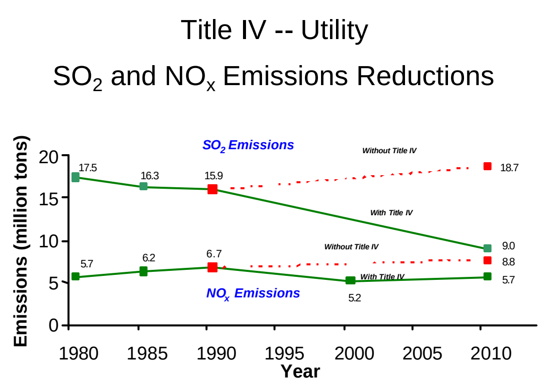
Emissions of sulfur dioxide ($SO_2$), mostly from electric power generation and other industrial sources, and nitrogen oxides ($NO_x$), mostly from electric power generation sources and motor vehicles, react in the atmosphere and fall to earth as acid deposition or "acid rain." Acid rain causes acidification of soils, lakes, and streams, making the water unsuitable for some fish and other wildlife and contributing to the damage of trees at high elevations. Acid rain also speeds the decay of buildings, statues, and sculptures that are part of our national heritage. Before falling to earth, $SO_2$ and $NO_x$ gases form fine particles that adversely affect human health by contributing to premature deaths, chronic bronchitis, and other respiratory problems. The fine particles also contribute to reduced visibility, and impair some of our most scenic vistas at national parks. Acid rain and its precursor $SO_2$ and $NO_x$ emissions are carried by the wind, sometimes hundreds of miles, across state and national borders. $NO_x$ emissions also are a major precursor of ozone, which contributes to asthma and other respiratory illnesses and damages crops, forests, and materials. $NO_x$ deposition also contributes to eutrophication of coastal waters, such as the Chesapeake Bay and Tampa Bay.

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 tradable 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 United States and abroad.

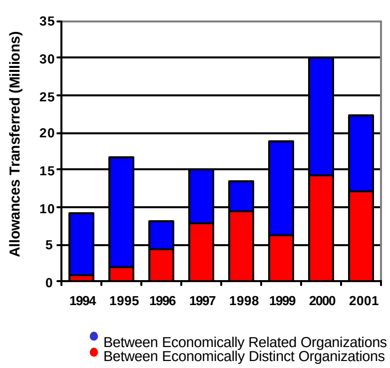
Major Acid Rain Program activities include: measurement, quality assurance, and tracking of $SO_2$, $NO_x$, and $CO_2$ emissions, as recorded by Continuous Emissions Monitors (CEMs) or equivalent continuous monitoring methods at more than 2,500 reporting electric utility units; conducting field audits 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 of permit actions.

The Acid Rain Program developed through two phases. Phase I of the Program began in1995, 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 1996. Phase II of the Program began in 2000 and required reductions in $SO_2$ emissions from more than 2,500 operating 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. In addition, the number of subject sources is increasing steadily as new capacity is built into the system to meet the Nation's expanding energy demands. Since 2000, 126 new operating sources have been added to the system, an increase of over 5 percent.

This growth has resulted in a steady increase in the number of units affected by the trading program and a significant increase in emissions tracking, $SO_2$ allowance trading, and account reconciliation activities conducted by EPA during Phase II of the Program. In 2001, 4,900 allowance transfers that affected over 22 million $SO_2$ allowances were recorded in the Allowance Transfer System, the accounting system developed to track holdings of allowances. EPA launched the On-Line Allowance Transfer System (OATS) in December 2001. This time-saving electronic system enables allowance market participants to record trades directly on the Internet, rather than submitting paper forms. Approximately 90% of all allowance transfers are now completed on line.



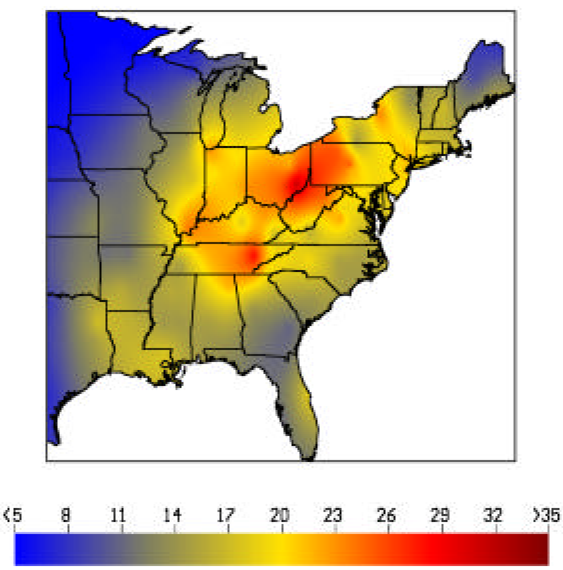

In addition to these operational activities, the Acid Rain Program is responsible for managing the Clean Air Status and Trends Network (CASTNet), a dry deposition monitoring network, as well as for providing critical operational support for the National Atmospheric Deposition Program (NADP), a wet deposition 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). 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 2004, the Acid Rain Program will continue analyzing the costs and benefits of the Program for inclusion in NAPAP's Integrated Assessment Report.



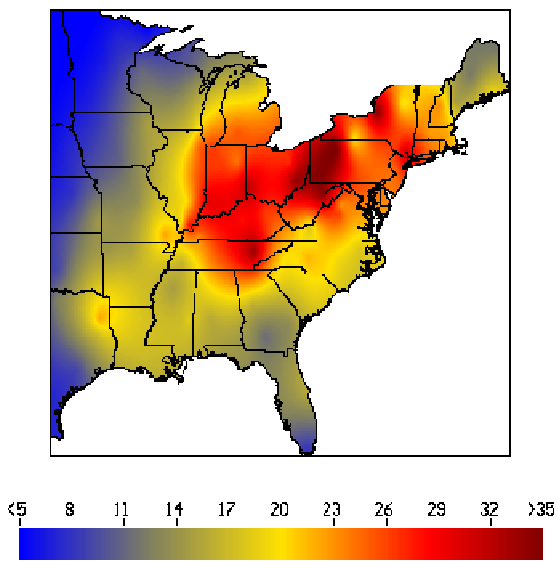

We estimate that when fully implemented in 2010, the $SO_2$ reductions alone under Title IV will provide $50 billion (1997 dollars) in health benefits (mostly from an estimated reduction in premature mortality of 9,000 cases per year) and $1 billion in additional benefits due to improved visibility from an expected 30 percent improvement in visibility at national parks in the eastern United States. The Acid Rain Program also 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, the Clear Skies Initiative is needed to address this deficiency as well as issues related to visibility impairment and attainment of the national air quality standards for fine particles and ozone. Over the next decade, Clear Skies is projected to further reduce $SO_2$ and $NO_x$ by another 35 million tons. EPA believes that the additional health benefits from this will exceed $96 billion by 2020 due mainly to reduced mortality from reduced concentrations of fine particulate matter.

**Sulfate Deposition in Acid Rain Reduced (kg/ha)**

**1989-91**




**1999-01**




These maps represent snapshots of wet sulfate deposition over time. Wet sulfur deposition has been reduced by up to 25% over a large area of the Eastern United States as a result of the Acid Rain Program.

# GOAL: CLEAN AIR

# OBJECTIVE: REDUCE ACID RAIN.

## Annual Performance Goals and Measures

**Reduce SO2 Emissions**

In 2004 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 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 On track to ensure that EPA maintains or increases 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.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| SO2 Emissions | Data Lag | 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. A statutory SO2 emission 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 2004 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 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 On track to ensure that 2 million tons of NOx from coal-fired utility sources are reduced from levels that would have been emitted without implementation of Title IV of the Clean Air Act Amendments.

| Performance Measures: | FY 2002 Actuals | FY 2003 Pres. Bud. | FY 2004 Request | |
|---|---|---|---|---|
| NOx Reductions | Data Lag | 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).

## Verification and Validation of Performance Measures

## FY 2004 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) or equivalent continuous monitoring methods, CASTNet (dry deposition), National Atmospheric Deposition Program (NADP) (wet deposition).

**Data Source:** On a quarterly basis, ETS receives and processes hourly measurements of $SO_2$, $NO_x$, volumetric flow, $CO_2$, and other emission-related parameters from more than 2,500 fossil fuel-fired utility units affected under the Title IV Acid Rain Program. For the 5-month ozone season (May 1 - September 30), ETS receives and processes hourly $NO_x$ measurements from electric generation units (EGUs) and certain large industrial combustion units affected by the Ozone Transport Commission (OTC) $NO_x$ Budget Program, the $NO_x$ SIP Call, and/or the Section 126 of the Clean Air Act controlling for regional transport of ozone in the eastern United States In 2004, the initial compliance year for the $NO_x$ SIP Call, up to 2000 units in as many as 20 States and D.C. will be reporting seasonal $NO_x$ data to ETS. Over 900 units have been reporting these data since 1999 under the OTC $NO_x$ Budget Program.

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).

The 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, provide funding and support for NADP. The Illinois State Water Survey/University of Illinois maintains the NADP database.

**Methods, Assumption, and Suitability:** Promulgated methods are used to aggregate data across all United States utilities for each pollutant and related source operating parameters.

**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 a CEM fails the bias test, indicating a potential for systematic underestimation of emissions, the source of the error must be identified and corrected or the data are adjusted to minimize the bias. Further information available on the Internet: http://www.epa.gov/airmarkets/reporting/arp/closure2001.html and http://www.epa.gov/airmarkets/monitoring/bias/index.html

CASTNet established a Quality Assurance Project Plan (QAPP) in November 2001; a copy of which is available at http://www.epa.gov/castnet/library/qapp.html The QAPP contains 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 representation, available on the Internet: http://nadp.sws.uiuc.edu/QA/. 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 on data reporting problems, format errors, and inconsistencies. The electronic data file QA checks are described at http://www.epa.gov/airmarkets/reporting/arp/closure2001.html under EPA=s *Quarterly Report Review Process*. All quarterly reports are analyzed to detect deficiencies and to identify reports that must be resubmitted to correct problems. EPA also identifies reports that were not submitted by the appropriate reporting deadline. Revised quarterly reports must be obtained from sources by a specified deadline to correct deficiencies found during the Data Review process. All data are reviewed, and preliminary and final emissions data reports are prepared for public release and compliance determination.

CASTNet underwent formal peer review in 1997 by a panel of scientists from EPA and NOAA. Findings are documented in *Examination of CASTNet: Data, Results, Costs, and Implications* (United States EPA, Office of Research and Development, National Exposure Research Laboratory, February 1997).

The 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:** In order to improve the spatial resolution of CASTNet, additional monitoring sites are needed.

**Error Estimate:** None

**New/Improved Data or Systems:** None planned

**References:** For additional information about CASTNet, see http://www.epa.gov/castnet/ and for NADP, see http://nadp.sws.uiuc.edu/ .
For a description of EPA's Acid Rain program, see http://www.epa.gov/airmarkets/acidrain/ and in the electronic Code of Federal Regulations at http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-C.htm (40 CFR parts 72-78.)

**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)