

DRAFT: March 5, 2003

2003 Strategic Plan
U.S. Environmental Protection Agency

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Message From the Administrator

INTRODUCTION

Since its establishment in 1970, the U.S. Environmental Protection Agency (EPA) has been working toward a cleaner, healthier environment for all Americans. Our new mission statement is clear: to protect human health and the environment. And over the past 33 years, EPA, working with its federal, state, tribal, and local government partners, has made great progress toward the achievement of clean air, pure water, and better-protected land for our Nation.

Today, however, we are dealing with some far more complex environmental issues than those of 20 or 30 years ago. The environmental problems we face in 2003 are more difficult to define; possible solutions are more difficult to identify; and the costs involved are likely to be much higher. Population growth, and the way resources are consumed to sustain this growth, are altering the earth in unprecedented ways. Scientific advances and technological developments pose new issues for human health and environmental protection. Today more than ever before, the Agency recognizes the need to look toward the future to anticipate potential threats to human health and the environment, establish clear priorities, and prepare itself to address them.

Our success, however, will depend on a variety of critical factors. First, we must set the right environmental and human health protection goals. The Agency believes that close collaboration and good communications with our federal, state, and tribal partners are critical if we are to set meaningful goals and develop the strategies and approaches that will achieve the environmental results we want. We and our partners will need the best available scientific and economic information in order to establish priorities and make decisions. Sound science and technology will help us determine which problems pose important risks to our natural environment, human health, and quality of life. We must also have the environmental information to help us assess where we are and determine where we need to go. Establishing a baseline of current conditions through the identification and monitoring of a variety of environmental indicators can help us not only in establishing goals developing strategies, but also in assessing our progress and evaluating our performance. And as we plan, the Agency must continue to explore new and creative ways to achieve our goals. We must look for innovative ways to address high-priority environmental problems and make full use of technology, market-based incentives, and environmental management systems. Finally, our future success depends on our ability to develop and sustain a highly skilled, adaptable, results-oriented workforce. EPA must ensure that it will have a workforce with the right mix of technical expertise, experience, and leadership capabilities to achieve our goals and carry out our mission.

As we considered these challenges and began to plan our work for the next 5 years and beyond, we have been guided by several new initiatives and commitments. We are working hard across the Agency to focus our efforts on achieving outcomes and results that are apparent to the

American people in a safer, healthier environment; to create stronger, more effective partnerships with states and tribes; to implement reforms called for under the President's Management Agenda that will help us improve our management and performance; and to be more clearly accountable to Congress and the American public for achieving results. These themes have shaped our strategic planning discussions over the past months, and they are reflected in EPA's *Strategic Plan* for 2003 to 2008.

Focusing on Results: A New Set of Goals

EPA's 2003 *Strategic Plan* reflects a new perspective on the Agency's work, a sharpened focus on achieving measurable environmental results. Our 1997 and 2000 *Strategic Plans* were based on 10 strategic goals, including both outcome-oriented goals, such as Clean Air, and functional or support goals, such as Effective Management. In contrast, EPA has constructed its 2003 *Strategic Plan* around five new goals that describe the results we are striving to achieve: Clean Air, Clean and Safe Water, Preserve and Restore the Land, Healthy Communities and Ecosystems, and Compliance and Environmental Stewardship.

Under its new *Plan*, the Agency treats critical functions such as sound science, quality environmental information, and effective management not as goals in themselves, but as important means to an environmental end. These functions are part-and-parcel of the strategies and approaches the Agency intends to use to achieve each of its five goals, and they are discussed in general terms in the "Cross-Goal Strategies" chapter of this *Strategic Plan*.

In establishing five goals focused on environmental results and streamlining its planning and budgeting structure, the Agency will be better able to promote multimedia, cross-program approaches to solving environmental problems. EPA leaders believe that taking this broader approach and establishing goals that are less rigorously aligned with Agency programs or organizational units will provide greater flexibility, both within the Agency and for state and tribal environmental programs. EPA regional offices, for example, working with their state and tribal partners, will have an increased ability to conduct regional strategic planning activities and address regional or geographic priorities under the Agency's five national goals.

Strengthening Partnerships: Improved Relationships with States and Tribes

There is no doubt that most of the advances in environmental protection that our Nation has realized over the past 30 years would not have been possible without the participation and support of state and tribal governments. EPA's partnerships with states and tribes are essential to achieving our human health and environmental protection goals. While the specific language of our strategic goals and

objectives may not reference our work with states and tribes, our reliance on these partnerships is implicit throughout our *Strategic Plan*. The Agency believes that it is only through the combined efforts of EPA, states, and tribes, that we can achieve the Objectives and Sub-Objectives and meet the strategic targets set out in the pages that follow.

Over the coming years we will continue to work closely with our state partners to strengthen the National Environmental Performance Partnership System, a system established in 1995 to reflect commitments made by states and EPA to work together for environmental protection. Currently, for example, we are jointly reviewing our use of Performance Partnership Agreements—negotiated agreements that define EPA and state responsibilities—with the intention of making them more useful and definitive. In keeping with our sharpened focus on achieving results, EPA believes that these Agreements can be used more effectively to set out clear performance expectations for both states and EPA regional offices, explain how we will work together, and describe how we will hold each other mutually accountable for accomplishing our objectives and achieving measurable results.

Just as we work in partnership with states, EPA is committed to working with tribes in a government-to-government relationship to improve environmental and human health protection throughout the Nation. The Agency is particularly concerned, however, about the poor state of the environment often found in Indian country. As a result, the work described in our *Strategic Plan* that focuses on communities must also ensure that tribes and tribal lands are safeguarded.

Implementing Reforms: The President's Management Agenda

Streamlining its goal structure to focus on the achievement of environmental results is an important, far-reaching reform. But it is not the only reform reflected in EPA's 2003 *Strategic Plan*. The President's Management Agenda, released in August 2001, proposed three basic principles for reform: government should be citizen-centered, results-oriented, and market-based. EPA has kept these principles in mind as it developed its *Strategic Plan*. In particular, EPA's *Strategic Plan* reflects five government-wide initiatives presented in the President's Management Agenda: (1) strategic management of human capital, (2) competitive sourcing, (3) improved financial performance, (4) expanded electronic government, and (5) budget and performance integration.

In developing plans for each of its five goals, establishing objectives and sub-objectives and developing the means and strategies to support achievement of the goal, EPA has considered opportunities to advance these initiatives. For example, the Agency has begun carefully to consider the unique skills, talents, and leadership that our future workforce will need to achieve each of our goals; we are working to revise and implement a Human Capital Strategy (discussed in more detail on page __, under "Cross-Goal Strategies") that is aligned with the Agency's planning and budgeting

processes. In developing the strategies and approaches we will use to achieve our objectives, Agency staff have also been alert to opportunities for using competitive sourcing reviews to increase the efficiency and effectiveness of Agency operations. Through its cross-goal strategy for information, the Agency is expanding its use of electronic systems for information management and a number of outreach and information-sharing mechanisms to streamline and improve communications with its state and tribal partners and with the public. For example, the Agency was recently chosen to be managing partner of online rule-making initiative and is working toward the migration of federal rule-making systems to a uniform approach.

EPA has long been a model for integrating budget and performance, having linked its budget to its long-range *Strategic Plan* and *Annual Performance Plans* since fiscal year 1999. By integrating its planning and budgeting and implementing other systems changes, the Agency has been better able to evaluate its programs, assess its performance, and use the results to make budget and program improvement decisions. The Agency will continue to strengthen links between budget and performance through its new goal structure. In addition, EPA is enhancing its financial reporting system, further integrating program performance and cost information and making it available to Agency managers and decision makers on a real-time basis.

Improving Accountability: Assessing the State of the Environment

The American public—taxpayers, communities, business and industry, environmental groups and others—have invested billions of dollars to control pollution and improve the environment, and EPA believes that it is time to assess our progress and review the results of those investments. To help assess the current state of the environment and to provide a baseline against which we can measure future performance, the Agency has launched a new “Environmental Indicators Initiative” to collect data and information about the quality of our environment and develop an Agency-wide system for tracking and reporting on our progress. In collaboration with our federal, state, and tribal partners, the Agency is developing a set of “environmental indicators,” measurements that can help us track environmental conditions over time. The information we glean from these environmental indicators will give Americans a better understanding of the condition of the environment and our natural resources and allow them to evaluate environmental programs and policies. The information we collect for this *Report on the Environment* will also be critical to the Agency’s strategic planning, both in establishing future goals and objectives and developing strategies, and in reviewing our performance and adjusting our policies and approaches as necessary. The Agency’s environmental indicators work, and the resulting *Report on the Environment* are critical steps in our more comprehensive effort to identify priorities, focus resources on areas of greatest concern, manage our work effectively to achieve measurable results, and report on our progress to the American public.

EPA's 2003 *Strategic Plan*

This *Strategic Plan* sets out our goals for the next 5 years and describes what we intend to do to achieve a cleaner, healthier environment for all Americans to enjoy. Our five goals, developed with input and advice from our partners and stakeholders, reflect our priorities and the results we will be working to achieve. The chapters that follow discuss each of our goals, laying out the objectives, sub-objectives, and strategic targets that support them and describing the means and strategies we, working with our partners, will employ to achieve them. In addition, we present the critical programs and strategies that cut across all the goals and through which we will accomplish our objectives.

In preparing our *Strategic Plan*, we have been guided by a commitment to the highest standards of management and to ensuring that we develop a strong, cost-effective system of environmental and human health protection. In carrying out these efforts, we will continue to work closely with our governmental partners and to communicate our progress as clearly and effectively as possible to the American public that we serve.

GOAL 1

CLEAN AIR

Protect and improve the air so it is healthy to breathe and free of levels of pollutants that harm human health or the environment.

Despite great progress in achieving cleaner, healthier air, air pollution continues to be a widespread human health and environmental problem in the United States as well as globally. Air pollution, both indoors and outdoors, can cause cancer, long-term damage to respiratory and reproductive systems, difficulty breathing, and premature death. Outdoor air pollution reduces visibility; damages crops, forests, and buildings; acidifies lakes and streams; contributes to the eutrophication of estuaries and the bioaccumulation of toxics in fish; diminishes the protective ozone layer in the upper atmosphere; contributes to the potential for world climate change; and poses additional risks to Native Americans and others who subsist on plants, fish, and game. Rapid development and urbanization in other countries are creating mega-cities with extreme air pollution which threatens not only those countries but also the United States, since air pollution can be transported great distances and across international boundaries. And air pollutants indoors often exist at comparable or higher levels.

Outdoor air pollutants come from many different sources: large stationary sources like electric power plants, industrial and chemical facilities, and incinerators; gasoline and diesel engine powered vehicles and equipment; agricultural activities; common, everyday activities like dry cleaning, filling a car with gas, and wood and trash burning; degreasing, varnishing, and painting activities; and natural sources like windblown dust and wildfires. Sources of indoor air pollution include combustion of oil, gas, kerosene, coal, wood, and tobacco products; building materials and furnishings such as carpet and pressed wood products; household cleaning products; and infiltrating outdoor or underground sources such as radon, pesticides, and outdoor air pollution.

Achieving further improvements in outdoor air quality—even maintaining gains made to date—will be difficult. Most “easy” successes have been won; reducing emissions further will be more contentious than in the past and, in some cases, will require public action. Reducing people’s exposure to indoor air pollutants will also be challenging. Further progress will require EPA and tribal, state, and local governments to work more collaboratively than in the past.

EPA intends to work closely with its partners and stakeholders to reduce pollution from electric generating and other stationary and mobile sources and indoor air pollution in schools and communities to protect millions of Americans from respiratory illness and other health risks. We will use regulatory, market-based, and voluntary programs to protect human health, global environments, and ecosystems

from the harmful effects of ozone depletion and climate change—restoring, fortifying, and safeguarding Earth’s precious resources for future generations. In developing and carrying out these programs, EPA will emphasize innovative approaches to regulations, policies, and non-regulatory measures. Our strategies include performance-based approaches; incentives and voluntary programs to achieve and surpass compliance; systems to integrate environmental management across facilities, problems, and media; initiatives to promote broad environmental stewardship; and cooperation with partners and stakeholders in the United States and internationally. Transboundary pollution threatens current air quality gains, and we will collaborate closely with neighboring countries and the international community to better understand the sources, fate, and effects of transboundary air pollution.

OBJECTIVES

Objective 1.1: Maintain and Improve Outdoor Air Quality. Through 2010, and consistent with established schedules, emissions of outdoor air pollutants will continue to decline, and ambient air quality will improve to or be maintained at levels that protect public health and the environment. In particular, air quality for ozone (8-hour) will improve to healthy levels for 52 percent of the people living in areas determined to have poor air quality in 2001, and air quality for fine particles will improve to healthy levels for 12 percent of the people who are living in areas determined to have poor air quality for fine particles in 2001. Healthy air for the other pollutants will be maintained for the 123.7 million people that had healthy air in 2001.

Sub-Objective 1.1.1: Reduce Emissions from Electric Generating Units and other Stationary Sources through Federal Regulations. By 2010, federal market-based and other regulatory programs will reduce emissions from electric generating unit and other stationary sources as follows:

Strategic Targets:

- By 2010, electric generating unit emissions of sulfur dioxide will be reduced by 4.6 million tons from their 2000 level of 11.2 million tons.
- By 2008, electric generating unit emissions of nitrogen oxides will be reduced by three million tons from their 2000 level of 5.1 million tons.
- By 2010, electric generating unit emissions of mercury will be reduced by 22 tons from their 2000 levels of 48

tons.

- By 2007, federal air toxics regulations will reduce air toxics emissions by 2.2 million tons from their 1993 level of 3.7 million tons.
- By 2009, EPA will promulgate the last group of area source standards, thus ensuring that 90 percent of the area source emissions of the 30 area sources listed in the Urban Air Toxics Strategy are regulated.

Sub-Objective 1.1.2: Reduce Emissions from Mobile Sources through Federal Regulations. By 2010, federal regulations will reduce emissions from mobile sources as follows:

Strategic Targets:

- By 2010, emissions of nitrogen oxides from mobile sources and fuels will be reduced by 3.7 million tons from their 2000 levels of 13.4 million tons.
- By 2010, emissions of volatile organic compounds from mobile sources and fuels will be reduced by 2.4 million tons from their 2000 levels of 7.3 million tons.
- By 2010, emissions of particulate matter from mobile sources and fuels will be reduced by 120,000 tons from their 2000 levels of 705,600 tons.
- By 2010, emissions of carbon monoxide from mobile sources and fuels will be reduced by 4.1 million tons from their 2000 levels of 75.6 million tons.
- By 2010, emissions of air toxics from mobile sources and fuels will be reduced by 1.1 million tons from their 1996 levels of 2.7 million tons.

Sub-Objective 1.1.3: Implement, Attain, and Maintain Air Quality Standards in Areas throughout the Country. By 2010, local air quality management programs will

build on emissions reductions achieved through federal regulations to maintain and improve air quality as stated in the objective.

Strategic Targets:

- In 2004, complete area designations, promulgate implementation rules, begin implementing the 8-hour ozone and PM2.5 NAAQS.
- By 2008, EPA will complete a policy on when Federal Implementation Plans are appropriate to bring Clean Air Act programs to Indian country.
- By 2008, the amount of air monitoring in Indian country will increase by 10 percent over FY 2003 levels of 158 monitors.

Sub-Objective 1.1.4: Reduce Air Toxics Risk at the Local Level. Through 2010, area-specific programs will build on the air toxics emissions reductions achieved through federal regulations to reduce exposure to ambient air toxics that may lead to adverse health effects including cancer and other significant health problems, and adverse environmental effects from air toxics in localities including Indian country.

Strategic Targets:

- ▼ By 2004, publicly release the revised National Air Toxics Assessment that is based on the 1999 inventory, and continue to update this national assessment of emissions, exposure, and risks from air toxics every three years.
- ▼ Air Toxics Monitoring: To be developed.
- ▼ By 2010, the tribes and EPA will have the information and tools to characterize and assess trends for 20 percent of Indian tribes from 2003 level of 1.2%.

Means and Strategies to Achieve Objective 1

The Clean Air Act distributes the responsibility for controlling air pollution and protecting people and the environment from its harmful effects among EPA, state, local, and tribal air pollution control agencies. Generally speaking, EPA develops policies, standards, regulations, programs, and strategies;

provides technical guidance and financial assistance; and develops and maintains the infrastructure for the Nation's air pollution control programs. State and local agencies are primarily responsible for implementing the Nation's air pollution control laws and regulations and for developing and implementing their own air pollution control regulations and programs. The discussion of outdoor air which follows reflects these differing roles and responsibilities. First, we focus on EPA's role in regulating, at the national level, large-scale or widespread sources of air pollutants that are found around the country such as mobile sources (cars, trucks, buses, construction equipment, snowmobiles, etc.) and stationary sources (power plants, oil refineries, chemical plants, dry cleaning operations, etc.). Then we focus on the lead role that state and local air pollution control agencies play in improving air quality in their areas and communities. EPA, states, and local agencies are committed to work together to meet goals for clean air cost-effectively.

Indian tribes have a unique status: EPA has a trust responsibility to protect air quality in Indian country, but tribes are also authorized and may choose to develop and implement their own air quality programs. The Clean Air Act Amendments of 1990 recognized tribal sovereignty and articulated Congress' intent to authorize tribes to carry out federal environmental programs for lands within their jurisdiction. Following the promulgation of the Tribal Authority Rule in 1998, many tribes began the first stages of developing tribal air programs. Challenges faced by EPA and tribes include increasing the currently very limited information on air quality on tribal lands, building tribal capacity to administer air programs in Indian country, and building effective EPA and state mechanisms to work with tribal governments on regulatory development, regional issues, and national policy.

Over the next several years EPA and its partners will focus on implementing the 1997 fine particle ($PM_{2.5}$) and ozone standards, further reducing emissions from electric generating units through the Clear Skies multi-pollutant approach, and implementing the air toxics program. We will also continue to work with multi-state planning groups to develop strategies for reducing haze and with individual states to develop implementation approaches to reduce emissions of particulate matter (PM) and ozone precursors.

To assist states in meeting clean air goals, we will proceed with federal programs aimed at achieving large, cost-effective reductions in PM and ozone-forming nitrogen oxide (NO_x) emissions. A cornerstone of our strategy is the Clear Skies Initiative, announced by President Bush in February 2002 and introduced as proposed legislation in Congress in July 2002. Through Clear Skies, EPA would set strict, mandatory emissions caps on three of the most harmful air pollutants from power generators—sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury. As the proposed Clear Skies legislation moves forward, we will continue to implement the Acid Rain Program to reduce emissions of SO_2 and NO_x (the primary causes of acid rain) and the two NO_x trading programs, the NO_x Budget Programs under the Ozone Transport Commission and the NO_x State Implementation Plan (SIP) Call, to reduce the interstate transport of ozone.

The Clean Air Act requires EPA to control 188 toxic air pollutants, including benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds. To date, EPA's air toxics activities have focused primarily on reducing emissions from large industrial sources through technology-based standards. Since 1990, the Agency has issued rules covering over 80 categories of major industrial sources such as chemical plants, oil refineries, aerospace manufacturers, and steel mills, as well as categories of smaller sources such as dry cleaners, commercial sterilizers, secondary lead smelters, and chromium electroplating facilities. These standards are projected to reduce annual air toxics emissions by about 1.5 million tons.

EPA's air toxics strategy will reduce exposures to air toxics through developing and implementing source-specific and sector-based federal standards and by conducting national, regional, and community-based initiatives that focus on reducing multi-media and cumulative risks. Significant effort will be needed to characterize the emissions and the resulting risks from those emissions on national and local scales. It will also be necessary to update the science and to keep the public informed about these issues. We will issue the remaining maximum achievable control technology standards on a schedule that avoids the need for case-by-case decisions by states and will address remaining risks from these sources and other smaller sources. We will continue to seek reductions of risks related to air toxics from mobile sources. We will continue to develop and refine tools, training, handbooks, and websites to assist our state, local, and tribal partners in characterizing risks from air toxics and work with them on strategies for making local decisions to reduce those risks. These efforts may include the establishment of "Centers of Excellence" (centralized sources of information) on measures and tools that EPA regional offices and state, local, and tribal governments can use to reduce risk at the local level from stationary, mobile, and indoor sources of air toxics, with an emphasis on voluntary and cost-effective measures. We also will compile and analyze the information from local assessments and use it to better characterize risk and assess priorities for further action, and we are working with state and local agencies to design a national toxics monitoring network. EPA will continue our efforts with the international community to address and reduce the risk from airborne persistent and bioaccumulative toxins (PBTs) transported across international boundaries.

Mobile sources continue to be a major contributor to outdoor air pollution. Over the past 30 years, EPA's national standards for vehicles, engines, and fuels have made remarkable advances in reducing on-road emissions. However, drastic increases in vehicle miles traveled have offset some of these advances, and more stringent standards and strategies are needed to provide further environmental benefits. EPA is now implementing a national standard-setting program that will dramatically reduce future emissions from a wide range of on-road/highway and non-road mobile sources including cars, minivans, sport utility vehicles, trucks, buses, motorcycles, recreational vehicles, forklifts, generators, marine engines, locomotives, and lawn and garden equipment.

Because of the projected emission reductions from these standards, emissions from heavy-duty non-road diesel engines (construction and farm equipment) will become a larger part of the mobile source inventory and will need to be addressed in the coming years. Thus, EPA is developing a program to establish new standards for these engines, including new sulfur requirements for non-road diesel fuel. A final rule for non-road engines and fuel is planned for 2004; benefits are expected to be similar to those from the on-road programs. This is an extremely important action as non-road engines are currently the biggest contributors to the PM emission problem from mobile sources.

EPA is also addressing diesel exhaust from both on-road and non-road sectors, not only through the establishment of new standards, but also through voluntary programs to reduce emissions from existing diesel engines in trucks, buses, and construction equipment. These programs will greatly reduce emissions of air toxics as well as criteria pollutants or their precursors.

We will continue to implement the reformulated gasoline program, while working to address issues associated with the use of oxygenates (e.g., methyl tertiary-butyl ether (MTBE) and ethanol). EPA will continue to partner with states, tribes, and local governments to create a comprehensive compliance program to ensure that vehicles and engines are clean, and we will continue to assist states in incorporating on-board diagnostic inspections into their vehicle inspection and maintenance programs. EPA will continue to assist states and local agencies in implementing the transportation conformity regulation and will propose and finalize changes to this regulation to address the revised ozone and PM standards. In addition, EPA will work with states and local governments to ensure the technical integrity of the mobile source controls in state implementation plans.

Although there are new rules regulating diesel emissions, the benefits of these rules will not be realized for at least 5 years. In the meantime, older, dirtier vehicles, often on the road for a million miles or more, will continue to adversely impact the Nation's health. EPA will expand its efforts to help create voluntary diesel retrofit projects to reduce PM from older, high-polluting trucks and buses, concentrating on areas with sensitive populations and with a particular focus on raising awareness of the problems of children riding to school in older, high-emitting diesel vehicles. Also, the SmartWay Transport partnership works with the trucking and railroad industry to achieve cleaner and more efficient vehicles and locomotives by adopting pollution control and energy saving technologies. 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 state and local governments to create incentives for implementation of idle control technologies and to remove barriers that truckers have identified.

EPA will work with tribes on a government-to-government basis to develop the infrastructure and skills tribes need to assess, understand, and control air quality on their lands. In consultation with our tribal partners, EPA will develop the necessary federal regulatory authorities and help develop tribal

programs to protect tribal air resources. The 1998 Tribal Authority Rule authorizes tribes to administer air programs in Indian country and, over the next few years, EPA will work with tribes to fashion and manage their own air programs, consistent with their traditions and culture. EPA will implement air quality programs directly where tribes choose not to develop their own programs. We will also support tribal air programs by providing technical support, assistance with data development, and training and outreach. EPA will help tribes participate in national policy and operations discussions and in regional planning and coordination activities.

EPA will work to better understand and take appropriate actions to address sources of air pollutants outside our borders that pose risks to public health and air quality within the United States. We will work with the National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration, and other federal agencies to improve our capability to detect, track, and forecast the impacts of international sources of air pollutants, and we will engage and challenge the international scientific community to improve our understanding of the processes that drive international flows and our analytical tools for evaluating policy responses. Working through bilateral agreements and multilateral international organizations (such as the United Nations Environment Programme and the Organisation for Economic Cooperation and Development). EPA will promote efforts, including capacity building and technology transfer, to reduce foreign sources of pollution that pose risks to the United States. EPA will also help represent the United States in existing multilateral international agreements (such as the Convention on Long-Range Transboundary Air Pollution and United Nations Stockholm Convention on Persistent Organic Pollutants) to control sources of internationally transported pollutants and protect U.S. interests. In North America, EPA will work with Canada and Mexico to control the cross-border flow of pollutants, working within existing agreements (for example, the US-Mexico La Paz Agreement, the US-Canada Air Quality Agreement, and the North American Agreement on Environmental Cooperation). We will also work with Canada, Mexico, and key stakeholders to identify and explore new approaches to managing air quality along our common borders.

Objective 1.2: Indoor Air. By 2008, 4 million additional Americans than the 16 million in 2005 will be experiencing healthier indoor air in homes, schools, and office buildings.

Strategic Targets:

- ▼ Homes: By 2008, approximately 1,800,000 additional people will be living in homes with radon-resistant features along with children not being exposed to environmental tobacco smoke.
- ▼ Schools: By 2008, approximately 1,575,000 additional students and staff will

experience improved air quality in their schools.

- ▼ Workplaces: By 2008, approximately 720,000 additional office workers will experience improved air quality in their workplaces.

Means and Strategies to Achieve Objective 2

Peer-reviewed research indicates that the air within homes and other buildings can be more seriously polluted than the outdoor air even in the largest and most industrialized cities. Other research indicates that people spend approximately 90 percent of their time indoors. Thus many people face greater health risks from indoor pollution than they do from outdoor air pollution. Indoor air pollution has been ranked among the top four environmental risks in relative risk reports issued by EPA, the Science Advisory Board, and several states. In addition, people who may be exposed to indoor air pollutants for the longest periods of time are often those most susceptible to their effects: the young, the elderly, and the chronically ill, especially those suffering from respiratory or cardiovascular disease. To address indoor air quality issues, EPA does not generally regulate, but rather develops and implements voluntary outreach and partnership programs that inform and educate the public about indoor air quality and the actions they can take to reduce risks in their homes, schools, and workplaces. Through these voluntary programs, EPA disseminates information and works with state and local governments, industry and professional groups, and citizens to promote actions to reduce exposures to harmful levels of indoor air pollutants, including radon.

Outreach, in the form of educational literature, media campaigns, hotlines, and clearinghouse operations, provides essential information about indoor air health risks not only to the public, but also to the professional and research communities. The personnel, expertise, and credibility that non-governmental and professional entities bring to our partnerships allow EPA to reach a larger audience than we could on our own. Underpinning all of our efforts is a strong commitment to environmental justice, community-based risk reduction, and customer service.

EPA will continue to use partnerships with a variety of non-governmental and professional entities to improve the way in which all types of buildings, including schools, homes, and workplaces, are designed, operated, and maintained. Our national partner network includes over 30 organizations and more than 1,000 local field affiliates such as the American Academy of Pediatrics, American Lung Association, and National Council of La Raza. Targeted audiences include health care providers who treat children with asthma, school personnel who manage the environments where children spend many hours each day, county and local environmental health officials, and disproportionately-affected and disadvantaged populations. Through our partners, we will disseminate multimedia materials encouraging individuals, schools, and industry to take action to reduce health risks in their indoor environments. In addition, we will use technology transfer to improve the ways in which all types of

buildings, including schools, homes, and workplaces, are designed, operated, and maintained. This technology transfer includes providing detailed guidance on operations and maintenance to the building community (building owners and managers and schools' facility managers) and easy-to-use tools to educators and school facility managers. To support these voluntary approaches, EPA will incorporate the most current science available as the basis for recommending ways that people can reduce exposure to indoor contaminants.

EPA will also provide tribes with appropriate tools and assistance in addressing indoor air toxics concerns, such as radon or particulate and biological issues. EPA will work with other federal agencies to provide guidance and assistance on how to reduce the exposure levels of these contaminants in all Indian communities.

EPA will broaden awareness and action by working with national as well as local community-based organizations to design and implement programs that address critical indoor air quality problems, including radon, asthma, mold contamination, and secondhand smoke in homes, child care and school facilities, and other residential environments. Indoor environment programs will focus on expanding awareness of asthma triggers. EPA is targeting three primary audiences to help address indoor asthma triggers nationwide: the general public, schools and child care centers, and health care providers.

We will also continue the State Indoor Radon Grant Program to help states develop and implement programs to assess and mitigate radon. In addition to establishing the basic elements of an effective radon program in states that have not yet done so, we will support innovation and expansion in states that do have programs in place and strengthen federal-state partnerships by helping states develop radon program elements and activities.

Objective 1.3: Atmospheric Change. Through 2010, protect humans, global environments, and natural ecosystems by reducing the harmful effects of ozone depletion and climate change.

Sub-Objective 1.3.1: Climate Change. By 2010, U.S. greenhouse gas emissions will be reduced by about 170 million metric tons of carbon equivalent (MMTCE) compared to business-as-usual.

Sub-Objective 1.3.2: Stratospheric Ozone. By 2010, ozone concentrations in the stratosphere will have stopped declining and slowly begun the process of recovery, and the risk to human health from overexposure to ultraviolet (UV) radiation, particularly among susceptible subpopulations such as children, will be reduced.

Means and Strategies to Achieve Objective 3

Global air quality issues pose a daunting challenge. Releases of greenhouse gases (GHGs), with potentially far-reaching impacts on climate and sea level, will continue to increase worldwide. Because chlorofluorocarbons (CFCs) are extremely persistent in the atmosphere and are still widely used in many developing countries, stratospheric ozone depletion remains a significant problem with serious long-term health implications.

In the United States, energy consumption causes more than 85 percent of the major air emissions such as NO_x, carbon dioxide (CO₂), and SO₂. At the same time, American families and businesses spend over \$600 billion each year on energy bills—more than we spend on education. Technologies are available today that can cut this energy use significantly. Other technologies are being developed that may provide even more dramatic opportunities.

In February 2002, President Bush announced a new U.S. climate policy to reduce the GHG intensity of the U.S. economy by 18 percent over the next decade. EPA's strategy for helping to reduce GHGs is to work in partnership with businesses and other sectors through programs that deliver multiple benefits—from cleaner air to lower energy bills. At the core of these efforts are voluntary government-industry partnership programs designed to capitalize on the opportunities that consumers, businesses, and organizations have for making sound investments in efficient equipment, policies and practices, and transportation choices. In 10 years, we expect that more than half the nation's anthropogenic (man-made) GHG emissions will come from equipment purchased between now and then. Thousands of products are purchased every day, and often people buy inefficient equipment, thereby committing themselves to higher energy bills for 10 to 20 years at a time, depending upon the life of the equipment. At the same time, people often overlook investment opportunities represented by more efficient equipment.

EPA manages a number of efforts, such as the ENERGY STAR programs, the Commuter Choice Leadership Initiative, and the EPA Clean Automotive Technology program, to remove barriers in the marketplace and more quickly deploy technology in the residential, commercial, transportation, and industrial sectors of the economy. On the international front, EPA will continue activities that provide multiple benefits at the global and local levels. These include global reductions in GHG emissions that can be achieved by recognizing and providing support for in-country environmental issues, such as improving local air quality, increasing energy access and efficiency, promoting cleaner production, providing transportation alternatives, and managing solid waste effectively (for methane reduction).

Over the next several years, EPA will build on its voluntary government/industry partnership efforts to achieve even greater GHG reductions by taking advantage of additional opportunities to simultaneously reduce pollution and energy bills. EPA will continue to break down market barriers and foster energy efficiency programs, products and technologies, cost effective renewable energy, and greater transportation choices. EPA will continue to work closely with state and local partners to

assess the air quality, health, and economic benefits of reducing GHG emissions and developing practical risk reduction strategies. It will establish international partnerships that will link industrial efficiency, reduction of GHGs, and sustainable development. Specifically, EPA will work in the following areas.

Buildings

The Buildings Sector, which contributes more than one-third of U.S. GHG emissions, is one of the largest areas for potential GHG emission reduction and, at the same time, represents one of EPA's most successful efforts. EPA will expand upon the ENERGY STAR partnerships that have been successful in profitably reducing GHG emissions (including ENERGY STAR Labeling, ENERGY STAR Buildings Program, and ENERGY STAR Homes).

Industry

EPA will continue to build on the success of the voluntary programs in the industrial sector, focusing on reducing CO₂ emissions and continuing the highly successful initiatives to reduce methane emissions and emissions of the high-global warming potential gases. EPA's goals for these efforts are to work with the U.S. Department of Energy (DOE) to accelerate the rate of energy and resource efficiency improvements in industry between now and 2010; to return, cost-effectively, emissions of methane to 1990 levels or below by 2010; to limit, cost-effectively, emissions of the more potent greenhouse gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride); and to facilitate the use of clean energy technologies and purchase of renewable energy.

Transportation

EPA will continue to build and enhance efficient and effective market-driven programs that address the transportation sector's contribution to climate change. The transportation sector contributes about one-third of the inventory of U.S. GHG emissions. Key to this effort are the SmartWay Transport Partnership and the Commuter Choice Leadership Initiative. The SmartWay Transport Partnership works with the trucking and railroad industry to achieve cleaner and more efficient vehicles and locomotives by adopting pollution control and energy-saving technologies. The Commuter Choice Leadership Initiative offers innovative solutions to commuting challenges faced by U.S. employers and employees by promoting commuter benefits that reduce vehicle trips and miles traveled.

The Agency's Clean Automotive Technology (CAT) Program will further advance clean and fuel-efficient automotive technology to protect the environment better and to save energy. CAT efforts in 2002 focused on achieving significant fuel economy gains by beginning to transfer these technologies from passenger cars to typical large domestic trucks. For the next 5 to 10 years, the CAT Program will

focus on research and collaboration with the automotive industry, applying EPA's unique knowledge of hydraulic hybrid technology and advanced clean-engine technologies to personal vehicles such as large sport-utility vehicles (SUVs), pickup trucks, and urban delivery trucks. Through these agreements, significant EPA technologies will be demonstrated in real-world applications and introduced commercially by vehicle manufacturers between 2005 and 2010.

The CAT Program commits EPA to develop technology by the end of the decade to satisfy stringent criteria emissions requirements and double fuel efficiency in personal vehicles such as SUVs, pickups, and urban delivery vehicles while meeting demands for size, performance, durability, and power. For a large SUV with a baseline fuel economy of 17 miles per gallon (mpg), the resulting fuel economy levels would be 25.5 to 28.9 mpg in 2006 and up to 34 mpg by 2010. Expanding this technology into 50 percent of new light trucks by 2020 would generate annual fuel savings of 8 billion gallons and a reduction in carbon emissions of 25 million metric tons of carbon equivalent (MMTCE).

EPA will also play a unique role in the development of fuel cell and hydrogen fuel vehicles by establishing the capability to test a range of fuel cell vehicles and components; taking the national lead in establishing emissions and fuel economy testing protocols and developing innovative, safe procedures for laboratory handling of hydrogen fuel; establishing a peer-reviewed life cycle model and promoting its use in decision making; and working closely with other key stakeholders through public/private partnerships, like the California Fuel Cell Partnership, to facilitate the commercialization of innovative technologies.

Carbon Removal

EPA will continue efforts to build domestic and international consensus around the integration of carbon sequestration (carbon capture, separation, and storage or reuse) activities into a comprehensive climate strategy. Carbon can be sequestered through changes in both forestry and agricultural practices, but these actions are not currently well understood or accepted in many sectors of the international and environmental communities. EPA is working collaboratively with the U.S. Department of Agriculture (USDA) to address misconceptions regarding carbon sequestration and to ensure that this important mitigation option is developed in an environmentally sound and economically efficient way. EPA and USDA will identify and develop specific opportunities to sequester carbon in agricultural soils, forests, other vegetation and commercial products, with collateral benefits for productivity and the environment.

State and Local

States and localities have a significant and an important role in reducing GHGs, provided they are equipped with the tools they need to consider climate change issues in their daily decisions. EPA's

State and Local Program responds to this need by providing guidance and technical information about the air quality, health, and economic benefits of reducing greenhouse gas emissions and developing practical risk reduction strategies. EPA will continue its efforts to build capacity and to provide state and local governments with technical, outreach, and education services about climate change impacts, mitigation and adaptation, and related issues so that state and local governments may more effectively and comprehensively address their environmental, human health, and economic goals.

International Capacity Building

EPA is working with a number of key developing countries to help them (1) design and implement programs to increase the use of low and zero GHG technologies; (2) identify, evaluate and implement strategies for achieving multiple social and health or economic benefits while reducing GHG emissions; (3) design market-based systems to facilitate more significant actions to reduce GHG emissions by these countries under the United Nations Framework Convention on Climate Change (UNFCCC) as well as the infrastructure necessary to implement these actions; and (4) accurately assess GHG emissions from the transportation sector and implement less energy intensive transportation strategies. Over the next 10 years, EPA's goals are to promote significant increases in voluntary, market-driven programs for increasing the use of low and zero GHG technologies; to fully integrate climate considerations into countries' development plans; and to establish the technical and institutional basis for major developing countries to take significant actions under the UNFCCC.

Scientific evidence amassed over the past 25 years has shown that chlorofluorocarbons (CFCs), halons, hydrochlorofluorocarbons (HCFCs), methyl bromide, and other halogenated chemicals used around the world are destroying the stratospheric ozone layer. The stratospheric ozone layer protects life on earth from harmful ultraviolet (UV) radiation; a depleted ozone layer allows more UV radiation to reach the earth. Increased levels of UV radiation can lead to a greater chance of overexposure and consequent health effects including skin cancer, cataracts, and other illnesses.¹ Today, one in five Americans develops skin cancer. Cataracts diminish the eyesight of millions of Americans and cost billions of dollars in medical care each year.

As a signatory to the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol), the United States is obligated to regulate and enforce its terms domestically. In accordance with this international treaty and related Clean Air Act requirements, EPA will continue to implement the domestic rule-making agenda for the reduction and control and ozone-depleting substances (ODSs) and enforce rules controlling their production, import, and emission. This includes combining market-based regulatory approaches with sector-specific technology guidelines and facilitating the development and commercialization of alternatives to methyl bromide and HCFCs. We will strengthen outreach

¹ World Meteorological Organization, Scientific Assessment of Ozone Depletion: 1998, February 1999.

efforts to ensure efficient and effective compliance and continue to identify and promote safer alternatives to curtail ozone depletion. To help reduce international emissions, we will assist with the transfer of technology to developing countries and work with them to accelerate phase-out of ozone depleting compounds.

Because the ozone layer is not expected to recover until the mid-21st century at the earliest, the public will continue to be exposed to higher levels of UV radiation than existed prior to the use and emission of ODSs. Recognizing this and the public's current sun-exposure practices, EPA will continue education and outreach efforts to encourage behavioral changes as the primary means of reducing UV-related health risks. We will continue to reach out to children (a particularly vulnerable population) through the SunWise School Program.

The Agency will advance its objective for atmospheric change through science and continued research in energy efficiency, emerging clean energy technologies, greenhouse gases and ozone, ozone-depleting substances, and human health issues. Over the next several years, we will use a variety of tools to achieve our objectives, including human capital strategies to maintain and secure expertise in atmospheric change assessments and analyses, voluntary and regulatory programs, market-based regulatory approaches, and public outreach.

Objective 1.4: Radiation. Through 2008, EPA and its partners and stakeholders will minimize unnecessary releases of radiation and be prepared to minimize impacts to human health and the environment should unwanted releases occur.

Sub-Objective 1.4.1: Radiation Protection. Through 2008, minimize radioactive releases of EPA-regulated radioactive waste and minimize impacts from radiation exposure.

Strategic Target: By 2008, the total number of drums of radioactive waste certified by EPA as properly disposed will increase to 140,171 from 47,171 in 2003.

Sub-Objective 1.4.2: Emergency Response. By 2008, ensure Agency readiness to protect the public from airborne releases of radiation by performing enhanced training and exercises and using state-of-the art equipment.

Strategic Target: By 2008, the percentage of EPA Radiation Emergency Response Team members that meet scenario-based response criteria will increase to 80 percent from 50 percent in 2005, and the percentage of the U.S. population covered by the National Radiation Monitoring System will increase to 60 percent from 24 percent in 2003.

Means and Strategies to Achieve Objective 4

The mining and processing of naturally occurring radioactive materials for use in medicine, power generation, consumer products, and industry inevitably generate emissions and waste. EPA is the primary federal agency charged with protecting people and the environment from harmful and avoidable exposure to radiation, and it is the lead federal agency for responding to international emergencies involving radioactive materials. EPA also provides guidance and training to other federal and state agencies in preparing for emergencies at U.S. nuclear plants, transportation accidents involving shipments of radioactive materials, and acts of nuclear terrorism. EPA sets protective limits on radioactive emissions for all media—air, water, and soil—and develops guidance for cleaning up radioactively contaminated Superfund sites.

EPA will continue to set priorities in waste management, clean material, and risk assessment to reduce the risk to the public of excessive radiation. One of EPA's major radiation-related responsibilities is to certify that all radioactive waste shipped by DOE to the Waste Isolation Pilot Plant (WIPP) is permanently disposed of safely and according to standards. Biennially, DOE submits documentation of compliance with applicable environmental laws and regulations, and EPA must determine whether DOE is in continued compliance. Every 5 years EPA must re-certify that the WIPP likely will comply with EPA's radioactive waste disposal regulations.

EPA will continue implementing the clean materials program by working with other federal agencies such as the Nuclear Regulatory Commission (NRC), DOE, U.S. Customs Department, and Department of State, as well as with state agencies and international organizations to prevent metals and finished products suspected of having radioactive contamination from entering the country. EPA will also work with states, local agencies, and tribes to locate and secure lost, stolen, or abandoned radioactive sources within the United States.

EPA's Radiological Emergency Response Team (RERT), a component of EPA's emergency response structure, will continue to prepare for incidents in which EPA is the designated Lead Federal Agency (LFA) under the Federal Radiological Emergency Response Plan as well as preparing to support other Lead Federal Agencies as appropriate. For example, EPA is the LFA for international radiological events and lost or orphan radioactive source incidents. EPA will support NRC for domestic nuclear power plant accidents and DOE for accidents at their weapons complex facilities.

Recognizing our expanding role in Homeland Security, EPA will also strengthen its national radiation monitoring capabilities to improve the Agency's ability to inform decision makers about risk from radiological emergencies to improve EPA's response. While the enhanced system will primarily support EPA's Homeland Security efforts, it can also be used to support EPA's traditional radiological

response activities.

EPA will provide national-level guidance on the risks posed by radioactive materials in the environment, including technical guidance for conducting risk assessments in order to limit public exposure to radiation. We will accomplish this by working with the public, industry, states, tribes, and other governmental agencies to use information systems and to inform and educate people about radiation risks and promote actions that reduce human exposure. EPA, in partnership with other federal agencies, will promote management of radiation risks in a consistent and safe manner at Superfund, DOE, Department of Defense, state, local and other federal sites. We will also continue to provide radioanalytical and mixed waste analytical data on environmental samples to support site assessment and clean-up activities and will coordinate with other nations on selected radiological issues, including risk assessment methodologies and risk management approaches.

Through the Radiation Program, EPA will ensure we have appropriate methods to manage radioactive releases and exposures. Approaches to meet this objective will include health risk site assessments, risk modeling, clean-up and waste management activities, national radiation monitoring, radiological emergency response, and provision of federal guidance to our international, federal, state, and local partners.

Objective 1.5: Science/Research. Through 2010, provide and apply a sound scientific foundation to EPA's goal of clean air by conducting leading-edge research and developing a better understanding and characterization of environmental outcomes under Goal 1.

Sub-Objective 1.5.1: Science to Support Air Programs. Through 2010, utilize the best available scientific information, models, methods and analyses to support air-program-related guidance and policy decisions.

Sub-Objective 1.5.2: Air Pollution Research. Through 2010, provide methods, models, data, and assessment research associated with air pollutants. Criteria pollutant research will focus on emissions, fate and transport, exposures, mechanisms of injury, and health effects of criteria air pollutants, and is designed to support both the periodic revision of National Ambient Air Quality Standards and their implementation and to develop scientific information and tools to understand and characterize environmental outcomes associated with criteria pollutants. Air toxics research will develop and improve air quality models and source receptor tools; cost-effective pollution prevention and other control options; and scientific information and tools to understand and characterize environmental outcomes associated with nationwide, urban, and residual air toxic risks.

Means and Strategies to Achieve Objective 5

Air pollution research carried out under this goal is designed to enable EPA to meet its objectives for clean outdoor and indoor air. EPA's Office of Research and Development (ORD) has developed multi-year plans for research on PM, tropospheric ozone (and other criteria pollutants), and air toxics which lay out long-term goals and describe targets the Agency intends to meet to reduce scientific uncertainties.

Particulate Matter

EPA's research on PM represents the largest portion of the Clean Air research program. In building this program, EPA has been guided by expert advice from the National Research Council of the National Academy of Sciences, and from several other organizations outside the Agency. PM research goals are being addressed through the use of in-house laboratory resources and partnering with numerous academic institutions, including five PM Research Centers around the Nation.

The PM research program focuses on reducing scientific uncertainties related to the exposure and health effects of PM to support statutory review under the National Ambient Air Quality Standards (NAAQS) and promote cost-effective implementation of NAAQS. From FY 2003 to FY 2007, research will focus on developing data and tools needed for implementation of the current PM standard and for the next required review of the standard. Because there is a 5-year cycle for review of NAAQS, research in later years will focus on the information needed to determine whether standards should be retained or revised and to implement new or revised standards.

Under its multi-year plan for PM research, EPA has established five long-term goals to support development and implementation of PM NAAQS. Within the 5-year scope of this *Strategic Plan*, we will:

- Develop and transfer to states new data and tools to predict, measure, and reduce ambient PM and PM emissions to attain the existing PM NAAQS;
- Advance the development and transfer of new exposure, epidemiological, toxicological, and clinical data for improved assessments of health risks associated with short- and long-term exposure to PM in the general and selected susceptible populations;
- Work to improve environmental decision makers' capabilities to ensure that PM NAAQS are adequately protective of human health by assessing the state of the science that integrates atmospheric, exposure, health, and engineering information and providing consultation on NAAQS promulgation;

- Advance the development and transference to states of improved data and tools to attain existing PM NAAQS and to refine the environmental factors related to health risks associated with PM exposure; and
- Advance development and transfer of new exposure, epidemiological, toxicological, and clinical data for improved assessments of health risks associated with short- and long-term exposure to PM, especially in susceptible populations.

Tropospheric Ozone

The tropospheric ozone research program addresses not only ozone, but other criteria pollutants such as SO₂, nitrogen dioxide, carbon monoxide, and lead. It focuses on developing tools to help with implementation of NAAQS, such as improving emissions estimates and modeling capabilities, and on developing the scientific criteria documents upon which NAAQS (and NAAQS reviews) are based. EPA's ozone research will continue to be an in-house program, with no extramural grants.

EPA has established three long-term goals for ozone research, which address development and implementation of air quality standards. Within the 5-year scope of this *Strategic Plan*, we will:

- Advance the provision of Air Quality Criteria Documents, research needs documents, and consultation on the proposal and promulgation of the periodic review of the NAAQS for ozone, nitrogen oxides, and carbon monoxide;
- Support implementation and attainment of 8-hour ozone NAAQS by EPA, states, and tribes by providing evaluated state-of-science modeling, monitoring, and other tools and information and training Agency and state staff on their use; and
- Advance the provision of regionally evaluated models and methods to attain 8-hour ozone NAAQS, focusing on remaining non-attainment areas and maintenance plans.

Air Toxics

The Air Toxics research program is designed to answer critical scientific questions that will result in more certain risk assessments and more effective risk management practices for stationary point, area, mobile, or indoor sources of air toxics. Research on air toxics is presently being addressed almost exclusively by utilizing the resources of in-house laboratories and research centers. In future years, EPA will consider the use of extramural research grants to complement the intramural program.

Under its multi-year plan for air toxics research, EPA has established long-term goals for reducing

uncertainties in risk assessments and implementing risk reduction. Within the 5-year scope of this *Strategic Plan*, we will:

- ▼ Advance the provision of health hazard and exposure methods, data, and models to help reduce uncertainty in risk assessments of acute, chronic, and multi-pathway exposures to air toxics at the national and regional levels and the conduct of community-level exposure and epidemiology studies to characterize the risk of air toxics at that scale; and
- ▼ Produce 15 new or modified tools (methods, models, or assessments) that enable national, regional, state, and local officials to identify or implement cost-effective approaches to reduce risks from stationary point, area, mobile, or indoor sources of air toxics.

HUMAN CAPITAL STRATEGY

To help achieve cleaner, healthier air across the United States, EPA is charged with researching and assessing air quality and regulating air pollutants. To accomplish this mission, the Agency collaborates with state, tribal, local, and other environmental partners to perform risk and economic assessments, set national standards, and implement market-based and voluntary programs. EPA's current air and radiation workforce consists of highly specialized scientists and engineers, attorneys, grants managers, and mission support specialists.

Over the next several years, EPA will continue to carry out its clean air mission through federal regulation of stationary and mobile sources and area-specific air quality and air toxics management. One important aspect of this work is using market-based and voluntary programs that require close collaboration between EPA and its partners. To accomplish this work, EPA will need to maintain a highly skilled technical workforce with enhanced leadership and management competencies.

Under EPA's human capital strategy, each EPA air and radiation professional, from interns to senior executives, will seek to develop a comprehensive set of leadership and management competencies. Between 2003 and 2008, EPA will continue to enhance its technical and communication capabilities as it works closely with a variety of environmental partners. Our strategy to identify, assess, and fill skill deficiencies through 2008 includes the following activities:

- Craft a workforce development strategy tailored to the critical developmental needs of the air and radiation workforce;
- Develop a recruitment plan to attract a diverse pool of candidates with essential competencies;
- Implement a 360 degree feedback program to improve managers' supervisory skills; and
- Continue to implement a permanent and rotational assignment program, mentoring and coaching

programs, and formal training activities to enhance and diversify employees' work experiences.

PROGRAM EVALUATION

Program evaluation results did not significantly influence development of the Agency's goals and objectives for achieving clean air.

EXTERNAL FACTORS

Weather conditions and meteorological patterns have very important effects on air quality. For example, high temperatures and bright sunlight can increase the formation of ozone. Wind can carry air pollution from one area to another, while conditions of little or no wind can cause air pollutants to remain in an area and build up to unhealthy levels. These effects must be considered when developing and implementing plans and strategies to reduce emissions and achieve and maintain clean air. On the other hand, plans to improve air quality can help ensure protection of public health even in the face of adverse weather conditions.

Achieving our environmental objectives depends on state implementation of delegated air programs, state and local implementation of federal regulations, and state and local agencies' implementation of their own air pollution control regulations and programs. Many states are currently facing reduced budgets and resource constraints which may impact their ability to carry out environmental protection programs.

Lawsuits and court action may also impact EPA's ability to achieve its objectives, by requiring the Agency to adjust schedules and delay accomplishment of certain goals and objectives. Achievement of the clean air objectives can also be affected by economic conditions and development patterns in the United States and the world and by choices made for energy and transportation policies.

Finally, some objectives and sub-objectives under this goal are based on or assume enactment and implementation of the Clear Skies legislation proposed by the President. As this proposed legislation is still in the early stages of the legislative process, it is not possible to predict at this time what action the Congress will take.

GOAL 2

CLEAN AND SAFE WATER

Ensure drinking water is safe. Restore and maintain oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

Over the 30 years since enactment of the Clean Water and Safe Drinking Water Acts, government, citizens, and the private sector have worked together to make dramatic progress in improving the quality of surface waters and drinking water.

Thirty years ago, many of the Nation's drinking water systems provided water to the tap with either very limited treatment (usually disinfection) or no treatment at all. Drinking water was too often the cause of acute illnesses linked to microbiological contaminants or of longer-term health problems resulting from exposure to low levels of toxic and other contaminants. Today, drinking water systems monitor the quality of the water they provide and treat water to assure compliance with drinking water standards covering a wide range of contaminants. In addition, sources of drinking water are better protected. We now regulate disposal of wastes to ground waters that are potential sources of drinking water.

Thirty years ago, about two-thirds of the surface waters assessed by states were not attaining basic water quality goals and were considered polluted. Some of the Nation's waters were open sewers posing health risks and many waterbodies were so polluted that traditional uses, such as swimming, fishing, and recreation, were impossible. Today, the number of polluted waters has been dramatically reduced and many clean waters are even healthier. A massive investment of federal, state, and local funds resulted in a new generation of sewage treatment facilities able to provide "secondary" treatment or better. Over 50 categories of industry now comply with nationally consistent discharge regulations. In addition, sustained efforts to implement "best management practices" have significantly slowed runoff of pollutants from diffuse or "nonpoint" sources and resulted in measurable improvement in waterbodies nationwide.

Cleaner, safer water has renewed recreational, ecological, and economic interests in communities across the Nation. The recreation and tourism industry is the second largest employer in the Nation and a significant portion of recreational spending comes from swimming, boating, sport fishing, and hunting. Each year, Americans take over 1.8 billion trips to water destinations, largely for recreation. American fishermen spend some \$24 billion annually and generate over \$69 billion for the economy. Commercial fishing and shellfishing, both of which rely on clean water, contribute some \$45

billion to the economy.

The dramatic restoration of some of the Nation's most polluted waters has paid large dividends in enhanced recreation, healthier fisheries, and stronger local economies. The Cuyahoga River, which once caught fire, is now busy with boats and harbor businesses that generate substantial revenue for the City of Cleveland. The Willamette River in Oregon has been restored to provide swimming, fishing, and water sports. Even Lake Erie, once infamous for its dead fish, now supports a \$600 million per year fishing industry.

Despite improvements in the quality of water, serious water pollution and drinking water problems remain. Population growth continues to generate higher levels of water pollution and places greater demand on drinking water systems. To further our progress toward cleaner surface waters and safer drinking water, we must both maintain our commitment to the core measures we have already established and look for new ways to improve water quality and protect human health.

OBJECTIVES

Objective 2.1: Protect Human Health. By 2008, protect human health by reducing exposure to contaminants in drinking water, in fish and shellfish, and in recreational waters.

Sub-objective 2.1.1: Water Safe To Drink. By 2008, 95% of the population served by community water systems will receive drinking water that meets all applicable health-based drinking water standards. (2002 Baseline: 93.6% of population; note that year-to-year performance is expected to change over time as new standards take effect.)¹

Strategic Targets:

- Increase Population Served Water Meeting Pre-2001 and Post-2001 Standards: By 2008, the percentage of the population served by community water systems that receive drinking water that meets health-based standards:

¹ Note: EPA will continue to consider how best to treat non-reporting systems in this Sub-objective and in supporting Strategic Targets. Options include treating non-reporting systems as in compliance, treating non-reporting systems as not in compliance, or excluding non-reporting systems from the compliance calculation. The targets shown here represent how EPA has calculated this baseline in the past and are based on the first approach. In addition, EPA would like comment on the most appropriate definitions of non-reporting (e.g. how to consider late reporting).

- with which systems need to comply as of December 2001 will be 95% (2002 Baseline: 93.6% of the population); and
- with a compliance date of January 2002 or later will be 80% (2002 Baseline: % of population to be determined May 2003; covered standards include: Stage 1 disinfection by-products/interim enhanced surface water treatment rule/long-term enhanced surface water treatment rule/arsenic; year-to-year performance is expected to change as new standards take effect.)
- Increase Community Water Systems Meeting Pre-2001 and Post-2001 Standards: By 2008, the percentage of community water systems that provide drinking water that meets health-based standards:
 - with which systems need to comply as of December 2001 will be 95% (2002 Baseline: 91.6% of community water systems); and
 - with a compliance date of January 2002 or later will be 80% (2002 Baseline: xx% of community water systems; to be determined May 2003; covered standards include: Stage 1 disinfection by-products/interim enhanced surface water treatment rule/long-term enhanced surface water treatment rule/arsenic; year-to-year performance is expected to change as new standards take effect.)
- Increase Population in Indian Country Receiving Safe Water: By 2008, 95% of the population served by community water systems in Indian country will receive drinking water that meets all applicable health-based drinking water standards. (2002 Baseline: 91.1% of population served by systems; year-to-year performance is expected to change as new standards take effect.)
- Reduce Vulnerability of Source Waters to Contamination: By 2008, implementation of source water contamination prevention strategies by states and tribes reduces to xx% the percentage of source water areas (both surface and ground water) identified as highly or moderately vulnerable to contamination. (2002 Baseline: to be determined)
- Improve Access to Safe Drinking Water: By 2008, reduce by xx% the number of households on tribal lands or in Alaskan Native Villages lacking

access to basic sanitation. (2000 Baseline: U.S. Census data indicate that xx% of households lack access to complete plumbing including hot and cold piped water, flush toilet, or a bathtub/shower.)

Sub-objective 2.1.2: Fish and Shellfish Safe to Eat. By 2008, the quality of water and sediments will be improved to allow increased consumption of safe fish and shellfish as measured by the strategic targets described below.

Strategic Targets:

- **Fish Safe to Eat:** By 2008, the quality of water and sediments will be improved to allow increased consumption of safe fish in not less than 3% of the water miles/acres identified by states or tribes as having a fish consumption advisory in 2002. (2002 Baseline: 485,205 river miles and 11,277,276 lake acres were identified by states or tribes in 2002 as having fish with chemical contamination levels resulting in an advisory of potential human health risk from consumption.)
- **Increase Acres Safe for Shellfishing:** By 2008, 85% of the shellfish growing acres monitored by states are approved for use. (1995 Baseline: 77% approved for use of 21.6 million acres monitored; 69% approved and 8% conditionally approved.)

Sub-objective 2.1.3: Water Safe for Swimming. By 2008, restore water quality to allow swimming in not less than 10% of the stream miles and lake acres identified by states in 2000 as having water quality unsafe for swimming. (2000 Baseline: approximately 90,000 stream miles and 2.6 million lake acres reported by states as not meeting a primary contact recreational use in the 2000 reports under section 305(b) of the Clean Water Act.)

Strategic Targets:

- **Reduce Disease Outbreaks Attributable to Recreational Waters:** By 2008, the quality of recreational waters nationwide will be protected so that the number of waterborne disease outbreaks attributable to swimming in, or other recreational contact with, the ocean, rivers, lakes, or streams will be reduced to not more than 8, measured as a five year average. (2002 Baseline: an average of 9 recreational contact waterborne disease outbreaks reported per year by the Centers for Disease Control over the years 1994 - 1998; adjusted by the Heinz Center to remove outbreaks associated with waters other than natural surface [e.g., removed outbreaks associated with pools, water parks, etc].)

- Reduce Beach Closures and Advisories: By 2008, coastal and Great Lakes beaches monitored by State beach safety programs will be open and safe for swimming in over 96% of the days of the beach season. (2002 Baseline: monitored beaches open 94% of the days of the beach season.)

Means and Strategies to Achieve Objective 1

Protecting and Improving Drinking Water

Safe drinking water and clean surface waters are critical to protecting human health. Over 260 million Americans rely on the safety of tap water provided by water systems that comply with national drinking water standards. EPA's strategy for assuring safe drinking water over the next several years includes four key elements: (1) developing or revising drinking water standards; (2) supporting states, tribes, and water systems in implementing standards; (3) developing sustainable management of drinking water infrastructure; and (4) protecting sources of drinking water from contamination.

Develop Drinking Water Standards

The Safe Drinking Water Act directs EPA to establish national standards for contaminants in drinking water provided to consumers by water systems. Over the past 30 years, EPA has established standards for some 91 contaminants. Over the next several years, EPA expects to establish additional standards for microbial contaminants, disinfectants, and disinfection by-products and for total coliform bacteria found in distribution systems.

Through 2008, EPA will continue to assess the need for new or revised drinking water standards. Based on recommendations from the National Research Council, the National Drinking Water Advisory Council, and other stakeholders, the Agency will continue to evaluate health effects data and risks of exposure to contaminants, information on technologies for detecting and removing contaminants, and compliance costs. If there is adequate information, EPA will determine whether a new risk-based drinking water standard is necessary, or revision to an existing standard is warranted. Where the source of the contamination is surface water, the Agency will also consider applying the pollution control authorities of the Clean Water Act, including development of water quality criteria for human health under Section 304 of the Act. These criteria, once adopted by states and authorized tribes, form the basis for limits on discharges of the contaminants to surface waters and guide programs to reduce runoff.

Implement Drinking Water Regulations

EPA works closely with states, tribes, and water systems to assure the full and effective implementation of drinking water standards and to support the highest possible rate of compliance with standards. Over the next 5 years, EPA will provide guidance, training and technical assistance to states, tribes and systems; ensure proper certification of water system operators; and promote consumer awareness of the safety of drinking water supplies.

Small community water systems are more likely to have difficulty complying with drinking water standards. Consistent with the Agency's Small Systems Strategy, EPA will provide training and assistance addressing the use of cost-effective treatment technologies, proper waste disposal, and compliance with standards for high-priority contaminants, including arsenic in drinking water and microbes, disinfectants, and disinfection by-products.

High quality information is needed to support the effective implementation of drinking water standards. The Safe Drinking Water Information System serves as the primary source of national information on compliance with all Safe Drinking Water Act requirements, and is a critical database for program management. EPA will work to ensure that all applicable drinking water regulatory requirements are incorporated into this new data system to help states and authorized tribes manage their drinking water programs. EPA will also continue to work with states and others to improve data completeness, accuracy, timeliness, and consistency.

Support Sustainable Drinking Water Infrastructure

Providing drinking water that meets safe standards often requires an investment in the construction or maintenance of infrastructure. The Drinking Water State Revolving Fund (DWSRF) provides water systems with low interest loans to make infrastructure improvements.

Even with financial assistance from the DWSRF, the Agency's September 2002 report on the infrastructure gap identifies a multi-billion dollar gap in capital infrastructure financing over the next 20 years. In recognition of this shortfall, EPA will continue to provide infrastructure grants to capitalize DWSRFs. EPA will also work with states to assure that funds are effectively managed and with water systems to encourage them to adopt sustainable management systems.

In a related effort, EPA will work with other federal agencies to develop a coordinated approach to improving access to safe drinking water. The 2002 World Summit in Johannesburg adopted the goal of reducing the number of people lacking access to safe drinking water by 50 percent by 2015. EPA will contribute to this work through its support for development of drinking water facilities in Indian country and Alaskan native villages, using set-aside funds from the DWSRF and targeted grants. Other federal agencies, such as the Department of Interior (DOI) and the U.S. Department of Agriculture (USDA), also play key roles in addressing this problem. In addition,

Mexico Border infrastructure projects, described under Goal 4: Healthy Communities and Ecosystems, will also increase access to safe drinking water.

Prevent Source Water Contamination

There is growing recognition that protecting the quality of sources of drinking water, including surface waters and groundwater, can reduce violations of drinking water standards. EPA will support source water protection through training and technical assistance to states, tribes, and communities that are taking voluntary measures to prevent or reduce contamination of source water. The Agency will foster coordination of contamination prevention strategies across jurisdictions, and will also work with states and tribes to use Clean Water Act authorities to prevent contamination of surface waters that serve as public water supplies and are at high risk.

In a related effort, EPA will protect ground water that is a source of drinking water by assuring safe underground injection of waste materials. EPA will continue working with states and tribes to educate and assist underground injection control well operators; working with industry and stakeholders to collect and evaluate data on endangering Class V wells; and exploring best management practices for protecting underground sources of drinking water.

Safe Fish and Shellfish

Some toxic contaminants that enter waterbodies can move up the food chain and build up to levels that make fish unsafe to eat. States and tribes report they have issued fish consumption advisories for some 14 percent of river miles and 28 percent of lake acres. Shellfish also can accumulate disease-causing microorganisms and toxic algae. In 1995, shellfishing was prohibited due to pollution in 11 percent of the approximately 25 million acres that support shellfishing. EPA is working with states, tribes, and other federal agencies to improve water and sediment quality so all fish and shellfish are safe to eat and to protect the public from consuming fish and shellfish that pose unacceptable health risks.

Fish Safe to Eat

Most fish consumption advisories today are issued because of unhealthy levels of mercury in fish. Although small amounts of mercury are discharged to waters, most mercury in fish originates from combustion sources, such as coal-fired power plants and incinerators, which release it into the air. The mercury is then deposited by rainfall onto land and water, where it is concentrated in waterbodies and moves up the food chain through fish to people. EPA is working to reduce releases of mercury to the air through controls on combustion sources. For example, EPA expects that by 2010, federal market-based and other air regulatory programs will reduce electric generating unit emissions of mercury by 22

tons from their 2000 level of 48 tons (see Goal 1 of this Strategy).

Improving water and sediment quality is another key element of the strategy for making more fish safe to eat. Implementation of Clean Water Act programs will improve water quality by reducing discharges from storm water systems, combined sewer overflows, and concentrated animal feeding operations (CAFOs), and reducing runoff from nonpoint sources.

These water quality programs rely on sound scientific information concerning individual contaminants in fish. EPA recently issued a criteria document under the Clean Water Act identifying the safe levels of mercury in fish tissue and will help states and tribes adopt the criterion into water quality standards. EPA expects that all states and authorized tribes will have adopted the new mercury fish tissue criterion by 2008. In 2000, EPA revised the methodology for calculation of “human health criteria” for contaminants found in surface waters. This new methodology reflects recent research on the health effects of contaminants and the potential for contaminants in water to be concentrated in the food chain and pose a greater risk to people who consume fish. EPA partially recalculated the criteria for 83 pollutants and will be revising these criteria and additional criteria more completely over the next several years.

EPA is also working to restore the quality of aquatic sediment in critical waterbodies, with special emphasis in the Great Lakes. In addition, EPA will use Superfund program authorities to restore the quality of sediment. To reduce the potential for future sediment contamination, EPA is working to reduce the use of PCBs, a major sediment contaminant, in electrical equipment. (See Goal 4: Healthy Communities and Ecosystems.)

Another key element of EPA’s strategy for safe fish is expanding the amount and type of information about fish safety and making this information available to the public. EPA provides guidance to states and tribes on monitoring and fish sampling. EPA also provides funding and technical training to help states and tribes assess fish safety in more of their waters every year. The Agency expects that by 2008, the percentage of rivers and lakes monitored for fish safety will continue to increase. EPA is also conducting a nationwide survey of contamination in fish.

A key public information tool is the internet-based National Listing of Fish and Wildlife Consumption Advisories. This website allows states and tribes to enter their advisories and provides the public with information about the location of advisories, the fish that are affected, and the number of meals or amount of fish that a person can safely eat.

Shellfish Safe to Eat

The safety of shellfish is managed through a partnership of the U.S. Food and Drug

Administration (FDA), the Interstate Shellfish Sanitation Commission (ISSC), and coastal states. States monitor shellfishing waters and restrict harvesting if shellfish taken from the waters would be unsafe.

Although there is a sound system to monitor the condition of shellfishing waters and limit public exposure to unsafe shellfish, shellfish harvesting is restricted in many acres of otherwise productive shellfishing waters. EPA is working with states, FDA, ISSC, and the National Oceanic and Atmospheric Administration (NOAA) to increase the percentage of shellfishing acres where harvesting is permitted from the estimated 1995 level of 77 percent to 85 percent in 2008.

Over the past several years, the ISSC, working with states and federal agencies, has developed a new information system that uses state monitoring data to pinpoint areas where shellfishing has been restricted. Using this information system, EPA and states will more readily be able to identify possible sources of pollutants restricting the use of shellfishing waters. This information can be used to strengthen water pollution control activities, including development of watershed plans, implementation of National Estuary Program plans, issuance or reissuance of permits to point sources, enforcement of existing permits, and implementation of controls over diffuse sources of polluted runoff.

Safe Swimming Waters

Recreational waters, especially beaches in coastal areas and the Great Lakes, provide outstanding recreational opportunities for many Americans. Swimming in some recreational waters, however, can pose a serious risk of illness as a result of exposure to microbial pathogens. Beach closures to protect the public from harmful levels of pathogens can have significant economic impacts. In some cases, these pathogens can be traced to sources such as sewage treatment plants, malfunctioning septic systems, and discharges from storm water systems and animal feeding operations. EPA is implementing a three-part strategy to protect the quality of the Nation's recreational waters. The Agency will work to protect recreational water generally, control combined sewer overflows, and protect the quality of public beaches along the coasts and Great Lakes.

Protect Recreational Waters

The first element of the strategy is broadly focused on all recreational waters. To protect and restore these waters, EPA works with state, tribal, and local governments to implement the core programs of the Clean Water Act. For example, development and implementation of total maximum daily loads (TMDLs) will generally benefit recreational waters that are impaired. The continuing implementation of the discharge permit program, urban storm water controls, and nonpoint pollution control programs will also reduce pollution to recreational waters. As part of this effort, EPA will work with states to assure that pathogen controls consistent with water quality standards are incorporated in 50 percent of permits for facilities that discharge pathogens.

Control Combined Sewer Overflows

Full implementation of controls for overflows from combined storm and sanitary sewers, or “CSOs,” is another key step in protecting recreational waters. These overflows release untreated sewage containing high levels of pathogens. CSOs, which occur in about 770 communities around the country, can have a significant impact on the quality of recreational waters. EPA, states, and local governments are making steady progress toward the reduction of overflows under the “CSO Policy.” Most communities with CSOs have now implemented basic control measures. Some 34 percent of these communities have developed long-term plans for control of overflows and 87 percent of these communities have substantially implemented their plans. EPA hopes to increase the percentage of communities that have developed long-term control plans.

Protect Coastal and Great Lakes Beaches

The third element of the strategy to protect and restore recreational waters is focused on public beaches in coastal areas and the Great Lakes. Under the recently enacted Beaches Environmental Assessment and Coastal Health (BEACH) Act, EPA provides grants to state, tribal, and local governments for programs to monitor beach water quality and notify the public when bacterial contamination poses a risk to swimmers. EPA expects that 100 percent of significant public beaches will be managed under BEACH Act programs by 2008.

The BEACH Act requires that coastal and Great Lakes states adopt scientifically sound water quality criteria for bacteria. EPA expects that all 35 coastal and Great Lakes states will have adopted scientifically sound bacteria criteria for beaches by 2008. As a result of a related effort, Agency-approved analytic methods will be available for pathogens of concern at beaches.

Finally, EPA will continue to expand public access to internet-based beach information on its website. Governments receiving BEACH Act grants and communities responding to EPA’s annual National Beach Health Protection Survey will provide information on water quality, beach monitoring and advisory programs, and beach closures.

Objective 2: Protect Water Quality. By 2008, protect the quality of rivers, lakes and streams on a watershed basis and protect coastal and ocean waters.

Sub-objective 2.2.1: Improve Water Quality on a Watershed Basis. By 2008, use both pollution prevention and restoration approaches, so that:

- in 700 of the Nation’s watersheds, water quality standards are met in at least 80% of

the assessed water segments (2002 Baseline: 510 watersheds of the total 2,262 USGS cataloguing unit scale watersheds across the Nation); and

- in 200 watersheds, all assessed water segments maintain their quality and at least 20% of assessed water segments show improvement above conditions as of 2002. (2002 Baseline: 0 USGS cataloguing unit scale watersheds).

Strategic Targets:

- Restore Water Quality: By 2008, reduce pollution from all types of sources as needed to restore polluted waters so that water quality standards are fully attained in over 10% of those water bodies/segments identified in 2000 as not attaining standards. (2002 Baseline: 0% of the 22,000 individual water bodies identified on 1998/2000 lists of impaired waters developed by States and approved by EPA under section 303(d) of the Clean Water Act.)
- Reduce Nutrient Levels in Rivers: By 2008, implement pollution reduction programs as needed to reduce levels of phosphorus contamination in rivers and streams so that phosphorus levels are below levels of concern established by USGS or levels adopted by a state or authorized tribe in a water quality standard in:
 - 55% of test sites for major rivers (1992-98 Baseline: 50%)
 - 38% of test sites for urban streams (1992-98 Baseline: 33%); and
 - 30% of test sites for farmland streams (1992-98 Baseline: 25%).
- Improve Tribal Waters: By 2008, water quality in Indian country will be improved at not less than 90 monitoring stations in tribal waters for which baseline data are available (i.e., show at least a 10% improvement for each of four key parameters: total nitrogen, total phosphorus, dissolved oxygen, and fecal coliforms.) (2002 Baseline: four key parameters available at 900 sampling stations in Indian country)
- Improve Access to Basic Sanitation: By 2008, reduce by xx% the number of households on tribal lands or in Alaskan Native Villages lacking access to basic sanitation. (2000 Baseline: U.S. Census data indicate that xx% of households lack access to complete plumbing including hot and cold piped water, flush toilet, or a bathtub/shower.)

Sub-objective 2.2.2: Improve Coastal and Ocean Waters. By 2008, prevent water pollution and protect aquatic systems so that overall aquatic system health of coastal waters nationally, and in each coastal region, is improved on the “good/fair/poor” scale of the National Coastal Condition Report by at least 0.2 points. (2002 Baseline: National rating of “fair/poor” or 2.4 where the rating is based on a 5-point system where 1 is poor and 5 is good and is expressed as an aerially weighted mean of regional scores using the National Coastal Condition Report indicators [i.e., water clarity, dissolved oxygen, coastal wetlands loss, eutrophic conditions, sediment contamination, benthic health, and fish tissue contamination].)

Strategic Targets:

- **Maintain Key Coastal Conditions:** By 2008, maintain water clarity and dissolved oxygen in coastal waters at the national levels reported in the 2002 National Coastal Condition Report. (2002 Baseline: 4.3 for water clarity; 4.5 for dissolved oxygen).
- **Improve Key Coastal Conditions:** By 2008, improve ratings reported on the national “good/fair/poor” scale of the National Coastal Condition Report for:
 - coastal wetlands loss by at least 0.2 points (2002 Baseline: 1.4)
 - contamination of sediments in coastal waters by at least 0.2 points (2002 Baseline: 1.3);
 - benthic quality by at least 0.2 points (2002 Baseline: 1.4); and
 - eutrophic condition by at least 0.2 points (2002 Baseline: 1.7).
- **Invasive Species Control:** By 2012, in cooperation with other Nations, other Federal agencies, and state and local governments, significantly reduce the annual rate of introduction of non-indigenous, invasive, aquatic species to waters of the United States. (2002 Baseline: 2002 baseline under development for 2004 in cooperation with the Federal National Invasive Species Council.)

Means and Strategies to Achieve Objective 2

Improving Water Quality on a Watershed Basis

In order to protect and improve water quality on a watershed basis, EPA will focus its work with states, tribes, and others in six key areas: (1) strengthen the water quality standards program; (2) improve water quality monitoring; (3) develop effective watershed plans and TMDLs; (4) implement effective nonpoint pollution control programs; (5) strengthen the NPDES permit program; and (6) effectively manage infrastructure assistance programs.

EPA expects to work with states and tribes in each of these areas, but progress toward water quality improvements will largely depend on success in integrating programs on a watershed basis, engaging diverse stakeholders in solving problems, and applying innovative ideas, such as water quality trading, to deliver cost-effective water pollution control.

Strengthen the Water Quality Standards Program

State and tribal water quality standards provide the environmental baselines for water quality programs. EPA provides scientific information concerning contaminants in the form of “water quality criteria” guidance and identifies innovative approaches to support state and tribal adoption of water quality standards that protect water for uses such as swimming, public water supply, and fish and wildlife.

The Water Quality Standards and Criteria Strategy, developed in cooperation with states, tribes, and the public and published in March of 2003, will provide a foundation for EPA’s work to strengthen state and tribal water quality standards programs. Over the next five years, the Strategy calls for EPA to develop implementation guidance for new and existing water quality criteria; develop a criteria methodology for waterbody sedimentation; develop a revised aquatic life criteria methodology; publish additional nutrient criteria (for example, for coastal waters and wetlands) and provide implementation guidance; and promote increased use of biological criteria and ecological evaluation to support assessment of water conditions on a watershed scale.

In addition, the Strategy identifies some key efforts to strengthen the program in the coming years, including developing nutrient standards, adopting biological criteria, and assisting tribal governments in adopting water quality standards. Finally, EPA will work with states and tribes to assure the effective operation and administration of the standards program. For example, all states and authorized tribes are expected to review and revise their standards every 3 years as required by the Clean Water Act. In addition, EPA will promptly review and approve or disapprove changes to standards as required by the Act.

Improve Water Quality Monitoring

Scientifically defensible data and information are essential tools in the Information Age. Water quality monitoring and assessment programs, the essential underpinning of all aspects of the watershed approach, must be strengthened and upgraded across the country.

Over the next 5 years, EPA will assist states and tribes in significantly improving information concerning the condition of the Nation's rivers, lakes, and streams. In this effort, EPA will work with states and tribes to adopt comprehensive monitoring strategies, addressing all the elements essential to an effective monitoring program, and statistically valid monitoring networks, leading to a doubling in the percentage of stream miles evaluated with sufficient water quality data. EPA will also encourage development of biological monitoring programs and transmittal of state monitoring data to the STORET national water quality data repository. This monitoring work will be coordinated with assessments of fish tissue contamination, the condition of water at beaches, and the condition of coastal waters.

Develop Effective Watershed Plans and TMDLs

EPA is working with states and tribes to foster a "watershed approach" as the guiding principle of clean water programs. EPA is encouraging states to develop watershed plans with a comprehensive approach to assessing water quality, defining problems, integrating management of diverse pollution control, and financing projects. States have successfully adopted watershed approaches that use a "rotating basin" approach as well as other methods. Where necessary, states will upgrade their continuing planning process to assure development of a watershed approach. EPA is also working with tribes to support development of watershed approaches to protecting tribal waters.

EPA is also supporting the development of watershed plans in specific geographic areas. In addition to continuing watershed protection programs as part of the National Estuary Program, the Chesapeake Bay Program, the Great Lakes Program, and the Gulf of Mexico Program, EPA has provided grants for watershed plans in recent years and is beginning a major new watershed grant program in 2003. EPA expects to continue supporting development of watershed-based plans in key watersheds over the next 5 years.

In watersheds where water quality standards are not attained, states will be developing TMDLs. Some impaired waters are isolated segments that can be addressed individually. The vast majority of impaired waters, however, are clustered on a watershed basis. EPA is encouraging states to develop TMDLs for these waters on a watershed basis. Watershed-based TMDLs are less expensive to develop and create the opportunity for innovations such as water quality trading and watershed-based permitting. Trading is a valuable tool allowing pollution sources to share pollution control responsibility within a watershed and achieve pollution reductions at the lowest possible cost.

While supporting state watershed plans, EPA will continue work with states to develop TMDLs consistent with state TMDL development schedules and court-ordered deadlines. States and EPA have made significant progress in the development and approval of TMDLs and expect to maintain the current pace of about 3000 TMDLs per year.

Control Nonpoint Pollution

Watershed plans and TMDLs will focus pollution control efforts for impaired waters on a range of pollution sources, including runoff from nonpoint sources. EPA will complement the efforts of states, tribes, and other federal agencies to implement management practices that will reduce levels of nonpoint pollution nationwide.

A critical step in this effort is for EPA to forge strategic partnerships with a broad range of agricultural interests at all levels. EPA will work with USDA to ensure that EPA and USDA target their resources in complementary ways—EPA's Section 319 funds to restore impaired watersheds and Farm Bill dollars to implement practices to protect water quality more broadly. EPA will also work cooperatively with USDA to develop voluntary nutrient management plans for animal feeding operations (small operations not covered by regulations) and to implement riparian and stream bank protection measures over the next 5 years.

In related efforts, EPA will collaborate with state managers of Clean Water Revolving Loan Funds to increase investments in projects to reduce nonpoint pollution. Properly managed onsite/decentralized systems are an important part of the Nation's wastewater infrastructure, and EPA will encourage state, tribal, and local governments to adopt voluntary guidelines for the effective management of these systems and use Clean Water Revolving Loan Funds to finance systems where appropriate.

Strengthen the NPDES Permit Program and Implement the National Industrial Regulation Strategy

The National Pollution Discharge Elimination System (NPDES) requires point source dischargers to be permitted and pretreatment programs to control discharges from industrial facilities to the Nation's sewage treatment plants. This program provides a management framework for millions of gallons of effluent discharged to waters each year. EPA has five key strategic objectives for the program over the next 5 years: (1) assure effective management of the permit program, including focus on permits that have the greatest benefit for water quality; (2) implement wet weather point source controls, including the storm water program; (3) implement the newly developed program for permits at CAFOs; (4) advance program innovations, such as watershed permitting and trading; and (5) develop national industrial regulations for industries where the risk to waterbodies supports a national regulation.

To address concern about the backlog in re-issuance of NPDES permits, in 2002 EPA developed the “Permitting for Environmental Results Strategy.” The Strategy focuses limited resources on the most critical environmental problems and targets four key areas: (1) increased environmental focus through permit prioritization and watershed-based permitting; (2) efficiency to maximize resources, such as electronic tools for permit applications and automation of the permit writing process; (3) increased quality and quantity of data necessary to assess and maintain program health through modernization of the Permits Compliance System and integration with other environmental databases; and (4) accountability in program management, using periodic permit quality reviews, a permit quality checklist, and permit writer training.

EPA is working with states and other interested parties to strengthen the permit program in two key areas: discharges of storm water and discharges from large animal feeding operations. Over the next 5 years, EPA expects that 100 percent of regulated industrial facilities and construction sites and 90 percent of regulated municipalities will be covered by storm water permits. In 2002, EPA finalized new rules for discharges from CAFOs. Currently about 4,500 CAFOs are covered by permits; up to 11,000 additional facilities will be required to apply for permits by 2006. Implementation of the new rule will have significant water quality benefits.

In addition, EPA expects that by 2008, at least 90 percent of significant industrial users that discharge to publicly owned treatment works under the pretreatment program will have individual control mechanisms implementing technically based local limits.

Most industrial facilities discharging directly to waterbodies or to sewage treatment plants have permit limits or pretreatment controls based on national regulations developed for the class of industrial activity. Most major industrial classes now have regulations in place. Over the next 5 years, EPA will complete national regulations now under development (covering, for example, meat production, construction and development sites, aquaculture farms, and large cooling water intakes). In consultation with the public, EPA will also establish program priorities based on sound science and demonstrated benefits, including the potential for cost-effective risk reduction. In addition to evaluation of regulatory options, EPA will consider other approaches (including clarifying guidance, environmental management systems, and permit writer support).

Support Sustainable Wastewater Infrastructure

Much of the dramatic progress in improving water quality is directly attributable to investment in wastewater infrastructure—the pipes and facilities that treat the Nation’s sewage. But the job is far from over. Communities are challenged to find the fiscal resources to replace aging infrastructure, to meet growing infrastructure demands fueled by population growth, and to secure their infrastructure against threats.

Clean Water State Revolving Funds (CWSRFs) provide low interest loans to help finance wastewater treatment facilities and other water quality projects. These projects are critical to the continuation of the public health and water quality gains of the past 30 years. As of early 2003, the federal government had invested almost \$20 billion in CWSRFs. The revolving nature of the funds and substantial additions from states have magnified that investment so that a cumulative total of \$42.4 billion has been available for loans. Recognizing the substantial remaining need for wastewater infrastructure, EPA expects to continue to provide significant annual capitalization to CWSRFs for the foreseeable future. This continued federal investment in CWSRFs, along with other traditional sources of financing (including increased local revenues), will result in significant progress toward addressing the Nation's wastewater treatment needs.

Over the next 5 years, EPA will work with CWSRFs to meet several key objectives: fund projects designed as part of an integrated watershed approach; link projects to environmental results through the use of scientifically-sound water quality and public health data; support development of integrated priority lists addressing nonpoint pollution and estuaries protection projects as well as wastewater projects; and maintain the CWSRF's excellent fiduciary condition.

Another important approach to closing the gap between the need for clean water projects and available funding is to use sustainable management systems to assure that infrastructure investments are tailored to the needs of the watershed, well capitalized, and well maintained. Sustainable management systems prolong the lives of existing systems and provide Americans with purer water at lower cost. EPA will work to institutionalize sustainable management systems and will also encourage rate structures that lead to full cost pricing and support water metering and other conservation measures.

In addition, EPA will continue to promote environmental management systems, especially for public agencies, that focus on improved compliance, environmental performance beyond compliance, and pollution prevention. Response to date is very positive, and support for adoption of environmental management systems in the public sector is growing rapidly.

In a related effort, EPA will work with other federal agencies to improve access to basic sanitation. The 2002 World Summit in Johannesburg adopted the goal of reducing the number of people lacking access to safe drinking water by 50 percent by 2015. EPA will contribute to this work through its support for development of sanitation facilities in Indian country and Alaskan native villages using funds set aside from the CWSRF and targeted grants. Other federal agencies, such as DOI and USDA, also play key roles in addressing this problem. In addition, Mexico Border infrastructure projects, described under Goal 4: Healthy Communities and Ecosystems, will improve access to basic sanitation.

Improving Coastal and Ocean Waters

Coastal and ocean waters are environmentally and economically valuable to the Nation. Key programs focused on coastal waters and critical to improving these waters are: assessing coastal conditions; reducing vessel discharges; controlling coastal nonpoint pollution; managing dredged material; managing non-indigenous invasive species; and supporting international marine pollution control.

In addition, coordinating our efforts with those of other federal agencies, states, tribes, and public and private parties is essential. Improving coastal waters will depend on successful implementation of pollution controls in inland watersheds. (See Sub-objective 1 under this Objective.) Progress in protecting and restoring coastal waters is also directly tied to geographically focused projects, such as the Chesapeake Bay Program, the Gulf of Mexico Program, and the National Estuary Program. These programs are described under Goal 4: Healthy Communities and Ecosystems.

Assessing Coastal Conditions

Progress in meeting these strategic targets will be tracked through the National Coastal Condition Report, created in 2002 as a cooperative project of EPA, NOAA, USDA, and DOI. The Report describes the ecological and environmental condition of U.S. coastal waters according to seven key parameters. EPA and other federal agencies will review changing conditions and periodically issue updated assessments of the health of coastal waters.

Reducing Vessel Discharges

A focus of EPA's efforts to improve the health of the Nation's ocean and coastal waters will be to enhance regulation of discharges of pollution from vessels. Key work includes development of discharge standards for cruise ships operating in Alaskan waters; cooperation with the Department of Defense to develop discharge standards for certain armed forces vessels; and cooperation with the Coast Guard to revise performance standards for marine sanitation devices to reduce sewage discharges from vessels.

Controlling Coastal Nonpoint Pollution

Rapid population growth in coastal areas can result in significant increases in pollution from both point and nonpoint sources. For the past 10 years, EPA and NOAA have been working with coastal and Great Lakes states to improve and expand programs to control nonpoint pollution in the "coastal zone" identified by states. Most states have used federal grant funds to develop coastal nonpoint programs, and EPA and NOAA are working with the remaining states to complete the program by providing continued support and assistance. These nonpoint control programs, focused on the critical

coastal zone areas, will play an important role in accomplishing the environmental improvements sought for coastal waters by 2008.

Managing Dredged Material

Several hundred million cubic yards of sediment are dredged from waterways, ports, and harbors each year to maintain the Nation's navigation system for commercial, national defense, and recreational purposes. All of this sediment must be disposed of safely. EPA and the U.S. Army Corps of Engineers (COE) share responsibility for regulating how and where it is done. EPA and COE will focus additional resources on improving the way disposal of dredged material is managed, including evaluating disposal sites, designating and monitoring the sites, and reviewing and concurring on the disposal permits issued by COE.

EPA is also working with its state partners and other federal agencies, including COE, the Fish and Wildlife Service, and the Coast Guard, to ensure that comprehensive dredged material management plans, which include provisions for the beneficial re-use of dredged material, are developed and implemented in major ports and harbors.

Managing Invasive Species

One of the greatest threats to U.S. waters and ecosystems is the uncontrolled spread of invasive species. Invasive species commonly enter U.S. waters through the discharge of ballast water from ships. Although the majority of these organisms never become established in a new ecosystem, an increasing number of invasive species are adversely impacting the environment and local economies and posing risks to human health. In response, EPA is assisting the U.S. Coast Guard in its efforts to develop ballast water exchange requirements and ballast water discharge standards to control aquatic invasive species and is addressing this issue at the international level. Negotiations are currently underway for a global treaty designed to prevent further introductions of invasive aquatic species through ballast water.

Supporting International Marine Pollution Control

EPA works closely with the Coast Guard, NOAA, and the Department of State to address environmental threats to U.S. waters that require international cooperation. Recognizing the effect of international shipping on the quality of the U.S. waters, EPA is heavily involved in the negotiation of international standards at the International Maritime Organization. These international standards are the principal mechanism EPA is using to address invasive aquatic species, tributyltin and other harmful antifoulants, and marine debris. EPA is also engaged in cooperative efforts to reduce other sources of

pollution affecting the Gulf of Mexico, Great Lakes, Arctic Ocean, Straits of Florida, and the Wider Caribbean Basin.

Objective 2.3: Science/Research. By 2008, provide and apply a sound scientific foundation to EPA's goal of clean and safe water by conducting leading-edge research and developing a better understanding and characterization of environmental outcomes under Goal 2.

Sub-objective 2.3.1: Science. By 2008, apply the best available science (i.e., tools, technologies and scientific information) to support Agency regulations and decision making for current and future environmental and human health hazards related to reducing exposure to contaminants in drinking water, fish and shellfish, and recreational waters and the protection of aquatic ecosystems.

Sub-objective 2.3.2: Research. By 2008, conduct leading-edge, sound scientific research to support the protection of human health through the reduction of human exposure to contaminants in drinking water, in fish and shellfish, and in recreational waters and to support the protection of aquatic ecosystems, specifically, the quality of rivers, lakes and streams and coastal and ocean waters.

Means and Strategies to Achieve Objective 3

Clean and Safe Water Science

Meeting the goal of clean and safe water requires that EPA effectively apply basic research findings to the specific needs of water programs. The Agency will draw on the results of basic research to prove and refine existing conclusions about the drinking water safety and water quality. Critical, scientific aspects of water program research include development of analytic test methods to support programs' scientific integrity; laboratory certification; and analysis of questions more commonly thought of as "social science," such as the costs and benefits of safe drinking water and healthy aquatic ecosystems.

Analytic Test Methods

EPA establishes analytic test methods that describe laboratory procedures for measuring contaminant levels in drinking and surface waters. In some cases, EPA itself develops methods; in other cases, the Agency approves alternative test procedures. Approximately 550 EPA-approved analytical methods exist for nearly 300 contaminants. These test methods support the development of

drinking water standards, surface water quality criteria and standards, industrial discharge regulations, water monitoring, discharge permitting, pretreatment, and compliance.

EPA has several goals for the improving the analytic methods program over the next 5 years. These include reducing the backlog of applications for approval of alternative test procedures, many involving new technology; developing new analytic methods that support increasingly more stringent levels of protection for some contaminants; and making analytic methods readily available to the public through a new web-based system.

Laboratory Certification

To ensure a sound scientific basis for determining whether a system has complied with EPA's drinking water standards, each drinking water regulation incorporates quality control and testing procedures for the laboratories that analyze drinking water samples for contaminants. EPA's Drinking Water Laboratory Certification Program evaluates whether Agency, state, and privately owned laboratories are analyzing drinking water samples accurately using approved laboratory methods and procedures, and are properly implementing quality assurance plans. Only certified laboratories may analyze drinking water samples.

Over the next 5 years, EPA will work to ensure that laboratories are appropriately classified as "certified," "provisionally certified," "interim certified," or "not certified." In making certification decisions, EPA will consider laboratory certification criteria, on-site audits conducted at least once every 3 years, and analysis of test samples.

Methods for Valuing Ecological and Recreation Benefits

A related scientific effort is development of improved methods to assess and value ecological and recreational benefits that result from improvements in water quality. EPA is supporting studies of the monetary value of cleaner water for aquatic life and other ecological and recreational benefits, such as boating, and will use this information to develop more precise estimates of the benefits of water pollution control programs and requirements. This economic work is discussed in greater detail in Appendix 1.

Clean and Safe Water Research

EPA's water research program enables EPA to pursue its objectives for protecting human health and water quality. The Agency's Office of Research and Development (ORD) has developed multi-year plans for drinking water and water quality that describe the research it will conduct over the next 5 to 10 years.

Research to Protect Human Health

The Safe Drinking Water Act Amendments of 1996 direct EPA to conduct research to strengthen the scientific foundation for standards that limit public exposure to drinking water contaminants. The Amendments contain specific requirements for research on waterborne pathogens, such as cryptosporidium and Norwalk virus; disinfection byproducts; arsenic; and other harmful substances in drinking water. EPA is also directed to conduct studies to identify and characterize population groups, such as children, that may be at greater risk from exposure to contaminants in drinking water than is the general population.

EPA's multi-year plan for drinking water research establishes five long-term goals. Within the 5-year scope of this *Strategic Plan*, we will:

- ▼ Develop scientifically sound data and approaches to assess and manage risks to human health posed by exposure to regulated waterborne pathogens and chemicals, including those covered by the Microbial/Disinfection Byproduct, Arsenic, and Six-Year Review rules;
- ▼ Develop scientifically sound data and approaches to assess and manage risks to human health posed by exposure to specific unregulated waterborne pathogens and chemicals on the Contamination Candidate List;
- ▼ Develop innovative tools, improved technologies, and new data to support regulatory decision-making and the implementation of rules by states, local authorities, and utilities;
- ▼ Provide data, tools, and technologies to support EPA, state, and local management decisions for protecting source waters and water quality in the distribution system.

Research to Protect Water Quality

The water quality research program provides approaches and methods the Agency and its partners need to develop and apply criteria to support designated uses, tools to diagnose and assess impairment in aquatic systems, and tools to restore and protect aquatic systems. Water quality research addresses a wide spectrum of aquatic ecosystem stressors. However, particular attention is accorded to stressors that the Agency most often cites as causing water body impairment: embedded and suspended sediment, nutrients, and pathogens and pathogen indicators.

EPA's multi-year plan for water quality research establishes four long-term goals, three of which represent research to be conducted in support of clean and safe water. (The fourth long-term research goal, which focuses on exposures to and health risks presented by biosolids, is reflected under

the Agency's Goal 3, Preserve and Restore the Land.) Within the 5-year scope of this *Strategic Plan*, we will:

- ▼ Provide approaches and methods to develop and apply criteria for habitat alteration, nutrients, suspended and bedded sediments, pathogens, and toxic chemicals that will support designated uses for aquatic systems;
- ▼ Provide the tools to assess and diagnose the causes and pollutant sources of impairment in aquatic systems;
- ▼ Provide the tools to restore and protect impaired aquatic systems and to forecast the ecological, economic, and human health benefits of alternative approaches to attain water quality standards.

HUMAN CAPITAL STRATEGY

Achieving clean and safe water goals will require strengthening the Agency's human capital—the knowledge, skills, and abilities that EPA's workforce needs to implement core water programs. Over the next 5 years, the Agency will concentrate on three human capital priorities in addressing clean and safe water goals: recruiting a highly talented workforce that reflects the diversity of the American citizenry; strengthening the skills and abilities of the current workforce; and training state, tribal, and local water program managers who operate core water programs.

Over the next 5 years, our existing EPA water program workforce will be increasingly eligible for retirement. To meet the present and future challenges of improving our Nation's waters, EPA will need to recruit and train a significant number of highly qualified individuals to replace those who retire and to meet the demands of an evolving water program. EPA water programs will strengthen recruitment planning and focus efforts in key areas. For example, the Agency will need scientists to assist in establishing drinking water standards and developing criteria contaminants for surface water quality. EPA will also focus on recruiting environmental specialists to help protect and restore a diverse environment that ranges from upstream wetlands to marine and ocean ecological systems. In addition, we will enhance staffing to support economic analysis, thereby improving our understanding of the cost and benefits of future regulations.

EPA will use a variety of training and development programs to strengthen the knowledge, skills, and abilities of its current workforce. The foundation of this training effort is the "Water Careers Program." This career development program builds traditional and career development skills, and addresses non-traditional areas such as community development and effective listening. These skills are

essential for development and implementation of TMDLs to restore impaired waters, supporting our strategy for safe swimming in recreational waters and improved water quality on a watershed basis.

EPA “core competencies” will be addressed in all training, with special emphasis on areas identified by the Workforce Assessment Project as gaps between EPA’s current skills inventory and those needed to meet the challenges of providing clean and safe water. These steps will allow EPA to develop and retain a skilled workforce by providing employees with opportunities for learning and professional growth through mentoring programs and developmental assignments.

Finally, the Agency’s water program will continue to provide a diverse range of training programs for our partners: states, tribes, and local governments. For example, the seminar, “Watershed Partnerships: Collaboration for Environmental Decision Making,” emphasizes building community-based partnerships and decision making within watershed areas. Seminars of this caliber develop skills and abilities that are key to both large- and small-scale geographic watershed protection. Other successful training programs include the Drinking Water Academy, the Watershed Academy, the Water Quality Standards Academy, and the NPDES Permit Writer’s Course. The Agency will promote staff exchanges with federal agencies such as USDA and will provide inter-governmental staff assignments to state and tribal partners.

PROGRAM EVALUATION

Over the past 3 years, the national water program has been the subject of numerous internal and external program evaluations, audits, and reviews. The Agency routinely reviews the results of these studies and incorporates any relevant recommendations into its program processes and strategies. The following completed program evaluations influenced the development of the architecture and strategies for Goal 2.

An Assessment of Water Quality Standards Review and Development Process (EPA’s Office of Science and Technology, 2000). The Office of Water conducted an assessment of the processes developed by a selected number of states in developing water quality standards and the EPA regional office efforts to review them. The results of the assessment contributed to the development of the *Strategic Plan* by helping establish new draft Program Activity Measures for developing clear and consistent national guidance on water quality criteria and standards, formulating a multi-year Strategy for Water Quality Standards and Criteria, and improving coordination among EPA, states, and federal agencies.

Assessing the TMDL Approach to Water Quality Management. (National Academy of Sciences, National Research Council, 2001) Congress directed EPA to contract with the

National Academy of Sciences of the National Research Council, to review the quality of the science used to develop TMDLs. The study found that program changes should be made to better account for scientific uncertainties, to improve water quality standards and monitoring programs, and to employ adaptive implementation. Most importantly, this study (along with our own understandings of current state programs) helped support our strategic thrust to place more emphasis on working with states in upgrading their ambient water quality monitoring and assessment.

2002 National Estuary Program (NEP) Implementation Review. (EPA's Office of Wetlands, Oceans, and Watersheds, 2002). The purpose of this evaluation was to assess the progress made by 19 of 28 NEPs in implementing their Comprehensive Conservation Management Plans developed under Section 320 of the Clean Water Act. The findings are used to determine whether an estuary program is eligible for continued funding under Section 320. The Review provided a comprehensive assessment of progress in meeting programmatic objectives as well as environmental improvement in the estuaries. In particular, the ability of the NEPs to restore and protect habitat was assessed, resulting in a measure for habitat protection. Key elements in the review were an assessment of how priority action plans are implemented and who is going to pay, resulting in our including finance plans and leveraging goals in the *Strategic Plan*.

A Review of Statewide Watershed Management Approaches. (EPA's Office of Wetlands, Oceans, and Watersheds, 2002) EPA's Office of Water conducted an evaluation of eight states' experiences with different models of the statewide watershed management approach. The study focused on the impact of the watershed approach on federal and state program management and coordination, public involvement, and the implementation of six core programs under the Clean Water Act and Safe Drinking Water Act. Specific influences of this program evaluation on the *Strategic Plan* include: development of strategic goals that must be attained through contributions from programs that, historically, have been managed separately; development of integrated measures reflecting linkages between source water protection activities and water quality monitoring and TMDL programs; and establishment of a new ecosystem-based goal within the *Strategic Plan* hierarchy.

EXTERNAL FACTORS

EPA's strategies for achieving clean and safe water depend on substantial contributions and investments by many public and private entities.

States are primary partners in implementation of both clean water and safe drinking water programs. Many state water programs have been substantially underfunded to meet basic program needs. For example, funding gaps for state clean water programs are estimated at \$735 to \$960 million dollars per year, meaning that states are funding their water programs at roughly half of the estimated level of need. This problem is compounded by projected state budget deficits. For 2004, all but six states project a budget deficit, and several states project deficits equal or greater than 25 percent of their overall budgets. EPA recognizes that state budget shortfalls are an external factor that may limit progress toward clean and safe water goals.

Consistent with the federal government's unique trust responsibility to federally recognized tribes, EPA implements programs in Indian country, helps build tribal capacity to administer clean and safe water programs, and works with authorized tribes as co-regulators. Tribal resource needs are great. Unlike states, many tribes are still developing programs to administer clean and safe water programs. Lack of support in developing these programs will limit progress toward clean water goals.

Local governments play a critical role in implementing clean and safe water programs, and the continued participation of local government in these programs is critical to cleaner, safer water. Municipalities and other local entities have proven to be strong partners with states and the federal government in the financing of wastewater treatment and drinking water systems, and continued partnership in financing these systems is essential to meeting water goals. Despite sometimes significant resource limits, municipalities are also now taking on additional responsibilities for addressing storm water and combined sewer overflows. In the case of the drinking water program, effective local management of drinking water systems is essential to maintaining high rates of compliance with drinking water standards. Ninety-five percent of the 160,000 or more public water systems responsible for meeting drinking water safety standards are small systems that often struggle to provide safe drinking water. Supporting these local governments is a top priority for EPA.

Several key elements of the national water program, including nonpoint source control and watershed management, require broad partnerships among many federal, state, and local agencies. Over the next several years, building partnerships with the agricultural community (such as USDA, state agricultural agencies, and local conservation districts) is a top priority for meeting clean water goals. We must also continue to strengthen efforts to ensure that USDA's runoff control programs are effectively targeted.

EPA relies on many other agencies to provide monitoring data to measure progress toward its goal of clean and safe water. States lead the effort in water quality monitoring. Other agencies provide critical information as well, such as the U.S Geological Survey, which maintains water monitoring stations throughout the nation, and NOAA, which provides information on coastal waters. EPA relies on the continued collection of data by these agencies. EPA also relies on COE to implement Section

404 of the Clean Water Act. In fact, COE acts as the lead federal agency for permitting the disposal of dredged or fill material and dredged material management and disposal issues.

Finally, all of the EPA's coastal and oceans activities are carried out in partnership with other federal agencies, and, in some cases, international, state, local and private entities as well. EPA relies on its work with the Department of Defense, Coast Guard, Alaska and other states, and a number of cruise ship and environmental and non-governmental organizations regarding regulatory and non-regulatory approaches to managing wastewater discharges from vessels. Meeting ocean and coastal goals will also depend on the extent to which the growth in coastal areas is directed in ways that minimize effects on water quality.

GOAL 3

PRESERVE AND RESTORE THE LAND

Preserve and restore the land by reducing and controlling risks posed by releases of harmful substances; promoting waste diversion, recycling, and innovative waste management practices; and cleaning up contaminated properties to levels appropriate for their beneficial reuse.

EPA will work to preserve and restore the land using the most effective waste management and cleanup methods available. Left uncontrolled, hazardous and nonhazardous wastes on the land can migrate to the air, groundwater, and surface water, contaminating drinking water supplies, causing acute illnesses or chronic diseases, and threatening healthy ecosystems in urban, rural, and suburban areas. Hazardous substances can kill living organisms in lakes and rivers, destroy vegetation in contaminated areas, cause major reproductive complications in wildlife, and otherwise limit the ability of an ecosystem to survive.

EPA uses a hierarchy of approaches to protect the land: reducing waste at its source, recycling waste, and managing waste effectively by preventing spills and releases of toxic materials and cleaning up contaminated properties. The Agency is especially concerned about threats to our most sensitive populations, such as children, the elderly, and individuals with chronic diseases.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) and the Resource Conservation and Recovery Act (RCRA) provide the legal authority for most of EPA's work toward this goal. The Agency and its partners use Superfund authority to clean up uncontrolled or abandoned hazardous waste sites and return the land to productive use. Under RCRA, EPA works in partnership with states and tribes to address risks associated with leaking underground storage tanks (LUSTs) and with the generation and management of hazardous and nonhazardous wastes at active facilities.

EPA also uses authorities provided under the Clean Air Act, Clean Water Act, and Oil Pollution Act of 1990 to protect against spills and releases of hazardous materials. Controlling the many risks posed by emergency releases of harmful substances presents a significant challenge to protecting the land. EPA uses an approach that integrates prevention, preparedness, and response activities to minimize these risks. Spill prevention activities keep harmful substances from being released to the environment. Improving EPA's readiness to respond to emergencies through training, development of clear authorities, and provision of proper equipment will ensure that we are adequately prepared to minimize contamination and harm to the environment when spills do occur.

OBJECTIVES

Objective 3.1: Prevention of, Preparedness for, and Response to Accidental and Intentional Releases. By 2008, reduce and control the risks posed by accidental and intentional releases of harmful substances by improving our nation's capability to prevent and respond more effectively to these emergencies.

Sub-objective 3.1.1: Preparedness for Emergencies. By 2008, improve the Agency's emergency preparedness by achieving and maintaining the capability to respond to simultaneous large-scale emergencies, and increasing response readiness by XX% (from a baseline established in FY 2003).

Sub-objective 3.1.2: Respond to Hazardous Substances Releases and Oil Spills. By 2008, EPA will increase the cumulative number of responses to hazardous substance releases from 7,469 to 9,219 and to oil spills from 2,958 to 4,458.

Sub-objective 3.1.3: Prevent Oil Spills. By 2008, reduce releases to the environment from oil facilities by increasing the number of those facilities in compliance from 3,525 to 6,000 where the universe of oil facilities is about 415,000.

Means and Strategies to Achieve Objective 1

Prevention, Preparedness, and Response

EPA plays a major role in reducing the risks posed to human health and the environment, especially our land resources and natural ecosystems, from accidental and intentional releases of harmful substances and oil. Under the National Response System (NRS), EPA evaluates and responds to thousands of releases annually. The NRS is a multi-agency preparedness and response mechanism which includes the following key components: the National Response Center; the National Response Team, composed of 16 federal agencies; 13 Regional Response Teams; and federal On-Scene Coordinators (OSCs). These organizations work with state and local officials to develop and maintain contingency plans that will enable the Nation to respond effectively to hazardous substance and oil emergencies. When an incident occurs, these groups will coordinate with the OSC in charge to ensure that all necessary resources, such as personnel and equipment, are available and that containment, cleanup, and disposal activities proceed quickly, efficiently, and effectively. EPA's primary role in the NRS is to serve as the federal OSC for spills in the inland zone. As a result of NRS efforts, the Nation has successfully contained many major oil spills and releases of hazardous substances, minimizing the adverse impact on human health and the environment.

EPA's emergency preparedness, prevention, and response staff are vital to meeting the targets established for prevention, preparedness, and response. The Agency will continue to develop technical personnel in the field, ensuring their readiness and protecting their health and safety when responding to releases of dangerous materials. In addition, EPA will strengthen its information infrastructure by making information management decisions Agency-wide and by improving operations and the security, collection, and exchange of information.

Preparing for Emergencies

Preparedness on a national level is essential to ensure that emergency responders are able to deal with multiple, large-scale emergency incidents, including those that may involve biological agents or weapons of mass destruction. Over the next several years, EPA will enhance its core emergency response program to respond quickly and effectively to chemical, biological, and radiological incidents or releases and will improve coordination mechanisms to enable response to simultaneous, large-scale national emergencies, including homeland security incidents. We will focus our efforts on Regional Response Teams and coordination among regions; health and safety issues, including identification, clothing, training, and exercise; establishment of delegation and warrant authorities; response readiness, including equipment; transportation; and outreach. The criteria for excellence in the EPA's core emergency response program will ensure a high level of overall readiness throughout the Agency and improve our ability to support multi-regional responses.

In addition to enhancing its readiness capabilities, the Agency will work to improve internal and external coordination and communication mechanisms. For example, as part of the National Incident Coordination Team (NICT), EPA will continue to improve its policies, plans, procedures, and decision-making processes for coordinating response to national emergencies. Under the Continuity of Operations/Continuity of Government program, we will upgrade and test plans, facilities, training, and equipment to ensure that essential government business can continue during a catastrophic emergency. NRT capabilities are being expanded to coordinate interagency activities during large-scale responses and to carry out future assignments from the Department of Homeland Security. EPA will coordinate its activities with the Department of Homeland Security, Federal Emergency Management Administration (FEMA), Federal Bureau of Investigation (FBI), other federal agencies, and state and local governments and will continue to clarify its roles and responsibilities to ensure that Agency security programs are consistent with the national homeland security strategy.

Responding to Hazardous Substances Releases and Oil Spills

Each year, EPA personnel assess, respond to, mitigate, and clean up thousands of releases, whether accidental, deliberate, or naturally occurring. These incidents range from small spills at chemical or oil facilities to national disasters such as hurricanes, earthquakes, terrorist events like the

September 11 World Trade Center and anthrax attacks, and the Columbia shuttle tragedy.

EPA will work to improve its capability to respond effectively to incidents that may involve harmful chemical, biological, and radiological substances. To implement its effectiveness strategy, the Agency will explore improvements in response readiness levels, including field and personal protection equipment and response training and exercises; review response data provided in the “after-action” reports prepared by EPA emergency responders following a release; and examine “lessons learned” reports to identify which activities work and which need to be improved. Application of this information and other data will improve the Agency’s response operations and advance the state-of-the-art of emergency response.

Preventing Oil Spills

An important component of EPA’s land strategy is preventing oil spills from reaching our Nation’s waters. Under the Oil Pollution Act, the Agency requires certain facilities to develop and implement spill prevention, control, and countermeasure (SPCC) plans. SPCC plans ensure that facilities put in place containment and other countermeasures that would prevent oil spills from reaching navigable waters. Facilities that are unable to provide secondary containment, such as berms around an oil storage tank, must provide a spill contingency plan as part of their SPCC plan that details clean-up measures to be taken if a spill occurs. Compliance with these requirements reduces the number of oil spills and helps prevent detrimental effects on human health and the environment should a spill occur.

Objective 3.2: Waste Reduction, Recycling, and Safe Waste Management. By 2008, reduce adverse effects to land by reducing waste generation, increasing recycling, and ensuring proper management of waste and petroleum products at facilities in ways that prevent dangerous releases.

Sub-objective 3.2.1: Reduce Waste Generation and Increase Recycling. By 2008, decrease the impact of waste disposed on the land by reducing materials and energy use through product and process redesign, and by increasing materials and energy recovery from wastes otherwise requiring disposal.

Strategic Targets:

- By 2008, maintain the national average municipal solid waste generation at 4.5 pounds per person per day.
- By 2008, increase municipal solid waste recycling to 35% from 31% in 2002.

Sub-objective 3.2.2: Prevent Dangerous Releases from RCRA Facilities. By 2008, prevent dangerous releases to the environment from RCRA hazardous waste management facilities.

Strategic Targets:

- By 2008, increase the percentage of RCRA hazardous waste management facilities with approved controls in place from 87% to 98%.
- Approximately 36% of the facilities that are due for permit renewals by the end of 2006 will have updated controls approved by the end of 2008.
- By 2008, reduce hazardous waste combustion facility emissions of dioxins and furans by 90%, particulate matter by 50% and acid gases by 50% from levels emitted in 1994.

Sub-objective 3.2.3 Reduce Releases from USTs. By 2008, reduce releases to the environment from underground storage tanks (USTs) by increasing the percentage of UST facilities that are in significant operational compliance from 65% to 80%.

Means and Strategies to Achieve Objective 2

Waste Reduction and Recycling

EPA's strategy for reducing waste generation and increasing recycling is based on (1) establishing and expanding partnerships with businesses, industries, states, communities, and consumers; (2) stimulating infrastructure development, product stewardship, and new technologies; and (3) helping businesses, government, institutions, and consumers by providing education, outreach, training, and technical assistance.

The Resource Conservation Challenge

The Resource Conservation Challenge (RCC) is the Agency's primary vehicle for implementation of this multi-component strategy. The RCC represents a major national effort to find flexible yet protective ways to conserve our valuable natural resources through waste reduction, recycling, and energy recovery. The program is designed to elicit a response from all Americans, since we all have opportunities to reduce the waste we produce and to increase recycling. Through the RCC, EPA challenges Americans to make purchasing and disposal decisions that conserve our natural resources, save energy, reduce costs, and preserve the environment for future generations.

The RCC reaches beyond municipal solid waste; it promotes reduction, recycling, and pollution prevention in the generation and management of industrial solid and hazardous wastes as well. Many materials that are currently managed as “wastes” and sent to land disposal facilities can be recycled and put to beneficial uses. Coal combustion products, metal-bearing industrial byproducts, foundry sands, electronic equipment, and used tires are some examples. In many cases, making changes in industrial or commercial processes can eliminate or reduce waste generation in the first place. EPA is working closely with states and other stakeholders to reduce and recycle municipal and industrial wastes. As part of this effort EPA will also carefully review waste generation and waste management practices to identify opportunities to reduce wastes, remove barriers to recycling and recovery, and promote beneficial uses.

EPA is assuming a national leadership role in working with its partners to identify additional goals that will supplement our current targets. These goals will reflect the evolving, expanded effort the Agency is beginning in 2003 to decrease use and increase recovery of materials and energy through recycling, waste minimization, and other approaches. (Also see Objective 2 under Goal 5, Compliance and Environmental Stewardship, for a discussion of our plans to reduce priority-list chemicals in hazardous waste streams.)

Establishing and Expanding Partnerships

EPA will establish and expand partnerships with industry, states, and other entities to reduce waste and to develop and deliver tools that can help businesses, manufacturers, and consumers. Nationally recognized programs such as WasteWise, which uses partnerships to encourage waste prevention and recycling, will serve as models for new alliances between federal, state, and local governments and businesses that capitalize on voluntary efforts to reduce waste and increase recycling. EPA and the Nation will also continue to benefit from well-established programs. For example, through 2001, WasteWise partners reduced over 35 million tons of waste through waste prevention and recycling efforts, and EPA estimates that, since the program’s inception, partners have prevented the emission of nearly 30 million tons of carbon equivalent, as much as would be realized by removing more than 20 million cars from the road for 1 year.

Another example of an expanded partnership program is the WasteWise Building Challenge, which EPA initiated in 2002. This program will continue to promote development of new tools, such as waste hauling contracts that provide financial incentives for haulers to identify and implement cost-effective, resource-efficient source reduction and recovery. The National Waste Minimization Partnership Program, discussed among the pollution prevention activities conducted under Goal 5, is a further example of a waste reduction strategy. In this case, partnerships target 30 hazardous waste chemicals for reduction by altering manufacturing practices and implementing recycling efforts. EPA will continue to foster such public-private partnerships to prompt new waste reduction, reuse, and

recycling initiatives.

Stimulating Infrastructure Development, Product Stewardship and New Technologies

Another key strategy for reducing waste is fostering development of infrastructure that will make it easier for businesses and consumers to reduce the waste they generate, acquire and use recycled materials, and purchase products containing recycled materials.

EPA will continue to promote development of new and better recycling technologies and explore ways to obtain energy or products from waste. Several initiatives already underway demonstrate the potential of such efforts. EPA has established voluntary product stewardship partnerships with manufacturers, retailers, government, and non-governmental organizations to reduce the life-cycle impacts of electronics and carpets. In January 2002, EPA, a carpet trade association, major manufacturers, and a variety of state and regional government organizations signed a breakthrough Memorandum of Understanding (MOU) to substantially reduce the amount of used carpet going to landfills. The MOU also created a new industry-funded organization to support the development of recycling infrastructure and provide for government procurement and market development initiatives to support this undertaking. In the coming years, EPA will pursue similar infrastructure-building efforts. The Agency will continue its work to establish programs for recycling cathode ray tubes (CRTs), which account for some of the largest volumes of recyclable materials in computer and electronics waste streams. EPA recently published proposed revisions to controls over CRT recycling to promote development of a safe, nationwide recycling infrastructure and market for used CRTs.

EPA will also promote development of new and better recycling technologies and explore ways to obtain energy or products from waste. Through bioreactor technology, the collection of landfill gases containing methane offers promise as a future source of energy. The Agency will continue to support several on-going initiatives that revamp technologies to reduce or eliminate the use of virgin materials, recover energy to produce power, and improve waste management.

Education, Outreach, Training and Technical Assistance

EPA will continue to work with major retailers, electronics manufacturers, and the amusement and motion picture industries to revitalize, create, and display conservation, waste prevention, and recycling messages. Communicated via movie and video trailers, posters targeted to schoolchildren, in-store displays and advertisements, and print and broadcast public service announcements, the messages will encourage consumers, young people, and under-served communities to make smarter, more responsible environmental decisions. The Agency and its partners will design activities that encourage students and teachers to start innovative recycling programs and will develop unique tools and projects

to promote waste reduction, recycling, and neighborhood revitalization in Hispanic and African-American communities and on Indian lands.

EPA has direct implementation responsibility for RCRA hazardous waste and UST programs in Indian country. Recognizing the unique challenges encountered on tribal lands, EPA will work with tribes on a government-to-government basis that affirms the federal government's vital trust responsibility to 572 tribal governments and recognizes the importance of conserving natural resources for cultural uses. Working with other federal agencies, EPA will continue to help its tribal partners improve practices for managing solid waste. We will conduct joint projects to upgrade tribal solid waste management infrastructure, including plans, codes and ordinances, recycling programs, and other alternatives to open dumping. These efforts will help to prevent open dumping in Indian country in the future and allow clean up of existing dumps, reducing the risks that such dumps pose to health and the environment..

Preventing Dangerous Releases from RCRA Facilities

Recognizing that some hazardous wastes cannot yet be completely eliminated or recycled, the RCRA program works to reduce the risks of exposure to hazardous wastes by maintaining a "cradle-to-grave" approach to waste management.

Working With State Partners in Implementing the Regulatory Framework

Hazardous waste management facilities with appropriate controls in place have already made significant progress in minimizing exposure to hazardous substances. Achieving greater efficiencies at waste management facilities through more focused permitting processes while tightening standards where appropriate are the bases of EPA's strategy to address hazardous wastes that must be treated or stored. EPA will work with its state, tribal, and local government partners to ensure that hazardous waste management facilities have approved controls in place and continue to strive for safe waste management.

To accomplish this Objective, EPA will work with authorized states, specifically those with a large number of facilities lacking approved controls in place, to help resolve issues and transfer successful strategies from other states. EPA also plans to study the universe of un-permitted facilities and work with states to identify and resolve issues that may be preventing key categories of facilities from obtaining permits or putting other approved controls in place. To achieve greater efficiencies at facilities that treat or store hazardous waste, the Agency will also promote new innovative technologies that streamline permitting processes and improve protection of human health and the environment.

Reducing Hazardous Waste Combustion Emissions

EPA will continue to develop and issue regulations regarding emissions standards for hazardous waste combustion facilities. Implementation of these regulations is key to reducing the emission of dioxins, furans, particulate matter, and acid gases. Within 2 years from the date that EPA issues new limits, facilities will conduct emissions tests to demonstrate their reductions. Additional periodic tests will ensure continued compliance with the limits established for emissions.

Application of Biosolids (Sewage Sludge)

EPA's Office of Water regulates the application of biosolids (sewage sludge) to land and works to improve state and industry implementation of the regulations. In 2002, the National Academy of Sciences reviewed EPA's biosolids land application program. In the coming years, EPA will be responding to this report, discharging its regulatory responsibilities under the Clean Water Act, and conducting program implementation activities.

Preventing Leaks from Underground Storage Tanks

EPA recognizes that, because of the size and diversity of the regulated community, state and local governments are in the best position to regulate USTs. RCRA Subtitle I allows state UST programs approved by EPA to operate in lieu of the federal program. Furthermore, state and local authorities, who are closer to the situation in their domain, are likely in the best position to set priorities. Even states that have not received formal state program approval from EPA are in most cases the primary implementing agencies (excepting in Indian country) and receive annual grants from EPA.

EPA will continue to work with its state and tribal partners to prevent and detect petroleum releases from USTs by ensuring that compliance with leak detection and leak prevention (spill, overfill, and corrosion protection) requirements is a national priority. While the vast majority of the approximately 698,000 active USTs have the equipment required under the regulations, significant work remains to ensure that UST owners and operators properly maintain and operate their systems. Therefore, to protect our Nation's ground water and drinking water from petroleum releases, EPA will continue to support state programs, strengthen partnerships among stakeholders, and provide technical and compliance assistance and training to promote and enforce petroleum management controls at UST facilities.

In addition, EPA will continue to work with states to obtain their commitments to increase their inspection and enforcement presence if state-specific goals are not met. The Agency and states will use innovative outreach and education tools to bring more tanks into compliance. For example, multi-site agreements can be effective in bringing a single tank owner with multiple sites into compliance.

The Agency will also provide guidance to foster the use of new technology to enhance

compliance. For example, the presence of methyl-tertiary-butyl-ether (MTBE) in gasoline increases the importance of preventing and rapidly detecting releases, since MTBE cleanups can cost 100 percent more than cleanups involving other gasoline contaminants. The Agency will focus its efforts on reducing UST releases and increasing early detection of petroleum products, including MTBE, by further evaluating the performance of compliant UST systems

While the frequency and severity of releases have been greatly reduced, EPA and its state partners have observed that releases are still occurring. Although there are many factors that may actually lead to an increase in reported releases from USTs, improper operation and maintenance of UST equipment contribute to these continued problems, as do problems with the equipment itself. Therefore, in FY 2004, the Agency will continue its evaluation of the performance of new or upgraded UST systems to better identify the sources and causes of releases and to determine the success of leak detection systems in quickly identifying releases. The Agency will also continue to identify opportunities for improving UST system performance.

Objective 3.3: Cleanup and Reuse of Contaminated Land. By 2008, control the risks to human health and the environment at contaminated properties or sites, and make land available for reuse.

Sub-objective 3.3.1: Control Risks at Contaminated Sites. By 2008, risks to human health and the environment at contaminated sites will be controlled through cleanup, assessment, stabilization, or other action.

Strategic Targets:

- **Site Assessments:** By 2008, EPA and its partners will perform site assessments leading to final assessment decisions (no further action or identification of appropriate cleanup program). (Under Superfund, assessments will be performed at 100,000 sites, leading to 41,700 final decisions, and under RCRA, 90% of facilities requiring such screening will be assessed.)
- **Current Human Exposures Under Control:** By 2008, EPA will determine that all identified current human exposure from contamination at sites are under control or below health-based levels for current land and/or groundwater use conditions. This environmental indicator does not consider potential future land or groundwater uses or ecological receptors. (Determination will occur at 95% of relevant RCRA facilities and 84% of Superfund sites.)
- **Groundwater Migration Under Control:** By 2008, EPA will determine that the

migration of contaminated groundwater from sites is controlled through engineered remedies or natural processes, to prevent human exposures and unacceptable discharge levels to surface water, sediments or ecosystems at the site. (Determination will occur at 70% of relevant RCRA facilities and 65% of Superfund sites.)

- **Remedy Selections:** By 2008, EPA and its partners will determine that final remedies, designed to clean up contamination to risk levels that are protective of human health and the environment and appropriate for reasonably anticipated future land use, have been selected at 70% of relevant RCRA facilities and 1,223 Superfund sites.
- **Cleanups:** By 2008, EPA and its partners will determine that cleanups are completed at 105,000 LUST sites. Additionally, EPA and its partners will determine that construction of remedies, designed to clean up contamination to risk levels that are appropriate for the next reasonably anticipated future land use, is complete at 50% of relevant RCRA facilities and 1,086 Superfund sites.

Sub-objective 3.3.2: Make Land Available for Reuse. Through 2008, land will be made available for reuse through cleanup, assessment, stabilization, or other action which indicates that such lands are restored to levels that are protective for the next reasonably anticipated future land use. (A strategic target for EPA-lead sites is under development.)

Sub-objective 3.3.3: Maximize Potentially Responsible Party Participation at Superfund Sites. Through 2008, conserve Superfund trust resources by ensuring that potentially responsible parties conduct or pay for Superfund cleanups whenever possible.

Strategic Targets:

- Through 2008, EPA will reach a settlement or take an enforcement action by the time of the Remedial Action (RA) start at 90% of Superfund sites (with RA starts during the fiscal year) that have known non-Federal, viable, liable parties.
- Through 2008, EPA will address all Statute of Limitations (SOL) cases for Superfund sites with unaddressed total past costs equal to or greater than \$200,000.

Means and Strategies to Achieve Objective 3

Contaminated land poses a risk to human health and the environment. Leaching contaminants can foul drinking water in underground aquifers used for wells or surface waters used by public water intakes. Contaminated soil can result in human ingestion or dermal absorption of harmful substances. Contamination can also impact subsistence resources, including resources subject to special protections due to treaties between federal and tribal governments. Furthermore, because of the risks it poses contaminated land may not be available for use. EPA and its partners work to clean up contaminated land to levels sufficient to control risks to human health and the environment and ultimately to return the land to productive use. The Agency's clean-up activities, some new and some well-established, include removal of contaminated soil, capping or containment of contamination in place, groundwater pump-and-treat activities, and bioremediation.

EPA uses a variety of tools to accomplish cleanups: permits, enforcement actions, consent agreements, Federal Facilities Agreements (FFAs), and many other mechanisms. As part of EPA's One Clean-up Program Initiative, programs at all levels of government will work together to ensure that appropriate clean-up tools are used; that resources, activities, and results are coordinated with partners and stakeholders and communicated to the public effectively; and that cleanups are protective and contribute to community revitalization. This approach reflects EPA's efforts to coordinate across all of its clean-up programs, while maintaining the flexibility needed to accommodate differences in program authorities and approaches.

EPA fulfills its clean-up and waste-management responsibilities on tribal lands by acknowledging tribal sovereignty and recognizing tribal governments as the most appropriate authorities for setting standards, making policy decisions, and managing programs consistent with Agency standards and regulations.

Through strong policy, leadership, program administration and a dedicated workforce, EPA's clean-up programs will merge sound science, cutting-edge technology, quality environmental information, and stakeholder involvement to protect the Nation from the harmful effects of contaminated property. To accomplish its clean-up goals, the Agency will continue to forge partnerships and develop outreach and education strategies.

Assessment, Stabilization, and Clean Up

EPA and its partners follow four key steps to accomplish cleanups and control risks to human health and the environment: assessment, stabilization, selection of appropriate remedies, and implementation of remedies. We will continue to work with our federal, state, tribal, and local government partners at each step of the process to identify facilities and sites requiring attention and to monitor changes in priorities, addressing new priority sites or removing previously identified facilities that will be addressed through other mechanisms. As they modify existing systems and approaches and

create new ones, clean-up programs will also continue to develop guidance for accomplishing each of these steps.

Assessment of Sites

All programs assess preliminary site information to identify potential exposures and sites or facilities that require further action. These assessments flag sites that will require priority action to protect human health and the environment and also direct site owners and operators to the appropriate authorities for follow-up. EPA conducts site assessments with all partners who share authority for the site in order to establish a common base of information for all stakeholders.

Stabilization of Sites

“Stabilization” refers to the initial actions taken to control actual or potential exposure, based on current land and groundwater usage. Site stabilization can include activities such as installing fences, slurry walls, pump-and-treat systems, or permeable reactive walls. Where appropriate, these actions are taken immediately to protect populations located within a reasonable distance from the site from exposure to harmful contaminants.

Selection of Site Remedies

In selecting final remedies, the Agency seeks to address all current and potential sources of contamination that threaten human health and the environment. Remedies are selected based on many criteria, including protectiveness offered, environmental media clean-up objectives, short- and long-term effectiveness, implementation issues, and acceptability to state and tribal governments and the affected community. In selecting remedies, EPA and its partners also consider reasonably anticipated future land use.

Implementation of Site Remedies

Implementation or construction of the site remedy is the first step in the final remediation process. Following implementation, EPA encourages monitoring of the site to ensure that the cleanup adequately protects human health and the environment.

The Agency is also planning several projects to help us characterize the benefits of various clean-up programs. These pilot projects are intended to evaluate (1) the feasibility of estimating the number of people whose potential exposure to hazardous substances has been reduced as a result of clean-up activities, (2) the degree to which ecological receptors are protected from hazardous substances through clean-up activities, and (3) the economic impact of clean-up activities.

Reuse and Restoration

Usable land is a valuable resource. However, where contamination presents a real or perceived threat to human health and the environment, options for future land use at that site may be limited. EPA's clean-up programs have set a national goal of returning formerly contaminated sites to long-term, sustainable, and productive use. This goal creates greater impetus for selecting and implementing remedies that, in addition to providing clear environmental benefits, will support reasonably anticipated future land use options and provide greater economic and social benefits.

EPA is evaluating its policies and guidelines to determine where it can refine its approach to cleanups to facilitate beneficial site reuse. EPA is also forming partnerships with states, tribes, other federal agencies, local governments, communities, land owners, lenders, developers, and parties potentially responsible for contamination that can help bring about reuse of formerly contaminated sites.

(Also see the discussion of EPA's Brownfields Program under Goal 4, Healthy Communities and Ecosystems.)

Responsible Party Participation

Enforcement authorities play a critical role in all Agency clean-up programs. However, enforcement authorities have an additional and unique role under the Superfund program, where they are used to leverage private-party resources to conduct a majority of the clean-up actions and to reimburse the federal government for cleanups financed by the Trust Fund. EPA will continue to pursue the following two strategies for limiting the use of trust funds:

"Enforcement First" under Superfund

Historically, EPA has achieved at least \$6 in private-party clean-up commitments for every \$1 spent on enforcement. The Agency will continue to use its enforcement authorities to achieve this end. The Superfund program's "Enforcement First" strategy will allow EPA to focus limited Trust Fund resources on sites where viable, potentially responsible parties do not exist or lack the funds or capabilities needed to conduct the cleanup. By taking enforcement actions at sites where viable, liable parties do exist, EPA will continue to leverage private-party dollars so that Trust Fund money is used only when absolutely necessary to clean up hazardous waste sites.

Cost Recovery

Cost recovery is another way to leverage private-party resources through enforcement. Under

Superfund, EPA has the authority to compel private parties to pay back Trust Fund money spent to conduct clean-up activities. EPA will continue its efforts to address 100 percent of the Statute of Limitations cases for Superfund sites with unaddressed total past costs equal to or greater than \$200,000 and to report the value of costs recovered.

Objective 3.4: Science/Research. Through 2008, provide and apply a sound scientific foundation to EPA's pursuit of protecting and restoring land by conducting leading edge research and development of better understanding and characterization of environmental outcomes under Goal 3.

Sub-objective 3.4.1: Conduct Research to Support Land Activities. Through 2008, conduct leading-edge, sound scientific research to provide a foundation for preservation of land quality and remediation of contaminated land. Research will result in documented methods, models, assessments, and risk management options for Program and Regional Offices, facilitating their accurate evaluation of effects on human health and the environment, understanding of exposure pathways, and implementation of effective risk management options.

Sub-objective 3.4.2: Science to Preserve and Remediate Land. Through 2008, provide a program based on sound science, and continuously integrate smarter technical solutions and protection strategies that enhance our ability to preserve land quality and remediate contaminated land for beneficial reuse.

Means and Strategies to Achieve Objective 4

Science to Preserve and Remediate Land

EPA will continue to improve and demonstrate its capability to assess environmental conditions and determine the relative risks that contaminated land poses to health and the environment. The Agency will ensure that the environmental data it collects is of known, documented, and acceptable quality by implementing necessary field and lab procedures, practices, and controls. We will continue integrating technological advances to enhance our site investigation capabilities, implement cost-effective remedies, and improve the operation and maintenance of existing remedies. In addition, EPA will continue to coordinate with other agencies to identify and communicate program research priorities.

Research to Preserve and Remediate Land

To support achievement of its objectives for land, EPA has developed multi-year plans for research on contaminated sites, RCRA issues, and biosolids (as part of its water quality research). Each of the Agency's research plans outlines long-term targets for reducing scientific uncertainties

associated with these topics.

Research activities related to contaminated sites will include demonstrating and verifying cost-effective technologies for characterization and remediation of contaminated sites through the Superfund Innovative Technology Evaluation program; providing site-specific technical assistance (including models) during all phases of characterization and remediation of contaminated sites; and providing support and advice to further the application of sound science in regulatory and non-regulatory efforts (rule-making, developing guidance, and other activities). More specifically, Agency goals for research on contaminated sites will:

- Aid in the selection of protective, cost-effective remedies for contaminated sediment by improving risk and site characterization and increasing understanding of different remedial options;
- Provide decision makers with performance and cost information on alternatives to pump-and-treat remedies for ground water and tools for ground water characterization and assessment;
- Provide tools and methods to assess, remediate, and manage soil and land efficiently at contaminated sites; and
- Provide scientific tools, methods, models, and technical support to characterize multimedia site contamination; assess, predict, and communicate risks; evaluate innovative remediation options; develop testing protocols and risk management strategies; and identify fate and effects of oil spills.

EPA will focus its RCRA-related research primarily on treatment processes for hard-to-treat chemicals; innovative containment technologies; and site-specific technical support and state-of-the-art methods, tools, and models for addressing priority RCRA management issues. More specifically, the Agency's goals for RCRA research will:

- ▼ Improve resource conservation and waste management for industrial and municipal wastes to enhance sustainability by providing peer-reviewed reports; and
- ▼ Support scientifically defensible and consistent decision making at RCRA waste management facilities by providing a tested multimedia modeling system, supporting peer-reviewed technical reports, and providing technical support.

EPA's multi-year research plan for water quality sets a long-term goal relating to biosolids. As a part of that research effort, the Agency will develop approaches, methods, and tools for assessing

exposures and reducing risks that biosolid contaminants pose to human health. EPA will use these results to update guidance on biosolids support regulations.

HUMAN CAPITAL STRATEGY

Advancing EPA's goal of protecting, preserving, and restoring the land requires a highly competent and motivated workforce to provide the technical assistance, training, and outreach tools needed by the Agency's partners. Our employees must create new partnerships with state and local governments, federal agencies, tribes, concerned citizens, and industry; ensure homeland security through their readiness to prevent and respond to acts of terror; and understand and apply appropriate insurance, real estate, and remediation strategies to promote the restoration and reuse of land.

Over the next few years, a substantial number of senior managers and employees currently involved in work supporting this Goal will be eligible to retire. To address this anticipated exodus, EPA will focus on building the talent needed to protect, preserve, and restore the land. The Agency's strategy includes developmental programs for staff; recruitment efforts, including establishment of partnerships with institutions of higher learning and rotational programs that provide cross-office experiences; and mentoring programs.

EPA will train its field responders extensively, providing scientific and technical training for detection, analysis, and response to chemical, biological, and chemical agents and training in incident command system response management processes. The Agency will develop and deliver training courses tailored to different levels of response experience and involvement: refresher courses for senior, experienced responders; in-depth training for newer responders in both scientific and response management areas; and training for all responders in state-of-the-art response techniques and emerging chemical, biological, and radiological threats.

EPA is currently developing training modules to assist EPA staff in implementing combustion permits. We will also continue to use communication technology, such as teleconferencing and internet-based conferencing, to provide technical training to EPA employees in such areas as making environmental indicator determinations and dealing with particular problems at corrective action facilities.

The land research program provides a scientific foundation for the risk management policies required of the Agency and supports the contaminated sites program and the waste management program. Over the next several years, the land research program will focus its human capital strategy on expanding its capabilities to secure and maintain expertise in characterization and monitoring methods, health and ecosystem effects estimation models, remediation and containment technologies,

multimedia modeling, sampling methods, land technologies, combustion, and chemical treatment technologies. To ensure that the EPA maintains the expertise it needs, the Agency is expanding its post-doctoral recruitment program and examining authorities to establish a pilot program for hiring additional researchers.

PROGRAM EVALUATION

Program evaluation results did not significantly influence development of the Agency's goals and objectives for protecting and restoring the land.

EXTERNAL FACTORS

EPA's ability to respond as the Federal OSC for releases of harmful substances in the inland zone will be impacted by several external factors. The NRS assures that EPA will respond when necessary, but relies heavily on the ability of responsible parties and state, local, and tribal agencies to respond to most emergencies. The need for EPA to respond is a function of the quantity and severity of spills that occur, as well as the capacity of state, local, and tribal agencies to address spills.

EPA's ability to respond to homeland security incidents may be affected by circumstances surrounding each event. For instance, if travel or communication is severely impacted, EPA's response may be delayed and its efficiency compromised. Also, in the case of a single large-scale incident, our Removal Program resources will likely be concentrated on that response, thus reducing our ability to address other emergency releases. In severe cases, EPA's current emergency response workforce and resources may not be sufficient to address a large number of simultaneous large-scale incidents.

In addition, a number of external factors could substantially impact the Agency's ability to achieve its objectives for cleanup and prevention. These factors include Agency reliance on private-party response and state and tribal partnerships, development of new environmental technologies, work by other federal agencies, and statutory barriers. Achievement of the release prevention objectives and attainment of our FY 2008 targets will depend heavily on the participation of states that have been authorized or approved to be the primary implementors of these programs.

Attainment of our waste reduction and recycling objectives will depend on participation of federal agencies, states, tribes, local governments, industries, and the general public in partnerships aimed at reducing waste generation and increasing recycling rates. EPA provides national leadership in the areas of waste reduction and recycling to facilitate public and private partnerships that can provide the impetus for government, businesses, and citizens to join in the campaign to significantly reduce the

amount of waste generated and ultimately sent for disposal. However, both domestic and foreign economic stresses can adversely impact markets for recovered materials.

State programs are primarily responsible for implementing the RCRA Hazardous Waste and Underground Storage Tank Programs. The Agency's ability to achieve its goals for these programs depends on the strength and funding levels of state programs. The ability to meet compliance standards is dependent on extensive training and a strong state presence. The Agency will build upon its commitment to provide states and tribes with technical support and training to increase UST compliance.

GOAL 4

HEALTHY COMMUNITIES AND ECOSYSTEMS

Protect, sustain or restore the health of people, communities, and ecosystems using integrated and comprehensive approaches and partnerships.

To achieve its fourth goal, Healthy Communities and Ecosystems, EPA must bring together a variety of programs, tools, approaches, and resources; create strong partnerships with federal, state, tribal, and local government agencies; and enlist the support of many stakeholders. Because Goal 4 is unique in its cross-media, cross-Agency approach, building a cohesive, integrated strategy is critical for achieving results.

EPA must manage environmental risks to watersheds, communities, homes and workplaces to protect our health and the environmental integrity of ecosystems. The Agency will employ a mix of regulatory programs and alternative voluntary approaches to achieve results efficiently and in innovative, sustainable ways. For example, preventing pollution at the source is a key strategy for reducing risk and environmental impact. However, where programs to prevent pollution or ecosystem damage are not viable, EPA promotes waste minimization, avoidance of impact on habitat, and disposal and remediation. In managing risk, EPA will direct its efforts toward the greatest threats in our communities, homes, and workplaces, including those to sensitive populations including children, the elderly, and Native Americans.

A key component of this goal is protecting human health and the environment by identifying, assessing, and reducing the risks presented by the thousands of chemicals on which our society and economy have come to depend. These include the pesticides we use to meet national and global demands for food and the industrial and commercial chemicals ubiquitous in our homes, our workplaces, and the products we use. EPA must also address the emerging challenges posed by a growing array of biological organisms—naturally occurring and, increasingly, genetically engineered—that are being used in industrial and agricultural processes.

Ensuring the safety of America's food supply is critical to public health and a primary concern for the Agency. Production processes designed to ensure that food is abundant, affordable, and safe may lead to adverse environmental and health effects. Modern pest control methods, for example, may present risks to human health and the environment. And the importance of safe pesticide use extends beyond the farm; pesticides remain essential for controlling pests such as insects, weeds, bacteria, and others in homes, gardens, hospitals, and drinking water treatment facilities. The Nation's reliance on pesticides makes it all the more critical that they are safe when they enter and remain in the

marketplace.

Building a community's capability to make decisions that affect the environment is at the heart of the community-centered work under this goal. Preparing for potential chemical spills is one part of community planning that EPA can help facilitate. The Brownfields Program addresses another community development issue: the over 600,000 properties that have been abandoned or underused due to possible contamination from previous industrial, mining-related, or other uses. The Program blends legal authorities, community development and clean-up expertise, and local decision-making to assess and clean up brownfields sites. EPA's efforts to share information and build community capacity offer the public the tools they will need in considering the many aspects of planned development or re-development.

EPA's ecosystem protection programs encompass a wide range of approaches that address specific at-risk regional areas along with larger categories of threatened systems, such as estuaries and wetlands. Locally-generated pollution, combined with pollution carried by rivers and streams and through air deposition, can collect in these closed and semi-closed ecosystems, degrading them over time.

At the Mexican Border, for example, local pollution and infrastructure are priorities for the Mexican and the U.S. governments under the Border 2012 agreement. Safe drinking water is a particular emphasis. Large water bodies like the Gulf of Mexico, the Great Lakes, and the Chesapeake Bay are surrounded by industrial and other development and have been exposed to substantial pollution over many years at levels higher than current environmental standards permit. As a result, the volume of pollutants in these water bodies has exceeded their natural ability to restore balance. Working with stakeholders, EPA has established special programs to protect and restore these unique resources by addressing the vulnerabilities for each. Where the water meets the land, coastal estuaries or wetlands, are also vulnerable. As population in coastal regions grows, the challenges to preserve and protect these important ecosystems increase. Coastal areas are testing grounds for combining innovative and community-based approaches with national guidelines and inter-agency coordination to achieve results.

Children and the aging face significant and unique health threats from a range of environmental exposures. Pound for pound, children breathe more air, drink more water, and eat more food than adults. Their behavior patterns increase their exposure to potential toxics. Because their systems are still developing, they may be more vulnerable to environmental risks, including asthma-exacerbating air pollution, lead-based paint in older homes, treatment resistant microbes in drinking water, and persistent chemicals that may cause cancer or induce reproductive or developmental changes.

Due to the normal decrease in biological capacity that accompanies the aging process, even

older Americans in good health may be at increased risk from exposure to environmental pollutants. As we age, our bodies are less able to detoxify and eliminate toxins. EPA has conducted many studies on environmental hazards that may affect the health of older persons. EPA will focus on these sensitive populations by increasing our understanding of these issues, building infrastructure and capacity, and providing information and tools needed to assess and prevent adverse impacts.

All of EPA's activities will rely on the latest and best scientific information. Sound science must be the basis of standard-setting. It also must guide us in identifying and addressing emerging issues, as well as updating and advancing our understanding of long-standing human health and environmental challenges. To help us focus our resources most effectively, EPA will also continue to improve its development and use of environmental indicators.

Sound science and carefully designed programs are critical to protecting people's health and the environment from inadvertent pollution. These same components are crucial to protecting us from deliberate attack. EPA is an integral part of the Nation's homeland security work. The Agency is taking a proactive approach to detecting, preventing and responding to potential threats. All programs—air, water, waste, industrial chemicals and pesticides, research and others—must be engaged, bringing to bear their special expertise and network of state, tribal, community, academic, industry, and other contacts to ensure protection and build response capabilities.

Goal 4 touches on every aspect of our Nation's environmental and public health. Multimedia impacts, especially on vulnerable ecosystems, and international and local decision making are hallmarks of the work under this goal.

OBJECTIVES

Objective 4.1: Chemical, Organism and Pesticide Risks. Prevent and reduce pesticide, chemical, and genetically engineered biological organism risks to humans, communities and ecosystems.

Sub-objective 4.1.1: Toxic Pesticide Exposure. Through 2008, protect human health, communities and ecosystems from pesticide use by reducing exposure to the more toxic pesticides.

Strategic Targets:

- ▼ Through 2008, systematically review pesticides in the marketplace to ensure that they meet the most current safety standards: re-registration (100% by

2008) , tolerance reassessment (100% by 2006) and registration review.

- ▼ Through 2008, protect endangered and threatened species by ensuring that none of the 15 species on the EPA/Fish and Wildlife Service/U.S. Department of Agriculture priority list of threatened or endangered species will be jeopardized by exposure to pesticides.
- ▼ By 2008, reduce by 30 percent from 1995 levels the number of incidents involving mortalities to terrestrial and aquatic wildlife caused by pesticides.
- ▼ By 2008, appropriately factor unique tribal pesticide exposure scenarios into 7 percent of annual registration and re-registration actions.
- ▼ By 2008, occurrence of residues of carcinogenic and cholinesterase inhibiting neurotoxic pesticides on foods eaten by children will have decreased by 30 percent from their average 1994 to 1996 levels.
- ▼ By 2008, at least 11 percent of acre treatments will use applications of reduced risk pesticides.
- ▼ By 2008, reduce by 20% (2003 baseline), from key source countries, inventories of obsolete persistent organic pollutants (POPs) pesticides which have the greatest potential for contributing to long-range environmental transport of these pollutants to the US.

Sub-objective 4.1.2: Pesticide Health Safety Standards. Through 2008, protect human health, communities and ecosystems from pests and disease by ensuring availability of pesticides, including public health pesticides and antimicrobial products, that meet the latest safety standards.

Strategic Targets:

- ▼ By 2008, reduce registration decision times by 10 % for conventional new active ingredients and 5% for reduced risk new active ingredients (including biopesticides) from the FY 2002 baseline.
- ▼ By 2006, reduce re-registration decision time (issuance of Re-registration Eligibility Decision) by 10% from the initiation of public participation to the signed Re-registration Eligibility Decision from the FY 2002 baseline.

- ▼ Through 2008, ensure new pesticide registration actions (including new active ingredients, new uses) meet new health standards and are environmentally safe.
- ▼ Through 2008, maintain timeliness of section 18 emergency exemption decisions (2002 baseline).

Sub-objective 4.1.3: Chemical and Biological Risks. Through 2008, prevent and reduce chemical and biological organism risks to humans, communities and ecosystems.

Strategic Targets:

- ▼ Through 2008, obtain, review for adequacy, and make public Screening Information Data Set (SIDS) information for 70% of the 2,800 High Production Volume (HPV) chemicals.
- ▼ Through 2008, obtain and make available for use by EPA and others two cycles of TSCA Inventory Update Rule reporting data on chemicals produced in or imported into America, including the initial cycle for obtaining additional exposure-related data authorized under the TSCA Inventory Update Rule Amendments.
- ▼ Through 2008, complete risk assessments for 20 chemicals to which children may be disproportionately exposed.
- ▼ Through 2008, the Sustainable Futures initiative will increase the efficiency of EPA's Pre-Manufacture Notice (PMN) review program, with an expected outcome of 40 PMNs per year that can be granted expedited reviews (240 PMNs cumulatively commencing in 2003 from a baseline of 0 expedited PMN reviews through 2002).
- ▼ Through 2008, reduce relative risks to chronic human health associated with environmental releases of industrial chemicals in commerce by 6% from 2002 levels, as measured by EPA's Risk Screening Environmental Indicators model.
- ▼ By 2008, eliminate in American hospitals the use of mercury and reduce the overall hospital waste volume by 33%, from a 1998 baseline.
- ▼ Through 2008, reduce the number of childhood lead poisoning cases to

150,000, from approximately 400,000 cases in 1999/2000.

- ▼ By 2008, reduce by 50% from 2003 baseline levels the number of people in specified key countries who are exposed to air pollution from leaded gasoline.
- ▼ Through 2008, ensure the safe disposal annually of 19,000 large capacitors and 10,000 transformers containing PCBs, safely reducing 2000 inventories of PCB large capacitors from 1.42 million to 1.27 million units (11%) and PCB transformers from 2.03 million to 1.95 million units (4%).
- ▼ By 2008, reduce by 20%, from 2003 baseline levels in key source countries, inventories of PCBs which have the greatest potential for contributing to long-range environmental transport of these pollutants to the US.
- ▼ Through 2008, collect, process, and make public annual Toxics Release Inventory (TRI) reporting data.

Sub-objective 4.1.4: Facility Risk Reduction. Through 2008, protect human health, communities, and ecosystems from chemical risks and releases through facility risk reduction efforts and building community infrastructures.

Strategic Targets:

- ▼ By 2010, 30% of those facilities with hazardous chemicals, including Risk Management Plan (RMP) facilities, will have reduced their risk of having a major chemical accident.
- ▼ By 2010, 50% of local communities or Local Emergency Planning Committees (LEPC) will have incorporated facility risk information into their emergency preparedness and community right-to-know programs.

Means and Strategies to Achieve Objective 1

Chemicals, pesticides, and biological organisms can pose risks to individuals, to communities, and to ecosystems. Under this Objective, EPA aims to prevent or significantly reduce these substantial risks by:

- ▼ Identifying and assessing chemical, pesticide, and microorganism potential risks;
- ▼ Setting priorities for addressing these risks;

- ▼ Developing and implementing strategies aimed at preventing risks and managing those risks that cannot be prevented;
- ▼ Implementing regulatory measures, such as systematic review of pesticides and new chemicals, and developing and implementing procedures for safe production, use, storage, and handling of chemicals, pesticides and microorganisms;
- ▼ Employing innovative voluntary measures, such as promoting the use of reduced-risk pesticides and challenging companies to assess and reduce chemical risks and develop safer and less polluting new chemicals, processes, and technologies;
- ▼ Conducting outreach and training and establishing partnerships; and,
- ▼ Reducing or eliminating risks from potential chemical releases.

While EPA will use these approaches to address risks associated with chemicals and pesticides directly, much of this work will be accomplished by our co-regulators and co-implementors, the states and tribes, with the support of industry, environmental groups, and other stakeholders. In addition, improving the ability of communities to address local problems is a critical part of all efforts to reduce these risks.

Reducing Pesticide Risks

Pesticides are essential for controlling insects, weeds, bacteria and other pests on farms and in homes, gardens, and hospitals. It is estimated that pesticides are used on more than 1 million farms and in 90 million households. These products regulated and held to safety standards prescribed by the Federal Insecticide, Fungicide, and Rodenticide Act.

One measure of potential health risk is the extent to which pesticide residues are found in food. Reducing pesticide exposure through food, particularly exposure to the more toxic pesticides, will enable progress toward our goal of reducing risk to humans and ecosystems from pesticide use. EPA will continue to address this challenge by setting tolerances, reviewing new and existing tolerance exemptions for inert ingredients, and reassessing tolerances established prior to the health standard set by the Food Quality Protection Act (FQPA). EPA will meet its statutory goal of reassessing these tolerances in tandem with the reregistration program by 2006 and 2008 respectively. As provided for under FQPA, EPA will review pesticides on a 15-year cycle, allowing the Agency to apply new science and risk criteria to ensure that risk evaluation and risk management information remain current.

FQPA added cumulative, aggregate, and other new risk assessment requirements to the review of pesticides. Implementation of the cumulative risk policy, completed in late 2002, will impact risk mitigation measures and determine which pesticides are available for what purposes. These changes will reduce the risks posed by pesticides in food and the risks to workers, farm families, and vulnerable populations posed by their exposure to pesticides. EPA will continue to use U.S. Department of

Agriculture and Food and Drug Administration food residue data to track progress toward risk reduction through food and to meet the statutory requirement of reassessing existing tolerances by 2006. As the re-registration program draws to a close, EPA will implement a registration review program to ensure that pesticides in the marketplace continue to meet the most current safety standards as required by FQPA. This program systematically reviews existing pesticides on a 15-year cycle. As we review new and old pesticides, we will continue to improve our processes to reflect lessons we have learned, additional information on pesticides resulting from scientific advances, more sophisticated methods and tools, and identification of new risks or threats.

Since pesticide use also affects ecosystems, our reviews consider impacts to water resources, soil, and wildlife to prevent unreasonable harm. For example, EPA is collaborating with the Fish and Wildlife Service and the National Marine Fisheries Service to improve our efforts to protect endangered species by strengthening our implementation of the Endangered Species Act (ESA). We will be working to identify changes to existing policies, regulations, and the regulatory processes that will result in better protection of endangered species with minimal impact on food producers and pesticide users. Integrating the ESA consultation process with EPA regulatory programs will also help to protect listed species and avoid adverse changes to critical habitats.

Pesticide and pest control issues extend beyond the farm. EPA registers antimicrobials used by public drinking water treatment facilities and by food processing plants and hospitals to disinfect surfaces. Effective antimicrobials are of growing importance as many serious disease-causing organisms become resistant to our antibiotic procedures. Public health officials use pesticides to control mosquitos, and homeowners use pesticide products to control flies, rats, and roaches, resulting in human health protection and consumer benefits such as controlling West Nile Virus or germs in the home.

Over the last several years, concern has grown about exposure to endocrine disrupting or hormonally active chemicals. Evidence suggests that exposure to chemicals that mimic hormones (endocrine disruptors) may cause adverse health effects in wildlife and potentially affect human health as well. However, there are many uncertainties in our knowledge of endocrine disruptors. EPA is working to identify the nature of adverse effects and the dose-response relationships involved and to determine how common is the potential in chemicals for endocrine disruption.

The Agency needs valid tests for endocrine disruption that can be integrated into the review of chemicals and pesticides now on the market along with new ones to be licensed. Over the next several years, the Agency will complete validation of screens and tests that are necessary before large-scale reviews can take place. The screening and testing program is of great interest to a wide range of stakeholders. EPA is working to minimize the use of animals for the program. A Federal Advisory Sub-Committee has been convened to provide scientific and technical advice to the Agency as the

screens and tests are developed and validated.

Lastly, outreach, training, and partnerships will play an integral role in meeting our goals. For example, to meet our domestic regulatory goals, EPA will address international sources of pesticides by (1) promoting a better understanding of the impact of pollutants from other countries and regions on the United States and of our emissions on other countries and (2) reducing pollution sources abroad through outreach, pollution prevention, and capacity-building measures such as cost-effective and appropriate technology transfer.

Reducing Risks from Chemicals and Biological Organisms

Screening and Risk Assessment

EPA's strategy to prevent and reduce risks posed by chemicals and microorganisms comprises three primary approaches: preventing the introduction into U.S. commerce of chemicals that pose unreasonable risks; effectively screening the stock of chemicals already in use for potential risk; and developing and implementing action plans to reduce use of and exposure to chemicals that have been demonstrated to harm humans and the environment. EPA intends to work with states and tribes, other federal agencies, the private sector, and international entities to implement this strategy and, in particular, to make protection of children and the aging a fundamental goal of public health and environmental protection in the United States and around the world.

The Toxic Substances Control Act (TSCA) requires that EPA review all new chemicals prior to production or import and be notified of significant new uses for certain chemicals that have already been reviewed. EPA's Pre-Manufacture Notice (PMN) Review Program typically assesses 1,500 to 2,000 new chemicals every year, a rate expected to continue through 2008. To keep pace with expanding review requirements (such as preventing the introduction of persistent bioaccumulative toxics [PBTs] or considering the use of chemicals as potential weapons of terror), while meeting the statutorily mandated 90-day time limit for these reviews, the Agency is developing an expanded set of screening tools. These tools will enable us to use the limited data that companies provide in their PMN submissions to predict potential hazards, exposures, and risks quickly and effectively. Tools include the PBT Profiler and other structure-activity-relationship-based models; models that estimate fate and concentrations of chemicals released to the environment, including chemicals released from consumer products; and models to estimate workplace exposures. These tools will be critical for meeting the zero-tolerance standard implicit in our 2008 strategic target for these reviews.

EPA is also shifting to a Sustainable Futures strategy to discourage development of potentially risky new chemicals at the earliest stages of product, process, and service design. The Sustainable Futures-P2 Framework initiative (see 67 FR 76282 and <http://www.epa.gov/oppt/p2framework/>)

provides chemical manufacturers with the same hazard and risk screening tools that EPA uses in its PMN reviews. For example, EPA made the PBT Profiler public in 2002, to help industrial chemical designers avoid uses of PBT chemicals. Industry, academia, and environmental advocates have praised this effort. Over the next several years, the Agency will provide these tools and target training to companies that can use them to design and develop safer, less risky new chemicals. Under the current pilot project, participating companies will be offered (subject to certain conditions) regulatory flexibility in the form of expedited review of their qualifying chemicals, which will allow manufacture of the new chemical to begin 45 days earlier. The intense interest expressed thus far suggests that this will be a powerful incentive for many companies to conduct their own hazard/risk screening. Effective use of these tools by companies that submit PMNs will enable EPA to focus its limited PMN-review resources on those chemicals that have not been pre-screened.

By 2008, EPA will make substantial progress in screening, assessing, and reducing the 66,600 chemicals that were in use prior to the enactment of TSCA. Thousands of these chemicals are still used today, and nearly 3,000 of them are “high production volume” [HPV] chemicals, produced in quantities exceeding 1 million pounds per year. Through the HPV Challenge Program, EPA will collect or develop the data needed to screen for risks associated with 70 percent of these chemicals by 2008. Under the Program, more than 300 companies and 101 consortia are voluntarily providing the screening information data set. As EPA provides the public access to this data, it will focus on the next phase: screening of the hazards and risks posed by HPV chemicals. The Agency will then identify and set priorities for further assessment requirements, and it will determine the need for and begin taking action to reduce the risks identified. To support these efforts, we will draw on data already obtained through the TSCA Inventory Update Rule, particularly on new exposure-related data to be provided beginning in 2005.

EPA is also working to complete detailed risk assessments of 20 chemicals to which children may be disproportionately exposed. The Voluntary Children’s Chemical Evaluation Program employs a new strategy under which companies’ assessments are submitted to an outside peer consultation panel composed of national experts in chemical risk assessment. EPA will also continue to identify and reduce the risks associated with other chemicals and classes of chemicals already in commerce. This effort will be similar to the Agency’s 2000 work with the 3M Company to withdraw from the marketplace most uses of perfluoroalkyl sulfonate (PFOS), a PBT, and the corresponding TSCA Significant New Use Rules, issued in 2002 to address and limit future uses of PFOS and chemicals like it.

By 2008, the broader risk screening and data assessment to be conducted under the HPV Challenge Program and TSCA Inventory Update Rule, the stronger focus on children’s health, and EPA’s ongoing chemical and chemical-class-specific work will provide a much better knowledge base from which to assess and reduce chemical risks. The chemical risk information developed under this

Goal is critical to EPA's success in achieving its other Goals, as it will provide the basis for virtually all chemical risk assessments that support EPA's air, water, and waste programs. The Agency will work to increase the availability of useful health and environmental information to our partners, stakeholders, and the public. We will continue to implement the Toxics Release Inventory (TRI) Program to provide information on releases of toxic chemicals to the environment, and we will combine such data with U.S. Census and other data through the Risk Screening Environmental Indicators model to measure our progress in reducing the relative risks associated with toxic chemical releases.

Targeted Efforts

In certain instances, risk-reduction efforts are targeted on a chemical-specific basis. Foremost among these is the federal government's commitment to eliminate the incidence of childhood lead poisoning. Since 1973, we have made considerable progress in reducing environmental lead levels by phasing out leaded gasoline in the United States, banning the production and sale of lead-based paint for residential use, adopting stringent standards for lead in drinking water, and terminating the use of lead in solder to seal food cans. Since the 1990's, EPA has primarily focused on reducing children's exposure to lead in paint and dust by developing and implementing a regulatory framework to improve work practices associated with lead-based paint and by educating parents and the medical community about the effects of lead poisoning and steps that can be taken to prevent it.

As a result of these efforts, in the United States, children's blood lead levels have declined nearly 90 percent since the mid-1970s, and the incidence of childhood lead poisoning has declined from 900,000 cases in the early 1990's to approximately 400,000 cases in 1999-2000. However, any number of children afflicted by this preventable condition is too high a number. Eliminating elevated-blood-lead levels in the "hot spot" pockets where it remains will prove increasingly challenging. EPA will collaborate with industry on a campaign to increase lead-safe work practices in home renovation and remodeling and to improve handling of lead paint on buildings and structures such as bridges through market-based incentives and other innovative approaches.

On the international front, EPA is working to eliminate the use of leaded gasoline and has succeeded in reducing use from 1993 to 1997 by two thirds, from 249 million metric tons to 166 million metric tons. One factor that contributed to this success was the hands-on, results-oriented approach to the problem that will also be a hallmark of our efforts to eliminate the use of leaded gasoline globally by 2010. EPA has formed partnerships with international and regional groups such as the World Bank, the World Health Organization, the Asian Development Bank, the National Safety Council, the Alliance to End Childhood Lead Poisoning and has leveraged resources from other U.S. government agencies, including the U.S. Agency for International Development, the U.S. Department of State, and the Centers for Disease Control, to develop and implement on-the-ground technical assistance projects in several parts of the world. One example is the development of the Implementer's Guide to Lead Phase

Out, which outlines fundamental policy, technical, and operational elements: from managing the transition to unleaded gasoline, to determining the effect of oxygenates and the impact of phase-out on vehicle fleet, to developing a list of priority actions.

Other specific chemicals and classes of chemicals also warrant special emphasis. Reducing risks associated with PBT chemicals is emerging as one of EPA's highest priorities and will be a primary focus through 2008. The Agency is employing a multimedia, cross-Agency strategy to focus on the highest risk chemicals, including preventing the entrance into commerce of new PBTs and development and implementation of Agency-wide action plans to reduce risks of chemicals currently or previously used. By 2008, the Agency expects to make much progress toward reducing risks related to mercury. New information to be developed through the Dioxin Reassessment will support strategies for reducing exposure to this most ubiquitous and risky class of chemicals, and recommendations to be provided to EPA in 2003 and 2004 from a panel of national experts on asbestos will assist the Agency in designing strategies to address asbestos risks. Successful pilots initiated in 2002 and 2003 to encourage companies to retire from service large capacitors and transformers containing polychlorinated biphenyls (PCBs) will be expanded to meet aggressive new targets for the safe disposal of these commodities by 2008. The Agency is assessing the need to shift human and financial resources to address these emerging and continuing environmental challenges.

Long-range and transboundary atmospheric transport and deposition of persistent organic pollutants (POPs) and other PBTs, such as mercury, are a continuing threat to human health and the ecosystems in North America. These pollutants may be transported and released far from their sources, enter the ecosystem, and bioaccumulate through the food chain. EPA believes that in order to meet our domestic goals for risk reduction from these pollutants, it is important to address international sources. Through cooperation with appropriate domestic and international partners and the provision of technical assistance and capacity building, EPA will reduce from key source countries POPs and mercury releases, which are most likely to impact the United States via long-range environmental transport.

Chemical Emergency Prevention and Preparedness

In order to reduce or eliminate the risks associated with chemical releases, EPA must first identify and understand potential chemical risks and releases. During 2003 and 2004, EPA will review and analyze data it has already collected as well as the information it will receive under the Agency's Risk Management Plan (RMP) program. This analysis will provide EPA with information on the geographic locations and facility types with the greatest potential for chemical accidents and releases. Additionally, EPA will identify areas where susceptible and sensitive populations may be at higher risk from chemical releases. EPA will also use information generated by other Agency efforts, such as the Emergency Planning and Community Right to Know Act and Spill Prevention Control and

Countermeasure program, to supplement data on potential chemical risk and develop voluntary initiatives and activities aimed at high-risk facilities and/or geographic areas.

The majority of this work will be accomplished through our partnerships. EPA will work with communities to provide chemical risk information on local facilities. The Agency will also assist states and local communities in understanding how these chemical risks could affect them and how to reduce those risks and prepare to address and mitigate risks should a chemical release occur.

Objective 4.2: Community Health. Sustain, cleanup, and restore communities and the ecological systems that support them.

Sub-objective 4.2.1: Sustain Community Health. By 2008, 220 communities, working with EPA through meaningful public involvement, will adopt and begin implementing comprehensive, integrated planning and environmental management processes to pursue ecologically compatible development, sustain local ecosystem function, and support more livable communities.

Sub-objective 4.2.2: Restore Community Health. By 2008, increase by 50 percent the number of communities, working with EPA through meaningful public involvement, that have addressed disproportionate environmental impacts and risks through comprehensive, integrated planning and environmental management processes that pursue ecologically compatible development, sustain local ecosystem function, and support more livable communities. [2002 baseline]

Sub-objective 4.2.3: Brownfields. Through 2008, EPA will facilitate the assessment, cleanup, and redevelopment of brownfield properties which will generate \$10.2 billion and create 33,700 jobs.

Sub-objective 4.2.4: US-Mexico Border. In the US-Mexico Border Region, sustain and restore community health, and preserve the ecological systems that support them.

Strategic Targets:

- ▼ By 2012, assess significant shared and transboundary surface waters and achieve a majority of water quality standards currently being exceeded in those waters. [Baseline: segments in both Mexico and US with significant transboundary and shared waters, standards being exceeded in 2003.]

- ▼ By 2005, increase by 1.5 million the number of people connected to potable water and wastewater collection and treatment systems. (Baseline: 0 additional people connected to water and wastewater systems, beginning in 1999).

Means and Strategies to Achieve Objective 2

People often connect most closely to the environment where they live—in their communities, where they experience first-hand the benefits of safe drinking water, clean air, and healthy lakes, streams, and rivers that are safe for swimming and fishing. Decisions are made every day at the local level that affect air and water quality, habitat and biodiversity, and land use. For example, transportation and land use planning, water supply and treatment, and waste management are all primarily local activities, and decisions made by communities can either systematically advance clean air, clean and safe water, and restored and preserved land or can incrementally chip away at these goals. Healthy, sustainable communities are the pieces that combine to reveal a healthy, sustainable country. For this reason, EPA is committed to sustaining and restoring the health of communities and the ecological systems that support them.

EPA will work in partnership with states and tribes, local governments, community groups, and other stakeholders to protect and sustain healthy communities and local natural resources. The Agency will also work to restore the health of communities that are vulnerable to environmental impacts, by addressing environmental justice issues and cleaning up and redeveloping Brownfield sites, for example, and to develop stronger partnerships in communities, such as those along the U.S.-Mexico Border, that can potentially impact neighboring jurisdictions.

Sustaining Healthy Communities

One of the most important strategies for achieving healthy communities and ecosystems is protecting and sustaining natural resources that are at risk. Many of the greatest threats—polluted runoff, mobile source air pollution, sprawling development and the corresponding loss of valuable forest and farmland—can best be addressed at the community level through partnership-based approaches. Partnerships promote a comprehensive, integrated approach to identifying risks and developing long-term solutions compatible with a community's economic, social, and cultural goals. EPA will facilitate community-based protection of local natural resources by:

- ▼ Supporting information networks and developing and distributing resource materials, data, and information that inform growth management and community environmental decision making;
- ▼ Helping build state, tribal, local agency, and community capabilities to address environmental challenges more effectively and better manage local natural resources;

- ▼ Facilitating innovative local, partnership-based environmental management through direct assistance to communities; and
- ▼ Coordinating and integrating various environmental programs, standards, and policies within EPA and in partnership with other agencies and standard-setting organizations to support comprehensive approaches to local natural resource management and better planning for growth.

EPA recognizes its important role in supporting local resource protection by serving as a source for information about new community assessment and planning tools, the latest research, and examples of what other communities are doing to address similar issues. EPA will continue to improve its vehicles for information exchange, such as the Smart Growth Network and affiliated web site. EPA also is committed to providing access to environmental data and information at the community level to better inform local decision making.

Community health and local resource protection depend on community-driven processes and actions. By developing and distributing tools that integrate media-specific information; supporting multimedia planning (such as the Smart Growth Index and Smart Growth Water); and developing training for local agencies and community groups on how to use data, information, and tools effectively in environmental assessment and planning and how to work collaboratively and cooperatively with a range of stakeholders, the Agency will strive to build local capacity through states, local agencies, and community groups. EPA will continue to identify and provide opportunities for public participation in environmental decision making.

The Agency recognizes that real-world, on-the-ground successes often galvanize neighboring communities into adopting integrated, comprehensive approaches to environmental management. EPA will continue to facilitate local successes by providing direct assistance to communities in the form of technical and financial assistance and by helping communities coordinate processes and develop strategic partnerships.

Finally, EPA will work to ensure that national policies and programs support rather than hinder comprehensive, integrated local resource management. EPA is committed to improved coordination and integration of its media-specific programs and policies. To this end, EPA will review new policies and regulations to ensure that programs are compatible and promote overall environmental improvements, rather than resulting in trade-offs across environmental media. The Agency will look for opportunities to integrate existing programs to optimize their impacts and make them more compatible with local processes. In addition, EPA will partner with other federal agencies and national standard-setting organizations to establish policies and standards that create incentives for and remove barriers to

smart growth and integrated environmental management.

Environmental Justice and Sensitive Communities

“Environmental justice” is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Under EPA’s environmental justice program created in 1994, the Office of Environmental Justice works to integrate environmental justice into all aspects of the Agency’s programs, policies, and activities and to promote constructive engagement and collaborative problem-solving among all stakeholders, especially in those communities that have been disproportionately exposed to environmental harms and risks.

EPA will continue to manage the Environmental Justice Community Small Grants program, which provides seed money to assist community-based organizations that are working to develop solutions to local environmental issues. The small grants provide grassroots groups, churches, and other nonprofit organizations with expanded opportunities for citizen involvement and tools they can use to learn more about exposure to environmental harms and risks and, consequently, protect their families and their communities.

The National Environmental Justice Advisory Council (NEJAC) was created specifically to provide an Agency forum for communities disproportionately impacted by hazardous risks. NEJAC’s six subcommittees (Air/Water, Enforcement, Health/Research, Indigenous People, International, and Waste/Facility Siting) will continue to conduct public meetings to address the implications of multiple sources of environmental degradation on the health of communities and to develop recommendations for the Agency.

EPA will also continue to chair the Interagency Working Group on Environmental Justice (IWG), comprising 11 Departments and Agencies as well as White House offices, to ensure that environmental justice is incorporated into all federal programs. The IWG will collaborate with all levels of government and with the private sector to address the environmental, health, economic, and social challenges facing our communities. The IWG’s 2000 Action Agenda will include 15 new demonstration and revitalization projects added in 2003, with additional projects expected every few years thereafter. These projects will focus attention on diverse urban and rural communities across the Nation. The Agenda is growing and will continue to select projects to achieve a variety of goals—from environmental cleanup, brownfields and economic development, and children’s health to community education and capacity building.

Training is essential to foster the integration of environmental justice into federal programs, policies, and activities. In 2002, EPA developed a Fundamentals Workshop on Environmental Justice

to aid in training Agency employees and external stakeholders. By 2005, the Agency will add modules that promote consideration of environmental justice issues in permitting under the Resource Conservation and Recovery Act (RCRA), the Clean Water Act, and the Clean Air Act. Regions that issue permits will hold at least one training session each year for EPA permit writers and external stakeholders involved in the permitting process.

EPA has undertaken another training initiative over the last several years to encourage the use of alternative dispute resolution by community stakeholders. The Agency believes that this approach can help reduce time and resources accompanying litigation and result in more efficient, favorable decisions for all parties involved. EPA will expand a 2002 pilot that exposed community stakeholders to alternative dispute resolution through training and multi-stakeholder partnering to increase Agency and community capacity to resolve disputes through this type of negotiation.

Brownfields

EPA's Brownfields Program will continue to facilitate the cleanup, redevelopment and restoration of brownfield properties. Under the brownfields law, brownfields are defined (with certain exclusions) as real properties, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Brownfield properties include, for example, abandoned industrial sites, drug labs, mine-scarred land, or sites contaminated with petroleum or petroleum products. Through its Brownfields Program, EPA will continue to provide for the assessment and cleanup of these properties, to leverage redevelopment opportunities, and to help preserve green space, offering combined benefits to local communities.

The Small Business Liability Relief and Brownfields Revitalization Act was signed into law in 2002, expanding federal financial assistance for brownfield revitalization by providing grants for assessment, cleanup, and job training. The law also limits the liability of certain contiguous property owners and prospective purchasers of brownfield properties and clarifies innocent landowner defenses to encourage revitalization and reuse of brownfield sites. In addition, the law provides for the establishment and enhancement of state and tribal response programs, which play a critical role in the successful cleanup and revitalization of brownfields.

As authorized under the brownfields law, EPA will continue to provide assessment, cleanup, revolving loan fund, and job training grants to communities. Brownfield assessment grants provide funding to inventory, characterize, assess, and conduct planning and community involvement activities related to brownfield sites. Brownfield revolving loan fund grants provide funding for a grantee to capitalize a revolving loan and make sub-grants to carry out cleanup activities at brownfield sites. Cleanup grants, newly authorized by the Brownfields Law, will fund cleanup activities at brownfield sites owned by grant recipients. EPA will also provide funding to create local environmental job

training programs to ensure that the economic benefits derived from brownfield revitalization efforts remain in the community.

EPA will continue to work in partnership with state cleanup programs to address brownfield properties. The Agency will provide states and tribes with tools, information, and funding they can use to develop response programs that will address environmental assessment cleanup, characterization, and redevelopment needs at sites contaminated with hazardous wastes and petroleum. The Agency will continue to encourage the empowerment of state, tribal, and local environmental and economic development officials to oversee brownfield activities and the implementation of local solutions to local problems.

EPA will also work to remove uncertainties often associated with brownfield cleanups. For example, EPA will fund the Brownfields Technology Support Center to assist grant recipients in understanding and evaluating technology options for environmental assessment and clean up. EPA will also work across its various programs and with other federal and state partners to foster innovative, integrated approaches to brownfield cleanups and redevelopment by sponsoring joint initiatives. For example, the RCRA Brownfields Prevention Initiative encourages clean up and revitalization of RCRA sites.

Mexico Border

EPA is working along the Mexican Border to reduce transboundary threats to human and ecosystem health in North America. The U.S.-Mexico Border 2012 Program, a joint effort between the U.S. and Mexican governments, will work with the 10 border states and with local communities to improve the region's environmental health.

Four regional workgroups, co-chaired by EPA and state officials, six border-wide workgroups, and three Policy Forums will collaborate with local communities to set priorities and plan and implement projects. These groups will also assist in establishing objectives, defining indicators, and measuring progress. The allocation of resources to activities will be based on the degree to which each project achieves the goals and objectives outlined in the Border 2012 Plan.

One focus of Border 2012 will be improved water quality in the region. Because of inadequate water and sewage treatment, border residents suffer disproportionately from hepatitis A and other water-borne diseases. By increasing the number of connections to potable water systems, EPA and its partners will reduce health risks to residents who may currently lack access to safe drinking water. Similarly, by increasing the number of homes with access to basic sanitation, EPA and its partners will reduce the discharge of untreated domestic wastewater into surface and ground water. Our planned assessment of shared and transboundary surface waters will facilitate the collection, management, and

exchange of environmental data essential for effective water management.

In addition to water issues, EPA will focus on the environmental and human health risks from pesticides. By training migrant farm workers and others who routinely handle pesticides, we will reduce both the long-term chronic health effects of pesticide exposure as well as the incidence of acute pesticide poisoning.

Objective 4.3: Ecosystems. Protect, sustain, and restore the health of natural habitats and ecosystems.

Sub-objective 4.3.1: Ecosystem Scale Protection and Restoration. Facilitate the ecosystem scale protection and restoration of natural areas.

Strategic Targets:

- ▼ By 2008, improve the overall aquatic system health of the 28 estuaries that are part of the National Estuary Program (NEP), as measured using the National Coastal Condition Report indicators
- ▼ By 2008, protect or restore an additional 250,000 acres of habitat within the study areas for the 28 estuaries that are part of the National Estuary Program (NEP). (2002 Baseline: 0 acres of habitat restored)

Sub-objective 4.3.2: Wetlands. By 2008, working with partners, achieve a net increase of 400,000 acres of wetlands. (2002 Baseline: annual net loss of an estimated 58,500 acres)

Sub-objective 4.3.3: Great Lakes. By 2008, prevent water pollution and protect aquatic systems so that overall ecosystem health of the Great Lakes is improved by at least 2 points. (2002 Baseline: Great Lakes rating of 22 on a 40 point scale where the rating uses select Great Lakes State of the Lakes Ecosystem indicators based on a 1 to 5 rating system for each indicator, where 1 is poor and 5 is good.)

Strategic Targets:

- ▼ By 2007, the average concentrations of PCBs in whole lake trout and walleye samples will decline by 25%. (2000 Baseline: concentration for Lake Superior of .9 ug/g; for Lake Huron of .8 ug/g; for Lake Michigan of 1.6 ug/g; for Lake Erie of .2 ug/g; and for Lake Ontario of 1.2 ug/g).

- ▼ By 2008, the annual concentrations of toxic chemicals in the air in the Great Lakes basin will decline by 30%. (concentration for Lake Superior of 59.8 pg/m³; for Lake Huron of 19.0 pg/m³; for Lake Michigan of 86.7 pg/m³; for Lake Erie of 182.7 pg/m³; and for Lake Ontario of 36.0 pg/m³).
- ▼ By 2010, restore and delist a cumulative total of at least 10 Areas of Concern within the Great Lakes basin.
- ▼ By 2008, a cumulative total of at least 3.3 million cubic yards of contaminated sediment in the Great Lakes will be remediated. (2002 Baseline: 2.1 million cubic yards of contaminated sediments from the Great Lakes have been remediated from 1997 - 2001).

Sub-objective 4.3.4: Chesapeake Bay. By 2008, prevent water pollution and protect aquatic systems so that overall aquatic system health of the Chesapeake Bay is improved enough so that there are 120,000 acres of submerged aquatic vegetation (2002 baseline, 85,252 acres).

- ▼ By 2008, reduce nitrogen loads entering the Chesapeake Bay by 94 million pound per year, from 1985 levels (2002 Baseline: 51 million pounds per year reduced).
- ▼ By 2008, reduce phosphorus loads entering the Chesapeake Bay by 9.7 million pounds per year, from 1985 levels. (2002 Baseline: 8 million pounds).
- ▼ By 2008, reduce sediment loads entering the Chesapeake Bay by 1.37 million pounds per year, from 1985 levels. (2002 Baseline: 0.8 million pounds).

Sub-objective 4.3.5: Gulf of Mexico. By 2008, prevent water pollution and protect aquatic systems so that overall aquatic system health of coastal waters of the Gulf of Mexico is improved.

Strategic Target:

- ▼ By 2008, reduce releases of nutrients throughout the Mississippi River Basin to reduce the size of the hypoxic zone in the Gulf of Mexico, to not more than 10,000 km² as measured by the five year running average of the size of the zone. (Baseline: 1996-2000 running average size = 14,128 km²).

- ▼ By 2008, improve the overall system health of the Gulf of Mexico by 0.2 on the “good/fair/poor” scale of the National Coastal Condition Report. (2002 Baseline: Southeast rating of fair/poor or 1.9 where the rating is based on a 5-point system).

Means and Strategies to Achieve Objective 3

EPA is working to protect, sustain, and restore the health of natural habitats and ecosystems by identifying and evaluating problem areas, developing tools, and improving community capacity to address problems.

National Estuaries Program

Estuaries are among the most productive ecosystems on earth, providing numerous ecological, economic, cultural, and aesthetic benefits and services. They are also among the most threatened ecosystems, largely as a result of rapidly increasing growth and development along the Nation’s coastlines. About half the U.S. population now lives in coastal areas, and coastal counties are growing three times faster than counties elsewhere in the nation. Overuse of resources and poor land use practices have resulted in unsafe drinking water, beach and shellfish bed closings, harmful algal blooms, unproductive fisheries, loss of habitat and wildlife, fish kills, and a host of other human health and natural resource problems.

EPA plans to implement key activities¹ under its flagship coastal watershed protection effort, the National Estuary Program (NEP), to help address these growing threats to the Nation’s estuarine resources. The NEP, which provides inclusive, community-based planning and action at the watershed level, is an important initiative in conserving our estuarine resources.

EPA will facilitate the ecosystem-scale protection and restoration of natural areas by supporting continuing efforts of all 28 NEP estuaries to implement their Comprehensive Conservation and Management Plans (CCMPs) to protect and restore estuarine resources. In addition, the Agency will provide more focused support for several priority needs identified by EPA and the NEP, including

¹The means and strategies outlined here for achieving Sub-objective 3.1 must be viewed in tandem with the means and strategies outlined under Goal 2, Objective 2, Sub-objective 2.2, “Improve Ocean and Coastal Waters.” Sub-objective 2.2 contains strategic targets for EPA’s vessel discharge, dredged material management, and ocean disposal programs, which are integral to the Agency’s efforts to facilitating the ecosystem scale protection and restoration of natural areas. [\[Double check this reference once architecture is final to make sure numbers are right.\]](#)

problems of invasive species, air deposition of pollutants such as mercury and nitrogen, and nutrient over-enrichment. EPA will support NEPs in developing aquatic nuisance species monitoring protocols and rapid response plans, expanding mercury deposition monitoring, and developing and implementing nutrient management strategies.

The health of the Nation's estuarine ecosystems also depends on the maintenance of high-quality habitat. Diminished and degraded habitats are less able to support healthy populations of wildlife and marine organisms and perform the economic, environmental, and aesthetic functions on which coastal populations depend for their livelihood. EPA will facilitate ecosystem-scale protection and restoration by supporting NEP efforts to achieve its habitat restoration and protection goal of 250,000 additional acres by 2008.

Wetlands

Over the years, the United States has lost more than 115 million acres of wetlands to development, agriculture, and other purposes. Today, the Nation still loses an estimated 58,000 acres of wetlands every year.

In December 2002, the U.S. Army Corps of Engineers, in cooperation with EPA, issued a Regulatory Guidance Letter to improve wetland protections through better compensatory mitigation, and the Administration unveiled a National Wetlands Mitigation Action Plan listing 17 action items that federal agencies will undertake to improve the effectiveness of wetlands mitigation and restoration. These actions reflect the Agency's and Corps' commitment to a regulatory program aimed at no overall net loss of wetlands and to public and private, regulatory and non-regulatory initiatives and partnerships to improve the overall condition of the Nation's wetlands.

In addition to the Regulatory Guidance Letter and National Wetlands Mitigation Action Plan, the Administration's commitment to protecting and restoring America's wetlands is reflected in the conservation title of the 2002 Farm Bill, which provides an unprecedented \$47 billion over the next decade. That includes funding for conservation programs that will double the number of wetlands restored and/or protected to a total of 2.275 million acres of wetlands and other aquatic resources. In December 2002, President Bush signed a bill re-authorizing the North American Wetlands Conservation Act, which extends for 5 years a program under which the federal government matches donations from sportsmen, state wildlife agencies, conservationists, and landowners who pledge to protect millions of acres of wetlands.

To meet these commitments, EPA's Wetlands Program will work to achieve national gains in wetlands acreage by implementing an innovative and partner-based wetlands and stream corridor restoration program, a broad-based and integrated monitoring and assessment program, and the Clean

Water Act Section 404 program. The Agency will assist its federal, state and tribal partners in building capacity to implement “no overall net loss” wetlands programs. EPA’s support of such programs will help avoid or minimize wetland losses, and provide for full compensation for unavoidable losses of wetland functions. Wetlands and stream corridor restoration will remain a focus for regaining lost aquatic resources.

Hundreds of regional watershed projects and 5-Star Restoration and Education Projects will continue to unite local stakeholders in environmental partnerships to restore wetlands and streams at the watershed level. EPA plans to support 840 watershed-based wetland and stream restoration projects by 2008. In addition, EPA plans to support 45 watershed-based wetland and stream restoration projects in Indian country within that time.

Great Lakes

The Great Lakes are the largest system of surface freshwater on earth, containing 20 percent of the world’s surface freshwater and accounting for more than 90 percent of the surface freshwater in the United States. The watershed includes two nations, eight American states, a Canadian province, more than 40 tribes and is home to more than one-tenth of the U.S. population. To further restore the chemical, physical, and biological integrity of the Great Lakes ecosystem, EPA is implementing Clean Water Act core water protection programs and has launched the Great Lakes Strategy 2002: A Plan for the New Millennium on behalf of the U.S. Policy Committee. The Strategy presents a basin-wide vision for Great Lakes protection and restoration, identifying the major environmental issues in the Great Lakes; establishing common goals for federal, state, and tribal agencies; and helping to fulfill U.S. responsibilities under the U.S.-Canada Great Lakes Water Quality Agreement. Objectives include the clean up and de-listing of at least 10 Areas of Concern by 2010, a 25 percent reduction in PCB concentrations in lake trout and walleye, and the restoration or enhancement of 100,000 acres of wetlands within the Great Lakes basin. The Strategy also sets goals for the clean up of all Areas of Concern by 2025, and for 90 percent of monitored Great Lakes beaches to be open 95 percent of the season.

The Great Lakes Strategy incorporates the Great Lakes Binational Toxics Strategy, a groundbreaking international toxics reduction effort that targets a common set of persistent, toxic substances for reduction and elimination (<http://www.epa.gov/glnpo/bns/documents.html>). The Toxics Strategy applies voluntary and regulatory tools focused on pollution prevention to a targeted set of substances including mercury, PCBs, dioxins/furans, and certain canceled pesticides. The Strategy outlines activities for states, industry, tribes, non-governmental organizations, and other stakeholders.

These efforts will be buttressed by the Great Lakes Legacy Act, which targets additional resources to clean up contaminated sediments at Great Lakes Areas of Concern. Sediment

contamination is a significant source of Great Lakes toxic pollutants and can impact human health via the bio-accumulation of toxic substances through the food chain.

Chesapeake Bay

The Chesapeake Bay Program is a unique regional partnership formed to direct and conduct restoration of the Chesapeake Bay. Bay Program partners include Maryland, Virginia and Pennsylvania; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; EPA, which represents the federal government; and participating citizen advisory groups. On June 28, 2000, the partners signed a comprehensive and far-reaching agreement that will guide their restoration and protection efforts through 2010. That agreement, Chesapeake 2000, focuses on improving water quality as the most critical element in the overall protection and restoration of the Bay and its tributaries.

One of the key measures of success in achieving improved Bay water quality will be the restoration of submerged aquatic vegetation (SAV). SAV is one of the most important biological communities in the Bay, producing oxygen, nourishing a variety of animals, providing shelter and nursery areas for fish and shellfish, reducing wave action and shoreline erosion, absorbing nutrients such as phosphorus and nitrogen, and trapping sediments. While recent improvements in water quality have contributed to a resurgence in SAV (from a low of 38,000 acres in 1984 to more than 85,000 acres today), more improvements are needed.

To achieve improved water quality and restore SAV, Bay Program partners have committed to reducing nutrient and sediment pollution loads sufficiently to remove the Bay and the tidal portions of its tributaries from the list of impaired waters. Key elements of state strategies to achieve these reductions include implementing advanced treatment of wastewater to reduce nutrient discharges and the restoration and protection of riparian forests that serve as a buffer against sediment and nutrient pollution that enters waterways from the land.

EPA's Chesapeake Bay Program Office (CBPO) has identified a number of actions that will contribute to achievement of the Sub-objective and strategic targets. For example, EPA will work with the Bay Program's Implementation Committee to develop a SAV strategy and water quality criteria for protecting SAV; collaborate with the U.S. Forest Service to ensure that effective strategies are put in place to conserve existing forest buffers; and ensure that states are implementing existing tributary strategies and are on schedule to implement new water quality standards/allocations regarding installation of biological nutrient removal at wastewater treatment facilities.

Gulf of Mexico

The Gulf of Mexico Program represents a broad, multi-organizational partnership based on the

participation of business and industry, agriculture, local government, citizens, environmental and fishery interests, federal agencies, and five Gulf states. The Gulf Program is designed to assist the Gulf states and stakeholders in developing a regional, ecosystem, and watershed-based framework for restoring and protecting the Gulf of Mexico in ways consistent with the economic well-being of the region. Gulf Program partners voluntarily identify key environmental problems and work at the regional, state, and local level to define and recommend solutions.

Gulf of Mexico issues can be broadly categorized as affecting water quality, public health, and habitat loss. The Gulf Program has adopted a 7-step strategy for assessing the work to be accomplished and focusing technical and financial resources on specific actions. These steps include (1) identifying priority issues to be addressed, (2) identifying coastal areas where technical and financial assistance should be focused, (3) identifying coastal watersheds and water-body segments requiring water quality and habitat restoration, (4) establishing annual performance goals, (5) developing the partnership agreements and commitments needed to implement the Program, (6) conducting implementation activities, and (7) tracking progress and evaluating outcomes against project goals.

The first step in restoring and protecting the biological integrity of the waters and important habitats of the Gulf of Mexico is to restore the full aquatic life and recreational uses (including safe consumption of seafood) of high-priority coastal watersheds and estuaries, including the watersheds of the Mississippi River Basin. Continued implementation of EPA's core Clean Water Act water protection programs² and efforts to address the hypoxic zone will help to restore the waters of the Gulf of Mexico and its tributaries. In addition, a continued focus on protecting and restoring aquatic life and recreational uses ensures that local communities directly benefit from an improved quality of life and that the Gulf as a whole ultimately benefits from the cumulation of community efforts. These local efforts will take place within a context of increased regional understanding of the Gulf as an ecological system, and they will benefit from improved capabilities to assess, evaluate, manage, and communicate progress from a holistic, systems perspective.

Objective 4.4: Homeland Security. Enhance the Nation's capability to prevent, detect, protect, and recover from acts of terror.

Sub-objective 4.4.1: Detection, Containment, and Decontamination of Biological and Chemical Agents. Conduct leading-edge research to develop enhanced methods for detection, containment, and decontamination of biological and chemical agents intentionally introduced into buildings and drinking water systems and wastewater systems, and methods for safe disposal of waste materials resulting from cleanups. Develop methods for conducting rapid

²EPA's water quality protection programs are discussed under Goal 2: Clean and Safe Water.

assessments of risks to emergency response personnel and the public from potential homeland security threats.

Sub-objective 4.4.2: Chemical and Oil Facilities. By 2008, EPA, working with States, tribes, and other partners, will enhance the security in the chemical and oil industry. XX facilities will have conducted vulnerability assessments and YY implemented security measures to reduce vulnerabilities and thereby protect communities and the environment from chemical releases.

Sub-objective 4.4.3: Data. Through 2008, EPA will enhance consistency in data collection and facilitate data-sharing to assist its efforts to collaborate on the prevention, detection, and response to incidents.

Strategic Targets:

- ▼ By 2005, EPA's National Radiation Monitoring System will cover 37% of the U.S. population. This percentage will increase to approximately 70% by 2006.
- ▼ By 2005, EPA will have enhanced ability to collect ambient air monitoring data and make data available to other Federal agencies.
- ▼ By 2005, EPA will demonstrate annually the ability to deploy emergency air monitoring capability, which is necessary to ensure the safety of responders and the public, to an incident within 12 hours of notification..

Sub-objective 4.4.4: Infrastructure. Through 2008, safeguard public health and safety by providing technical support to drinking water and wastewater utilities, the chemical industry, and those parties responsible for the quality of indoor air.

Means and Strategies to Achieve Objective 4

Recent events have illustrated the need for the federal government to prepare for and protect the public against the threats posed by terrorism. As a key agency charged with crisis and consequence management responsibilities under various federal preparedness and response plans, EPA must be ready to help detect, prevent, protect against, respond to, and recover from acts of terror. Under this Objective, EPA will survey the private sector, universities, federal agencies, and others to assess existing capabilities. We will provide those who need them with technologies, information, and instructions, and we will conduct research to fill gaps where technology and science are lacking.

The Agency remains fully committed to homeland security and will take a proactive approach in preparing for potential or emerging terrorist threats. EPA recognizes that potential threats can be biological agents, such as anthrax or smallpox. The Agency has the unique expertise as well as the statutory responsibility to determine which pesticides are effective and can be used against these threats. EPA will continue to identify and evaluate biological agents which may become weapons used by terrorists against the United States and has begun to conduct scientific assessments and develop test protocols to determine the efficacy and safety of products that can be used against potential biological threats. At the same time, EPA will develop detection and decontamination processes for potential threats. To provide added protection, the Agency will work to educate its partners and the public about these pesticides, strengthen the certification and training program, and improve storage and disposal procedures.

To support Homeland Security, EPA conducts research in three main areas: building decontamination, water security, and rapid risk assessment. Research on decontamination of buildings will focus on methods and technologies for (1) prevention, detection, and containment of biological and chemical agents intentionally introduced into large buildings or structures; (2) decontamination of building surfaces, furnishings, and equipment; and (3) safe disposal of residual materials. This work will result in more efficient and effective cleanup of contaminated buildings, as well as more effective prevention measures. In the area of water security, research will include the development, testing, and communication/implementation of enhanced methods for prevention, detection, treatment, and containment of biological and chemical warfare agents and bulk industrial chemicals intentionally introduced into drinking water and wastewater systems. This research will ensure that appropriate parties are properly equipped with the tools they need to protect or treat water systems in the event of contamination. Rapid risk assessment research will focus on 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. For more efficient emergency response, EPA will also inventory the Agency's, the federal government's, and the private sector's expertise in order to provide quick access to nationally recognized, highly specialized experts in Homeland Security areas, such as biology, chemistry, exposure assessments, detection/treatment technologies. EPA will also provide guidance, technical expertise and support to federal, state and local governments, and other institutions on preventing building contamination (chemical and biological), treatment and clean-up activities, water security, and rapid risk assessment.

While EPA has programs in place to address chemical risks from accidental releases (as discussed Objective 1), on September 11, 2001, we learned that human health, communities, and ecosystems can also be threatened by deliberate acts. Therefore, we are developing and implementing programs to enhance security at chemical and oil facilities. As a first step, EPA is working with the Office of Homeland Security, other federal agencies, and industry to determine the kinds of vulnerability assessments of chemical facilities to be conducted and security measures to be implemented at various

types of chemical and oil facilities. EPA will then develop an implementation plan to ensure that these assessments and measures are put into place over the next several years.

Another aspect of preparedness is protection of first responders or other on-site personnel. Many chemicals that pose a potential threat emit toxic fumes, are toxic when in contact with skin, or present other direct effects. Acute Exposure Guideline Levels (AEGLs) are short-term exposure limits, representing three tiers of health effect endpoints (discomfort, disability, and death) for five different exposure durations. To increase the Nation's preparedness, EPA, in collaboration with other federal, private, and academic organizations, is increasing the pace for development of AEGLs and providing key information to emergency personnel so they take necessary precautions and treat citizens who may be on the scene.

EPA is the federal organization responsible for ensuring the safety of critical water infrastructure in the event of terrorist or other intentional acts. Currently, there are approximately 54,000 community drinking water systems and almost 16,000 wastewater utilities nationwide, serving approximately 264 million people. EPA's principal goal related to critical water infrastructure is to work with states, tribes, drinking water and wastewater utilities, public health and environmental organizations, and other stakeholders to enhance the security of these water utilities. Critical water infrastructure protection has taken on an even greater urgency since the terrorist attacks of September 11, 2001. The Agency initiated technical support and financial assistance activities to help drinking water and wastewater utilities assess their vulnerability to terrorist or other intentional acts and develop or revise their emergency response plans. For drinking water systems, these efforts were reinforced through the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Bioterrorism Act of 2002), which required community water systems supplying water to more than 3,300 people (of which there are about 9,000 nationwide) to conduct vulnerability assessments and prepare emergency response plans by certain dates. The last of these deadlines is December 31, 2004. While not subject to the Bioterrorism Act of 2002, wastewater systems have also been conducting the full range of activities related to vulnerability assessments and emergency response plans. EPA and the water infrastructure community agree that these protective activities are not "one time only" endeavors, but represent an iterative process based on new and emerging information, science, and technology. Thus, EPA, in collaboration with its stakeholders, will continue to provide the full menu of technical assistance and training approaches to ensure that systems are identifying their vulnerabilities and developing robust emergency response plans. Contingency Plans for the 14 U.S.-Mexico Sister Cities will also significantly enhance the effectiveness of municipal authorities to cooperate in responding to potentially disastrous incidents. Scientific and technical analyses, especially on methods and technologies, will improve the overall capacity to protect drinking water and wastewater utilities. The Agency will spearhead and support efforts to develop effective and affordable methods, technologies, equipment, and other tools needed to protect drinking water and wastewater systems from attack.

Ensuring that critical information reaches the right people by the fastest means necessary is another facet of maintaining a secure infrastructure. For drinking water facilities, the Agency will also continue to support the operation of a secure, web-based, password-protected Information Sharing and Analysis Center that provides data on threats of attacks or actual alerts and notices to drinking water and wastewater utilities. This Center, required by Presidential Decision Directive 63 of 1998, was developed by the Association of Metropolitan Water Agencies in partnership with the Federal Bureau of Investigation and is a critical component of water infrastructure protection activities.

EPA's primary effort to enhance collection and sharing of environmental data and information is the development of the National Environmental Information Exchange Network (Exchange Network). The Exchange Network is a collaborative effort by EPA, states, and tribes to exchange data among all partnering entities via the Internet. The exchange points on this Network are called "nodes." EPA's node is the Central Data Exchange (CDX), a facility that has been established to handle electronic data transfers as well as non-electronic submissions such as paper forms and diskettes. Working in partnership with states and tribes, EPA has identified and set priorities for the information systems that will be supported by these electronic exchanges; as of early 2003, five such systems are being supported by the CDX facility and the technical design work is underway for seven additional systems.

Other component activities are being pursued to support the Exchange Network that also contribute heavily to data consistency and integration capability. The Facility Registry System (FRS) is a database of facility records drawn from EPA and state program systems. In addition to housing the facility information in one registry system, the FRS supports Homeland Security efforts because it is linked to the programmatic data and information associated with each facility. FRS users can generate reports which provide all of the location data, environmental interest data, and other attributes for a facility that are contained in the contributing information systems.

Another activity that supports data consistency is EPA's data standards program. Again working in collaboration with states and tribes, EPA supports the Environmental Data Standards Council (EDSC), a body formed in 1999 to develop and support the use of data standards. The EDSC has approved 11 data standards and is working on 3 additional data standards. When implemented in information systems, these data standards enhance consistency in terminology, enable data integration, and improve data quality. Finally, the Environmental Data Registry (EDR) provides access to a wide range of information about the availability, definition, and use of information systems maintained by EPA; the EDR also contains a catalog of the data elements in these systems. System developers use the EDR as a reference tool to enhance data consistency and integration.

One of the problems that EPA identified in responding to the events of September 11 and its aftermath concerned the availability of personnel, equipment, and infrastructure for air monitoring and analysis. While a number of existing ambient air monitors were already located in the

Manhattan/Brooklyn area, the Agency was still hard pressed to make hand-held and movable monitors available for transport to the site. We have identified a need for rapid deployment capability with air monitoring expertise and equipment to address incidents that may occur in the future at multiple sites or sites removed from regional centers. We also lacked state-of-the-art analytical and communications equipment to provide health effects analysis and advisories in the timeliest manner. In addition, the Agency lacked emergency response training for air monitoring personnel.

To address these issues, EPA has established a strategic objective to ensure that critical environmental threat monitoring information and technologies are available to the private sector, other federal agencies, and state and local governments to assist in threat-detection and response. Specifically, EPA will work with states, tribes, and other federal agencies to use the current and new air monitoring infrastructure to assist in detecting potential threats in the ambient air. In conjunction with states and tribes, EPA operates a system of air monitors for compliance, trend, and characterization purposes. We will work cooperatively with the Department of Homeland Security and other agencies to ensure the ambient air monitoring system is available and capable of providing nearly real-time information to aid in detecting threatening substances in the ambient air. The Agency will also develop and operate rapid response laboratories to monitor and analyze the air where there is a suspected or known release of chemical, biological, or radiological agents into the outdoor air.

EPA's National Monitoring System is the only nationwide environmental radiation monitoring program that provides information about the wide-scale spread of radioactive material from nuclear or radiological incidents. Data from the National Monitoring System is necessary to provide timely information for making protective-action decisions in the event of a major nuclear or radiological incident. This data will allow increased preparedness for and response to terrorist threats and other incidents. The expanded and upgraded National Monitoring System will increase reliability and population coverage and include component that can be deployed to impacted areas immediately after notification.

Objective 4.5: Science/Research. Through 2008, provide and apply a sound scientific foundation to EPA's goal of protecting, sustaining and restoring the health of people, communities, and ecosystems by conducting leading-edge research and developing a better understanding and characterization of environmental outcomes under Goal 4.

Sub-objective 4.5.1: Science. Through 2008, identify and synthesize the best available scientific information, models, methods and analyses to support Agency guidance and policy decisions related to the health of people, communities, and ecosystems.

Sub-objective 4.5.2: Research. Through 2008, conduct research that contributes to the

overall health of humans, their communities, and ecosystems. Research in this goal is a combination of problem-driven and core programs, and will focus on pesticides and toxics, global climate change, and comprehensive, cross-cutting research on the health of humans, their communities, and ecosystems.

Means and Strategies to Achieve Objective 5

Science

EPA's goal of protecting, sustaining, and restoring the health of people, communities, and ecosystems requires a committed and coordinated effort among multiple programs offices. This effort brings together expertise and resources from across the Agency and cultivates relationships with our external partners and stakeholders. To meet this goal, EPA must utilize the best available science and apply its findings effectively to assist Agency decision-making and to meet a broad range of program needs.

Environmental Indicators

Environmental indicators are an important tool for simplifying, analyzing, and communicating information about environmental conditions and human health. EPA will continue to implement the Environmental Indicators Initiative to establish a set of performance indicators that measure environmental status. For environmental indicators to be as important as are economic indicators in signaling change, they must be scientifically valid for answering environmental questions from many perspectives. In general, questions about the environment from local, state, regional, or national perspectives differ and may not be answerable by one environmental indicator. As noted in the 2003 draft *Report on the Environment*, great care must be taken when selecting environmental indicators. By 2008, EPA's scientifically valid environmental indicators will capture the essence of key national, regional, and state perspectives on environmental questions and provide indicator-based signals of progress for comparison with EPA's five goals.

Emergency Management

The Agency will implement a suite of customized Situational Analysis tools for emergency management. These tools will deliver secure, reliable, and timely data access and communications to on-scene coordinators, emergency response teams, and investigators from field locations.

Geospatial Tools and Public Access

EPA will develop new geo-spatial tools and information that will allow the Agency and its

partners to assess ecosystem conditions holistically. This approach will indicate where environmental stressors may be located and enable EPA and its partners to develop more comprehensive natural resource and environmental programs to improve ecosystem health. The Agency will build on the foundation of existing public access tools such as *Envirofacts* and *Window to My Environment* (a geographic portal to community-based environmental information) by providing additional access to information collected by EPA, its partners, and stakeholders.

EPA's regional offices will continue to improve their ability to identify baseline community and ecosystem health conditions in priority geographic areas. The Agency will use the Environmental Monitoring and Assessment Program (EMAP) and the Regional Environmental Monitoring and Assessment Program (REMAP) to assess the status and trends of ecosystem health. Additionally, EMAP, REMAP, and local monitoring activities will facilitate development of community and ecosystem indicators to monitor the success of EPA program implementation.

EPA will continue to assure that high-quality environmental data is used to make sound environmental decisions by conducting laboratory evaluations and investigations, data validations, quality assurance management and project plan reviews, and Geographic Information System (GIS) analyses and by managing regional quality assurance programs and analytical services/support contracts. State and tribal organizations that receive funds from EPA will provide a quality management plan for EPA review and approval. EPA regional offices will continue to provide environmental monitoring and technical assistance to federal, state, tribal, and local agencies to assist them in evaluating and addressing problem facilities and priority geographic areas.

Regional Laboratories

Through its regional offices, EPA will participate in the National Environmental Laboratory Accreditation Conference (NELAC), an association of state and federal agencies and private organizations formed to establish and promote mutually acceptable performance standards for the inspection and operation of environmental laboratories. We will support implementation of the NELAC standards to ensure that decisions are made from a sound technical, scientific, and statistical basis and that laboratories deliver quality data. EPA will also update its own outdated laboratory equipment to increase its investigative, monitoring, and analytical capabilities.

Research

Research carried out under this goal is designed to enable EPA to meet its regulatory and policy objectives by providing both problem-driven and core research results. EPA's Office of Research and Development (ORD) has developed multi-year plans for research on safe food, pesticides and toxics; global climate change; ecological assessment; human health; endocrine disruptors;

and mercury. These plans lay out long-term research goals and describe targets the Agency intends to meet to reduce scientific uncertainties. Additional research is planned on computational toxicology and persistent bioaccumulative toxic pollutants.

Safe Food

The Safe Food Research Program, developed in response to the passage of FQPA, builds on earlier research to reduce scientific uncertainty in risk assessment. Research results will provide data needed to develop refined aggregate and cumulative risk assessments, to develop the appropriate safety factors to protect children and other sensitive populations, to refine risk assessments and decisions regarding pesticide safety, and to provide risk mitigation technologies to reduce risks to humans. By 2008, EPA will provide scientific tools that can be used to characterize, assess, and manage risks across the exposure-to-dose-to-effects continuum in implementing FQPA.

Safe Communities

Additional research on pesticides and toxics provides results that support FIFRA and TSCA. EPA's multi-year research plan establishes four long-term goals, designed to enhance the Agency's human health and ecological risk assessment and risk management capabilities. Over the next 5 years, EPA will:

- ▼ Advance development of predictive tools for prioritization of testing requirements and enhanced interpretation of exposure, hazard identification, and dose-response information.
- ▼ Work toward creating a scientific foundation for probabilistic risk assessment methods that protect birds, fish, and other wildlife populations.
- ▼ Work toward providing the scientific basis for EPA guidance to prevent or reduce risks of human environments within communities, homes, and workplaces.
- ▼ Advance the provision of strategic, scientific information and advice concerning novel or newly discovered hazards.

Global climate change

The Global Change Research Act of 1990 establishes the U.S. Global Change Research Program to coordinate a comprehensive research program on global change. This is an inter-Agency effort, with EPA bearing responsibility to assess the consequences of global change on human health, ecosystems, and social well-being. Research examines future global change scenarios and the influence

of climate, land use, and other factors on issues that are important to the public. Additional assessments will focus on air quality, water quality, ecosystem health, and human health. EPA's research plan for global climate change lays out five long-term goals. Within the 5- year scope of this *Strategic Plan*, EPA will:

- ▼ Make progress toward determining the regional and national implications of climate change and variability for the people, environment, and the economy of the United States in the context of other, non-climate-related (environmental, economic, and social) factors;
- ▼ Work to build the capacity to assess and respond to global change impacts on fresh water and coastal ecosystems;
- ▼ Make progress toward determining the possible impacts of global change on water quantity and quality and the consequences for aquatic ecosystems and drinking water and wastewater systems;
- ▼ Work to build the capacity to assess and respond to global change impacts on human health in the United States; and
- ▼ Advance the provision of approaches, methods, and models to quantitatively assess effects of global change on air quality and develop and apply tools to integrate global change effects across environmental media.

Ecological Assessment

EPA is focusing on strengthening our scientific basis to adequately assess and compare risks to ecosystems, to protect and restore them, and to track progress in terms of ecological outcomes. Global climate change, loss and destruction of habitat due to sprawl and exploitation of natural resources, invasive species, non-point source pollution, and the accumulation and interaction of these effects present emerging ecological problems. We will emphasize (1) monitoring ecosystem conditions that reflect the scale of the problem and need for action, the causes of harm, and the success of mitigation and restoration efforts; and (2) developing models and protocols to help diagnose the causes of ecosystem degradation and forecast future conditions. Additionally, efforts focus on developing risk assessment techniques that quantify and compare current and future ecosystem risks and developing cost-effective, stakeholder-driven restoration and protection strategies. The Agency has established four long-term goals for this effort. Within the 5-year scope of this *Strategic Plan*, EPA will:

- ▼ Advance state and tribal use of a common monitoring design and appropriate ecological indicators to determine the status and trends of ecological resources;

- ▼ Work toward ensuring that managers and researchers will understand the links between human activities, natural dynamics, ecological stressors, and ecosystem condition;
- ▼ Work toward providing environmental managers with tools to predict multi-stressor effects on ecological resources to assess vulnerability and manage for sustainability; and
- ▼ Work toward providing managers with scientifically defensible methods to protect and restore ecosystem condition.

Human Health

EPA's human health research represents the Agency's only comprehensive program to address the limitations in human health risk assessment. The measurement-derived databases, models, and protocols developed through this research program will strengthen the scientific foundation for human health risk assessment and will be used by scientists across the Agency. Research efforts include developing principles that establish how chemicals or chemical classes act and improved risk assessment methods for evaluating selected subpopulations (including exploring ways that age, genetics, and health status influence susceptibility to chemical exposures); determining the effects of preexisting disease (such as pulmonary or cardiovascular disease) to humans exposed to environmental agents; and developing the tools and methods that comprise the framework to evaluate public health. Within the 5-year scope of this *Strategic Plan*, EPA will advance toward its long-term goals of:

- Developing a commonly accepted approach for estimating the risk to human health posed by exposure to toxic chemicals in the environment. The approach will incorporate information on biological modes or mechanisms governing toxicity;
- ▼ Providing regulatory decision makers with data-based models, risk assessment approaches, and guidance across the whole of the risk paradigm for improved assessments of aggregate and cumulative exposures and risks;
- Improving the scientific foundation of human health risk assessment and risk management for susceptible subpopulations; and
- ▼ Providing the scientific understanding and tools to assist the Agency and others in evaluating the effectiveness of public health outcomes resulting from risk management actions.

Endocrine Disruptors

To support its regulatory mandates, EPA's research focuses on improving our scientific understanding of the exposures, effects, and management of endocrine disruptor chemicals and determining the extent of the impact they may have on humans, wildlife, and the environment. EPA will evaluate current and develop new standardized protocols to screen chemicals for their potential endocrine effects. The Agency has established three long-term goals for its research on endocrine disruptors. During the 5-year scope of this *Strategic Plan*, we will:

- ▼ Provide a better understanding of the science underlying the effects, exposure, assessment, and management of endocrine disruptors;
- ▼ Make progress toward determining the extent of the impact of endocrine disruptors on humans, wildlife, and the environment; and
- ▼ Advance EPA's screening and testing program.

Mercury

A 1997 *EPA Mercury Study Report to Congress* discussed the magnitude of mercury emissions in the United States and concluded that a plausible link exists between human activities that release mercury from industrial and combustion sources in the United States and methyl mercury concentrations in humans and wildlife. Regulatory mandates require EPA to address these risks. The Agency is developing risk management research for managing emissions from coal-fired utilities (critical information for rule-making) and non-combustion sources of mercury; risk management research for fate and transport of mercury to fish; regionally-based ecological assessments of the effects of methyl mercury on birds; assessment of methyl mercury in human populations; and risk communication methods and tools. EPA has established two long-term goals for mercury research and, within the 5-year scope of this *Strategic Plan*, will:

- ▼ Provide tools to reduce and prevent the release of mercury into the environment; and
- ▼ Improve understanding of the transport and fate of mercury from its release to its effects on the receptor.

Persistent, Bioaccumulative Toxic Pollutants

EPA is forging a strategic approach to identify and reduce risks to humans and the environment from current and future exposures to priority persistent bioaccumulative toxic (PBT) chemicals. Research will establish action priorities for a select list of PBT pollutants; screen and select more priority PBT pollutants for action; and develop a cross-cutting PBT routine monitoring strategy. Within

the 5-year scope of this Strategic Plan, EPA will continue to reduce risks to human health and the environment from current and future exposure to PBTs.

Computational Toxicology

The Agency is enhancing the scientific basis and diagnostic/predictive capabilities of existing and proposed chemical testing programs by using *in vitro* or alternative approaches such as molecular profiling, bioinformatics, and quantitative structure-activity relationships. The term “computational toxicology” refers to using these alternative approaches in conjunction with highly sophisticated computer-based models. This approach is expected to greatly reduce the use of animal testing to obtain chemical toxicity information. EPA research will provide methods for evaluating endocrine disruptors, as mandated by FQPA, and enhanced computer models that will predict, from chemical structure, adverse effects of a chemical or class of chemicals. Research will also evaluate and improve *in vitro* models, and *in vitro* assays. Within the 5-year scope of this *Strategic Plan*, EPA will:

- ▼ Advance the use of genomics approaches to provide data for the computational modeling of toxicological pathways for single chemicals or classes of chemicals;
- ▼ Enhance the scientific basis and diagnostic/predictive capabilities of existing and proposed chemical testing programs by using *in vitro* or alternative approaches such as molecular profiling, bioinformatics, and quantitative structure activity relationships; and
- ▼ Make progress in determining the genes responsible for specific mechanisms of toxicity, diagnosing patterns of genes associated with known mechanisms of toxicity, and characterizing and modeling chemical structures associated with known mechanisms of toxicity.

Human Capital Strategy

Activities within this goal are designed to protect, sustain or restore the health of people, communities, and ecosystems using integrated and comprehensive approaches and partnerships. To accomplish this goal, which comprises several media programs and relies heavily on the support of stakeholders, EPA will employ a mix of regulatory programs and alternative voluntary approaches. The Agency has completed workforce assessments for a broad cross-section of the programs that contribute to this goal to identify current competencies and skill gaps, and it is implementing strategies to attract, acquire, develop, and retain the talented and diverse workforce required to achieve the Agency’s objectives for communities and ecosystems.

To meet our chemical emergency prevention and preparedness objectives, EPA will need

chemical engineers with experience at industrial facilities. These engineers work with facilities to reduce chemical risks in the community and to certify that chemical and oil facilities have site security measures in place. At the same time, EPA will need people capable of reaching out to, and building consensus with, the numerous stakeholders and state and local officials who are tasked with ensuring chemical emergency prevention, preparedness, and response. The Agency will use a variety of authorities to recruit a workforce that is balanced in career seniority, diversity, and tenure and, in so doing, will establish an effective, long-term staffing framework. In addition, the Creative Leadership Groups Project, a pilot leadership program for mid-level managers, will support the culture change needed to address current and future environmental challenges successfully.

As more communities and local and state governments develop smart growth programs and the policies and analytical tools for improved environmental management, EPA will need to build employee skills and competencies in land use planning, Geographic Information Systems, and facilitation to provide technical assistance to our partners. EPA will seek to attract staff with experience at the local level, as well with environmental media programs. EPA will also seek to recruit at least one land use attorney and one public health expert. In addition to traditional recruiting tools, EPA will take advantage of the EPA Intern Program, EPA detail assignments, and the Smart Growth Network to attract the most experienced and qualified individuals.

As a result of the authorities granted by the new Small Business Liability Relief and Brownfields Revitalization Act, EPA has expanded its Brownfields Program. This expansion will require additional Agency staff with effective outreach and grants management skills to work with and respond to the changing needs of local communities and state partners on brownfields revitalization.

To meet the present and future challenges of improving our Nation's waters, EPA will focus on recruiting environmental specialists to help protect and restore wetlands and marine and ocean ecological systems. EPA will train its workforce and partners through programs such as its "Water Careers Program" and "Watershed Partnerships Seminar" and will strengthen competencies to support core water programs. To carry out the enforcement and compliance assistance work that supports this goal, the Agency will need to develop technical, analytical, negotiation, and facilitation skills.

EPA needs to maintain critical scientific expertise for developing methodologies, data, models, risk assessment guidance, and toxicity testing methods and protocols to implement its regulatory statutes. EPA anticipates losing some of its critical scientists through retirement, and it is working on a strategy to recruit developmental and molecular biologists, toxicologists, modelers, engineers, chemists, and statisticians by using a variety of hiring authorities, internships, and fellowships.

To achieve EPA's Homeland Security goals, the Agency will need to maintain technical staff proficient in the building sciences and in assessing the human health effects of exposure to airborne

contaminants. Staff must also be skilled in education, outreach, and communications to develop and disseminate the information needed by the buildings community and the public to protect themselves from potential terrorist incidents.

To find the talent needed to achieve healthy communities and ecosystems, the Agency will take advantage of various hiring authorities and participate in a number of special recruitment programs, such as the Hispanic Association of Colleges and Universities and the Washington Internships for Native Students. Finally, the Agency will continue efforts to equip all employees with skills needed for leading people, leading change, developing business and technological acumen, being results driven, communicating effectively, and building teams. Employee development includes not only training, but also coaching, mentoring, rotational assignments, and many other tools.

Program Evaluation

The many Agency programs that contribute to the achievement of healthy communities and ecosystems have undergone various types of evaluations, and program managers have used the results of these evaluations to improve the effectiveness and efficiency of their efforts.

Regulation and Innovation in the Chemical Industry (Joint Research Center of the European Commission, 2000). The Center concluded from its research that risk-based testing regulations, such as those employed in the United States, appear to provide more incentives to innovate than do more fixed-base approaches, such as those used in the European Union. EPA was encouraged by this study to continue its strategy of emphasizing risk-based screening of new and existing chemicals. This approach is reflected throughout the Agency's strategic architecture for program measurement and assessment.

Great Lakes Program Evaluations, including the State of the Lakes Ecosystem conferences and reports by EPA's Inspector General, the General Accounting Office, and the International Joint Commission, were used in developing the Great Lakes strategy and its updated Lakewide Management Plans. The Strategy and Lakewide Management Plans set forth the goals, objectives, and targets for environmental progress at the Great Lakes basin-wide and lake basin-wide levels. Both the Strategy and the Lakewide Management Plans involve substantial public participation. Select indicators from the State of the Lakes Ecosystem conferences (coastal wetlands, phosphorus concentrations, sediment contamination, benthic health, fish tissue contamination, beach closures, drinking water quality, and air toxics deposition) served as the basis for Great Lakes sub-objective targets.

External Factors

EPA's ability to achieve its strategic objectives depends on many factors over which the Agency has only partial control or little or no influence. Partnerships, voluntary cooperation, international collaboration, global harmonization, industry, economic influences, industrial accidents, natural disasters, litigation, and legislation play critical roles, affecting the Agency's results. Changes in the focus, level of effort, or status of any of these components could affect the success of the Agency's programs under Goal 4. Consequently, EPA must consider these factors as it establishes annual performance measures and targets.

EPA's emphasis on partnerships with other federal agencies, states, tribes, local governments, and regulated parties magnifies our impact. It can also place the Agency in a dependent position. EPA coordinates with and uses information from a variety of federal, state, and international organizations and agencies to protect our health and our environment from hazardous or higher risk pesticides and toxics. EPA relies on others (states, the Department of Health and Human Services, and the Food and Drug Administration) to carry out some enforcement activities. EPA's lead program depends in part on the ability of the Department of Housing and Urban Development to renovate the Nation's stock of public housing.

The Brownfields Program, in which EPA partners with over 21 agencies and departments as well as with local communities, is one major example of the effectiveness of the collaborative approach. Although federal and state programs may be in place to address the difficult issues local communities face, too often the programs operate in isolation. The diverse expertise and experience of the agencies collaborating in the Brownfields Federal Partnership Action Agenda will help make all relevant federal programs work more productively for the people and communities affected by the presence of brownfields.

EPA and the Army Corps of Engineers often engage in cooperative efforts which frequently include other federal agencies, such as the U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture (USDA), National Oceanic and Atmospheric Administration, and the National Marine Fisheries Service. Annual or biannual tracking of wetlands inventory information will depend upon the ability of USFWS and/or USDA to upgrade their abilities to deliver more frequent wetlands inventory information for the Nation. At present, the USFWS National Wetlands Inventory is updated once each decade. Successful implementation of the wetlands provisions of the Farm Bill by USDA and its partners is critically important, as reduction of wetland losses in rural areas and most of the anticipated national gains will be a result of those programs.

EPA's pesticide programs also depend, in part, on the voluntary cooperation of the private sector and the public. Farmers favor broad-spectrum pesticides that are cheaper and easier to apply.

While the Agency reviews pesticides to ensure that they meet the current health and safety standards, it has limited impact on which of the registered pesticides are adopted. Therefore, accurate predictions on the extent of its adoption once a pesticide is registered are very difficult. Similarly, the Lead Program also depends on the success of its state partners in encouraging homeowners to correct lead-based hazards in the home (since home-owner participation is largely elective) and that of schools and parents in screening children for high blood levels of lead. If any of these partnerships are disrupted, EPA's ability to achieve its risk reduction goals will be significantly compromised.

International collaboration, guideline harmonization, information sharing, and building other nations' capacity to reduce risk also contributes to risk reduction, making EPA's effective consultation and communication critical to achievement of our goals. For example, several key factors, external to the Agency, may significantly affect the achievement of the Border 2012 goals and objectives. Border 2012 is a binational effort, and EPA recognizes that the results achieved will be based on the efforts of both partners. It will be essential for both the United States and Mexico to invest the necessary resources to achieve the goals and to collect the data needed to measure progress. Continued Great Lakes ecological improvement will rely on participation in the Great Lakes Strategy by our state, tribal, and federal partners and by Canadian efforts under the Great Lakes Water Quality Agreement. Until invasive species can be prevented from entering the Great Lakes through cargo ships, they will likely continue to impact the achievement of Great Lakes ecosystem goals.

Progress in reducing risks from new and existing chemicals is highly dependent on actions taken by industry in response to EPA assistance and initiatives. EPA has no direct control over the pace and volume at which industry develops new chemicals or pesticides for submission. EPA concentrates primarily on providing industry with tools, such as the PBT Profiler and Pollution Prevention Framework, to help screen out high-risk chemicals before they are submitted for EPA review. If industry should fail to respond to such initiatives, the Agency will be less able to achieve effective new chemical screening in an efficient manner. EPA's screening work on existing chemicals is dependent on industry response to the HPV Challenge Program, which operates exclusively on the basis of voluntary commitments to sponsor particular chemicals for review. While the Agency can provide incentives for the submission of registration actions such as reduced risk and minor uses, EPA does not control incoming requests for registration actions. As a result, the Agency's projection of regulatory workload is subject to change.

Economic growth and changes in producer and consumer behavior could also influence the Agency's ability to achieve its Objectives within the time frames specified. New technology or unanticipated complexity or magnitude of pesticide-related problems could also delay the Agency's achievement of Objectives. Economic conditions will affect EPA's ability to achieve its Brownfields Program objectives. Grant recipients leverage the cleanup funding as well as redevelopment funding needed at brownfield properties. But their ability to leverage this funding is dependent on economic

conditions external to EPA. The leveraging of funding for brownfields cleanup and redevelopment is also necessary for attendant job creation.

Finally, large-scale accidental releases, such as pesticide spills or rare catastrophic natural events (such as hurricanes or large-scale flooding) could impact EPA's ability to achieve objectives in the short term. In the longer term, the time frame for achieving the objectives could be affected by new technology or unanticipated complexity or magnitude of pollution-related problems. Newly identified environmental problems and priorities could have a similar effect on long-term goals. For example, pesticide use is affected by unanticipated outbreaks of pest infestations and/or disease factors, which require EPA to review emergency uses in order to avoid unreasonable risks to the environment.

Goal 5

Compliance and Environmental Stewardship

Improve environmental performance through compliance with environmental requirements, preventing pollution, and promoting environmental stewardship. Protect human health and the environment by encouraging innovation, and providing incentives for governments, businesses, and the public that promote environmental stewardship.

Goal 5, Compliance and Environmental Stewardship, is designed to protect human health and the environment by improving environmental behavior through regulatory and non-regulatory means. Under this goal, EPA will work to ensure that government, business, and the public meet federal environmental requirements and empower and assist them to do more. EPA programs designed to ensure compliance with federal environmental laws and regulations, to increase voluntary and self-directed actions to minimize or eliminate pollution before it is generated (pollution prevention), and to promote “stewardship” behavior will all contribute to the achievement of this goal.

EPA uses the term “environmental stewardship” to describe behavior that includes but exceeds required compliance. Stewards of the environment recycle wastes to the greatest possible extent, minimize or eliminate pollution at its sources, and use energy and natural resources efficiently to reduce impacts on the environment. Under this goal, EPA will strive to use science and research more strategically and effectively to inform Agency policy decisions and guide compliance, pollution prevention, and environmental stewardship efforts. Finally, EPA will work to provide necessary environmental protection to the Nation’s tribes and to assist them in building the capacity to implement environmental programs where needed and feasible.

OBJECTIVES

Objective 5.1: Improve Compliance. By 2008, maximize compliance to protect human health and the environment through compliance assistance, compliance incentives, and enforcement by achieving a 3% increase in the pounds of pollution reduced, treated, or eliminated, and achieving a 3% increase in the number of regulated entities making improvements in environmental management practices. (Baseline to be determined for 2005)

Sub-objective 5.1.1: Compliance Assistance. By 2008, prevent noncompliance or reduce environmental risks through EPA compliance assistance by achieving: a 3% increase in the percentage of regulated entities that improved their understanding of environmental

requirements; a 3% increase in the number of regulated entities that improved environmental management practices; and a 3% increase in the percentage of regulated entities that reduced, treated, or eliminated pollution. (Baseline to be determined for 2005)

Sub-objective 5.1.2: Compliance Incentives. By 2008, identify and correct noncompliance and reduce environmental risks through a 3% increase in the percentage of facilities that use EPA incentive policies to conduct environmental audits or other actions that reduce, treat, or eliminate pollution or improve environmental management practices. (Baseline to be determined for 2005)

Sub-Objective 1.3: Monitoring and Enforcement. By 2008, identify, correct, and deter noncompliance and reduce environmental risks through monitoring and enforcement by achieving: a 3% increase in the number of complying actions taken during inspections; a 3% increase in the percentage of enforcement actions requiring that pollutants be reduced, treated, or eliminated; and a 3% increase in the percentage of enforcement actions requiring improvement of environmental management practices.

Means and Strategies to Achieve Objective 1

Environmental laws and regulations are designed to protect human health and safeguard the environment. But it is only through compliance that they can achieve their purpose. To ensure that the many and diverse private, public, and federal facilities it regulates—approximately 41 million under various statutes—comply with requirements, EPA has developed a strategy that combines monitoring and civil and criminal enforcement with programs that encourage facilities to self-correct by using voluntary audits and making other improvements. Violators who do not comply with statutory or regulatory environmental requirements may gain unfair advantages. EPA's compliance and enforcement program protects human health and the environment both by punishing violators to deter noncompliance and by strengthening the regulated community's ability to achieve compliance through improved performance—reducing potential pollution, reducing exposure to prohibited compounds and chemicals, and reducing the risk to human health and the environment.

EPA's compliance program is composed of four elements: compliance assistance, compliance incentives, compliance monitoring, and civil and criminal enforcement. The combination of these activities, conducted in cooperation with state, tribal, and local regulatory authorities, provides a broad range of actions designed to maximize compliance to protect human health and the environment.

Compliance Assistance

To assist regulated facilities in complying with environmental regulations, EPA will continue to

use a mix of tools and strategies to address particular compliance problems that exist in specific industrial, commercial, and government sectors or that are associated with certain regulatory requirements. EPA will continue to partner with state and local governments and to collaborate with trade associations to provide tools and materials to compliance assistance providers that work directly with the regulated community. In this role of “wholesaler” of compliance assistance, the Agency will continue to serve as a national repository and point-of-contact for information and materials. EPA’s virtual Compliance Assistance Centers will provide assistance directly to the regulated community and make available to the public compliance data that will provide citizens and the regulated community more timely information on the Agency’s progress. EPA also interacts directly with regulated entities through training, onsite visits, and workshops and assesses the results of its assistance efforts.

The Agency’s partnership activities also include establishment of a compliance assistance exchange forum to share information on best practices, outcome measurement, and new compliance assistance materials; an inter-agency roundtable of representatives from federal compliance assistance programs; and a clearinghouse of compliance assistance materials available from federal, state, local governments, academia, and trade associations. EPA will continue to publicize its compliance assistance efforts to help the regulated community anticipate and prevent violations of federal environmental laws that could lead to enforcement actions.

Compliance Incentives

EPA offers a suite of incentives to encourage government, industry, and business facilities to assess their overall compliance with environmental requirements and voluntarily correct and report compliance problems. The Agency will continue to make the Audit Policy (Self-Policing Policy) and other compliance incentives available to the regulated community. These incentives for compliance include reduced penalties for violations, extended time for correction, and potentially fewer or less frequent inspections. EPA also encourages owners of multiple facilities to disclose environmental violations because such disclosures encourage these regulated entities to review their operations more comprehensively, providing a greater overall benefit to the environment.

The Agency will continue to work with stakeholders to improve opportunities for industries voluntarily to self-disclose and correct violations. The Small Business Compliance Policy has recently been modified to encourage greater participation by small businesses. As part of the marketing and outreach it conducts to support this approach, EPA will work with small business compliance assistance providers to develop tools small businesses can use to understand applicable environmental requirements and take advantage of the flexibility offered by the policy. EPA also will continue to encourage states to adopt and communities to utilize the policy.

Compliance Monitoring and Enforcement

EPA uses monitoring and enforcement activities—inspections, civil and criminal investigations, administrative actions, and civil and criminal judicial enforcement—to identify the most egregious violators and return them to compliance as quickly as possible. EPA will continue to base its compliance monitoring and enforcement efforts on inspections, investigations, and enforcement actions carried out by the Agency and its state, tribal, and local government regulatory partners. To address the most significant risks to human health and the environment, including disproportionate burdens on certain populations, the Agency will target inspections, civil investigations, and criminal investigations to achieve the greatest reduction in pollution. For example, the Agency and its state and tribal partners review compliance data, the results of inspections and investigations, and citizen “tips” and complaints to target those areas that present high rates of noncompliance and significant risk to human health and the environment.

Objective 5.2: Improve Environmental Performance through Pollution Prevention, Innovation, and Analysis. By 2008, improve the environmental performance of governments, businesses, and the public by preventing pollution, increasing efficiency in operations, activities, and products, and creating incentives and reducing regulatory barriers for the adoption of cost-effective, multi-media, results-based approaches.

Sub-objective 5.2.1: Pollution Prevention by Government and the Public. Through 2008, reduce pollution throughout all sectors and levels of government operations, serving as models for others to follow, and improve the public’s awareness and role in preventing pollution.

Strategic Targets:

- By 2008, reduce TRI reported toxic chemical releases at Federal Facilities by 40%, from a baseline year of 2001.
- By 2008, double EPA's yearly purchases of “green” products and services including office supplies, electronic equipment, fleet operations, janitorial and maintenance services, meetings and conference management, from a baseline year of 2002.
- By 2008, all Federal agencies will have defined Environmentally Preferable Purchasing (EPP) programs and policies in place and be expanding their purchases of available "green" products and services, from a baseline of one Federal agency in 2002.

Sub-objective 5.2.2: Pollution Prevention by Industry. Through 2008, reduce pollution in business operations through the adoption of more efficient, sustainable and protective policies, practices, materials and technologies.

Strategic Targets:

- By 2008, prevent 12 billion lbs. of industrial hazardous chemical releases to the environment and hazardous chemicals in industrial wastes, from the baseline year of 2003.
- By 2008, reduce waste minimization priority list chemicals in hazardous waste streams reported by businesses to TRI by 50% from 1991 levels.
- By 2008, conserve 400 billion BTUs of energy and 10 billion gallons of water, reduce 93 thousand metric tons of CO2 emissions, and save \$1 billion of unnecessary costs as a result of pollution prevention activities, from a baseline year of 2003.
- By 2008, reduce by 10 % industrial TRI chemical releases and wastes produced per unit of production, from a baseline year of 2002.

Sub-objective 5.2.3: Business and Community Innovation. Through 2008, achieve measurably improved environmental performance through sector-based approaches, performance-based programs, and assistance to small business.

Strategic Targets:

- Through 2008, Performance Track members who commit to improvements in the following environmental categories will achieve average annual reductions of: 3% in water use; 3% in energy use; 3 % in total solid waste; 1% in air releases*; and 5% in water discharges*. These reductions will be normalized, where possible. [*These improvements are beyond existing regulatory requirements.] Baseline: In 2002, Performance Track members reduced their water use by 5%, decreased their energy use by 6%, reduced their total solid waste by 8%, increased their air releases by 4%, and decreased their water discharges by 25%.
- Through 2008, annually provide outreach and technical assistance to 50 state and 3 territorial small business assistance programs to reach 750,000 small

businesses across the nation using a variety of innovative tools and approaches. Baseline: 450,000 small businesses reached through technical assistance providers in 50 states and 3 territories in 2001.

- Through 2008, work with business sectors to remove regulatory and other performance barriers and increase the number of facilities using environmental management systems, enabling member companies in participating sectors to achieve aggregate annual reductions of 3% in greenhouse gas emissions, other significant air releases, energy use, and water discharges; a 1% aggregate annual waste reduction; and an aggregate annual increase of 100 facilities using EMS. (Baseline: to be developed, using 2000-2002 data from participating sectors.)

Sub-objective 5.2.4: Environmental Policy Innovation. Through 2008, achieve measurably improved environmental and economic outcomes by testing, evaluating, and applying alternative approaches to environmental protection in states, companies, and communities.

Strategic Targets:

- Through 2008, facilitate the review of all new innovative approaches proposed to EPA annually. Baseline: 70 percent, 2002.
- Through 2008, demonstrate 5 innovative approaches proposed to EPA annually. Baseline: 3, 2002.
- Through 2008, annually evaluate 5 innovative approaches to environmental protection. Baseline: 3 evaluations, 2002.
- Through 2008, facilitate the adoption of 5 new innovative approaches in Federal and State environmental programs. Baseline: 1 innovation adopted by multiple states, 2002.

Sub-objective 5.2.5: Economic Analysis. Through 2008, improve the Agency's regulatory and non-regulatory decisions through the development of sound economic analysis, clear analytic guides, and other economic tools used to estimate environmental costs and benefits.

Sub-objective 5.2.6: Regulatory Policy Analysis. Through 2008, enhance EPA's regulatory decision-making process through sound analysis and consideration of alternatives.

Sub-objective 5.2.7: Implement NEPA. Through 2008, minimize significant adverse environmental impacts that result from major proposed Federal actions, including EPA actions subject to the National Environmental Policy Act (NEPA).

Strategic Targets:

- 70 percent of significant impacts identified by EPA in its review of Draft Environmental Impact Statements (EISs) are successfully mitigated.
- 80 percent of EPA projects subject to NEPA (water treatment facility project and other grants, new source National Pollutant Discharge Elimination System [NPDES] permits, and EPA facilities) result in a finding of no significant environmental impact. (Baseline: In FY 2002 EPA issued XX Findings of No Significant Environmental Impact out of a total universe of YY projects subject to NEPA Environmental Assessment [EA] or EIS requirements.)

Means and Strategies to Achieve Objective 2

Pollution Prevention

The Pollution Prevention Act of 1990 establishes pollution prevention as a “national objective” and the pollution prevention hierarchy as national policy. The Act declares that pollution should be prevented or reduced at the source wherever feasible; that pollution that cannot be prevented should be recycled in an environmentally safe manner; and that, in the absence of feasible prevention or recycling opportunities, pollution should be treated. Disposal or other release into the environment should be used as a last resort.

EPA intends to achieve its pollution prevention goals through voluntary partnerships. The Agency will work with industry to build pollution prevention into the design of manufacturing processes and products and team with states, tribes, and governments at all levels to find simple, voluntary, and cost-effective pollution prevention solutions. EPA will promote the principles of responsible stewardship, sustainability, and accountability in developing approaches to prevent pollution.

Executive Order 13101 mandates that EPA assist Executive agencies in making purchasing decisions that are less damaging to the environment. The Agency established the Environmentally Preferable Purchasing (EPP) program to provide guidance and carry out a variety of initiatives and outreach activities for a wide constituency, including federal agencies. Under the EPP program, EPA will help purchasers conduct thorough life cycle analysis to identify products that generate less pollution,

consume fewer non-renewable natural resources, and are less threatening to human health and to wildlife. Our strategy harnesses the purchasing power of government to stimulate demand for “greener” products and services, thereby fostering manufacturing changes. We will identify environmental performance standards by which products can be evaluated, for example, criteria and standards to evaluate chemical cleaning products and their impact on the environment. The Agency will also invest in the development of tools, such as life cycle analysis tools, that businesses and purchasers can use to identify key environmental attributes and evaluate the environmental performance of products. In developing and distributing these tools, we will coordinate and cooperate with businesses, states, tribes, and environmental groups and will rely on the expertise of other federal agencies, such as the National Institute of Standards and Technology.

Under Executive Order 13134 and the Farm Bill, EPA has an important role in developing and promoting biobased products and energy. Biobased products are made from renewable agricultural, animal, or forestry materials, such as vegetable-based lubricants, biofuels, or compost. The Order sets a goal of tripling U.S. use of bioenergy and bioproducts by 2010. To meet this goal, EPA will work closely with the U.S. Department of Agriculture not only to promote the use of these renewable sources of resources, but also to assure that they are protective of the environment.

EPA remains committed to helping industry further prevent pollution by adopting more efficient, sustainable, and protective business practices, materials, and technologies. A vital component of our strategy is the continuation of the Pollution Prevention State Grant program. Annually, EPA provides \$6 million to states and tribes to support their efforts to provide industry with technical assistance, information sharing, and outreach. The grants also support promising, innovative new ideas for preventing pollution. Finally, states will require adequate resources dedicated to pollution prevention to implement strategies successfully. EPA will monitor state resource levels and work with states to expand resource commitments for pollution prevention.

Apart from its work with business, the Agency will continue to target prevention of hazardous chemical releases and wastes generated by federal facilities. Working with the states; in coordination with other federal agencies; and armed with pollution prevention tools, technologies, and data generated through the Agency’s Toxic Release Inventory, we will work to reduce toxic chemical releases at federal facilities by 40 percent (from a 2001 baseline) by 2008. To help achieve this goal, and to continue reducing other environmental impacts at federal facilities, we will promote the use of environmental management systems under Executive Order 13148. These systems help to address environmental impacts through measured problem identification and response, rather than crisis management. Leading by example, EPA will be implementing environmental management systems at 34 of its own facilities.

EPA’s Green Chemistry Program (www.epa.gov/greenchemistry) supports research and

fosters development and implementation of innovative chemical technologies to prevent pollution in a scientifically sound, cost-effective manner. Through voluntary partnerships with academia, industry, and other government agencies, Green Chemistry supports fundamental research in environmentally benign chemistry and provides a variety of educational and international activities, including sponsoring conferences and meetings and developing tools. The Presidential Green Chemistry Challenge Award program recognizes superior achievement in the design of chemical products.

Traditionally, engineering approaches to pollution prevention have been focused on waste minimization and have not addressed risk factors such as exposure, fate, and toxicity. EPA's Green Engineering (GE) program (www.epa.gov/oppt/greenengineering) promotes consideration of these factors in the design, commercialization, and use of chemical products and the development of feasible, economical processes that minimize generation of pollution at the source. A goal of the GE program is to incorporate "green" or environmentally conscious thinking and approaches in the daily work of engineers, especially of chemical and environmental engineers. Similarly, EPA's Design for the Environment (DfE) Industry Partnership Program promotes integration of cleaner, cheaper, and smarter pollution prevention solutions into everyday business practices. DfE (www.epa.gov/dfe) will continue to work with industry sectors to reduce risks to human health and the environment, improve performance, and save costs associated with existing and alternative technologies or processes.

To reduce priority chemicals in hazardous wastes going to landfills, EPA will focus on key waste streams and waste generators through a variety of mechanisms, including the Waste Minimization Partnership Program (part of the Agency's Resource Conservation Challenge). The Waste Minimization Partnership Program encourages EPA, state and local governments, manufacturers, and other non-governmental organizations to form voluntary partnerships to reduce the generation of hazardous wastes containing any of 30 priority chemicals. Companies that become Waste Minimization Partners are publicly recognized for their contribution to the national reduction goal. In 2003, EPA worked with a limited number of Charter Members in a pilot effort to ensure that all aspects of the program were operating smoothly. EPA will now be accepting applications from additional companies that meet membership criteria with the goal of recruiting 100 new partners, including Fortune 500 companies and small businesses, over the next 5 years. Our primary goal, however, will remain not the number of Program participants, but the reductions in chemical wastes that can be achieved.

The Resource Conservation Challenge (RCC) also focuses on recovering materials and energy, either by converting wastes into products and energy directly or as a result of process and product redesigns that produce these benefits. We will closely coordinate our RCC efforts with the Agency's other pollution prevention activities, potentially revising our strategies or targets to focus on materials and energy recovery through recycling when source reduction is not a feasible solution. The Agency is also working with its partners to identify additional goals. These new goals will reflect our expanded effort, beginning in 2003, to increase recovery of materials and energy and reduce releases of priority

chemicals in waste. We expect these new goals to be in place by 2004, as the program becomes fully operational.

Innovation

EPA is committed to developing and promoting innovative strategies that achieve better environmental results, reduce costs, and reward stewardship. In collaboration with its state and tribal partners, the Agency will continue to focus its efforts on innovations that will assist small businesses and communities in improving both their environmental performance and their bottom lines. EPA has prepared an Innovations Strategy to guide our efforts in this and other areas. The Strategy relies on continued outreach to states, tribes, and business to help identify innovative approaches that merit testing, evaluation, and implementation. Innovation also plays a role in the Agency's implementation of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, which requires EPA to review other federal agencies' environmental impact statements and make its comments public.

Improving Business and Community Environmental Performance

EPA will continue to advance environmental protection through innovative and collaborative approaches with business and other governmental entities. EPA's National Environment Performance Track program, for example, recognizes and rewards superior environmental performance and motivates improvement. Through Performance Track, the Agency will continue to recruit high-performing facilities that have the environmental policies and management systems needed to deliver better results and will create mechanisms and resources for sharing information that can help other Performance Track members and prospective members improve their performance.

Because small businesses represent approximately 99 percent of U.S. business, their environmental performance is critical to our success in protecting human health and the environment. EPA's Small Business Ombudsman will be revising our Small Business Strategy to coordinate the many Agency programs and activities targeted to small business. The strategy will guide the Agency's efforts to reach out to small business and to provide technical assistance to states and tribes. EPA will regularly evaluate and update its Small Business Strategy to ensure that it addresses the changing economic, social, and political trends that affect small businesses and meets the needs of the small business community.

Under its Sector Performance Improvement Program, EPA also tailors environmental performance improvement efforts to particular industry sectors. The Agency will continue to select sectors based on criteria such as their impact on national and regional priorities, trade association interest, and facility-level Environmental Management System development. The Agency will designate a staff liaison with expertise on the sector to develop and maintain partnerships and facilitate quick

responses to sector-specific questions and issues. Through its website, the Agency will also continue to provide an array of sector-specific information on pollution prevention, voluntary partnerships, best practices, sector performance, and other topics.

Improving Environmental Protection Policy

To foster innovation in environmental protection, the Agency reaches out to states, tribes, business, and others to identify new approaches that merit further testing, development, and potential dissemination. Over the next 5 years, EPA plans to test and demonstrate up to five innovations annually. In partnership with states and industry, and through programs and agreements that have been created since the mid-1990s, we will focus on priority environmental problems to improve environmental protection while increasing efficiency and cost savings. For example, the State Innovations Grant Program will fund projects that use innovative approaches to permitting. The Program will broaden its solicitation of state and tribal projects and will continue to provide direct assistance on a number of the most promising projects. The Agency will also continue to collect, review, approve, and help implement state proposals through the Environmental Council of States and EPA's Joint Agreement to Pursue Regulatory Innovation.

Various Agency offices will cooperate to expand program evaluation in two ways. First, the Agency will share evaluation results and collective learning experiences among programs. Second, it will promote tools and techniques that address the unique challenges associated with measuring and evaluating innovation. The Agency-wide "Improving Results: Program Evaluation and Performance Measurement Improvement Competition" will again fund program evaluation projects for innovation, as well as other key program areas. Improving our evaluation capabilities will also assist EPA in responding to the Office of Management and Budget program assessment rating tool that requires comprehensive, independent, impact evaluations.

EPA will continue to promote promising innovations that provide for the use of more flexible and performance-based regulation, multimedia approaches, incentives for superior performance, market-based approaches, public involvement processes, and programs tailored for small sources. In some cases these improvements will be brought about through changes in national rules or policies; in others, they may occur through a more gradual process of adopting new techniques across states or Agency programs. EPA will facilitate these processes by encouraging Agency, state, and tribal staff to submit innovative ideas and suggestions to a central point; using the Agency's Innovation Action Council as a forum to obtain senior-level endorsement of promising innovations; identifying pilot projects that can be mined for "lessons learned;" holding national symposia during which federal, state, and tribal officials can share information and experiences; and use of its online "innovation catalog" to disseminate information about ongoing projects.

Economic and Regulatory Policy Innovation

EPA is working to strengthen its decision-making processes for both regulatory and non-regulatory actions by continuing to improve its policy and economic analyses. The Agency will be reviewing its regulatory development procedures to ensure that they provide for management attention throughout the process, cross-office participation in priority rule makings, and planning for better analytic research. EPA will conduct detailed regulatory analyses in a number of high-priority industry sectors to identify particular business characteristics and needs and to craft innovative solutions to priority environmental problems.

EPA continues to identify important economic issues that require further research and analysis. To address these issues, the Agency will prepare an Environmental Economics Research Strategy that establishes three priority research topics each year from FY 2004 through FY 2008 and guides development of economic analyses. The Agency will also issue its first Ecological Benefits Strategic Plan, which will establish a framework for applying existing methods and data to help determine the value of ecological impacts resulting from its policies and regulation. Under its Risk Assessment for Benefits Analysis Project, the Agency will continue to contribute to the measurement and valuation of human health benefits. In addition, the Agency will revise its guidance on the value of human health improvements, reexamining the literature associated with estimating the value of reductions in premature mortality. EPA will continue to support development of indicators of environmental health for the general population and for subpopulations of interest.

EPA will continue its efforts to measure the influence of environmental costs on individual plant and industrial sector performance and analyze the effects of environmental regulations on the size, structure, and performance of domestic and international economic markets. To accomplish these efforts, EPA will train staff and managers involved in the development of benefit-cost analyses or in the decision-making process and will provide appropriate guidance material.

EPA will conduct similar efforts to improve its regulatory policy analysis. For example, the Agency will review its workgroup process for developing regulations and identify opportunities for improvement. We will assess the usefulness of our Analytic Blueprint process, which encourages early participation of workgroup members and allows senior Agency managers to provide early guidance to the workgroup, and enhance our regulation tracking system through the addition of accountability and management information (such as upcoming actions, statutory and court-ordered deadlines, and general progress reports.) In addition, we will train staff in the regulatory development process, emphasizing the integrity of the regulation development process, and identify additional training needs. Finally, the Agency will work to ensure that high priority legislation, such as the Regulatory Flexibility Act, the Unfunded Mandates Reform Act, and the Data Quality Act, as well as priorities identified in Presidential Executive Orders and other topics such as Federalism and Children's Health, are reflected

in EPA regulations.

Implementing the National Environmental Policy Act

EPA actions that are subject to NEPA requirements include wastewater and drinking water treatment plant construction and other grants, EPA-issued new source water discharge permits, and EPA facility construction. For actions that may impact the environment, EPA prepares either an environmental assessment that supports a finding of no significant impact or an environmental impact statement. The Agency will continue to comply fully with NEPA requirements and to implement mitigation measures to ensure that EPA-sponsored activities result in no significant environmental impact.

In addition, Section 309 of the Clean Air Act requires EPA to review and make public its comments on other federal agencies' environmental impact statements. EPA performs this role in consultation with the White House Council on Environmental Quality (CEQ). EPA promotes environmental stewardship by establishing strong working relationships with other agencies. For example, EPA helps other agencies scope out their environmental impact statements; assists them in developing projects to avoid environmental impacts; supports streamlined environmental review processes; participates in rotational assignment programs; participates in interagency work groups; and provides training and guidance.

Objective 5.3: Build Tribal Capacity. Through 2008, assist all federally recognized tribes in assessing the condition of their environment, help in building tribes' capacity to implement environmental programs where needed to improve tribal health and environments, and implement programs in Indian country where needed to address environmental issues.

Strategic Targets:

- By 2008, increase tribes' ability to develop environmental program capacity by ensuring 100% of federally recognized tribes have access to an environmental presence. (FY 02 baseline: 82% of tribes)
- By 2008, develop or integrate 15 (cumulative) EPA and interagency software applications to facilitate the use of EPA Tribal Baseline Assessment Project information in setting environmental priorities and informing policy decisions. (FY 03 baseline: Two.)
- By 2008, eliminate 20% of the data gaps for environmental conditions for

major water, land and air programs as determined through the availability of information in the EPA Tribal Baseline Project.

- Commencing in 2004, produce an annual status of the tribal environment report.
- By 2008, increase implementation of environmental programs in Indian country to X (cumulative total) as determined by program delegations, approvals or primacies issued to tribes and direct implementation activities by EPA. (FY 02 Baseline: Program actuals TBD.)
- By 2008, increase by 50% the number of tribes with environmental monitoring and assessment activities under EPA approved quality assurance procedures.
- By 2008 increase by 50% the number of tribes with multi-media programs reflecting traditional use of natural resources as determined by use of Performance Partnership Grants (PPGs), EPA/Tribal Environmental Agreements (TEAs), and other innovative EPA agreements which reflect holistic program integration.

Means and Strategies to Achieve Objective 3

EPA's strategy for achieving its objectives in Indian country has three major components. First, the Agency will work to develop the information technology infrastructure needed to measure environmental conditions in Indian country and related lands and the environmental results that accrue from the implementation of environmental programs on those lands. Second, EPA will continue to distribute Indian General Assistance Program capacity building grants with the goal of establishing an environmental presence in all 572 federally recognized tribes in the United States. Third, the EPA's American Indian Environmental Office will continue to coordinate closely with Agency programs to guide and track the timely and appropriate implementation of those programs directly on Indian lands. This work is closely related to efforts described under the tribal component of EPA's cross-goal Partnership strategy. (See Chapter 6.)

EPA will continue to construct an information technology infrastructure that organizes environmental data on a tribal basis, enabling a clear, up-to-date picture of environmental activities in Indian country. We will take advantage of new technology to establish direct links with other federal agencies (including the U.S. Geological Survey, Bureau of Reclamation, and Indian Health Service) to create an integrated, comprehensive, multi-agency Tribal Information Management System (TIMS). This interactive system will allow tribes and EPA regional offices to supply management information that

supplements data collected by the national tribal systems.

In addition, EPA will develop Strategic Plan Tracking Systems (GPRA Tracking Systems) to follow progress in achieving tribal objectives, sub-objectives, and strategic targets on a real-time basis. The Agency will use data available through TIMS and allied GPRA Tracking Systems to adjust approaches and activities as necessary to achieve improved results on tribal lands and to report to the tribes on the progress the Agency is making. These tools will also assist in determining resources and skills needed over the 5-year cycle of the Strategic Plan.

Consultation and direct partnerships with tribes are integral to EPA's strategy. The Tribal Caucus, which has advised the Agency on tribal issues for several years, will serve as the focal point for work under this Objective and will help facilitate continued development of EPA-tribal partnerships. The Agency will also engage other EPA-sponsored tribal groups, such as the Tribal Committee of the FOSTTA [need to spell out] organization, the Tribal Pesticides Program Council, the Tribal Association for Solid Waste and Emergency Response, and the Tribal Science Council, to help achieve environmental improvements in Indian country.

Objective 5.4: Science/Research. Through 2008, strengthen the scientific evidence and research supporting environmental policies and decisions on compliance, pollution prevention, and environmental stewardship.

Sub-objective 5.4.1: Science. By 2008, all (100 percent of) routine National Enforcement Investigations Center environmental measurements (field or laboratory) will be accredited by an internationally recognized, third party organization. FY 2001 baseline: 30 areas of environmental data collection

Sub-objective 5.4.2: Research. Conduct leading-edge, sound scientific research on pollution prevention, new technology development, socio-economics, and decision making. By 2008, products of this research will be independently recognized as providing critical and key evidence in informing Agency policies and decisions, and solving problems for the Agency and its partners.

Means and Strategies to Achieve Objective 4

EPA is working to strengthen the science that it needs to make sound decisions and establish effective compliance and enforcement policies. The Agency is continuing to conduct research on pollution prevention, new and developing technologies, social and economic issues, and decision making, and it will use the results of these studies to develop products and tools that EPA, its partners,

and stakeholders can use to promote conservation of energy and natural resources, pollution prevention, recycling, and other aspects of environmental stewardship. Advancing science and research will not only benefit the Agency and its partners, however. It will also help to clarify requirements and expectations for members of the regulated community and provide tools and strategies to help them comply.

Science

EPA's science work under Goal 5 has a two-fold purpose: (1) to improve the science that supports compliance monitoring, inspections, investigations, case support, and selected regulations and (2) to continue to provide premier investigatory work for the Agency in support of enforcement and compliance assistance. To accomplish these ends, EPA's National Enforcement Investigations Center (NEIC) will implement a nationally and internationally recognized quality system that provides for third party oversight and features both technical/scientific and the forensic elements of environmental data collection and measurement. Through NEIC, EPA will also work to improve field and laboratory measurement techniques and to advance innovative analytical approaches to support compliance and enforcement efforts.

Research

The Agency is continuing to conduct research on pollution prevention, new and developing technologies, social and economic issues, and decision making, and it will use the results of these studies to develop products and tools that EPA, its partners, and stakeholders can use to promote conservation of energy and natural resources, pollution prevention, recycling, and other aspects of environmental stewardship.

EPA will work with its partners and stakeholders to identify research needs, set priorities, and develop project plans. We will concentrate on (1) research that will help identify best practices and approaches and promote, at a minimum, compliance with all regulatory requirements and (2) research that may yield new, innovative approaches to improve performance and results in areas such as pollution prevention or sustainable development. For example, over the next 5 years EPA's Office of Research and Development (ORD) will conduct research and prepare reports and assessments on renewable resources, metal processing fluids, fuel cells, and buildings. We will share these products with industry, academia, and other agencies to further their work in preventing pollution. Other research efforts will result in four generic sustainable environmental system methodologies (using market incentives, ecological food-web models, hydrological models, and pest resistance management frameworks) for watershed management; an evaluation of the effectiveness and efficiency of market-based incentive approaches as compared to traditional environmental regulation; and efforts to make innovative environmental technologies, such as those EPA would use for building decontamination and

water security, commercially available.

EPA has developed multi-year plans for research on pollution prevention and new technologies for environmental protection and economics and decision sciences that lay out long-term goals and describe targets the Agency intends to meet to reduce scientific uncertainties.

Pollution Prevention and New Technologies for Environmental Protection

Over the last decade, the Agency has increasingly focused on pollution prevention when addressing high-risk human health and environmental problems. A preventive approach requires (1) innovative design and production techniques that minimize or eliminate adverse environmental impact; (2) holistic approaches that make the most of our air, water, and land resources; and (3) fundamental changes in the ways that goods and services are created and delivered to consumers.

As part of its multi-year plan, EPA has established five long-term goals for pollution prevention and new technologies research. These goals focus on the development of tools, technologies, and sustainable environmental systems approaches and on continuing to prevent and control pollution by targeting sources and sectors that pose the greatest risks to human health and the environment. Within the 5-year scope of this *Strategic Plan*, EPA will:

- Develop new and advanced theories and methods of environmental system analysis, along with decision-support tools based on those methods, that can be applied within industrial sectors and beyond (for example, in municipal, agricultural, transportation, and energy areas);
- Complete and document studies in areas such as kinetics, catalysis, reaction engineering, materials, interfaces, separations, thermodynamics, and applied engineering that will enable regulators and the regulated community to determine how these new concepts can be applied to accelerate the introduction of cleaner processes and materials in specific industries, energy production processes, or consumer products, thereby reducing emissions and resource usage;
- Provide appropriate and credible performance information about new, commercial-ready environmental technologies that will promote the purchase of effective environmental technology in the United States and abroad;
- Assemble and deliver to state and local governments a watershed-scale strategy for sustainable environmental systems based on computer-based tools and a manual of suggested management practices to reduce risks to human health and the ecology using combined economic, hydrologic, physical and ecological, land use, legal, and technological methods; and

- Use Small Business Innovation Research incentive funding to develop and commercialize innovative environmental technologies that EPA, state, and local regulatory and compliance programs need to protect human health and the environment.

Economics and Decision Sciences

As long as environmental policy is designed to change behaviors that cause environmental problems, economics and decision sciences research will be essential to understanding these behaviors. In addition, this research informs state and federal environmental agencies on how best and most cost-effectively to accomplish three overarching responsibilities: (1) anticipating, identifying, and setting priorities for managing environmental problems to protect ecological and human health; (2) developing policies to address the selected environmental priorities; and (3) implementing the policies to achieve better environmental outcomes.

Under its multi-year plan, EPA has established five long-term goals for economics and decision sciences research that focus on changing behaviors that cause environmental problems; developing tools to assess the highest priority issues based on public preferences; and developing implementation strategies that accurately account for behavioral responses to government initiatives and interventions. Within the 5-year scope of this *Strategic Plan*, EPA will:

- Develop reliable estimates of how people value environmental and health benefits, with a particular emphasis on children's health issues;
- Identify the motivations that influence the behavioral responses of corporations or other regulated entities to various government interventions, including regulatory enforcement, information dissemination, and voluntary initiatives;
- Identify behavioral responses to market mechanisms and incentives. Research will investigate how programs can be designed to take advantage of predictable behavioral responses to deliver cost effective environmental protection;
- Identify and categorize the environmental behavior and decision making of a variety of different actors, from individuals to community groups, that are affected by pollution or changes in environmental quality; and
- Identify the socioeconomic causes and consequences of the potentially most significant long-term environmental issues and develop tools for predicting and addressing them.

HUMAN CAPITAL STRATEGY

Protecting human health and the environment through compliance with environmental requirements, improving environmental performance through pollution prevention, and promoting environmental stewardship will require a workforce that has the appropriate knowledge, skills, experience and expertise. The Agency's work under this Goal is dynamic, and our workforce must be able to respond quickly to emergency situations, evolving environmental problems, and changing priorities. To meet these objectives, it is critical that we identify and address our human capital needs over the next 5 years. EPA will need effective, resourceful leaders who understand and can articulate the strategic direction for compliance and environmental stewardship and employees who can continue traditional tasks while taking on new roles and responsibilities.

A growing number of senior managers and employees who support this goal will be eligible to retire over the next few years. We will need to attract new employees who possess a diversity of skills and perspectives reflecting an academic grounding in environmental law, science, social science, engineering, chemistry, economics, and marketing. To accomplish our compliance assurance work, we will need to attract skilled attorneys, engineers, and scientists to develop and distribute compliance assistance tools, carry out civil and criminal inspections and investigations, and conduct litigation when necessary. To support our innovations and science/research efforts, we will also need to recruit scientists, economists, chemists, systems ecologists, risk assessment modelers, risk communication specialists, and decision analysts. We have defined core competencies that will be needed over the next 10 years to support the Agency's renewed focus on sound science and research.

We will also be faced with the challenges of maintaining critical expertise to carry out multi-disciplinary work in cooperation with our partners and stakeholders (states, tribes, small businesses, communities, other federal agencies, civic and environmental organizations, various scientific organizations, and academia). For example, we need a workforce committed to innovative approaches that ensure compliance with environmental laws and help achieve higher levels of environmental performance. This involves working creatively with regulatory partners and small businesses; providing outreach to targeted audiences and sectors on the availability and benefits of compliance assistance and voluntary programs; and applying knowledge of and experience with environmental management systems, audit protocols, and other best management practices. Lastly, as we continue our important work with federally recognized tribes, we will need to enhance our cadre of trained grant project officers and employees who are well-versed in federal Indian law and who are sensitive to issues in Indian country and Alaskan Native Villages.

To expedite the hiring process, we will select from existing pools of qualified candidates by using Direct Hire Authorities (including Peace Corps, Outstanding Scholar), recruit from established intern programs (such as EPA's and the Presidential Management Intern programs), and host detailees

from state and tribal organizations. In efforts to retain highly motivated and competent employees, we will revise our mechanisms for rewarding risk-taking and innovation and ensure a high-quality work environment. In order to ensure that expectations are clear and focused on results, we will put in place employee performance agreements that contain specific outcome measures of successful performance and individualized incentives that will customize rewards for exceptional results.

PROGRAM EVALUATION

A February 2001 General Accounting Office (GAO) report entitled “Environmental Protection: EPA Should Strengthen its Efforts to Measure and Encourage Pollution Prevention” (GAO-01-283) examined the extent to which companies have adopted pollution prevention approaches and the major factors which either encourage or discourage private sector decisions to employ such strategies. In this report, GAO concluded that improved data collection and measurement are critical needs, stating that “EPA officials note that the limitations of available data inhibit both their ability to ascertain the extent to which companies use pollution prevention practices, and their attempt to target efforts to further encourage these practices.” GAO’s recommendations focused on the need for EPA to clarify source reduction reporting requirements and to obtain accurate data on the quantity of emissions reduced. In response to this study, EPA has taken steps to improve its ability to measure source reduction. As a result of these actions, performance measurement architecture for the *Strategic Plan* is for the first time composed of specific measurable targets for pollution prevention, expressed in terms of the quantity of waste reduced (for example, “By 2008, reduce by X percent TRI business-reported wastes from 19__ levels”).

EXTERNAL FACTORS

EPA’s ability to meet its objectives for compliance and environmental stewardship may be affected by a number of factors. For example, natural catastrophes such as floods, significant chemical spills, or the new challenges associated with homeland security and responding to real or potential terrorist threats may require the Agency to revise its priorities and redirect its resources.

The Agency relies heavily on its partnerships with other federal agencies, states, tribes, local governments, the regulated community, and the public to advance protection of human health and the environment. Many of the strategic targets the Agency has set under Goal 5 are predicated on the assumption that states and tribes will be able to maintain or increase their levels of compliance and enforcement work or that, for example, the U.S. Department of Justice will accept or prosecute cases.

In the area of pollution prevention, for example, the Agency’s work is almost entirely

dependant on voluntary partnerships, collaboration, and persuasion, since there are few environmental regulations that set specific source reduction requirements. The Design for the Environment Program seeks partnerships with industry trade associations to engage jointly in the development and marketing of products that generate less pollution. The Green Chemistry Program challenges industry and the academic community to step forward with new chemical formulations that pose fewer risks to human health and the environment. And EPA's strategy of "greening the supply chain" depends on the willingness of large manufacturers voluntarily to require their suppliers to provide environmentally preferable products. These efforts all depend on our partners' continued willingness to cooperate in joint endeavors that may not realize an immediate payoff. EPA's ability to carry out its voluntary pollution prevention initiatives could be reduced if partners begin to believe that the initiatives are not worthwhile, are too risky, or are otherwise contrary to their best interests.

The community that contributes to and uses EPA's data and information is also evolving. As states and tribes develop the ability to integrate their environmental information, EPA will need to adjust its systems to ensure that it can receive and process reports from states and industry under Agency statutory requirements. Citizen and community organizations and the public at large are also increasingly involved in environmental decision making, and their need for quality information and more sophisticated analytical tools is growing.

Finally, the regulated community's willingness to comply with the law and to exceed minimum requirements is an obvious factor in the Agency's achievement of its compliance and environmental stewardship goals. A key component of our waste minimization strategy for reducing priority chemicals from waste streams, for example, is the commitment that small and large businesses make to work with EPA and other governmental organizations to address the targeted chemicals.

MEASURING OUR PERFORMANCE: RELATING GOALS TO ANNUAL PERFORMANCE

Are we making progress toward our strategic goals? Have we accomplished what we planned, and are we achieving the environmental results we intend?

To plan strategically, to adjust our approaches and activities to improve results, and to be able to report to the American people on our progress, EPA must routinely assess its performance and accomplishments. The Government Performance and Results Act (GPRA) requires agencies to report to Congress each year on their progress toward their strategic goals. Under GPRA, agencies set annual performance goals and establish measures to determine how well they are achieving those goals. Annual Performance Reports summarizing these findings are due to Congress after the end of every fiscal year.

EPA's strategic "architecture"—the Goals, Objectives, and Sub-Objectives that we use to plan our work, develop our budget, and account for our resources—is also designed to help us track our performance. Each of our five long-range strategic goals (Clean Air, Clean and Safe Water, Protect and Restore the Land, Healthy Communities and Ecosystems, and Compliance and Environmental Stewardship) is broken down into a number of Objectives that describe what we intend to accomplish over 5 years in order to attain our larger goals. In turn, the Objectives are supported by a series of Sub-Objectives, which are focused on more specific results the Agency intends to achieve during those 5 years.

EPA's 2003 *Strategic Plan* introduces another element to many of the Sub-Objectives in the Agency's architecture: strategic targets. These 5-year targets will help us chart our course more quantitatively and track our progress from different perspectives. In most cases, we will develop our annual performance goals to mirror each of our strategic targets, so that we can measure our progress each year toward these targets and the Sub-Objectives that they support. In this way our strategic targets help provide a clear first link in the Sub-Objective-to-Objective-to-Goal chain, demonstrating how the work the Agency conducts during a given year ultimately will help us reach our five Goals.

Taken in its entirety, EPA's strategic architecture presents a multi-year map for achieving our goals. It shows how accomplishments at each level—annual performance goals, strategic targets, sub-objectives, and objectives—"add up" to the next level and, ultimately, toward a strategic goal of "Clean Air" or "Clean and Safe Water." This structure also enables us to measure our performance on an annual basis and to track our progress over the long term. Most importantly, it allows EPA to present our partners, our stakeholders, and the public with a coherent, step-by-step plan for achieving our goals, accounting for our costs, measuring and evaluating our performance, and managing our work to achieve environmental and human health protection results.

CROSS-GOAL STRATEGIES

Many of EPA's efforts—strengthening our partnerships with states and tribes, improving the quality and availability of the environmental and health information on which we base our decisions, and improving our management systems to achieve better results—contribute to our progress toward all five of our goals. This cross-Agency, cross-media work includes both support functions, such as administrative and financial management or legal services, and the strategies or means we employ to help accomplish our objectives, such as science and research or information management.

Each of these efforts is a significant component of our work and plays a critical role in the accomplishment of all of our goals. This chapter highlights a few of these cross-goal strategies: Partnerships, Information, Innovation, Human Capital, Science, and Homeland Security. For each, we will discuss the Agency's approach, explain how the strategy will contribute to the achievement of our goals, and describe some of the activities we will conduct and results we hope to achieve using this approach.

Partnerships

Since EPA was established, we have relied on collaborative partnerships with states and tribes to help us carry out our mission. The advances made in protecting our Nation's health and environment would not have been possible without the participation and support of state and tribal governments. EPA is committed to strengthening these partnerships and, recognizing the unique concerns and contributions that each of us brings to the table, to working together with state and tribal agencies to address environmental problems and achieve results. The discussion which follows outlines our approach to establishing and improving our partnerships with states and tribes.

State Partnerships

Most of the Nation's environmental laws envision a strong role for state governments in implementing and managing environmental and human health protection programs. As state environmental authority and management capacity have grown over the past three decades, EPA has delegated or authorized primary responsibility to states for implementation of many day-to-day environmental and human health protection program activities such as issuing permits, conducting compliance and enforcement programs, and monitoring environmental conditions. Direct administration of environmental and human health protection programs by states, with EPA oversight to ensure compliance with federal statutes and achievement of national objectives, has brought about significant improvements in the environment and human health across the country. State performance is critical to achieving both EPA and state goals and objectives.

In 1995, the states and EPA re-grounded their relationship by agreeing to a series of principles that would guide their work together. For the past 7 years, the principles articulated in the *Joint Commitment to Reform Oversight and Create the National Environmental Performance Partnership System*, also known as the "May 17th Agreement," have guided the state-EPA

partnership. These principles call upon the states and EPA to set priorities jointly; develop performance agreements to define their roles, responsibilities, and accountability; encourage innovative environmental and human health protection strategies; agree upon performance measures; and jointly evaluate the results achieved.

The states and EPA use a variety of tools to define their relationship and guide their implementation of the Nation's environmental laws and the principles of the "May 17th Agreement." These tools include performance partnership agreements (PPAs), categorical grants to states, performance partnership grants (PPGs), enforcement agreements, primacy delegation agreements, and others. In addition to the performance partnership system, EPA works with a variety of associations representing state environmental agencies, such as the National Governor's Association, the Environmental Council of the States (ECOS), and other pollution-media-specific organizations such as the Association of State and Interstate Water Pollution Control Administrators. EPA also works with state agricultural and public health agencies on environmental matters.

<p style="text-align: center;">Key Principles National Environmental Performance Partnership System May 17, 1995 Joint Commitment</p> <ul style="list-style-type: none">• Continuous Improvement.• Environment Protected for All.• Progress Reported Using Environmental Indicators.• Allowing Flexible Approaches while Maintaining Level Playing Field.• Joint Planning and Priority Setting to Address Highest Needs.• Facilitate and Encourage Public Involvement.• Reforming Oversight to Concentrate on Weaknesses.
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The results of a joint system evaluation conducted by state environmental commissioners and senior EPA managers in 2002 confirm that Performance Partnerships are based on sound principles that guide a flexible process that adapts environmental goals to local conditions in a way that builds trust between states and EPA. Performance Partnerships have greatly improved communications between EPA and state environmental agencies by fostering more frequent discussions between state commissioners and regional administrators and by beginning to break down organizational and media-program barriers in both EPA regional offices and state agencies. Increased joint planning and priority-setting have focused state and EPA regional office efforts on achieving results, increased work sharing, allowed more flexibility in funding, and reduced low-value oversight and reporting.

Since establishment of the Performance Partnership System, our increased focus on partnering has led to other advancements in the state-EPA relationship. EPA's intensive and comprehensive work with states on information management includes grant programs for state environmental information efforts and the Information Exchange Network, which is increasing the speed at which we can share data, driving down costs, and improving efficiency and accuracy. State-EPA partnering efforts also yielded the 1997 State-EPA Regulatory Innovation Agreement.

EPA is also working with states to achieve greater value from PPGs. We are conducting a structured, disciplined three-part effort to evaluate barriers that prevent EPA and states from taking greater advantage of the flexibility that PPGs provide. First, we will identify and assess legal and administrative barriers. The next phase involves meetings between state and federal front-line grant managers and negotiators to develop plans for reducing barriers and increasing use of PPG flexibility. Then we will build on these efforts to develop a training module and a best practices guide. These

activities will greatly increase use of the flexibility that PPGs provide to states.

Progress toward all five of our *Strategic Plan* goals depends not only on EPA's efforts, but on the efforts of all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and the Islands of the Pacific Insular areas. Therefore, effective partnerships with these jurisdictions are necessary for achieving the results contemplated in this *Plan*. Among the problems identified by the evaluation of the Performance Partnership System described above was that EPA's priority-setting and planning processes (including PPAs, issuance of national program guidance, budgeting, and accountability systems) are not aligned in a way that fosters joint planning and priority-setting across media program lines. EPA and state staff have limited experience with collaborative approaches to environmental problem-solving; strong media program perspectives and loyalties still dominate many aspects of state-EPA relationships, and there are few incentives for state and federal staff to risk new ways of doing business. PPAs are "in addition to" and many times conflict with delegation agreements, national program guidance, or aspects of state-federal management of environmental programs.

In addition, transaction costs for developing PPAs are believed to be too high, due to a perception that the hours spent planning exceed the hours of actual environmental work. The expected benefits of a reduction of oversight and reporting were not realized. Finally, some states invested considerable resources in developing self-assessments about which they received no EPA feedback. Our partnership strategy will address these and other concerns. The successes we achieve together will enable both states and EPA to advance to a more results-oriented approach to protecting human health and ecosystems.

What We Intend to Accomplish

While the 2002 joint evaluation identified some remaining challenges, states and EPA will work together over the next 5 years to realize the full benefits of Performance Partnerships. EPA's partnership strategy comprises five components. We hope to build a new, collaborative approach to environmental protection that will improve results while reducing overall costs by focusing on these five aspects:

(1) Increase our emphasis on environmental results in state-EPA management of environmental protection programs. We have begun to incorporate more outcome-based Objectives and Sub-objectives in EPA's 2003 *Strategic Plan*, and we will continue to propose new annual performance goals and measures. We will also try to link output measures to longer-term outcomes more clearly and to develop better environmental indicators and the necessary data and monitoring support. We will continue our work with the ECOS-EPA Information Management Workgroup to foster further development of integrated information systems that support results-based management.

(2) Work with our state partners to establish a range of PPAs that advance a results-orientation to priority-setting and planning, tailored to the needs of individual states. EPA will propose a framework for a range of agreements—from a targeted PPA focusing on a limited set of environmental issues, to a comprehensive multi-year, cross-media PPA and PPG. We will analyze and implement ways that EPA and a state can unify all existing agreements under a single definitive agreement that details how they will perform under statutory and delegation requirements. This single definitive agreement will address environmental performance expectations and provide for joint EPA-state performance evaluations that will hold each accountable. The Agency will also work with our state partners through a joint evaluation process to identify ways to improve and advance agreements

and the methods by which they are developed and negotiated.

(3) Improve the state-EPA working relationship and clarify our roles and responsibilities to make more effective use of limited resources. We will identify mandatory activities as early as possible, discuss relative priorities, and work within the agreement format to address new environmental, legal, economic, or political events lying outside state and EPA control that might change work direction. For states with PPAs, we will ensure that only those changes with which appropriate Regional and Assistant Administrators have concurred will occur. We will continue to reduce duplicate activities and, during this era of fiscal resource constraints, increase use of PPGs to address the highest environmental protection priorities. We will also work with interested states to make their normal financial and results information accessible to EPA, precluding Agency requests for special reports. We will strengthen the ways we conduct regular joint evaluations between regions and states to ensure mutual accountability and continuous improvement.

(4) Establish more systematic ways to reflect state priorities in EPA planning and budgeting processes and ensure that states understand and know when to contribute to these processes. We have made progress toward this goal through the consultations that EPA conducted with states, ECOS, and other state organizations during the development of this *Strategic Plan*. EPA regional offices will also be developing Regional Plans that incorporate state and tribal input on priorities, identify priority problems, and describe how states and EPA will address these issues. EPA regions will also solicit state input to EPA's annual planning meeting, budget forum, and establishment of national program performance targets in annual plans and budgets. EPA will also synchronize the timing of its processes for all programs, especially in the development of national program guidance and memoranda of agreement (MOAs), or a successor approach. The Agency will share with states detailed information about the MOA or a successor process, including schedules, key steps, and program documents. Finally, EPA regions will continue to ensure compatibility of commitments in PPAs with national program office strategies.

(5) Promote innovative, cross-media approaches to environmental problem solving. The Agency will encourage and enable state representatives (for example, from the ECOS Cross-Media Committee) to participate on EPA's Innovation Action Council. EPA will continue to encourage use of the Joint EPA/State Agreement to Pursue Regulatory Innovations to provide flexibility needed for state innovation projects. EPA will also attempt to provide funding to encourage and enable state innovation, such as the state innovation grants that were piloted in 2002. Finally, EPA will incorporate state-proposed innovation efforts in the PPA where appropriate, to underscore the importance that EPA and the state accord to innovation..

The belief that states and EPA are equal partners in the national effort to protect human health and the environment is the basis for our partnership strategy. The Nation's environmental laws set certain goals, standards, and approaches for environmental protection to which EPA and its state partners are committed. But environmental issues and problems also vary greatly from region to region, and EPA is committed to adapting to these situations.

There is a burgeoning movement among state governments and the federal government to focus their work on achieving performance results. EPA's support for this movement is evidenced by the Agency's efforts to manage for improved results; improve environmental indicators; promote innovation; and establish an exchange network that will allow EPA, states, and the public to access environmental data. Improving the Agency's working relationship with the states is also part of this performance management effort. Together, these initiatives will help to focus the entire national

environmental protection system on achieving improved results.

Tribal Partnerships

EPA's mission—to protect human health and the environment—applies to all our Nation, including Indian country and areas for Alaska Native Villages. In carrying out our mission, we will build on our strong foundation of working with our tribal partners to ensure that our efforts encompass all U.S. lands, regardless of ownership status or jurisdiction.

Tribes have unique cultural, jurisdiction, and legal issues that present special challenges to the coordination and implementation of environmental management in activities in Indian country. Recognition of the uniqueness of tribal jurisdictional lands was formally made in EPA's 1984 Indian Policy. Vital to that policy is the principle that EPA works with tribes on a government-to-government basis that reaffirms the federal trust responsibility to tribes. Therefore, EPA's work toward a comprehensive plan of application of environmental protection activities in Indian country and for Alaska Native Villages must utilize innovative approaches and coordinated programs that work in partnership with tribes to complement tribal government structures, incorporate tribal priorities, and recognize tribal cultural considerations.

As EPA works with tribes it attempts to do so with the understanding that the work is about more than physical landscapes, rules, regulations, matters of jurisdiction and funding. EPA's work within tribal jurisdictions also recognizes Indian people as a distinct people with distinct ways of life that set them apart from all others. Survival as a people is dependent upon the protection and vitality of tribal homelands. Therefore, protecting that environment and ensuring equitable environmental protection in Indian country and Alaska Native Villages is critical to maintaining the vibrancy of tribal culture.

To help achieve our mission, the Agency will promote greater collaboration with tribes by tailoring environmental programs to protect the natural resources and traditional ways of life and to complement tribal government structures. As we strive to advance consistency and equitable environmental protection in Indian country and for Alaska Native Villages, EPA will promote development of metrics under all of our strategic goals that indicate performance and environmental results for tribes. Where we lack environmental data for Indian country, we will continue our work to reduce data gaps in tribal environmental information.

Information

Accurate, timely, and usable information is the foundation for decisions and actions taken by EPA, states, and others responsible for protecting human health and the environment. Effective information management is vital to the success of EPA's mission, and contributes to the achievement of all Agency strategic goals. EPA develops, collects, analyzes, and provides integrated access to information to promote more knowledgeable and environmentally responsible attitudes, decisions and actions.

EPA's Cross-Cutting Environmental Information Strategy

Enhance environmental results through the improved use of quality environmental information by EPA decision-makers, states, tribes, other partners, and the public to:

- *Promote environmentally-beneficial action;*
- *Improve environmental decisions;*
- *Promote more environmentally responsible attitudes; and*
- *Improve knowledge*

EPA strives to provide the right information, at the right time, in the right format, to the right people. This means making quality environmental and management information available to decision makers for developing environmental policies and priorities. It means making environmental data publicly accessible to support individual and community involvement in decisions that may affect environmental quality. It means building the necessary infrastructure to provide secure information, reliable data, efficient and timely access, and analytical information tools.

New ways of conducting business are required to meet new, more complex information challenges, especially EPA's vital responsibility to work with federal, state, and local partners to ensure homeland security. The Agency's crosscutting information strategy, developed in the framework of the President's Management Agenda, is a three-pronged approach to meeting these challenges. To achieve EPA's mission, over the next 5 years EPA's cross-cutting information strategy will focus on:

Analytical Capacity—providing access to new analytical tools that facilitate data interpretation and enable users to respond to environmental problems, set priorities, make sound decisions, manage for results, and measure performance;

Governance—adopting an Agency-wide approach to managing information, including administrative and programmatic systems, data and investment priorities; and

Excellence in Information Service Delivery—working collaboratively with states, tribes, other federal agencies, and key stakeholders to improve the efficiency and utility of environmental information.

Finally, the need to make environmental information accessible and usable by the American public, including populations that have been historically disenfranchised, is critical. The public's ability to acquire, use, and understand environmental information is increasingly important to solve problems and address challenges.

Decisions regarding Agency information management can potentially affect EPA employees; state, tribal and local partners; and the regulated community. EPA employees rely on the Agency's information management systems, central information services and special information resources to achieve the Agency's mission. EPA has adapted information models that show the clear linkages between information investments and achievement of efficient, effective environmental results. These logical models are part of the business case methodology that EPA uses to evaluate proposed investments in information technology. We will continue to ensure that information technology and data initiatives directly support EPA's mission, and are fully coordinated with efforts of our federal, state, tribal and local agency partners to avoid duplication, reduce burden and increase effectiveness. As part

of its work to meet and exceed federal requirements for information management and services, EPA has been commended for assuring that information investments are made wisely to achieve environmental results.

Analytical Capacity

Environmental data are most meaningful when examined from a holistic perspective; that is, when users are able to examine all of the data about a particular situation, location, or source at once.

Integrated analytic capacity is integral to meeting the Agency's five goals. In order to meet the objectives under each goal, EPA, other federal agencies, states, tribes, and other partners require specific information on environmental and human health conditions and analytical tools capable of isolating specific stressors associated with those conditions. These capabilities must be designed to meet the needs of specific objectives—whether assessing global issues such as stratospheric ozone depletion, regional issues such as haze, state-level issues such as watershed protection, or local issues such as ambient air quality protection within a particular metropolitan area.

Improved capacity to integrate and analyze environmental data will support cross-media solutions to complex environmental and human-health problems. Better analytic tools will also help EPA fulfill its homeland security responsibilities by providing a clear picture of the spatial coordinates, materials, and corporate ownership of regulated facilities.

Better analytical capabilities will help managers to assess existing baseline conditions, isolate data gaps, track the implementation of specific solutions, and measure the results achieved. By 2008, EPA will provide analytical tools to support decision-making, results-based management, and the public's right to know.

Over the next 5 years, EPA will:

- Continue to implement the Environmental Indicators Initiative. EPA will establish a set of performance indicators of environmental and human health conditions. Environmental indicators will help in assessments of the effectiveness of environmental programs.
- Implement a suite of customized tools for emergency management. These tools will deliver secure, reliable, and timely data access and communications to on-scene coordinators, emergency response teams, and investigators from field locations.
- Continue to increase the availability of useful health and environmental information. EPA will continue to implement the Toxics Release Inventory (TRI) Program to provide the public with information on releases of toxic chemicals to the environment. The Agency will build on the foundation of existing public access tools such as Envirofacts and Window to My Environment (a geographic portal to community-based environmental information) by providing additional access to information collected by EPA, its partners, and stakeholders.

Desired Outcomes by 2008

Decisions made by EPA, states and tribes, other partners and stakeholders, and the public are strengthened by the improved use of environmental information.

Governance

EPA recognizes that successful organizations align technology, people, and processes with goals. Information governance is the Agency's strategy to ensure efficient, coordinated management of information assets across all EPA programs. An Agency-wide approach to information will allow EPA to make key information, technology, and funding investments that improve the efficiency and effectiveness of services and operations.

Enhanced information governance will help the Agency identify and manage the "informational infrastructure" or common information elements used by more than one program area. Shared management of the informational infrastructure will better position the Agency to develop integrated, multi-media strategies, improve the efficiencies of information collection and exchange, and reduce the administrative burdens associated with the Nation's environmental protection programs for states, tribes, and the regulated community. By 2008, EPA will fully adopt and implement an Agency-wide approach to make and implement information management decisions.

Over the next 5 years, EPA will:

- Continue to develop its Enterprise Architecture. Enterprise architecture involves identifying the business processes that support Agency goals, the data needed to for environmental results, and the technology that most efficiently secures and delivers the data. Enterprise architecture drives investment decisions and promotes wise investments in information technology.
- Continue to focus on partnering. EPA will continue to strengthen emerging partnerships, identify collaborative goals, promote integrated planning, and foster interagency coordination with other federal agencies, States and Tribes. The foundation for meeting these goals is access to the collective data resources of all partners.
- Improve existing governance processes. EPA will continue to pursue an investment strategy to support a strong Agency information architecture program and investment management process as outlined by the Federal Chief Information Officer Council and as required by the Clinger-Cohen Act. The architecture and investment review processes will govern funding for individual systems development and modernization.

Desired Outcome by 2008

Enhanced information integrity, analysis, and access strengthened by software tools and the collection of quality and appropriate data.

Desired Outcome by 2008

Improved Agency operations including the security, collection, and exchange of information by implementing an EPA-wide approach to managing technology and information.

A highly diverse, well-trained workforce able to fully benefit from information technology investments and deliver quality and timely information products and services.

Excellence in Information Service Delivery

Information technology is transforming

the way EPA conducts the business of environmental protection. But EPA faces information management challenges similar to those faced by many other private and public organizations. The Agency must continually adapt to emerging technologies such as electronic-commerce and web services that enable organizations to become more productive, effective, and proactive in service delivery. Three major themes of change in information service delivery are streamlining management processes, linking data partners, and improving information access.

EPA, like other public and private organizations, is exploiting information technology to streamline internal management processes. New administrative systems for financial, personnel, and program management will integrate data, eliminating database fragmentation and limited information access. Groupware applications are enhancing the traditional Agency workgroup process by improving information flow, facilitating meeting scheduling, and encouraging more frequent team member involvement. In other organizational settings, changes such as these have been shown to deliver measurable improvements in the quality and efficiency of administrative work processes.

Second, networks will link EPA to federal, state, tribal and other implementation partners as the means of exchanging policy, research, management and performance information between Agency organizations and State environmental programs throughout the country. In the U.S. economy, distributed network technology is fast eliminating time and distance as obstacles to business collaboration. Today, vast webs of suppliers are able to contribute to work products in a global marketplace according to their specialized expertise. The result: greater innovation and resource productivity.

Finally, explosive growth in data processing and storage capacity has opened up new opportunities for accessing data from multiple sources. Fine resolution data from local monitoring organizations can be assembled into geographic information systems providing holistic environmental pictures on geographic scales both large and small. Mountains of data collected using advanced monitoring technologies in space, the air and on the ground can be placed at the public's fingertips in usable formats. Integrated public information has been shown to deliver bottom-line improvements in environmental programs, by closing the behavioral gap between environmental policy and private actions.

Improved information service delivery is key to the implementation of many of the objectives detailed under the Agency's five strategic goals. The utility of environmental information, from ambient monitoring data to compliance assistance material, will depend largely upon the Agency's ability to ensure that the right information is provided to the right user at the right time. By 2008, EPA will increase the operational efficiency of all Agency business processes through the use of information technology.

Over the next 5 years, EPA will:

- Solicit customer feedback. This feedback will be used to systematically improve information usability, clarity, accuracy, reliability, and scientific soundness. Other efforts to improve information will include the development and implementation of necessary data standards and associated registries to improve the consistency, quality, and comparability of data managed in national environmental systems. EPA will require that data quality is known and appropriate for intended uses. Usability testing and customer satisfaction baselines will assure that the information the Agency provides is meeting the needs of its customers.

- Streamline information collection. This will help regulated entities to meet regulatory requirements while eventually easing burdens placed on states and the Agency to collect information. The Agency will continue to assess the information reporting burdens placed on its partners and on the regulated community, and align information collection requirements with specific needs. EPA will improve the timeliness and completeness of requests for information by implementing an Agency-wide electronic records and document management system. The Agency plans to develop and acquire the necessary software and hardware to begin phased implementation of the system throughout the Agency.
- Continue to develop the Exchange Network. The Exchange Network is a comprehensive, integrated information exchange program designed to strengthen the partnership between, and facilitate information sharing among, EPA, states, other federal agencies, tribes, localities, and the regulated community. The Exchange Network will provide a wide range of shared environmental information and improve environmental decision making through increased availability of quality data, enhanced security of sensitive data, avoidance of data redundancy and conflict, and reduced burden on those who provide and those who access information. It uses an internet-based, multi-media approach to environmental information exchange that is standards-based, highly connected, flexible, and secure. Additionally, through an information grant program begun in 2002, states and tribes will be better positioned to participate in the Exchange Network.

The Central Data Exchange (CDX) is the electronic portal of the Exchange Network through which information is securely received, translated and forwarded to EPA's data systems. In 2004, the CDX infrastructure will service 46 states, and over 25,000 facilities, companies, and laboratories will use it to provide data to EPA electronically. By widely implementing an electronic reporting infrastructure, CDX will reduce reliance on less efficient paper-based processes, resulting in improved data quality, reduced reporting burden, and the creation of new opportunities for simplifying the reporting process. Electronic reporting through CDX will be possible for all of the national environmental systems. CDX will serve as the Agency's node on the Exchange Network, providing data exchange services for states and other EPA partners. The Agency will make strategic investments in the information infrastructure that support our 10 regional offices

- Continue to focus on data quality. EPA has a key role in working with data partners to develop and promote consistent, complete, current, and reliable data to support full and effective information sharing, environmental monitoring, and enforcement. EPA will continue to develop Agency-wide policies and procedures for planning, identifying data needs, documenting, implementing, and assessing data collection and use in Agency decisions. EPA will continue to work with data partners to develop and implement data standards. The Agency will also continue to implement its Information Quality Guidelines, to help ensure that information EPA provides to the public is of the highest quality.

Context of Federal Innovation in Information Management

All EPA's emerging information capabilities will continue to support and further the President's Management Agenda Electronic Government (e-Gov) Strategy for improving service to citizens, business, and others while increasing efficiencies. EPA will continue to collaborate with other federal agencies, states, tribes, and local partners to expand Internet access, improve the quality of services, and drive down the cost of basic government functions. The approach of the e-Gov Strategy is to

simplify processes and unify operations to better serve citizens' needs. EPA will continue to implement this vision and eliminate redundancies and overlaps in such functions as small business compliance, payroll and other resource functions, and geospatial information. Overall, EPA is participating as a partner in 14 designated e-Gov projects and is the lead agency for the Online Rulemaking Initiative to make the rulemaking process more transparent to citizens and businesses.

By implementing this information strategy, EPA will keep pace with the rapid advances in information technology and meet the growing demand for reliable, quality environmental information.

Innovation

EPA's Innovation Strategy

In 2002, EPA released a strategy to strengthen environmental protection through the power and promise of innovation. *Innovating for Better Environmental Results: A Strategy To Guide the Next Generation of Environmental Protection* is designed to drive innovation in environmental programs.

EPA and many other environmental policy leaders see a critical need for environmental innovation. The U.S. environmental protection system is widely recognized as one of the strongest in the world. For more than 30 years, this system has succeeded in cleaning up some of the most visible and egregious forms of pollution and provided Americans with strong environmental and public health protection. But that legacy of progress is challenged by an increasingly complex set of environmental problems, like global climate change and polluted runoff, that will require a broader set of tools than we have relied upon in the past. At the same time, EPA and other agencies are experiencing the reality of tight budgets and pressure to be more accountable for results. Other factors spurring environmental innovation include the availability of powerful new information technologies that can advance environmental knowledge and public and private interests in making environmental management a value-added endeavor. Yet another factor is the need to address sustainability, environmental justice, and other issues with interwoven social, economic, and environmental dimensions. Together, such challenges make environmental innovation an absolute imperative.

EPA's Innovation Strategy responds to this need and provides a vision for what our environmental protection system should be. That vision, one that is now widely shared in the environmental policy community, is for a system that puts more emphasis on results; in which the focus is on environmental responsibility, not just pollution control; and where multimedia approaches address problems in a comprehensive rather than piecemeal fashion. The system envisioned would rely more on incentives to motivate better environmental performance and on partnerships that help to leverage ideas and resources for greater environmental gain.

Developed in consultation with states, the Innovation Strategy consists of four inter-connected elements that will enable progress towards this long-term vision and, in the shorter term, progress under EPA's *Strategic Plan*. The first element is designed to strengthen our partnership with states and tribes. With shared responsibilities for environmental programs, states and tribes are EPA's most important partners, and they share our interest in innovations that can improve results. The Innovation Strategy lays out a set of actions designed to enable state and tribal innovation. These include finding

ways to improve the National Environmental Performance Partnership System and the Joint State/EPA Agreement to Pursue Regulatory Innovations, two policy tools that provide a means for jointly advancing innovation initiatives. Another priority is providing states with opportunities for earlier, more meaningful input in EPA's planning and budgeting processes, where decisions about resources for innovation are made.

The second element focuses on using innovation to solve a set of priority environmental problems—greenhouse gases, smog, degrading water quality, and deteriorating water infrastructure. While there is a need for innovation in solving many environmental problems, these are especially important because they are persistent, widespread problems that are not being adequately addressed with the tools and approaches that exist today. From voluntary agreements with key industry sectors, to market-based trading programs that create an economic incentive for environmental improvement, to new information tools that support decision-making, the Innovation Strategy calls for a suite of creative approaches for making progress on these priority problems.

The problems just described highlight the importance of continuously developing new tools and approaches that can expand and enhance environmental problem-solving. The third element of the Innovation Strategy focuses EPA on the continued development of tools that have already proven effective on a limited scale and that have applicability across many environmental programs. They include information tools that can improve our understanding of problems and solutions, Environmental Management Systems (EMSs) that can foster a more comprehensive approach to environmental protection, incentives that can motivate better environmental performance, environmental technologies that can improve results and lower costs, and performance measures that show how well innovations are working.

Finally, the Innovation Strategy focuses on what may be the most important element of all—creating a culture and set of organizational systems that foster innovation throughout EPA. The goal is to have each individual within the EPA work force view his or her job more broadly, as an environmental problem-solver, a partner, a facilitator, and a leader, as well as a program implementor. Communicating results from innovations, rewarding the innovators, and ensuring that successful approaches are considered for broader replication are just some of the ways we will work to realize our innovation potential.

With its comprehensive focus and detailed plan for implementation, EPA's Innovation Strategy identifies a number of actions that will drive innovation throughout the Agency. The next section highlights innovative approaches that will be used to ensure progress toward each of our national environmental goals.

Innovative Approaches For Achieving National Goals

Clean Air

From indoor environments to global climate change, EPA faces the challenge of developing air strategies that are workable on very different scales and for very different circumstances. We will meet this challenge by innovating in air programs, policies and regulations. For example, our strategy for reducing smog calls for national leadership, creating new inherently innovative programs such as the Clear Skies Initiative, a new market-based cap-and-trade program modeled after the Acid Rain trading program. We will continue to develop new regulations where needed, but those regulations will be crafted in innovative ways to improve results, ease implementation, and decrease costs. Outside the

regulatory arena we will work to reduce smog and greenhouse gas emissions by developing new cleaner technologies and promoting the use of those developed by others. We are also creating a range of partnership and information programs to foster improvements across the nation.

But national actions can not do it alone. That is why we will continue to work at the local level, providing information and tools that empower people to make a difference in their communities. We will look for ways to meet the needs of different communities and to provide them with the support and tools they need to achieve cleaner, healthier air.

The Innovation Strategy also calls for management actions that will lead to more efficient and effective regulatory approaches to clean air. One is to evaluate pilot projects that can show whether an innovation has value. For example, in the mid-1990s, EPA launched a series of innovative air permitting projects designed to streamline the regulatory process and foster pollution prevention. The results show that flexible air permits can help companies achieve equal or greater environmental protection, improve competitiveness, and encourage pollution prevention, while still retaining practicable enforceable capabilities.

Over the years we have developed a number of innovative programs and new tools to achieve environmental improvements. Now the key is to learn from these innovative approaches and use our experience to create additional options for cleaning the air. In this way, we can tailor clean air strategies, using new and traditional tools, to ensure that we are using the approach that will achieve the best possible results.

Water

In the national water program, the focus is on watersheds, those naturally defined areas that encompass and impact our rivers, streams, and lakes. By looking at the watershed as a whole, rather than as a set of unrelated components, watershed management offers a more advanced and effective approach for improving water quality. To support this approach, the Innovation Strategy calls for EPA to launch a national Watershed Protection Initiative that will provide grants to support protection and restoration activities in up to 20 priority watersheds. It also commits EPA to issuing a national policy on water quality trading that will encourage use of this cost-effective approach for meeting water quality goals.

Another priority for the national water program, and one that clearly can benefit from solutions, is water infrastructure. A 2002 EPA study revealed a critical funding gap for meeting U.S. wastewater and drinking water infrastructure needs. Recognizing this need, the Innovation Strategy called for a national forum to discuss innovative management mechanisms to reduce the life cycle costs of infrastructure and more flexible financial mechanisms to fund improvements. EPA held that forum in January 2003, and many of the ideas that emerged are reflected in this *Strategic Plan*.

Land

The Innovation Strategy's emphasis on testing, evaluating, and implementing innovative approaches to environmental problems; fostering a more innovation-friendly culture within EPA; and working through partnerships and stakeholder collaboration will promote better waste management and the clean up of contaminated waste sites. In particular, innovative tools and approaches will be used for land revitalization; consistency and enhanced effectiveness in site cleanups; and waste minimization, recycling, and energy recovery of hazardous and non-hazardous wastes.

Building upon the success of the Brownfields Program, EPA will pilot projects that integrate land reuse into all land clean-up processes, explore the use of innovative public and private property reuse and stewardship mechanisms, and actively seek out opportunities for policy reforms. We will do so by working with partners and stakeholders to enhance coordination, planning, and communication across the full range of federal, state, tribal, and local cleanup programs. These efforts will improve the pace, efficiency and effectiveness of site cleanups, as well as more fully integrate land reuse into cleanup programs.

Recognizing that many changes have taken place since the Resource Conservation and Recovery Act was originally passed, EPA is launching a national Resource Conservation Challenge that is designed to find flexible, yet more protective, ways to conserve our natural resources through waste reduction and energy recovery. This new program will take a comprehensive, integrated approach that includes traditional waste management programs and lesser recognized avenues, inside and outside of EPA, for promoting waste minimization and natural resource conservation. This will involve forming diverse partnerships to test innovative approaches to waste reduction and to stimulate development of new environmental management infrastructure and technologies.

Healthy Communities and Ecosystems

The Innovation Strategy recognizes the value of community-based approaches that integrate environmental management with human needs, consider the long-term ecosystem health, and highlight the positive correlations between environmental well-being and economic prosperity. Many actions planned under the Innovation Strategy have this kind of comprehensive, community-based focus. For example, the national air program is supporting the development of a regional strategy to comprehensively address multiple air quality problems, as well as economic growth, land use patterns, transportation, and energy issues, in a growing urban area along the North Carolina-South Carolina border. Likewise, the national water program's watershed strategy will enable a more comprehensive, stakeholder-driven approach to achieving water quality goals.

The Innovation Strategy also calls for environmental protection tools and approaches that can be used to protect people, communities, and ecosystems. For example, improving the use and deployment of information resources and technology means we will have more powerful tools to make environmental management decisions. It will also enable us to give citizens information they can use in their own lives, and if they choose, to become more involved in environmental decision-making. The emphasis on developing results-based performance goals and measures will have similar consequences, creating information that agencies can use to manage programs and provide public accountability.

Finally, the plans for strengthening our partnership with states and tribes are designed to improve the environmental and public health effectiveness of our individual levels of government. Engaging states earlier in national planning and budgeting processes, facilitating state innovations, and reaching out to build working relationships with agriculture, transportation, and other agencies with environmental interests are just some of the means through which we will enhance protection for communities and ecosystems.

Compliance and Environmental Stewardship

The vision described in the Innovation Strategy would raise the bar for environmental performance by creating an environmental protection system that encourages greater environmental

stewardship across all parts of society. Getting there means finding ways to bring together compliance, pollution prevention, and environmental leadership initiatives in a way that facilitates environmental management and maximizes environmental results. It also means meeting the various needs that exist along the environmental performance spectrum, from the leaders that are pursuing advanced environmental improvements to enterprises such as small businesses that require assistance in meeting regulatory responsibilities.

The Innovation Strategy calls for more support and encouragement for environmental leaders by expanding the National Environmental Performance Track. This unique program offers rewards and recognition for strong environmental performance. The Innovation Strategy focuses on making membership even more valuable by offering additional regulatory incentives and a higher level of membership for the very top performers. While the program clearly benefits members, its greatest value is in creating role models and mentors that other facilities can learn from as they pursue their own environmental improvements.

The Innovation Strategy also recognizes the value of smart and strategic compliance assurance in helping companies meet their environmental responsibilities. To this end, it focuses EPA on using the full range of compliance assurance tools and combining them in ways that improve environmental management by regulated entities, maximize compliance, and address the needs of environmental justice communities. These integrated approaches include voluntary compliance incentives, such as the Audit, Small Business, and Small Communities Policies to encourage self-auditing, reporting and correction; the use of EMSs in enforcement settlements to address serious environmental management problems; and creative supplemental environmental projects that return significant, tangible benefits to communities harmed by non-compliance. Yet another is the award-winning environmental results program. Pioneered by Massachusetts, this program merits expansion because it improves the performance of small businesses, results in savings for those businesses, and allows EPA and states to focus resources on priority environmental problems.

Providing smart, strategic compliance assurance also means providing additional tools to help facilities understand environmental laws and regulations. EPA partners with compliance assistance providers to provide easy access to compliance information through the National Compliance Assistance Clearinghouse and “virtual” compliance assistance centers that support specific industry sectors and national environmental program priorities. These innovative resources harness the power of the internet to meet small business needs. The Innovation Strategy will direct more attention to small business needs, starting with a national small business environmental summit and development of a comprehensive small business assistance strategy.

Managing Innovation at EPA

The complexity of today’s environmental challenges, coupled with the need to achieve environmental results more cost-effectively, make environmental innovation an imperative. But innovation brings its own set of challenges. As EPA pursues new approaches for improving environmental results, we are faced with the difficulty of crafting multimedia solutions within a single media-based organization, the complexity of sharing responsibilities across several layers of government, and the need to maintain baseline environmental protections while still creating room for experimentation.

EPA's Innovation Action Council provides experienced leadership for addressing these and other challenges. This group of senior managers provides overall direction for innovation, demonstrated

most recently through development of the Innovation Strategy. The Innovation Action Council also helps resolve policy issues that invariably arise during the course of exploring new approaches.

In addition, EPA has formed a National Center for Environmental Innovation to advance innovation in environmental programs. Established in 2003, this organization combines staff that have led some of EPA's most innovative initiatives, and it has several unique roles. First and foremost, the Center is a focal point for strategic thinking on innovative approaches to environmental management and provides a point of contact for organizations that share EPA's environmental innovation interests. It acts as a partner with organizations that want to test and evaluate innovative approaches and as a proponent for replicating innovations that prove successful. The Center also stays at the forefront of scientific, economic, and other social trends in order to bring the value of new developments to EPA's strategic thinking, planning, and management. Together, the National Center for Environmental Innovation and the Innovation Action Council provide the leadership needed to guide innovation and realize its full value for improving environmental results.

Human Capital

Protecting human health and the environment requires a highly skilled and motivated workforce that seeks creative solutions to environmental problems and is committed to achieving excellence. EPA's Human Capital Strategy will ensure that the Agency's workforce is high performing, citizen-centered, and aligned with EPA's strategic goals and corresponding objectives for air, water, land, healthy communities and ecosystems, and compliance and environmental stewardship.

To implement its Human Capital Strategy, EPA must integrate workforce planning, employee development, and targeted recruitment with established Agency processes for strategic planning and resource management. This comprehensive and systematic approach combines strong national leadership with effective planning and implementation of human capital programs across the Agency. The Strategy addresses both the Agency's current and future workforce needs to accomplish its goals and objectives.

Built upon the Office of Personnel Management (OPM) six pillars of effective human capital management, EPA's Strategy for Human Capital establishes objectives to ensure that the Agency:

- Aligns its workforce to accomplish strategic goals and objectives to protect human health and the environment through effective integration of Agency-wide planning and management processes;
- Conducts workforce planning and deployment at the national, regional, and program levels and deploys employees or assigns work based on mission-critical needs;
- Maintains continuity of leadership and employee skills and competencies through strong knowledge management, employee development programs, and succession planning;
- Encourages a results-oriented workplace and culture by emphasizing performance management;
- Identifies, hires, and retains talented individuals, using innovative and progressive tools for recruitment and retention;
- Evaluates its human capital programs to ensure they are data-driven, cost-effective, and held

accountable for results by developing and linking program performance to organizational goals.

Strategic Alignment with Mission

The first objective of the Human Capital Strategy is to align EPA's workforce to accomplish strategic goals and objectives to protect human health and the environment. The Agency accomplish this alignment in two ways: (1) by addressing human capital management issues under each of the Agency's five strategic goals and (2) by explicitly linking human capital activities with annual Agency-wide processes for strategic planning and budgeting. By 2004, EPA will make planning, reporting, and accountability for effective human capital management an essential component of its Annual Performance Plan and Budget. Linking dollars, people, and skills together will enable program managers across the Agency to develop a more complete assessment of the resources required to meet annual performance goals and strategic goals and objectives.

EPA's Human Resources Council (HRC), composed of headquarters and regional senior leaders, is expected to actively communicate the Agency's vision for human capital to employees at every level and to play an essential role in cascading human capital planning activities to all levels of the Agency. In addition, EPA's Senior Policy Council, comprising Assistant Administrators and Regional Administrators and established to address cross-cutting Agency issues, is expected to communicate human capital roles and responsibilities and inspire employee commitment to the President's and the Administrator's vision. Senior Policy Council members will also ensure that resources and tools for sharing knowledge are available to their organizations and across the Agency and foster a culture of continuous learning. Both Councils will support Agency efforts to develop performance metrics for evaluating the effectiveness of EPA's human capital programs.

As EPA fully implements its Strategy for Human Capital, it will continue to benchmark best practices of other federal agencies and evaluate whether EPA should implement similar strategies or processes. The Agency will review and strengthen its Strategy for Human Capital as a result of ongoing work with OPM, the Office of Management and Budget (OMB), the General Accounting Office (GAO), and inter-agency councils, and it will consider lessons learned to improve its human capital strategies.

Workforce Planning and Deployment

Workforce planning is an integral, strategic, and tactical approach for addressing many of EPA's human capital issues. EPA has identified 11 key business lines—each with a unique set of skills and competencies—to help the Agency align mission-critical work with the skills of its workforce. To facilitate this alignment, EPA developed a National Strategic Workforce Planning methodology and online support system and is in the midst of phased implementation. The Agency's workforce planning system will enable line managers to make decisions in the deployment of employees with mission-critical skills and competencies both programmatically and geographically to fulfill EPA's mission. By 2005, EPA's workforce planning system, in conjunction with established Agency systems for planning and budgeting, will support analysis and decision making for effective management of human capital.

In making effective workforce deployment decisions, EPA recognizes the need to look beyond numbers of employees and their respective skills. The Agency continuously examines environmental objectives, changing priorities, and emerging technologies. EPA's competitive sourcing efforts

complement the Human Capital Strategy by providing an opportunity to analyze the Agency's activities and increase the efficiency and effectiveness of Agency operations. EPA is examining those activities with potential for efficiency gains either through internal improvements or competition/direct conversion.

To leverage the skills and talents of its workforce, the Agency will evaluate human capital innovations for possible national deployment. Examples include:

- ▼ *Assignments, not Positions* Program. EPA Region 10 offers voluntary rotations every 3 years to encourage employees to swap jobs and learn about technical programs outside of their immediate expertise. Since 1996, approximately 70 employees have participated in each of the three *Assignments, not Positions* exercises, and more than 100 people have moved to new assignments, bringing new insights and fresh points of view to their new organizations.
- ▼ *The Senior Executive Service (SES) Mobility Program*: To optimize the talents and development of its senior executives, in 2002 EPA moved more than 60 executives into new positions across the Agency through the SES Mobility Program. The Mobility Program concept may be extended to other EPA levels of management to strengthen leadership skills and provide cross-Agency exposure. Such flexibility supports continued development of EPA managers by challenging them with new learning experiences and broadening their view of the Agency. If implemented, these development opportunities would strengthen EPA's succession planning and management efforts as well.

EPA is using advances in information technology to improve accessibility of personnel data for managers and employees through its automated human resources information system (HR Pro). Improved access to personnel data will help employees manage their careers and Agency leaders make critical decisions as they manage their organizations' human capital resources.

- Employee Profiles will provide employees with access to their official personnel record to update personal information such as emergency contacts, home address/phone, handicap/special needs designations, and other business-process-related information.
- E-Development provides web-based access for employees and managers to update/review training information, review/approve training enrollment, and document newly acquired skills.
- The Manager's Desktop gives supervisors and managers access to workforce information to facilitate organizational decision making. It also provides the connection for managers to initiate and track personnel action change requests electronically.

EPA is also supporting the President's government-wide E-Gov Internal Efficiencies and Effectiveness (IEE) initiatives to bring commercial best practices to key government operations. EPA is an active participant in a number of government-wide human-resources-related E-Gov activities including the following projects:

- *E-Payroll* consolidates systems at more than 14 processing centers across government and eliminates duplication in purchases of enterprise resource planning software;
- *Enterprise Human Resources Integration* electronically integrates personnel records across government and reduces delays involved in security clearance processing; and

- *Recruitment One Stop* modifies USA Jobs to create an automated resource for federal government information and career opportunities. It allows for automated resume and assessment tools with the ability to route resumes, assess candidates, and streamline the federal hiring process, and it provides an up-to-the-minute application status for job seekers.

Leadership and Knowledge Management Strategies

The anticipated loss of institutional knowledge as managers and employees retire clearly highlights the need for effective leadership and knowledge management systems. To address this need, EPA is refining and enhancing three core strategies: growing leaders throughout the organization, promoting continuous learning, and enabling knowledge transfer.

Through EPA's Workforce Development Strategy, the Agency grows leaders by offering developmental programs centered around EPA's core competencies and the SES Executive Core Qualifications. Using a combination of classroom training, mentoring, coaching, and rotational assignments, EPA will continue to build its leadership capacity.

With an increasing number of EPA's current senior executives eligible for retirement, EPA's SES Candidate Development Program (CDP) will help to mitigate the loss of leadership, institutional knowledge, and expertise. By 2004 EPA will graduate over 50 highly qualified SES candidates to replace the retiring SES corps. EPA will continue to use and strengthen the SES CDP to ensure continuity of leadership.

EPA is establishing a continuous learning culture that enables employees and managers to adapt to the rapidly changing political, social, and economic environment. A key component of this learning culture is feedback systems. EPA's performance management system provides regular performance feedback to employees and helps them understand how their work aligns with the Agency's mission. To help Agency managers assess and improve their performance, EPA is implementing a 360 degree feedback pilot program. Through this program, EPA employees and peers are able to provide managers with feedback to on their performance. The results of the pilot will guide Agency-wide implementation over the next several years.

Evaluations of EPA's human capital programs will provide feedback at the organizational level. In 2003, the Agency is evaluating the EPA Intern Program to assess its effectiveness in recruiting and growing a diverse group of future Agency leaders. In 2004, EPA will begin evaluations of the Agency's other workforce development programs. The results of these evaluations will be used to improve and refine our leadership development and knowledge management activities.

Supported by the workforce planning system, EPA is examining ways to access and link information on EPA expertise in selected skills and competencies. Building this capacity will enable the Agency to align capabilities with mission-critical projects and utilize in-house resources and expertise.

Performance Culture

To carry out its mission and mandates, EPA is building a results-oriented workforce and culture. The Agency is implementing three core strategies: enhancing performance management, fostering workplace diversity, and improving employee/labor relations management. These strategies

help Agency employees and managers understand their roles and responsibilities in achieving EPA's mission and improving methods for evaluating and improving performance.

In 1998, EPA redesigned its performance management system, PERFORMS (Performance Planning, Employee Rating, Feedback, Opportunity, and Recognition Management System), to more clearly, simply, and easily communicate performance expectations to managers and employees. EPA's performance management system reduces administrative burden and minimizes paperwork for managers in an environment of broader spans of control, while providing for more frequent, meaningful, two-way communication between supervisors and employees. An essential aspect of PERFORMS is separating cash awards from ratings of record, so that feedback and rewards occur not just at appraisal time but throughout the year to highlight and reinforce excellence in a timely manner.

There are a variety of awards, both monetary and non-monetary, available to supervisors and managers for use as tools to motivate or recognize individual employees, teams, or organizations for high performance. Although the Agency has pay and performance systems in place to provide timely feedback and pay for increased contributions, EPA is reviewing these systems to ensure that, in fact, skilled individuals are attracted, encouraged, and rewarded for their high performance. EPA is evaluating its performance management system to confirm that the system improves communication between employees and managers and sets appropriate performance expectations. The Agency is also benchmarking other federal and private sector performance management systems for application at EPA.

The EPA National Diversity Action Plan (DAP) Initiative represents the Agency's comprehensive strategy to ensure that all employees are afforded equitable treatment. EPA is educating employees about diversity issues; promoting a dialogue within every office to address and work through these concerns; recruiting and maintaining a diverse workforce; and developing and implementing concrete solutions to EPA's diversity issues. EPA will continue to examine ways to expand diversity recruitment to identify candidates for mission-critical positions.

EPA and its National Partnership Council are working to foster collaborative relationships among Agency managers, unions, and employees to improve working conditions, career development, and morale of employees. EPA has also established the Workplace Solutions Staff to provide a one-stop source of employee services for workplace conflicts, including informal mediation, conflict resolution, Alternative Dispute Resolution awareness training, outreach, and consultation services for Headquarters employees. The Staff focuses on the prevention and resolution of workplace disputes and coaches employees to deal with workplace conflicts more effectively in order to resolve disputes prior to the filing of formal grievances or complaints. To improve Labor Management accountability, HR Pro provides modules to manage labor-employee relations by creating a corporate database for tracking labor/management agreements, decisions, and disputes.

Recruiting and Retaining Talent

In light of changing Agency priorities, growing numbers of senior managers and employees eligible for retirement, and the increasingly competitive market for individuals with desirable or unique skills, EPA's Human Capital Strategy places strong emphasis on recruiting and retaining creative and talented people. EPA is using its workforce planning system to identify gaps in mission-critical skills, knowledge, and competencies in conjunction with employing a variety of human resource tools to recruit and retain a diverse and highly skilled workforce.

EPA is maximizing its use of special hiring authorities, incentives, and internship and fellowship programs to attract and retain a talented workforce. For example, to recruit and retain talented researchers that EPA may not otherwise attract, the Agency is examining the use of a focused pilot program (not subject to Title V) to hire up to five researchers a year with a salary cap of \$200,000. In addition, EPA is reviewing innovative pay strategies being utilized across government. This review will focus on pay structures, flexibility, and opportunities relative to the Agency's workforce needs, job market conditions, and program requirements.

The Agency is exploring flexible organization structures, collaborative work arrangements, multi-skilled teams, and options to promote a family-friendly, quality work environment. EPA is also interested in reviewing the proposed civil service retirement system computations for part-time service that eliminate disincentives for employees nearing the end of their careers who would like to phase into retirement by working part-time schedules. This would allow EPA to keep senior staff in hard-to-fill positions as part of a succession planning/management effort.

In addition, EPA is reviewing the human resource tools (voluntary separation incentives and early retirement authority) of the Homeland Security Act for possible Agency implementation. These tools provide more flexibility than do the current regulations and may aid in reshaping the workforce when the skill mix in an organization is no longer optimal for carrying out the Agency's mission.

Accountability

In order to manage EPA's Human Capital efforts effectively, the Agency has established and continues to improve its Human Resources Management (HRM) Accountability Program. EPA is developing a template to ensure that all Agency employees, from the Administrator to EPA's rank and file, understand their human capital roles and responsibilities.

EPA's senior political and career leaders are taking an active role in communicating EPA's human capital vision to all levels of the organization. The Agency's HRC advises the Administrator and Deputy Administrator on human resources issues, maintains a sustained commitment to human resources within EPA, and oversees implementation of Agency-wide human capital initiatives and policies. The Senior Policy Council advises the Administrator and Deputy Administrator on cross-cutting Agency issues and helps to communicate the impact of these issues on the Agency.

EPA's Human Resource Program Managers, in headquarters and each regional office, ensure that employees are recruited and hired to meet the needs of the Agency and in accordance with merit-based principles and other civil service personnel requirements. EPA's new HRM Accountability Program ensures effective merit-based decision making by collecting substantive data that serve as a primary diagnostic tool and provide information on performance measurement indicators. Annual on-site reviews of human resources offices and delegated examining units will:

- Certify knowledge of, and compliance with, Merit System Principles;
- Identify the contribution that human resources management makes to organizational effectiveness;
- Determine whether human resources management is accomplishing its objectives;
- Establish a database that can assist managers in making human resources decisions; and

- Identify strengths and weaknesses of human resources programs and processes.

As a part of EPA's future Human Capital Planning Process, the Agency is initiating development of Annual Human Capital Plans in concert with the Agency-wide process for developing Annual Performance Plans. Data-based planning and analysis required for Annual Plans will rely heavily on the near-term completion of EPA's workforce planning and allocation model to help programs identify the competencies needed to meet EPA's strategic and organizational goals. Annual Human Capital Plans will integrate EPA's strategic goals and objectives with strategies for deploying both resources and workforce development tools needed to achieve them. EPA is developing results-oriented performance goals and measures and a performance tracking mechanism to link the effectiveness of the Human Capital Program with the Agency's environmental mission. Performance goals and measures help EPA track success toward strategic objectives, guide implementation of the Agency's Strategy for Human Capital, and evaluate EPA's framework for aligning human capital with the Agency's *Strategic Plan*.

The Road Ahead

Investing in Our People, EPA's Human Capital Strategy for 2001 through 2003 (developed in 2000) laid the foundation for strengthening the Agency's human capital practices. EPA's current effort to integrate human capital into its strategic planning process serves as a blueprint for the work that remains to be done. The Agency recognizes that implementing its Human Capital Strategy will not happen overnight. It will take time, persistence, and dedicated resources. This integration effort will lead to human capital planning at all levels of the organization. Responsibility for ensuring sound human capital investment and management will be shared by all national and regional offices, managers and supervisors, and staff across the Agency.

Science

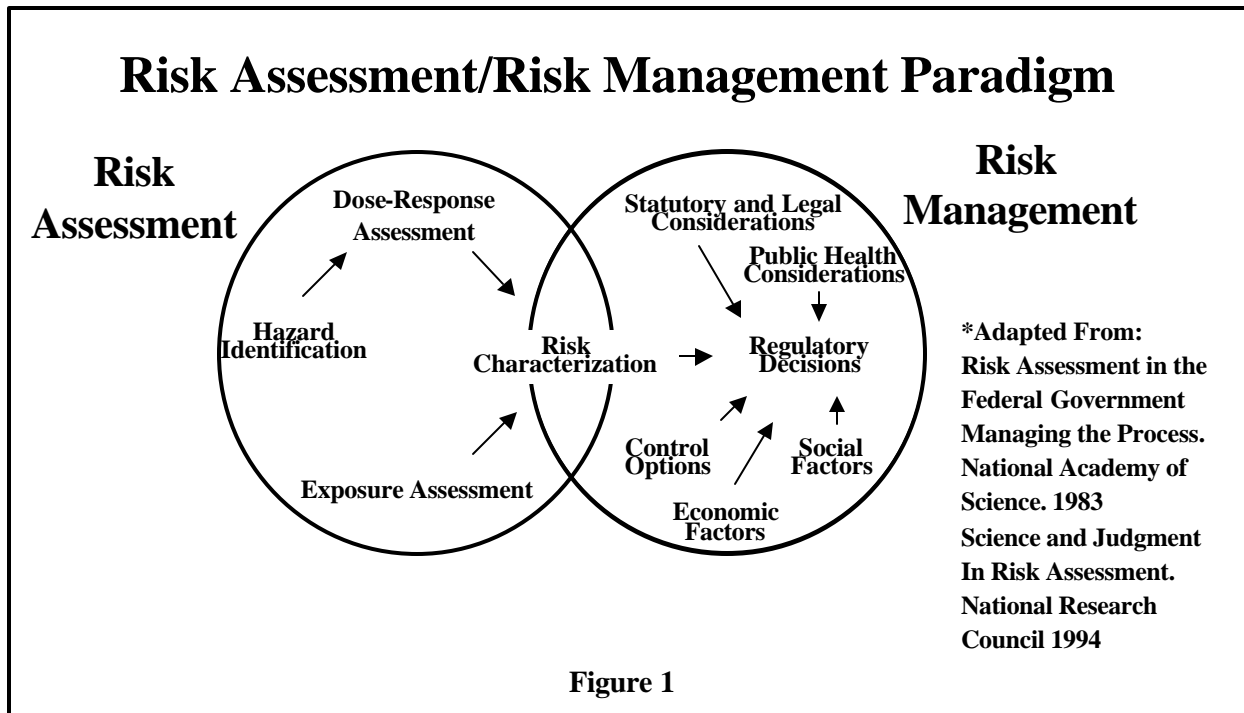
Today, scientific knowledge and technical information are more important than ever as we seek to understand, and successfully address, the increasingly complex environmental problems facing our Nation (NRC, 2000). EPA has identified sound science and credible data among the guiding principles we will follow to fulfill our mission to protect human health and environmental quality. EPA relies on science, technology, and scientifically defensible data and models to evaluate risk, develop and defend protective standards, anticipate future health and environmental threats, and identify their solutions.

To conduct science of the highest quality and relevance, we promote collaborative partnerships and expert peer review. Our approach to addressing science issues is centered around generating and using scientific information based on science priorities (“doing the right science”) and sound science practices (“doing the science right.”) We do this through partnerships with states, tribes, and other federal and international institutions and by producing scientific information of the highest quality. The Administrator has named a Science Advisor to work across the Agency to ensure that the highest quality science is better integrated into the Agency’s programs, policies, and decisions.

“Sound science is the foundation of EPA’s work. We rely upon science and technology to help us determine which environmental problems pose important risks to our natural environment, human health, and our quality of life.”
Governor Christine Todd Whitman
EPA Science Forum (May 2002)

Generating and Using Scientific Information

EPA’s organizing principle for generating and using scientific information is the risk assessment/risk management paradigm (Figure 1). Risk assessment is the process that scientists use to understand and evaluate the relative size (magnitude) and likelihood (probability) of risk posed to human health and ecosystems by environmental stressors, such as air pollution or chemicals in drinking water. Risk assessments play an important role in Agency decisions and, as appropriate, they are joined with other scientific information, such as economic data and engineering studies, as part of a complete scientific analysis to inform decisions. Risk management involves determining whether and how risks should be reduced. Scientific analysis taken together with non-scientific factors such as public values, social factors, legal requirements, and statutory mandates inform Agency decisions and guide our actions.



The scientific data used in risk assessments are generated in research facilities, collected in the field, and compiled from the body of scientific literature. EPA creates and gathers scientific information through our laboratories, centers, program and regional offices and from external partners such as states, tribes, other federal agencies, the academic community, and the regulated community. Making environmental decisions built on sound science includes ensuring that scientific findings are properly described (characterized). To characterize scientific findings properly, the knowledge, assumptions, and uncertainties regarding the science must be clearly stated.

Science Priorities (“Doing the Right Science”)

EPA sets its science priorities through coordinated science planning, while also taking into account the particular missions and mandates of individual programs. For example, EPA uses “analytic blueprints” to plan and guide scientific analyses throughout the regulatory decision-making process. Analytic blueprints lay out the sequence and nature of the scientific analyses and data needed to inform regulatory decisions. As more complex environmental science is included in the Agency’s regulatory and non-regulatory decision-making process, EPA scientists are increasingly involved throughout the decision-making process and help determine additional research and analyses needed to ensure that EPA’s policies are informed by the best possible science. For complex environmental management issues requiring close coordination across multiple programs and regions, EPA may develop Agency-wide science plans to ensure that the relevant science is available to inform its decisions and actions.

The Agency’s research program is designed to conduct leading-edge research and foster the

sound use of science and technology. EPA research addresses specific needs to support Agency decisions, as well as core research to understand a wide-range of environmental issues and problems. Our research direction is described in research strategies and documented as performance measures in multi-year research plans. To ensure the quality of our research program, we use a coordinated, cooperative research planning process; rigorous, independent peer review; and inter-agency partnerships and extramural grants to academia to complement EPA's own scientific expertise. This approach allows EPA to keep its leading edge in environmental research and focuses our efforts and resources on those areas where we can add the most value toward reducing uncertainty in risk assessments and enhancing environmental management.

EPA is implementing the President's Management Agenda to improve research and development (R&D) program management and effectiveness through our application of explicit R&D investment criteria. By carefully examining the relevance, quality, and performance of our research program, we are improving R&D program management, better informing R&D program funding decisions, and increasing public understanding of the possible benefits and effectiveness of the federal investment in R&D. Agency R&D programs strive to articulate *why* this investment is important, relevant, and appropriate. Programs have well-conceived plans that identify program goals and priorities and identify linkages to national and customer needs.

EPA's specific science priorities, identified in each strategic goal in a separate research/science objective, are summarized below:

- Goal 1, Clean Air, science priorities focus on emissions, fate and transport, exposures, mechanisms of injury, and health effects of criteria air pollutants. Activities include routine monitoring, air quality modeling, fuel and fuel additive toxicity testing review, and risk assessments. Air Toxics priorities include developing and improving air quality models and source receptor tools; cost-effective pollution prevention and other control options; and scientific information and tools for quantitative assessment of nationwide, urban, and residual air toxic risks. Other significant activities include analyses of the impacts of atmospheric change, the collection and analysis of solar UV monitoring data, community-based assessments, and building surveys.
- Science priorities for Goal 2, Clean and Safe Water, address water quality and drinking water. Water quality priorities focus on approaches and methods to develop and apply criteria to support designated uses and diagnose impairment and protect and restore aquatic systems. Drinking water priorities include assessing and managing risks to human health posed by exposure to regulated and unregulated chemicals and pathogens, protection of source waters, and the quality of water in the distribution system.
- The science priorities for Goal 3, Preserve and Restore the Land, focus on improving characterization, measuring, and monitoring methods; enhancing methods and models for estimating ecological effects; reducing uncertainty in human health and ecological risks; and developing more cost-effective and reliable remediation and treatment technologies.
- Goal 4, Healthy Communities and Ecosystems, science priorities are wide-ranging, and comprise a variety of priorities among multiple program offices, as well as core research. These priorities include risk assessment/management of new and existing chemicals, protection of targeted aquatic ecosystems, refinement and enhancement of human health and ecological risk assessments, characterization of global climate change, development and support of

emerging scientific advancements, and Homeland Security.

- The science priorities for Goal 5, Compliance and Environmental Stewardship, are pollution prevention practices; new technology development; socio-economics; and decision-making related to compliance, enforcement, incentives, monitoring, and innovative approaches to environmental stewardship.

In addition, EPA has identified cross-cutting science priorities that span several programs and help the Agency accomplish multiple science objectives. We have identified aggregate and cumulative risk assessment, genomics, computational toxicology, and susceptible subpopulations as high-priority cross-cutting activities. Advances in these areas will improve EPA's capability to predict and reduce human health and ecological risk under all five of the Agency's goals.

Aggregate and Cumulative Risk Assessment

Risk assessment is evolving from evaluating a single stressor in one environmental medium affecting one endpoint to considering aggregate and cumulative risk. Aggregate risk assessments consider exposure to a single stressor, such as a chemical, by multiple pathways and all relevant routes of exposure. Cumulative risk assessments describe and, where possible, quantify a wide variety of health and ecological effects from radiation, biological stressors, and chemicals. An example is the estimation of risks posed from concurrent exposure, through all relevant pathways and routes of exposure, to multiple chemicals that act the same way in the body. Cumulative assessments also consider characteristics of the population at risk. These range from individuals to sensitive subgroups which may be highly susceptible to risks from stressors or groups of stressors due to their age, gender, disease history, size, or developmental stage.

Genomics

Advances in genetic toxicology will have an enormous impact on EPA's ability to assess risk. Our initial research is focusing on the use of genomics as a tool to identify and, ultimately, to solve human and environmental problems. Genomics examines the molecular basis of toxicity and develops biomarkers of exposure, effects, and susceptibility to chemicals and other stressors. Before genomics information can be used effectively in Agency risk assessments, issues such as accuracy, reproducibility, data quality, and understanding whether a genetic change indicates an adverse effect need to be resolved. An important goal for EPA is to utilize genomics approaches to provide data for the computational modeling of toxicological pathways for single chemicals or classes of chemicals ("computational toxicology.")

Computational Toxicology

The Agency is enhancing the scientific basis and diagnostic/predictive capabilities of existing and proposed chemical testing programs by using *in vitro* or alternative approaches such as molecular profiling, bioinformatics, and quantitative structure-activity relationships (QSAR). These techniques will be used for determining genes responsible for specific mechanisms of toxicity, diagnosing patterns of genes associated with known mechanisms of toxicity, and characterizing and modeling chemical structures associated with known mechanisms of toxicity, respectively. The term "computational toxicology" refers to using these alternative approaches in conjunction with highly sophisticated computer-based models. This approach is expected to greatly reduce the use of animal testing to obtain chemical toxicity information.

Susceptible Subpopulations

The Agency conducts a continuing research program to protect the general public as well as those groups of individuals (for example, the elderly, children, and tribal peoples) who may be more sensitive/susceptible than the general population to the harmful effects of exposure to environmental agents (e.g., contaminants in drinking water). Studies conducted or supported by EPA to identify and characterize susceptible subpopulations can be described in the context of the various intrinsic (e.g., age, gender, genetic traits) or acquired (e.g., pre-existing disease, exposure) characteristics that may modify the risk of illness or disease. Studies of susceptible subpopulations typically involve multi-disciplinary research and assessments to identify a range of possible health outcomes, including cancer, reproductive toxicity, gastrointestinal illness, and other adverse health effects. Because of the importance and broad scope of this issue, EPA has established partnerships to leverage resources and capabilities with various federal and state agencies, universities, and other public or private research entities. Examples of activities at EPA include supplemental guidance to the cancer guidelines on cancer risk to children and research to focus on the elderly.

EPA Science Practices (“Doing the Science Right”)

Equally important to doing the right science is doing it correctly. Sound science, as described by the Society of Environmental Toxicology and Chemistry, is “organized investigations and observations conducted by qualified personnel using documented methods and leading to verifiable results and conclusions.”¹ The R&D investment criterion of quality, mentioned earlier, refers to the Agency “doing the science right.” Sound science or “doing the science right” means supporting, enhancing, and implementing sound science practices and approaches, such as peer review, quality assurance, science coordination and oversight.

Peer Review

External review of scientific work products by qualified, independent knowledgeable scientists enhances credibility, uncovers technical problems, identifies additional information needs, and ensures that conclusions follow from data using generally accepted standards. The goal of the Agency’s Peer Review Policy is to enhance the quality and credibility of Agency decisions by ensuring that the scientific and technical work products underlying these decisions receive appropriate levels of peer review by independent scientific and technical experts.

Quality Assurance

Quality assurance involves planning, implementation, and review of data collection activities to ensure that the data collected by, or on behalf of, the Agency is of the type, quantity, and quality needed. EPA’s peer review policy and quality system are described in our Information Quality Guidelines, which outline how we maximize the quality, objectivity, utility, and integrity of our scientific information.

Science Coordination and Oversight

¹Society of Environmental Toxicology and Chemistry (SETAC), 1999, Sound Science Technical Issue Paper, Pensacola, FL, USA.)

The Science Policy Council (SPC) serves as a mechanism for addressing EPA's many significant science policy issues that go beyond regional and program boundaries. To integrate the policies that guide Agency decision makers in their use of scientific and technical information, the SPC works to implement and ensure the success of selected initiatives recommended by external advisory bodies such as the National Research Council and the Science Advisory Board, as well as others such as Congress, industry, and environmental groups, and Agency staff. Examples of SPC issues include: revision of the cancer guidelines to provide a current state of the art approach for determining cancer risk, harmonization of cancer and non-cancer risk assessment approaches, evaluation of toxicity testing approaches, and laboratory methods validation.

The Risk Assessment Forum (RAF) is a standing committee of senior EPA scientists. It was established to promote Agency-wide consensus on difficult and controversial risk assessment issues and to ensure that this consensus is incorporated into appropriate Agency risk assessment guidance. The RAF focuses on generic issues fundamental to the risk assessment process and related science policy issues.

Another effort to ensure Agency dialogue and coordination is the Council for Regulatory Environmental Modeling (CREM). The CREM was established to promote consistency and consensus between environmental model developers and users.

Meeting the Challenge

EPA intends to meet the challenge of advancing environmental science, and the use of this science in our decisions, through continued and enhanced collaboration with states, tribes, and federal and international partners, and by measuring our performance through the use of environmental indicators and other measures.

Tribal Partnerships

The Tribal Science Council (TSC) represents a new paradigm for how the Agency works with tribal governments. The mission of the TSC is to provide a forum for interaction between tribal and Agency representatives to work collaboratively on environmental scientific issues including research, monitoring, modeling, information, technology, and training in Indian country. In conjunction with our tribal partners, the Agency is exploring a new approach, Health and Well Being, that incorporates the cultural interconnectedness between tribes and the natural world into assessments and uses health and well being of the environment and people as its foundation. The TSC is committed to the development of sound cross-media scientific approaches to support the tribal cultural values and traditional ways of life and the availability of a healthy environment for present and future generations.

Other Federal Partners

Our emphasis on building partnerships also extends to our relationships with other federal agencies. EPA has ongoing partnerships with many federal agencies engaged in environmental research. We actively participate in the Committee on Environment and Natural Resources (CENR) of the National Science and Technology Council, which was established to foster and implement a coordinated multi-agency and interdisciplinary focus for federal environmental R&D. Through partnerships with CENR members such as the Departments of Energy, Agriculture, and the Interior; the National Institute of Health; the National Oceanic and Atmospheric Administration; the National

Science and Technology Council; and the Committee on Environmental Quality, as well as other nonmembers, we can stay abreast of emerging technologies, evaluate new approaches, and provide a broad knowledge base to inform EPA decisions.

The Result

EPA's approach to conducting and using science in service to the Agency's mission will ensure that Agency policies, decisions, and other activities reflect high-quality scientific information relevant to current and future environmental issues. We will accomplish this goal by ensuring that we work together, both across the Agency and with our partners, to identify the highest priority science activities and that our work meets the highest standards of scientific excellence.

Homeland Security

The terrorist attacks of September 11, 2001, followed shortly by the deliberate use of anthrax to contaminate public buildings, brought into sharp focus the important role the EPA has to play in helping America meet and defeat the threat of terrorism. EPA's role in environmental monitoring and remediation in lower Manhattan, along with its efforts to decontaminate the Hart Senate Office Building and other facilities on Capitol Hill, revealed the extent to which EPA would be on the front lines in the war against terrorism.

EPA's mission is clear: to protect human health and the environment. In pursuing this mission, EPA has developed certain unique scientific and technical expertise and possesses additional capabilities which complement those of other federal agencies, including the new Department of Homeland Security.

The events of September 11 and thereafter led EPA to reassess those capabilities relative to national security and to determine whether these capabilities can be enhanced to better protect the American people. At Administrator Whitman's direction, the Agency developed a Strategic Plan for Homeland Security, which was released publicly in September 2002.

EPA's Homeland Security Strategic Plan is intended to provide guidance and direction to the Agency as it seeks to integrate its homeland security responsibilities into its traditional mission. It reflects certain responsibilities given to the Agency under such laws as the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, several Presidential Decision Directives, as well as in the President's July 2002 National Strategy for Homeland Security.

Organizing the Work

EPA's homeland security efforts are centered around four main areas of responsibility:

1. Critical Infrastructure Protection
2. Preparedness, Response and Recovery
3. Communication and Information
4. Protection of EPA Personnel and Infrastructure.

Each of these areas draws on expertise already possessed by EPA and expands on that experience to meet the challenges faced in protecting the Nation against the terrorist threat.

Critical Infrastructure Protection

Under the National Strategy for Homeland Security, the EPA is named the lead federal agency for the protection of two of the Nation's critical infrastructure sectors: the Water sector and the Chemical Industry and Hazardous Materials sector.² In addition, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 gives EPA specific responsibilities for promoting the security of the Nation's public drinking water infrastructure.

These missions draw on EPA's unique programmatic responsibilities and expertise related to the drinking water and wastewater industries and the use, handling, storage, release, and disposal of chemicals and chemical wastes at industrial facilities. In addition, EPA's experience with air monitoring and indoor air quality issues have resulted in it being given the lead by the then-Office of Homeland Security at the White House for the Biowatch system being put in place in various cities across the country to monitor for airborne release of certain biological contaminants.

In these areas, EPA is committed to assessing and reducing vulnerabilities and strengthening detection and response capabilities for critical infrastructures. In addition, EPA will contribute to similar efforts by other federal departments and agencies addressing food, transportation, and energy, and will provide environmental expertise to support federal law enforcement activities. Among EPA's program offices involved in this area are the Office of Solid Waste and Emergency Response (OSWER), the Office of Water (OW), the Office of Research and Development (ORD), the Office of Air and Radiation (OAR), and the Office of Prevention, Pesticides, and Toxic Substances (OPPTS).

Critical Infrastructure Protection Goals

1. EPA will work with the states, tribes, drinking water and wastewater utilities (water utilities), and other partners to enhance the security of water and wastewater utilities.
2. EPA will work with the states, tribes, and other partners to enhance security in the chemical and oil industry.
3. EPA will work with other Federal agencies, the building industry, and other partners to help reduce the vulnerability of indoor environments in buildings to chemical, biological, and radiological (CBR) incidents.
4. EPA will help to ensure that critical environmental threat monitoring information and technologies are available to the private sector, Federal counterparts, and state and local governments to assist in threat detection.
5. EPA will be an active participant in national security and homeland security efforts pertaining to food, transportation, and energy.
6. EPA will manage its Federal, civil, and criminal enforcement programs to meet our

²National Strategy for Homeland Security, July 2002, page 32

homeland security, counter-terrorism, and anti-terrorism responsibilities under Presidential Decision Directives (PDD) 39,62, and 63 and environmental, civil, and criminal statutes.

Preparedness, Response and Recovery

Under the National Strategy for Homeland Security and various Federal response plans, EPA has specific response and recovery responsibilities. As the Agency's experiences since September 11 have made clear, the Agency should expand and enhance its ability to provide response and recovery support to any future terrorist events. Under this goal, EPA will focus on strengthening and broadening its response capabilities, clarifying its roles and responsibilities to ensure an effective response, and promoting improved response capabilities across government and industry in the areas in which the Agency has unique knowledge, experience, and expertise. Among the program offices involved in this effort are OSWER, OPPTS, and ORD.

Preparedness, Response, and Recovery Goals

1. EPA will be prepared to respond to and recover from a major terrorist incident anywhere in the country. To do this, the Agency will maintain trained personnel and effective communications, ensure practiced coordination and decision-making, and provide the best technical tools and technologies to address threats.
2. EPA will communicate to federal, state, and local agencies the Agency's roles, responsibilities, authorities, capabilities, and inter-dependencies under all applicable emergency plans consistent with the National Strategy for Homeland Security and efforts undertaken by the new Department of Homeland Security. The Agency will also understand the roles, responsibilities, authorities, capabilities, and inter-dependencies of its partners.
3. EPA will support and develop the preparedness of state, local, and tribal governments and and private industry to respond to, recover from, and continue operations after a terrorist attack.
4. EPA will advance the state of the knowledge in the areas relevant to homeland security to provide first responders and decision-makers with tools and the scientific and technical understanding they need to manage existing or potential threats to homeland security.

Communication and Information

Comprehensive, accurate, well-organized, and timely information is critical to sound decision making internally and to maintaining public confidence in times of threat. EPA possesses unique capabilities to collect, synthesize, interpret, manage, disseminate, and provide understanding to complex information about environmental and human-made contaminants and the condition of the environment. Effectively managing and sharing this information within the Agency, among its partners at all levels of government, with the private sector, and with academia will contribute to the Nation's capability to detect, prepare for, prevent, protect against, respond to, and recover from terrorist incidents. Among the program offices involved in this effort are OEI and OARM.

Communication and Information Goals

1. EPA will use reliable environmental information from internal and external sources to ensure

informed decision-making and appropriate response.

2. EPA will effectively disseminate timely, quality environmental information to all levels of government, industry, and the public, allowing them to make informed decisions about human health and the environment.
3. EPA will exchange information with the national security community to prevent, detect, and respond to terrorist threats or attacks.
4. EPA will continually and reliably communicate with employees and managers.

Protection of EPA Personnel and Infrastructure

The security and protection of its own personnel and infrastructure are critical to ensuring EPA's ability to respond to terrorist incidents as well as continue to fulfill its mission. In recognition of this and in light of the new environment under which we work, EPA is undertaking steps to further safeguard its staff, ensure the continuity of its operations, and protect the operational capability of its vital infrastructure assets. Offices involved in this effort include OARM, OSWER, OECA, and OEI.

Protection of EPA Personnel and Infrastructure Goals

1. EPA will safeguard its employees.
2. EPA will ensure the continuation of the Agency's essential functions and operations.
3. EPA will maintain a secure technology infrastructure capable of supporting lab data transport and analysis functions, 24x7 telecommunications to all EPA locations, and management of critical data and information.
4. EPA will ensure that the Agency's physical structures and assets are secure and operational.

Coordinating the Effort

The Agency's homeland security efforts are very much an extension of its traditional mission and involve a number of its program offices. To coordinate these efforts, the Administrator has established with the Office of the Administrator, the EPA Office of Homeland Security. This office will serve as the central coordinating body in the Agency for homeland security and will be responsible for monitoring the implementation of the Agency's Homeland Security Strategic Plan. The Office will also serve as a single point of entry for homeland security matters with other federal departments and agencies.

Working with the Department of Homeland Security and other Partners

With the creation of the new Department of Homeland Security, the federal government now has one organization responsible for coordinating the efforts of the various federal departments and agencies involved with homeland security. EPA will be an important partner with the new Department, working with it on a host of homeland security issues, including critical infrastructure protection, research, and response and recovery. That partnership necessarily means the new Department will be

working with numerous program offices and regional offices, continuing the efforts initiated by the former White House Office of Homeland Security. EPA's Office of Homeland Security will be responsible for ensuring that the Agency's various external efforts are properly coordinated and receive clear direction from the Office of the Administrator and other senior leadership.

Measuring Performance

EPA's Homeland Security Strategic Plan not only lays out the Agency's goals for meeting its homeland security mission, it also enumerates tactics for reaching those goals and states the specific results the Agency should expect to achieve. EPA's Office of Homeland Security will be ensuring that the Agency's homeland security goals are being carried out across the Agency.

The Result

Through implementation of the Agency's Homeland Security Strategic Plan, EPA will ensure that it has the capability to meet its homeland security mission without compromising its ability to meet its traditional mission. By keeping the operational aspects of the Plan in existing programs (as opposed to creating a new homeland security program office), the Agency should realize numerous cross-cutting benefits from its homeland security work.

For example, work done to enhance detection technologies against chemical or biological contaminants that could be deliberately introduced into a water supply to create a public health risk may prove useful in detecting naturally occurring contaminants. Similarly, efforts to enhance our response capacity to meet the challenges of several simultaneous terrorist acts could help the Agency respond more effectively to an accidental event, such as an accidental release at a chemical facility.

Appendix 1

Social Costs and Benefits

Introduction

For the Budget and Performance Integration initiative under the President's Management Agenda, the Office of Management and Budget requires that EPA "include both social costs and budget costs of attaining each goal in its revised strategic plan." As part of its ongoing assessment of EPA's progress toward Budget and Performance Integration OMB has recognized the methodological difficulties of estimating the future social costs of *achieving* strategic goals. This appendix therefore describes the current social costs and benefits of EPA programs and policies under each of the Agency's strategic goal areas for the year 2002.

The Agency would like to have provided estimates of the annualized social costs and benefits of achieving our strategic goals. However, such an analysis is infeasible largely because EPA's economic models and tools have not been developed to estimate aggregate costs or benefits of achieving the kind of broad, long-term and ambitious goals adopted in this strategic plan. It is important to note that although the results are presented here by strategic goal area, they do not reflect the costs and benefits of *achieving* the strategic goals in this plan.

Scope and Methodology

The quantitative and qualitative analysis of current social cost and benefits includes regulations, programs and activities that were substantially in place by 2002 and have achieved substantial compliance with standards or attainment of goals. This appendix draws upon existing data, reports, summaries and studies of the costs and benefits of environmental regulation. While there are many studies that address these economic effects in part (e.g. regulatory impact analyses), studies to fully support the analysis of social costs and benefits for strategic goal purposes are not generally available. Even the most complete analyses available, such as those estimating the benefits and costs of the Clean Air Act mandated under Section 812 of the 1990 Clean Air Act Amendments, are substantially limited by available economic data and models. The benefits of environmental protection are particularly difficult to quantify and monetize for most EPA programs.

The methods used here are based on those used in EPA's 1990 report, *Environmental Investments: The Cost of a Clean Environment*. In that report EPA presented a comprehensive assessment of the costs of environmental programs based on readily available data, including those from the U.S. Census Pollution Abatement Costs and Expenditures (PACE) survey. Many parts of the analysis in this appendix draw upon the most recent version of this survey. The analysis in this report is

also guided by EPA's *Guidelines for Preparing Economic Analyses*.

For the purposes of this report we have defined social costs as non-federal expenditures due to EPA policies, regulations and programs. This includes compliance costs by the private sector as well as costs borne by state and local governments. It does not include the costs of "basic services" such as trash removal or sewer lines, under the assumption that these activities would occur regardless of EPA activities. It should be noted that our definition of social cost is narrower than that typically used by economists. Economists usually define social costs as all opportunity costs associated with resource use, which would include all the "ripple" effects throughout the economy. Additionally, we include in this report fines and penalties imposed on industry; however, economists typically consider such expenditures to be 'transfers' rather than social costs.

Social benefits from EPA programs are diverse, ranging from reduced health risks to improvements in ecological services. Many of these benefits are quantified and monetized in this appendix, but many more are not. To offer a more complete picture of benefits we have included indicators and qualitative descriptions when limitations in data and methods prohibited quantification and monetization.

Key Limitations of the analysis

This appendix presents an assessment of current levels of benefits and costs of EPA activities, but it is not a benefit-cost analysis. A benefit-cost analysis would evaluate all of the costs and benefits of EPA activities over time and calculate the present value of future costs and benefits. Efficiency could then be gauged by determining if the present value of benefits was larger than the present value of costs. The distinction between assessing *current* costs and benefits, and assessing the present value of all costs and benefits is important because even a program that is net beneficial may have costs exceeding benefits at any particular point in time. Focusing on the costs and benefits in a single year will produce an incomplete assessment of an activity that results in social costs and benefits. For example, a regulation promulgated in 2001 may result in compliance costs during 2002 but may not produce benefits until future years. This could be the case if the regulation reduced exposures to carcinogens that resulted in cancers avoided after a period of latency.

The cost and benefits estimates in this appendix cannot be aggregated across goal areas without some double-counting due to the overlapping of many EPA activities. For example, the annual cost of fines for non-compliance are reported under goal 5 by the Office of Enforcement and Compliance Assurance. While these are non-federal expenditures by the private sector, many of the cost estimates under other goals are based on an assumption of full compliance with proposed regulations (in accordance with EPA guidance). Adding enforcement costs under goal five to other costs would result in some double-counting of costs. In a similar fashion, the benefits of enforcement are to some extent

already included in estimates under the other goal.

Specific limitations and uncertainties associated with estimates of individual programs and Agency activities are detailed below. In many cases the appendix reports several separate estimates for individual programs under a goal area. Generally we have not added these separate estimates to produce an overall estimate for the goal area because of concerns about double-counting costs and/or benefits.

Overview of the appendix

The remainder of this appendix presents costs and benefits individually by strategic goal area. Under each goal area we begin with a discussion of the scope of the analysis, describe the methodology and limitations, and then detail estimates of social costs and benefits.

The analysis of social costs and benefits associated with goal one, Clean Air, includes EPA actions under the Clean Air Act Amendments of 1990, Titles I through VI. Analyses are provided for three source categories - point sources, mobile sources and area source compliance - as well as compliance costs and benefits associated with the stratospheric ozone program.

Under goal area two, Clean and Safe Water, the appendix reports the benefits and costs of programs under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA). All actions evaluated under the SDWA are regulations that improve the quality of drinking water in the United States. Clean Water Act programs assessed in this report includes industrial and municipal pollution control performance standards for point sources of pollutants.

Several different programs are included under goal area three, Preserve and Restore the Land. Most of the activities associated with the Office of Solid Waste and Emergency Response (OSWER) fall under this goal, including Superfund, the Oil Spill Program and RCRA and the Underground Storage Tank program. Quantitative and qualitative descriptions of benefits and costs are reported for each of these activities.

The analyses under goal area four, Healthy Communities and Ecosystems, includes EPA's pesticide programs such as registration and re-registration; worker protection and certification; and ecological resource protection. The Toxics Release Inventory Program also falls under this goal, and the section provides an analysis of its costs and benefits.

Goal area five, Compliance and Environmental Stewardship, covers activities from the Office of Enforcement and Compliance Assurance (OECA) such as fines and penalties. As noted earlier, economists generally consider fines and penalties to be a transfer of resources rather than a social cost,

but for consistency and clarity we include them here as “non-federal expenditures.” Also included here are pollution prevention programs under Office of Prevention, Pesticides and Toxic Substances and OSWER.

Strategic Goal area: Goal 1 – Clean Air

Discussion

Although Office of Air and Radiation administers several programs in addition to Clean Air Act regulations, the estimates presented in this section are based upon assessments of the Clean Air Act (CAA) and the Clean Air Act Amendments of 1990 (CAAA). Of the Office's programs and regulations, CAA- and CAAA-related activities generate the most significant costs and benefits. In addition, several programs, such as the radiation program, are voluntary and require no expenditures from private firms.

Methodology

To estimate the costs and benefits in 2002 of the Clean Air Act and its Amendments, we rely upon the comprehensive economic assessments of the legislation that Congress requires the Agency conduct under section 812 of the Clean Air Act Amendments. To date, EPA has completed two Reports to Congress in this series:

- *The Benefits and Costs of the Clean Air Act: 1970 to 1990* (hereafter the Retrospective) measured the costs and benefits of the Clean Air Act of 1970 over the 1970 to 1990 period, and was delivered to Congress in 1997;
- *The Benefits and Costs of the Clean Air Act: 1990 to 2010* (hereafter the Prospective) examines the benefits and costs of the Clean Air Act Amendments for the target years 2000 and 2010, and was delivered to Congress in 1999.

Both of these reports address the full range of regulatory programs implemented pursuant to the Clean Air Act, including measures to achieve compliance with all National Ambient Air Quality Standards (NAAQS) (Title I of the Act); measures to control air pollutant emissions from mobile sources, primarily cars and trucks (Title II); measures to control the release of Hazardous Air Pollutants (HAPs) (Title III); measures to control acid rain, including the sulfur emissions trading program that primarily affects electric utilities (Title IV); permitting requirements (Title V); and measures to control pollutants that contribute to depletion of stratospheric ozone (Title VI).

We generate separate cost and benefit estimates for the CAA and CAAA and, for reasons noted below, present only estimates based on the Prospective. Estimate specific discussions appear below; however, for the most part, estimates related to this appendix have been calculated by linearly interpolating estimates provided in the Prospective. We present estimates for three source categories - point sources, mobile sources and area source compliance - as well compliance costs associated with Title VI of the Amendments.

Limitations

There are a variety of uncertainties and limitations associated with the estimates discussed below. As noted above, these estimates are not reflective of all of OAR's program.

Because of the comprehensive nature of these studies, an ideal measure of the social costs and benefits would reflect the combined effect of the Clean Air Act and the Amendments. The combined effect, however, is not necessarily represented by adding the estimates from the Retrospective to those from the Prospective. There are many reasons to expect that the cost estimates from the last target year in the Retrospective, 1990, overstate the costs that were incurred in 2002 for compliance with those regulations. The reasons include the cumulative effects of CAA and CAAA regulations that lead to co-control efficiencies, the cost-reducing effects of twelve years of learning-by-doing, major advancements in technologies for extracting and using low-sulfur coal that reduces costs of all compliance, and a significant shift in U.S. economic activity away from higher-polluting manufacturing industries. As a result, attempting to extrapolate the cost and benefit estimates from the Retrospective to 2002 is too problematic to undertake. We therefore report only estimates from the Prospective. The likely effect on the cost estimates we report is that they are underestimated somewhat. As outlined below, the recent PACE survey suggests that the degree of underestimation in costs may be small. The likely effect on benefit estimates is a substantial underestimation, as the Prospective measures benefits relative to a baseline of CAA compliance.

The results of the latest Pollution Abatement Costs and Expenditures (PACE) survey suggest that the total point source cost of complying with the CAA and the 1990 Amendments are much less than the sum of the Retrospective and Prospective cost estimates, and are close to those estimated for the Prospective alone. According to the PACE results, point source expenditures in 1999 were \$10 billion in current dollars. Adjusting for inflation and increased abatement and prevention activity between 1999 and 2002, these costs would be \$11.5 billion in 2002, which is significantly lower than the \$44.4 billion sum of point source compliance costs as estimated in the Retrospective and Prospective analyses.

With regards to the benefit estimates, monetized social benefits include only improvements in human health, enhanced worker productivity, and increased recreational services and are not a complete picture of even these benefit categories. Further, OAR programs also generate ecological benefits that have not been quantified. It is also important to note that our estimates of annual benefits exclude the potentially substantial benefits of the Clean Air Act regulations promulgated prior to 1990. The Retrospective estimates that annual benefits of the Clean Air Act in 1990 were approximately \$1.2 trillion in 1990\$, which translates to over \$1.8 trillion in 2002\$. While we cannot reliably estimate the effects of a shift in economic activity away from more polluting activities, some of which may actually have been hastened by the Clean Air Act, it is reasonable to expect that some substantial portion of this very large benefit estimate still applies in 2002. As a result, we expect that our estimates are a

substantial understatement.

Summary of Results

A summary of the estimated costs and benefits appear in Table 1. Using a 5 percent discount rate, the estimated 2002 monetized benefits associated with OAR regulations and programs are \$118.9 billion while the estimated costs are \$30.9 billion.

Table 1		
Summary of 2002 Monetized Costs and Benefits of OAR Regulations and Programs		
Regulation or Program	Costs	Benefits
Clean Air Act Amendments, Titles I through V	\$29.1 billion	\$118 billion
Clean Air Act Amendments, Title VI	\$1.8 billion	\$0.90 billion
TOTAL, CAAA	\$30.9 billion	\$118.9 billion

Note: The above estimates were generated using a 5 percent discount rate, consistent with advice received by EPA from the SAB panel that oversaw development of the section 812 reports. A discount rate sensitivity analysis performed in the Prospective found that annual costs in 2010 are 0.746 percent lower when the discount rate is 3 percent, but the analysis could only be completed for a subset of the relevant regulations. Because of the effect of a modeled cessation lag, the use of a lower discount rate would increase benefits.

Social Costs

We present CAA and CAAA cost estimates for three source categories - point sources, mobile sources and area source compliance - as well compliance costs associated with Title VI of the Amendments.

Point Sources

To estimate 2002 CAAA compliance costs, we linearly interpolate cost estimates from the 2000 and 2010 target years of the Prospective analysis. Table 2 shows the inflation-adjusted point source costs of the Clean Air Act Amendments for the two target years. Using the 2000 and 2010 data from the Prospective analysis, we estimate the annual change in costs for different types of point sources. Based on this per year average change, we estimate 2002 point source CAAA compliance costs of approximately \$10.0 billion in 2002.

Table 2				
Point Source Annual Costs of Clean Air Act Amendments of 1990				
Source Category	2000 Costs (Mn. of 2002\$)	2010 Costs (Mn. of 2002\$)	Estimated Annual Change (Mn. of 2002\$)	Estimated 2002 Costs (Mn. of 2002\$)
Non-Utility Point Sources	\$4,313	\$5,056	\$74	\$4,461
Utility Point Sources	\$4,610	\$6,841	\$223	\$5,056
Permits	\$446	\$446	\$0	\$446
Total	\$9,369	\$12,343	\$297	\$9,963

Mobile Sources and Area Sources

The Prospective report presents 2000 and 2010 compliance cost estimates for both on-road and off-road mobile sources and we use these estimates to linearly interpolate 2002 compliance costs for motor vehicles and non-road engines. 2002 mobile source costs for the Clean Air Act Amendments are approximately \$19.2 billion. As was the case with point sources, cost estimates derived from the sum of Retrospective and Prospective analysis estimates may substantially overestimate total 2002 mobile source costs because of the reasons highlighted above.

We perform a separate calculation for area source compliance costs with the Clean Air Act Amendments. Our method for calculating area source costs related to the CAAA is identical to our method for calculating mobile source costs.

Stratospheric Ozone

In calculating the costs of Title VI of the Clean Air Act Amendments in 2002, we used data that formed the basis of EPA's present value stratospheric ozone cost estimate in the Prospective analysis. We present only the costs associated with compliance with Sections 604 and 606, as most of the CAAA stratospheric ozone costs are associated with these sections. Adjusting the Prospective estimates for inflation, we estimate the 2002 cost of the stratospheric ozone provisions is approximately \$1,752 million. However, the costs of the stratospheric ozone program are highest during its earlier years. By 2008, the last year covered in EPA's Strategic Plan, annual costs of the program will have fallen by 36 percent.

Social Benefits

Monetized social benefits include improvements in human health, enhanced worker productivity, and increased recreational services. OAR programs also generate ecological benefits that have not been quantified. Benefit estimates are based upon the Prospective analyses of the legislation,

which provides monetized benefits estimates for the human health and welfare improvements resulting from the Clean Air Act Amendments.

The Prospective analysis provides annual benefits estimates for specific target years: 2000 and 2010. To estimate the 2002 benefits of the 1990 Amendments, we linearly interpolate the inflation-adjusted annual change in benefits between the years 2000 and 2010. Based on this average rate of change, we estimate 2002 health and welfare benefits of \$118 billion (Table 3).

Source Category	2000 Benefits (Mn. of 2002\$)	2010 Benefits (Mn. of 2002\$)	Estimated Annual Change (Mn. of 2002\$)	2002 Benefits (Mn. of 2002\$)
Mortality	\$93,686	\$148,708	\$5,502	\$104,690
Chronic Illness	\$5,562	\$8,595	\$303	\$6,168
Hospitalization	\$414	\$775	\$36	\$486
Minor Illness	\$1,538	\$2,443	\$91	\$1,719
Welfare	\$4,327	\$6,186	\$186	\$4,699
Total	\$105,527	\$166,707	\$6,118	\$117,763

Notes: Mortality benefits include only the deaths of people who are least 30 years of age. Chronic illness includes chronic bronchitis and chronic asthma. Hospitalization benefits include all hospital visits due to respiratory and cardiovascular conditions, as well as asthma-related emergency room visits. Minor illnesses include acute bronchitis, URS, LRS, asthma attacks, work loss days, and several other conditions. Welfare benefits include enhanced worker productivity, increased recreational activity, and improved agricultural productivity. For a complete list of these minor illnesses, refer to Table H-5 of EPA, *The Benefits and Costs of the Clean Air Act: 1990 to 2010*, November 1999.

Stratospheric Ozone

We estimate the annual benefits of the stratospheric ozone provisions of Title VI of the Clean Air Act Amendments with annual benefits data used to calculate the present value of benefits estimate in the Prospective. According to these data and adjusting for inflation, benefits are \$893 million in 2002. Although the 2002 annual benefits are less than 2002 costs, most of the benefits of the program will not be realized until after 2015. Estimates of annual benefits climb rapidly after 2015, to well over \$1 billion annually through the end of the 21st century.

Strategic Goal area: Goal 2 – Clean and Safe Water

Discussion

EPA's programs related to this goal are primarily administered under the Safe Drinking Water Act (SDWA) and Clean Water Act (CWA).

In 2002, 15 federal regulations aimed at improving the quality of drinking water in the United States were in effect (Table 1). These regulations require public drinking water systems to monitor for contaminants, provide finished water in compliance with maximum contaminant levels, install required drinking water treatment technologies, and to inform their customers when water quality is compromised. In addition, these regulations impose primacy requirements on the states to implement and enforce these regulations. The public health issues addressed by these rules are far-reaching, and include, among other effects, avoided cancer cases, reduced incidences of acute gastrointestinal illnesses associated with microbial infections, and reduced incidence of brain damage associated with lead exposure in children.

With regards to surface water, EPA establishes industrial and municipal pollution control performance standards for point sources of conventional, nonconventional, and toxic pollutants. It charges States and Tribes with setting specific water quality criteria appropriate for their waters, and with developing pollution control programs, including controls on nonpoint sources, to meet them. The Agency also provides funding to States and communities to help them meet their clean water infrastructure needs. EPA's efforts to implement the Clean Water Act provide benefits to businesses that use water as an input, and to households, which value water for a variety of services including recreation.

Methodology

Safe Drinking Water Act

To estimate the costs and benefits associated with the Safe Drinking Water Act, we rely on *Environmental Investments: The Cost of a Clean Environment* (hereafter Cost of Clean) as well as Regulatory Impact Analyses, Economic Analyses and Federal Register Preambles associated with SDWA regulations.¹ Specifically, the cost of compliance with the two earliest drinking water standards (the National Interim Primary Drinking Water Regulations and the Total Trihalomethane Rule) estimate is based upon information from Cost of Clean while the incremental cost of the remaining 13 regulations rely upon the other types of documents. For each of these 13 federal regulations, the annualized capital cost was added to the annual operation and maintenance costs to derive an estimate of Year 2002

¹ U.S. EPA. 1990. *Environmental Investments: The Cost of a Clean Environment*. Office of Planning and Evaluation, EPA 230-11-90-083, November.

costs.

An estimate of the benefits associated with the two earliest regulations is not readily available. For the purpose of this analysis it is assumed that the annual benefits of these two rules are equal to the annual costs.² For each of these 13 regulations, the annualized benefits were applied to derive an estimate of Year 2002 benefits. In some cases, the benefits of a regulation were not able to be monetized and/or quantified.

Clean Water Act

Cost estimates related to the Clean Water Act (CWA) are based on partial estimates thru the mid-1990s from EPA's retrospective study of the costs of the CWA (*A Retrospective Assessment of the Costs of the Clean Water Act: 1972 to 1997*), and supplemented by data on water pollution abatement expenditures from PACE surveys, the Census of Governments through 2000/2001 for State/local spending, and EPA 2002 budget for information on Federal spending. Data through 1994 (industrial) and 2000/2001 (State/local) are extrapolated to 2002 using the methods described in the retrospective study. The retrospective cost study was also used for methodology and data to apportion total spending into the amount that would occur without the CWA and the increment attributable to the CWA. Data on capital expenditures are converted to annual capital costs by annualizing over the expected life of the capital equipment.

Spending is considered pursuant to an EPA program if the program prompting the spending is carried out by EPA or can be enforced by EPA. The estimate does not include most nonpoint source costs, the bulk of which are voluntarily initiated in response to incentive-based voluntary programs; however, these programs are also often heavily cost-shared. Likewise it does not include clean water programs implemented by other federal agencies. We also assume that there would be some spending on water pollution abatement even in the absence of EPA programs.

Limitations

Safe Drinking Water Act

To estimate the costs and benefits of the SDWA programs, we utilized the economic analyses developed in support of 15 regulatory actions. While aggregating the values is comparatively straightforward, it is important to note that the approach taken in these analyses typically involves comparing the state-of-the-world before the regulation to the state-of-the-world after the regulation. This "before-and-after" approach ignores the potential for the future state-of-the-world to be different than it is today even without the regulation. It is, however, analytically more tractable, since a sophisticated baseline forecast is not necessary.

² This is likely an underestimate of benefits as these early rules were aimed at correcting gross public health concerns.

Clean Water Act

With regards to the CWA, in estimating baseline, non-EPA-driven spending (“without CWA” spending) we assume that this spending continues to grow steadily post-1972 as the exogenous macroeconomic variables continue to grow. Second, our approach in estimating the federal contributions which are not included in social cost estimates was to subtract the amounts provided toward State, local and private spending in EPA’s 2002 enacted water program budget. There are certain clean water grant programs, subsidies or tax expenditures administered by federal agencies other than EPA which may provide federal contributions toward state/local clean water activities. However, we are uncertain how much of this spending may simply fund basic services or further CWA activities. Furthermore, we did not net out some funds in EPA’s water budget that are provided to State and local governments because State/local spending on these items was not considered to be pursuant to an EPA mandate in the first place. Finally, our process for extrapolating to 2002 from data series that end in 1994 (PACE) and 2000/2001 (Census of Governments) omits any increments of spending due to EPA programs or requirements that have ramped up sharply over this period.

There are also uncertainties and omissions associated with the CWA social benefit estimate. The partial estimate of benefits through the mid 1990s does not include improvements to the Great Lakes, ocean shorelines, bays and estuaries, and lakes and reservoirs, benefits from reductions in nonconventional and toxic pollutants, controls on nonpoint sources, and withdrawal benefits. These omissions likely result in a substantial underestimate of benefits. No benefits are counted for the National Toxics Rule, State water quality standards for toxics not included in the NTR, the CSO policy. Only partial estimates are possible for other regulations implemented since the 1990’s. Although EPA policies may be reflected in NPDES permits by 2002, factors such as compliance schedules and historical contamination may result in a lag in realizing water quality benefits; although compliance schedules may also mean that costs are not fully realized by 2002 either.

Summary of Estimate

The monetized portion of the benefits of the SDWA programs are estimated to be between \$4.8 billion and \$13.5 billion in 2002, while the costs are estimated to be between \$3.1 billion and \$3.8 billion. The monetized portion of the benefits of the CWA programs are estimated to be \$12.8 billion, while the costs are estimated to be \$11.2 billion. Potentially significant effects were not valued in monetary terms, in large part as a result of missing or incomplete data and/or methods. For example, the data, information, and/or methodologies required to reasonably estimate and monetize the benefits associated with CWA programs are often entirely unavailable, particularly with regard to ecological benefits.

Social Costs

Safe Drinking Water Act

The estimated social cost of the SDWA programs are presented in Table 4.

Clean Water Act

Annual 2002 monetized social costs for the public and private sectors pursuant to EPA clean surface water programs implemented under the Clean Water Act are presented in Table 5. Estimates for the following are provided : (1) total public and private spending pursuant to CWA programs, excluding water spending that would have occurred even without the CWA; (2) the Federal contribution to this current spending; and (3) public and private social costs net of these Federal contributions.

Social Benefits

Safe Drinking Water Act

The estimated monetized social benefits of the SDWA programs are presented in Table 4.

Clean Water Act

Industries and the general public depend on high quality water resources. In 1995, agricultural production required freshwater withdrawals of over 139 billion gallons per day; the commercial and industrial sectors used over 23 billion gallons of water per day; and 132 billion gallons were used in thermoelectric power generation each day (USGS, 1998). High quality water resources are important to the recreation industry through direct services (e.g., to swimmers) and indirect services (e.g., through wildlife habitat). Between 1999 and 2002, an average of 96.8 million residents aged 16 and over swam in a lake, river or ocean, and 88.2 million participated in some form of boating, rafting or sailing per year (USFS, 2002). Finally, water quality also affects the commercial fishing industry. The National Marine Fisheries Service's estimate for U.S. commercial fish landings in 2001 is 9.5 billion pounds, valued at \$3.2 billion in wholesale prices (NMFS, 2002).

Table 6 provides benefit estimates prepared in Economic Analyses or Regulatory Impact Analyses for specific rules implemented since the 1990s. The retrospective study estimated annual partial benefits of \$12.4 billion annually through the mid-1990s of current water quality levels relative to what they would have been without the water pollution control programs since the 1970s. These benefits are partial because they reflect only controls on point sources, controls on conventional pollutants, improvements to rivers and streams, and in place and existence benefit values. EPA has estimated the benefits of some of these missing elements:

- the Great Lakes Water Quality Guidance (partial annual benefits of \$278 million to \$364 million)
- the California Toxics Rule (partial annual benefits of \$7.7 million to \$83.0 million)
- effluent limitation guidelines for over 50 industries (partial annual benefits of \$15 million to \$75 million).

Adding in these benefits results in annual benefits of \$12.7 billion to \$12.9 billion. Moreover, EPA's benefits estimates reflect the fact that the technology-based effluent limitation guidelines program

and the national pretreatment program has reduced the discharge of almost 700 billion pounds of pollutants each year.

Table 4
Year 2002 Social Cost of Drinking Water Regulations¹

Regulation	Year	Social Costs² (\$ millions)	Monetize d Benefits (\$ millions)	Other Benefits
National Interim Primary Drinking Water Regulations National Primary Drinking Water Regulation: Trihalomethane	1976-1979	\$293.3	\$293.3	
National Primary Drinking Water Regulations; Fluoride	1986	\$4.4	--	Reduction in incidences of osteosclerosis and fluorosis.
National Primary Drinking Water Regulations; Synthetic Organic Chemicals (Phase I)	1987	\$63.4	--	27 - 32 cancer cases avoided.
National Primary Drinking Water Regulations; Total Coliform Rule	1989	\$86.3 - \$102.4	--	Identification of public water systems that are contaminated or vulnerable to contamination.
National Primary Drinking Water Regulations; Surface Water Treatment Rule	1989	\$672.5 - \$955.6	--	Reduction in 83,194 cases of waterborne microbiological disease.
National Primary Drinking Water Regulations; Synthetic Organic Chemicals; Inorganic Chemicals; (Phase II)	1991	\$147.3	\$39.0 - \$778.3	
National Primary Drinking Water Regulations; Lead and Copper	1991	\$699.8 - \$1,105.7	\$4,016.8 - \$6,215.1	Corrosion control extends the life of distribution and premise pipes.
National Primary Drinking Water Regulations; Volatile Organic Chemicals (Phase IIB)	1991	--	--	280,000 reduced exposures to aldicarb, aldicarb sulfoxide, and aldicarb sulfone. 960,000 people will have reduced exposure to pentachlorophenol.
National Primary Drinking Water Regulations; Synthetic Organic Chemicals and Inorganic Chemicals (Phase V)	1992	\$59.7	--	0.01 cases of cancer avoided per year.
National Primary Drinking Water Regulation: Consumer Confidence Reports	1998	\$25.5	--	Increased consumer awareness concerning source water protection. Encourages consumers to be more aware of decisions that affect their health.
National Primary Drinking Water Regulations: Disinfectants and Disinfection By-products (Stage 1)	1998	\$676.7	0 - \$4,324.2	Possibly reduces mutagenicity, kidney disorders, developmental effects, immunotoxicity, liver disorders, kidney disorders, and spleen disorders.
National Primary Drinking Water Regulations; Interim Enhanced Surface Water Treatment Rule	1998	\$310.3	\$376.2 - \$1,732.9	Reduces the risk of outbreaks and exposure to other pathogens such as giardia.
National Primary Drinking Water Regulations; Radionuclides	2000	\$86.4	\$5.0	Avoidance of kidney toxicity due to reductions in exposure to uranium. Treatments may also reduce exposure to other contaminants.

¹ All prices were adjusted to Year 2002 dollars using the estimated GDP price index as found in Historical Table 10.1 of the FY2003 Federal Budget. ² 2002 Dollars

Table 5 - 2002 Social Costs for Clean Water Pursuant to CWA Programs¹			
Item	Total CWA Prompted Public & Private Spending (Net of non-CWA Spending)	Federal Contribution	Social Costs Net of Federal Contribution ("nonfederal expenditures")
Industry:			
Capital	\$3,156.3	\$0.0	\$3,156.3
O&M (net of cost savings)	\$2,608.2	\$0.0	\$2,608.2
Public sewerage and wastewater treatment:			
Capital	\$2,340.7	\$1,599.5	\$741.2
O&M	\$4,401.8	\$0.0	\$4,401.8
Regulation and monitoring and other	\$766.4	\$604.8	\$161.6
Research and development	\$133.0	\$55.5	\$77.5
Public electric utilities	\$93.9	\$0.0	\$93.9
Total	\$13,500.3	\$2,259.8	\$11,240.5

¹ 2002 Dollars

Table 6 - Social Benefits of Surface Water Protection Regulations Implemented Since the Mid-1990s			
State (rule)	Number of Facilities Affected	Annual Pollutant Loading Reductions	Annual Benefits (Millions 2002 \$)
Water Quality Standards			
OH, IN, PA, MI, MN, NY, WI (GLI, final, 1995; assumed fully implemented by 2002)	Major municipal: 316 Major industrial: 272	5.8 million to 7.6 million toxic pounds-equivalent	Evaluated (human health-carcinogenic risks): \$0.9 to \$8.2 Not evaluated: human health-systemic risks, recreational fishing, commercial fishing, recreational swimming, recreational boating, nonconsumptive recreation, hunting, nonuse
Ohio (GLI, final, 1995; assumed fully implemented 2002) - case study	Major municipal: 3 Major industrials: 2	11,000 toxic pounds-equivalent	Evaluated (recreational fishing, recreational boating, waterskiing, sailboarding, and swimming, nonuse): \$1.1* Not evaluated: human health
Michigan (GLI, final, 1995; assumed fully implemented by 2002) -case study	Major municipal: 18 Major industrial: 10	135,000 toxic pounds-equivalent	Evaluated (recreational fishing, wildlife viewing, waterfowl and other hunting, commercial fishing, human health-carcinogenic risks, nonuse): \$4.9* Not evaluated: human health-systemic risks
Wisconsin (GLI, final, 1995; assumed fully implemented by 2002) -case study	Major municipal: 6 Major industrial: 13	824,000 toxic pounds-equivalent	Evaluated (recreational fishing, wildlife viewing, commercial fishing, human health-carcinogenic risks, nonuse): \$5.5* Not evaluated: human health-systemic risks
Idaho (ID WQS, final, 1997; assumed fully implemented by 2002)	Major municipals: 1 Major industrials: 5	14,772 to 70,000 toxic pounds-equivalent	Not evaluated
Alabama (AL WQS Phase 1, final, 1999; assumed fully implemented by 2002)	Major municipals: 6 Major industrials: 5	29,000 toxic pounds-equivalent (does not include BOD reductions)	Not evaluated
California (CTR, final, 1999; assumed fully implemented by 2002)	Major municipals: 128 Major industrials: 56	1.1 million to 2.7 million toxic pounds-equivalent	Evaluated (human health-carcinogenic risks, recreational angling-San Francisco Bay and freshwater, nonuse): \$7.7 to \$83.0 Not evaluated: human health-systemic risks, recreational angling-other estuarine resources, recreational boating, swimming, and related in-stream and stream-side activities, wildlife viewing, hunting <u>Qualitative</u> Evaluated: Nonuse (ecologic)
Effluent Limitation Guidelines			

Table 6 - Social Benefits of Surface Water Protection Regulations Implemented Since the Mid-1990s			
State (rule)	Number of Facilities Affected	Annual Pollutant Loading Reductions	Annual Benefits (Millions 2002 \$)
Centralized Waste Treatment Effluent Limitation Guidelines (Final rule published December 22, 2000)	223 facilities	9.7 million pounds of conventional pollutant 9.3 million pounds of toxic and nonconventional pollutants	Reduced cancer risk: \$0.08 - \$0.45 Reduced Lead Health Risk: \$0.54 - \$1.75 Reduced Non-Carcinogen Hazard: Unquantified Improved Recreation Value: \$1.35 - \$3.84 Improved Intrinsic Value (including ecological conditions): Unquantified Reduced Biosolid Contamination at POTW Operation (Inhabitation): Unquantified
Commercial Hazardous Waste Combustor Subcategory (Final rule published January 27, 2000)	8 facilities	170,000 pounds of pollutants	Recreational fishing \$0.10 - \$0.18 Nonuse (intrinsic) \$0.05 - \$0.18 Avoided cancer cases \$0.02 - \$0.10 POTW Operation (Sludge) Unquantified
Landfills Point Source Category (Final rule published January 19, 2000)	143 facilities	323,150 pounds of toxics pollutants 600,000 pounds of conventional pollutants	Reduced cancer risk \$0.002 - \$0.01 Recreational fishing 0
Transportation Equipment Cleaning Point Source Category (Final rule published August 14, 2000)	692 facilities	20,979,069 pounds of toxic pollutants 60,875 ponds of conventional pollutants 25,574,670 pounds of nonconventional pollutants	Cancer benefits \$0.06 - \$0.32 Recreational benefits \$1.08 - \$3.78 Nonuse benefits \$0.54 - \$1.84
Pesticide Formulating, Packaging, and Repackaging Point Source Category (Final rule published November 6, 1996)	2,600 facilities	7,600,000 toxic pounds	Benefits not monetized: annualized costs are less than \$100 million
Pulp, Paper, and Paperboard Point Source Category (Published April 15, 1998 as part of the "Cluster Rule")	96 mills	AOX: 28,210 kkg Chloroform: 45kkg Dioxin and Furan: 125gm	Human health: \$2.3 - \$25.3 Recreation angling: \$2.3- \$21.85 Reduced sludge disposal cost: \$9.2 - \$18.4

Table 6 - Social Benefits of Surface Water Protection Regulations Implemented Since the Mid-1990s			
State (rule)	Number of Facilities Affected	Annual Pollutant Loading Reductions	Annual Benefits (Millions 2002 \$)
Oil and Gas Extraction (Synthetic-Based Drilling Fluids) (Final rule published January 22, 2001)	Gulf of Mexico: 1,047 shallow wells, 138 deep wells Offshore California: 7 shallow wells, 0 deep wells, Alaska: 6 shallow wells, 0 deep wells	118 million pounds of cuttings per year	<i>Cost savings: \$52.8 million</i>
NA = not applicable. 1. Benefit estimates updated to 2002 dollars using the Consumer Price Index. * Represents midpoint of the estimated range.			

Strategic Goal Area 3: Preserve and Restore the Land

Discussion

In general, all of the activities associated with Office of Solid Waste and Emergency Response (OSWER) programs support EPA's Strategic Goal 3: Preserve and Restore the Land. Programs included in the analysis are: Superfund Emergency Response and Site Remediation; Resource Conservation and Recovery Act (RCRA) Prevention, Technical Standards, and Corrective Action; Oil Spill Response; Clean-up Program and Technical Standards under the Office of Underground Storage Tanks (OUST); Federal Facilities Restoration and Reuse; activities of the Technology and Innovations Office; 2002 Oil Pollution Prevention Revisions; and Hazardous Waste Combustion maximum achievable control technology (MACT) standards.

Three OSWER activities that support other goals are activities implemented by the Office of Brownfields Cleanup and Redevelopment (OBCR) to restore brownfields; chemical facility planning and preparedness under the Emergency Planning and Community Right-to-Know Act (EPCRA), which is implemented by the Chemical Emergency Preparedness and Prevention Office (CEPPO); and waste reduction and resource efficiency efforts managed by the Office of Solid Waste (OSW.) The brownfields and chemical facility activities support EPA's Strategic Goal 4, which entails the development and protection of Healthy Communities and Ecosystems. OSWER's waste reduction initiatives assist in achieving EPA's Strategic Goal 5: Compliance and Environmental Stewardship. It is important to note that OSWER programs also contribute to the protection of water and air (i.e., by assuring the proper management and rapid cleanup of volatile wastes, and by encouraging pollution prevention). The limitations of available data, however, prevent the accurate assignment of benefits among multiple goals.

Methodology

OSWER uses the Census Bureau's 1999 Pollution Abatement Costs and Expenditures (PACE) survey as the basis for estimates of annual private sector costs. While PACE data provide information by sector and also categorize some costs by medium (air, water, solid waste) and type (e.g., remediation, disposal), the survey does not allocate costs to specific EPA or OSWER programs. OSWER therefore uses alternative estimates from the 1994 Census Bureau PACE survey, the 1994 Bureau of Economic Analysis Pollution Abatement and Control (BEA PAC) survey, and various RIAs to refine and allocate the 1999 PACE estimates.

After identifying and allocating relevant PACE expenditure estimates among OSWER programs, we adjusted the estimates to 2002 using the BEA GDP deflator. In general, OSWER assumes that 1999 costs are similar to current costs. The exception to this assumption is the 1999

publication of the Hazardous Waste Combustion MACT standards; these costs are included separately.³

To estimate state and local government costs, OSWER relied on the Environmental Council of States (ECOS) report, *States Put Their Money Where Their Environment Is (State Environmental Spending)* to estimate costs associated with hazardous waste management; the *Regulatory Impact Analysis for the Final Criteria for Municipal Solid Waste Landfills (Municipal Solid Waste Landfill RIA)* to estimate state and local costs associated with non-hazardous waste management; the Association of State and Territorial Solid Waste Management Officials' (ASTSWMO) *Report Card on the Federal UST/LUST Program (Report Card)* and *OUST FY 2001 and 2002 End-of-Year Activity Reports (Activity Reports)* to estimate state administrative costs associated with the UST programs; and the *Economic Analysis in Support of Final Rule on Risk Management Program Regulations for Chemical Accident Release Prevention, as Required by Section 112(r) of the Clean Air Act (EA of RMP Regulations)* to estimate state and local costs associated with chemical emergency preparedness and prevention. We then adjusted these estimates to account for EPA grant distributions. To the extent possible, we allocated costs among OSWER programs, using available reports on office activity and RIAs

To estimate annual benefits, OSWER has compiled benefits estimates from a number of existing published reports and adjusted them to constant 2002 dollars using BEA's GDP deflator. Where possible, OSWER used comprehensive program-level assessments of benefits (e.g. the Oil Spill Program and Superfund). These analyses measure the total benefits of program regulations against a "without regulation" baseline. For programs that have not been able to perform a comprehensive assessment of benefits, OSWER used partial estimates of benefits based on assessments of specific regulations. Regulatory Impact Analyses (RIAs) provided a significant amount of information; this analysis draws from RIAs related to nine major OSWER regulations: the municipal solid waste landfill design criteria, RCRA Corrective Action, the five land disposal restriction regulations, the technical standards for Underground Storage Tanks, and the Risk Management Program. However, RIAs do not address benefits related to voluntary OSWER programs and initiatives. Several other available publications assess the effectiveness of various programs, and in some cases individual program websites provide additional information. Based on compiled information from these sources, OSWER added monetized and quantified benefits within groups of related activities. Because benefits are typically calculated on a program or regulation basis, it is not necessary to allocate benefits across multiple programs.

Limitations

³ Note that the implementation of standards published in 1999 are one exception that has been delayed by court action, but it appears that the regulated community is undertaking system improvements and incurring costs. We therefore include costs associated with these standards under Goal 3. Note, however, that because MACT standards address air pollution, these costs may be more relevant to EPA's Goal 1: Clean Air.

Estimates of costs reflect a number of uncertainties. Several of these are associated with the 1999 PACE data, including that the 1999 PACE survey covers only a small number of non-manufacturing industries (i.e., mining and electric power generation) in its estimate of total costs. Accounting for the remaining non-manufacturing industries is difficult given available data and the omission of these industries results in an underestimate of total social costs. A variety of assumptions regarding the calculation of private costs were also made; these are detailed in the supporting documents to this appendix.

Several factors affect the benefit estimates. First, OSWER documents that were written in support of regulation tend to be limited in scope and provide conservative estimates of benefits. Second, several of the available estimates are several years old or based on limited data; these may not reflect the most data on releases of pollutants, or the most recent economic and health science methods for estimating benefits. In addition, a draft analysis of the benefits of the Superfund program to estimates total benefits associated with Superfund site remediation (including both National Priorities List (NPL) and "NPL caliber" state sites) was used to provide benefit estimates for Objectives 1 and 3.⁴ The draft report monetizes the annual benefits of all Superfund activities (including some emergency removal activities) in 2002 dollars. The report is currently under review and the estimates are subject to change. Finally, the magnitude of some of the annualized benefits estimates depends on the discount rate used. OSWER used a seven percent discount rate in those cases where existing documentation presented benefits in present value terms.

Summary of Estimates

As summarized in Table 7, total estimated costs of programs under goal 3 are approximately \$7.4 billion. The largest contributors to estimated social costs are RCRA Subtitle-C Prevention program (\$2.4 billion) and RCRA Subtitle-D Technical Standards (\$2.2 billion). Superfund Site Remediation costs are estimated at \$958.5 billion. Most of these costs are allocated to the specific sets of programs below, but approximately \$1.5 billion are included in the total, but cannot be so allocated. Additionally, 2002 Oil Pollution Prevention Revisions offer some cost savings, and Combustion MACT Standards result in relatively modest costs that are included in the summary table below (Table 7), but are not detailed in the text.

Monetized benefits from these programs total approximately \$12.7 billion and are also summarized in Table 7. The Technical Standards program from OUST contributes over \$7.5 billion in benefits, while Superfund Site Remediation results in an estimated \$4.1 billion in benefits. The Superfund Emergency Response program provides \$915 million in benefits. Many of the benefits of programs under goal 3 are not monetized in this report due to the limitations described above. These non-monetized benefits are diverse and range large numbers of reduced cancers and other health

⁴ EPA, Office of Emergency and Remedial Response. *Draft Superfund Benefits Analysis*. August 2002.

effects to the preservation of animal habitat and groundwater. Non-monetized benefits are detailed below for specific sets of programs.

Social Costs

Superfund Emergency Response and Oil Spill Response

The quantitative cost estimates of these programs are included in the analysis of RCRA Prevention and Technical Standards, and OUST Technical standards as indicated in Table 7. These costs are not estimated separately.

RCRA Prevention and Technical Standards, and OUST Technical Standards

Current annualized costs of these programs total \$6.2 billion. Costs of RCRA Subtitle-C Prevention Program are estimated at approximately \$2.5 billion, but this is offset by \$106.4 million in grants, for a net cost of \$2.4 billion. RCRA Subtitle-D Technical Standards contribute approximately \$2.2 billion in costs while Technical Standards from the UST program cost an estimated \$42.7 million.

Superfund Site Remediation, OUST Clean-up Program, RCRA Corrective Action and Federal Facilities Restoration and Reuse

The total social costs for this set of programs is around \$1.2 billion. The costs of Superfund Site Remediation are estimated to be approximately \$958.5 million, \$872.9 million of which are from the private sector. The OUST Clean-up Program results in costs of \$99.9 million, \$87.6 million of which are from the private sector. Costs from RCRA Corrective Action include \$136 million from the private sector as well as costs that are included in the RCRA Prevention and Technical Standards program estimates.

Technology and Innovations

Social costs for programs under the Technology and Innovations Office of OSWER are included in total costs for OSWER programs (See Table 7).

Social Benefits

Superfund Emergency Response and Oil Spill Response

Monetized benefits are estimated at \$915 million for Superfund emergency response and \$85.3 million for Oil Spill Response, totaling \$1 to \$1.1 billion. Non-monetized benefits from these programs include lower maintenance costs for drinking water systems, reduced third party damages, diminished cancer risk, improved ability to deter terrorism and mitigate its consequences, and the avoidance of uncertain or unanticipated risks.

RCRA Prevention and Technical Standards, and OUST Technical Standards

Monetized benefits are estimated only for the OUST Technical Standards program. These benefits total approximately \$7.6 billion. Benefits for RCRA Prevention and Technical Standards

programs are diverse and substantial, but are not monetized. In total the non-monetized benefits of these programs include 10.9 to 14.2 fewer cases of cancer each year and 115.4 fewer cases of several unidentified illnesses. Benefits also arise from 13,600 fewer leaks from underground storage tanks, reduced drinking water replacement costs, preserved animal habitat, prevention of properties from becoming contaminated, and preserved groundwater option and existence values.

Superfund Site Remediation, OUST Clean-up Program, RCRA Corrective Action and Federal Facilities Restoration and Reuse

Total current annualized monetized benefits for these programs are estimated at \$4.2 billion, most of which are from Superfund Site Remediation (see Table 7). Non-monetized benefits from these programs include: 105 to 204 fewer cancer cases per year; approximately 464 fewer children born annually with birth defects; an estimated 98,437 fewer non-cancer illnesses per year. Additionally these programs provide 4,360 acres remediated annually for ecological reuse; 139 acres remediated for agricultural reuse; and the clean-up of 15,769 leaks from underground storage tanks. Activities from these programs result in increased property values, improved runoff management, better property maintenance and design, more extensive pedestrian and transit access, and lower incidence of several illnesses in humans and animals.

Technology and Innovations

Benefits from programs under the Technology and Innovations Office of OSWER are reflected in reduced remediation costs. Non-monetized benefits from these programs include information from 120,000 documents per year distributed to stakeholders, and information to 14,000 individuals reached monthly via *Tech Direct*. Additional benefits result from training 6,100 federal and state clean up professionals per year, and the development and adoption of several technologies that quicken the pace and lower the cost of site analysis and remediation.

Table 7 SUMMARY OF MONETIZED COSTS AND BENEFITS OF OSWER GOAL 3 PROGRAMS (million 2002\$)				
Office and Program	State and Local Cost Estimate	Private Cost Estimate ^a	Total Cost Estimate	Monetized Benefits ^b
OERR: Superfund Emergency Response	<i>Included elsewhere in table</i>			\$915 ^d
OERR: Oil Spill Response	<i>Included elsewhere in table</i>			\$85.4
OSW: RCRA Subtitle-C Prevention	\$1,170.1 <i>(\$1,276.5, offset by \$106.4 in grants)</i>	\$1,242.2	\$2,412.3	<i>Not monetized</i>
OSW: RCRA Subtitle-D Technical Standards	\$1,138	\$1,106.9	\$2,244.9	<i>Not monetized</i>

Table 7				
SUMMARY OF MONETIZED COSTS AND BENEFITS OF OSWER GOAL 3 PROGRAMS				
(million 2002\$)				
Office and Program	State and Local Cost Estimate	Private Cost Estimate^a	Total Cost Estimate	Monetized Benefits^b
OUST: Technical Standards	\$42.7	<i>Included in Total</i>	\$42.7	\$7,568
OERR: Superfund Site Remediation	\$85.6	\$872.9	\$958.5	\$4,149 ^d
OUST: Clean-up Program	\$12.3 million	\$87.6	\$99.9	<i>Not monetized</i>
OSW: RCRA Subtitle-C Corrective Action	<i>Included elsewhere in table</i>	\$136.0	\$136.0	<i>Not monetized</i>
Federal Facilities Restoration and Reuse	<i>Minimal</i>	<i>None</i>	<i>Minimal</i>	\$12
Technology and Innovations Office	<i>None</i>	<i>Minimal</i>	<i>Minimal</i>	<i>Not monetized</i>
2002 Oil Pollution Prevention Revisions	(\$1)	(\$11)	(\$12)	<i>Not monetized</i>
Combustion MACT Standards	<i>Minimal</i>	\$62.4	\$62.4	<i>Not monetized</i>
Total Monetized Costs & Benefits	\$2,447.9	\$4,964	\$7,411.9	\$12,729.4
^a Total private costs include additional costs (\$1,467 million) not allocated to RCRA Subtitle-C or -D. ^b Does not include non-monetized benefits of OSWER programs. ^c Includes some costs for Goal 4. ^d These estimates are based upon a document, <i>Draft Superfund Benefits Analysis</i> , that is currently under review and are subject to change.				

Strategic Goal Area: Goal 4 – Healthy Communities and Ecosystems

Discussion

Goal 4, Healthy Communities and Ecosystems, is composed of a wide variety of EPA programs. As is the case for the other goals, the estimates and discussion of social costs and benefits we provide below cover only a portion of the programs included in Goal 4. The EPA programs under Goal 4 for which we do have some information on social costs and/or benefits include:

OSWER's Chemical Emergency Preparedness and Prevention Office (CEPPO) Risk Management Plan program – CEPPO implements provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA), designed to prevent or assure effective emergency response to chemical spills, including any caused by acts of terrorism.

OPPTS's Office of Pesticide Programs (OPP) Pesticide Programs – OPP, with assistance from its regional offices and state and tribal partners, protects human health and the environment from unreasonable risks associated with pesticide use while ensuring that human health and economic welfare are protected from damages caused by insects, weeds and other pathogens. OPP regulates pesticides under two statutes. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires that pesticides be registered (licensed) by EPA before they may be sold or distributed for use in the United States, and that they not cause unreasonable adverse effects to people or the environment when used according to EPA-approved label directions. Under the Federal Food, Drug, and Cosmetics Act (FFDCA), as amended by the Food Quality Protection Act (FQPA), EPA sets tolerances for pesticide residues in food and must ensure that there is a reasonable certainty of no harm to human health as a result of pesticide residues on food.

OPPTS's Office of Pollution Prevention and Toxics (OPPT) Lead Safe Housing Program – Lead-based paint in houses built prior to 1978 is the largest remaining source of lead exposure to Americans. Individuals, especially children, can either be exposed to high levels of lead from deteriorating lead-based paint or exposed to lead during remodeling of older housing. The *Residential Lead-Based Paint Hazard Reduction Act of 1992* added a significant new section to TSCA, requiring EPA develop a series of regulations concerning lead paint abatement, including hazard identification, laboratory procedures, training requirements, and information programs. No EPA program requires that any lead paint abatement be undertaken, but the TSCA program does assure that all abatements which occur are done correctly and safely.

OPPTS's Office of Pollution Prevention and Toxics (OPPT) Asbestos Regulations – Long term exposure to asbestos can lead to fatal lung disease (asbestosis) and cancer, among other respiratory diseases. EPA's asbestos program for schools (ASHERA), which also includes guidance for owners of other buildings, regulates the inspection of in-place asbestos insulation, as well as the proper removal and disposal of asbestos if necessary or during remodeling.

OPPTS's Office of Pollution Prevention and Toxics (OPPT) New Chemicals Program – EPA's New Chemicals Program functions as a human health and ecosystem “gatekeeper” to ensure that new chemicals being introduced into commercial use in the United States are of low risk or have the risk properly managed. Any entity considering manufacturing or importing a new chemical must notify EPA of their intent by filing a Pre-Manufacture Notice (PMN), through which they provide EPA with information about the chemical's use, potential volume, possible health risks, disposal practices, and human exposures. EPA reviews the information in the PMN and determines what procedures manufacturers must follow if they begin to manufacture or import the chemical commercially.

OPPTS's Office of Pollution Prevention and Toxics (OPPT) Existing Chemicals Program – The Existing Chemicals Program collects data on the toxicity, health risk, safety and exposure characteristics of chemicals and mixtures used in the U.S., as well as data on the volume and location of the chemicals' manufacture and use. Those data not considered confidential business information (CBI) are made accessible to the public. All the data, CBI and non-CBI, are intended to provide input for efforts to evaluate and manage risk from exposures to these chemicals. Elements of the Existing Chemicals Program addressed here are: the TSCA Inventory which contains data on the more than 70,000 chemicals in U.S. commerce, and the Testing Program which collects human health and environmental data on chemicals for which this information is lacking. The testing program has a particular focus on High Production Volume (HPV) chemicals (greater than 1MM pounds /year) and the Voluntary Childrens' Chemical Exposure Program (VCCEP), both voluntary programs.

OSWER's Office of Brownfields Cleanup and Redevelopment (OBCR) Brownfields Economic Redevelopment Program – EPA's Brownfields Program is designed to empower states, cities, tribes, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields. EPA's Brownfields Program identifies and addresses barriers to cleanup and redevelopment. EPA's Brownfields Program provides financial and technical assistance for brownfields revitalization, including grants for environmental assessment, cleanup, and job training. Four broad activities serve as the cornerstones of EPA's Brownfields Program, these include Protecting the Environment, Promoting Partnerships, Sustaining Reuse, and Strengthening the Marketplace.

OEI's Toxics Release Inventory (TRI) Program – The Toxics Release Inventory (TRI) Program collects annual reporting on toxic chemical releases and other waste management from facilities in manufacturing and certain other industry sectors, as well as federal facilities. Section 313 of the Emergency Planning and Community Right-to-Know Act requires owners and operators of facilities that manufacture, process, or otherwise use any of the approximately 650 listed toxic chemicals and chemical categories in excess of applicable threshold quantities to report annually to the EPA. In addition, section 6607 of the Pollution Prevention Act requires that facilities provide information on the quantities of the toxic chemicals in waste streams and the efforts made to reduce or eliminate those quantities. Data gathered under these authorities are available through a public database maintained by EPA.

Methodology

The estimates of social costs and benefits provided below are derived mainly from existing economic and other analyses. Many of the estimates are not monetized and are limited to a qualitative description of social costs and benefits supplemented by quantitative information. The specific analyses used are described more fully in the sections below.

Limitations

Due to a lack of data, many of the social costs and benefits for Goal 4 are not monetized. A variety of uncertainties and limitations are associated with the estimates that do exist. These uncertainties and limitations are described in the sections below. As noted above, an overwhelming limitation is that the estimates we do have do not represent the full scope of EPA programs that strive to achieve Goal 4.

Social Costs

Risk Management Plans

The *Economic Analysis in Support of Final Rule on Risk Management Program Regulations for Chemical Accident Release Prevention, as Required by Section 112 (r) of the Clean Air Act* (May 1996) provides an estimate of \$113.1 million for private compliance costs and \$34.2 million for state and local government compliance costs.⁵ Total social costs for the Risk Management Plan Program are \$147.3 million.

Pesticide Programs

Non-federal costs of pesticide regulation may be imposed upon registrants (pesticide manufacturers or formulators), state agencies, pesticide users (most significantly, residential and agricultural users) laborers and consumers. To estimate these expenditures we generally relied upon average expenditures inferred from a small number of case studies or estimated in reports, multiplied by the number of expected annual actions. Both of these sources represent a very limited sample of analyses and estimates are subject to a high degree of uncertainty.

OPP estimates that the total yearly burden to registrants of pesticide regulations is about \$306.5 million. Annual costs to state agencies total around \$3.3 million and to agricultural users about \$81.6 million. Other users, laborers and consumers face only nominal costs. Partly offsetting these costs are allocations by Congress of about \$13 million annually for the support of research and testing for products used on minor crops. USDA also funds research in the development of new pesticides, most notably \$17.9 million in 2002 for research into alternatives for methyl bromide. Based on these estimates, the net costs total costs of pesticide regulations is calculated to be \$391.4 million per year less \$30.9 million in subsidies, or \$360.5 million, as summarized in Table 8. Estimates of social benefits

⁵ Costs are reported in 1996 dollars, an inflation factor of 1.1046 is used to arrive at the 2002 estimate.

are generally unavailable due to data limitations, however they are described qualitatively in the section below.

Registrants face costs for re-registration and new registration. The total cost to the pesticide industry of *re-registration* may be around \$70.2 million annually. This includes test costs of about \$23 million per year (\$1 million per chemical with 23 chemicals re-registered per year between 2000 and 2002), and other re-registration costs (*e.g.*, meetings with OPP officials, legal counsel and other administrative costs) at just under \$900,000 per chemical. Recent re-registration decisions have involved special testing in 12 situations, with costs averaging around \$200,000, and monitoring in eight situations, with costs as much as \$900,000 per chemical. Finally, OPP levies a maintenance fee on existing registrations that collected \$17.0 million in 2002.

Registrants' total burden for *new registrations* is calculated to be about \$236.3 million dollars. This is based on OPP estimates that the industry pays almost \$100 million per year for testing of all new conventional chemicals, products and uses to meet OPP's data requirements. The equivalent costs for antimicrobials are about \$37.3 million, for biopesticides, around \$4.4 million and, about \$67.7 million for reduced risk pesticides. Other registration costs total approximately \$15.5 million. OPP also collects \$11.6 million dollars in fees to pay for the establishment of tolerances, the maximum allowable residues that can be found on food products.

The total cost to registrants of OPP regulatory requirements is therefore estimated at \$306.5 million annually. This is only 2.7% of U.S. expenditures on pesticides, which in 1999 were \$11.155 billion.

State agencies face a relatively small annual burden from OPP regulations of around \$3.3 million. This is mainly associated with supporting special local registrations under Section 24(c) of FIFRA and emergency exemptions from restrictions under Section 18. The estimate is based on an annual average of 350 local registration requests that cost agencies about \$800 each, and an annual average of 600 emergency exemptions that cost about \$5,000 each.

Agricultural users may face costs of around \$81.6 million annually. This represents only 0.2% of net farm income (gross value of production less operating expenses) in 2000, estimated by USDA to be \$46.4 billion. This total includes regulations for dietary reasons of approx. \$19.0 million; regulations to address occupational concerns of approx. \$17.1 million; and regulations for environmental concerns of around \$45.5 million. These figures are based on average ex-ante estimates of impacts from a small number of crop-chemical combinations. Estimates of these anticipated impacts are subject to a high degree of uncertainty due to the limited available information and widely varying conditions under which pesticides are regulated.

Other users, consumers and laborers could face costs as a result of pesticide regulations due to higher pest control costs, higher food costs and fewer employment opportunities. However, these

impacts are likely to be small. For example, active ingredients make up only a small proportion of the cost of household pest control products; changes in pesticide use have little impact on retail prices, which are largely influenced by international prices; and labor may well benefit from restrictions on labor-saving chemical inputs to production.

TABLE 8 - Summary of 2002 Costs	
Entity	Total Cost (millions)
Registrant (manufacturer)	\$306.5
State agency	\$3.3
User, agricultural	\$81.6
Total cost	\$391.4
Government subsidies	
• registration support, minor crops	\$13.0
• research support	\$17.9
Total subsidy	\$30.9
Net cost	\$360.5

Lead Safe Housing

TSCA regulations set standards for lead paint abatement-related activities, including the proper identification of a lead-based paint risk, training requirements for abatement workers, and abatement work practices and the disposal of removed hazardous materials. In 2002, approximately 30,000 housing units underwent at least a screening for lead paint hazards and 11,000 units underwent some sort of abatement. The total cost of these abatements was \$111.4 million, including \$92.4 million in direct abatement work practice costs, \$11.4 million for inspections and risk assessments, and \$7.6 million for worker training.⁶

Asbestos

The current social costs of AHERA include periodic re-inspections, taking appropriate action to repair any deterioration, and the proper removal and disposal of asbestos products during renovation and remodeling. States must also maintain contractor and laboratory accreditation programs.

New Chemicals

⁶ Sources: # abatements in 2002 from current OPPT estimates, abatement costs from TSCA §403 Lead Based Paint Standards Economic Analysis (1996) adjusted to \$2002 using the GDP price index.

The private costs of the PMN program come from the firms' costs of preparing a notification. There are no costs to state, local and tribal government organizations. In 2001 (the last year with complete data), firms submitted a total of 1,365 notices. In a limited number of cases EPA requested additional information, which would of course lead to higher submission costs. In addition to the costs of submitting a PMN, firms who decide to begin commercial production or use of a chemical that has received restrictions bear the cost of meeting the restrictions as well.

Existing Chemicals

Chemical suppliers incur costs for laboratory tests, administrative activities, and reporting. They are responsible for conducting laboratory tests on the toxicity, risk and exposure characteristics of the chemicals. The majority of the test results received by the Agency in 2002, were submitted as part of the HPV Voluntary Challenge Program. Under this program, test results were submitted for approximately 200 chemicals. These costs are borne by the companies that manufacture and use these chemicals, with no substantive costs to state or local governments. The chemical manufactures and importers that are required to report for the TSCA Inventory Update Rule incur costs as part of their reporting on the production volume, plant site, and status of TSCA inventory chemicals. This cost occurs every fourth year, since the collections are on a four-year cycle.

Brownfields Redevelopment

Based on the limited data available regarding brownfields costs, we assume that at a minimum state brownfields budgets totals \$170.5 million, which is equal to the amount of grants provided by EPA. Therefore, we estimate that the actual costs to states is a minimum of \$0. In reality, we assume that state spending on brownfields is higher (e.g., because federal grants may not be used for certain activities); however, remaining state and local costs of brownfields redevelopment is included in the estimate for RCRA Subtitle C (in Goal 3). Note that neither state brownfields programs nor state spending on brownfields is required by federal regulation.

TRI

For the 2002 reporting year, EPA expects that 24,308 facilities will file 88,117 Form R reports and 5,451 facilities will file Form A certification statements on 13,209 chemicals.⁷ Using the 2002 burden hour estimates from supporting statements for the TRI Information Collection Request (ICR) and loaded hourly wage rates derived from data in the Employer Costs for Employee Compensation (ECEC) report from the Bureau of Labor Statistics (BLS) as described in the TRI ICRs, the 2002 social costs of TRI are estimated to be \$115 million.

Social Benefits

⁷ "Supporting Statement for Information Collection Request for TRI Reporting Form R," EPA #1363.12, OMB #2070-0093, December 2002 and "Supporting Statement for Information Collection Request for TRI Reporting Form A," EPA #1704.06, OMB #2070-0143, December 2002.

Risk Management Plans

In the 1996 *Economic Analysis in Support of the Final Rule on Risk Management Program Regulations for Chemical Accident Release Prevention*, EPA used data from the Accidental Release Information Program (ARIP) database to monetize damages prevented by the Risk Management Program. The Economic Analysis estimated \$202.3 million in annual human health, property, and ecological benefits. To estimate the effectiveness of an additional dollar expended on risk management activities, EPA assumed that doubling spending reduces damages by 50 percent. In addition, the Economic Analysis assesses the probability of a catastrophic accident similar to the 1984 Bhopal, India incident, using two different methods to calculate the probability and recognizing that the lack of data on serious accidents is a source of uncertainty. The Economic Analysis does not address ecological benefits or the value that people place on decreased risk of accidents and terrorist-related incidents.

Pesticide Programs

The benefits of the re-registration process primarily accrue through reductions in risk to human health and the environment. In the absence of re-registration, pesticides would continue to be used as originally registered. The re-registration program offers a mechanism for OPP to identify unacceptable levels of risk, and the lack of a re-registration program would allow these risks to continue unabated. For dietary risk, including drinking water, benefits accrue to more than 220 million consumers of agricultural products and, in particular, to the nation's children. Children's lower body weight and specialized diet leads OPP to consider them explicitly when determining tolerable levels of residues.

The benefits of worker protection requirements and certification & training accrue to the more than 1.5 million farm workers, including family labor as well as permanent hired, seasonal and migrant labor, who might otherwise be exposed to excessive levels of toxic chemicals. The primary benefits include reductions in illness of those exposed individuals and less loss of work. Unfortunately, measuring these reductions is complicated by difficulties in monitoring changes over time and statistically relating that to regulations. Incidents of worker sickness are documented and many more effects go unreported, particularly among migrant workers.

The benefits of ecological resource protection accrue to commercial enterprises that depend on the natural environment either directly or indirectly (*e.g.*, commercial fisheries, tourism industry, agriculture) and to individuals through recreational value (*e.g.*, sports fishing, tourists) or existence value. There may also be an option value, in that future goods or services may result from preserving the environment in the present. As with dietary and occupational concerns, linking regulations with data on reductions in mortality and morbidity of wildlife is nearly impossible although incidents are documented, as in the cases of fish kills and bird deaths.

Benefits of registration accrue to pesticide users in agriculture or other commercial enterprises from new and better pest control products. These products reduce production costs, improve working conditions, protect plants and structures from damage and increase productivity. Pest control products

are used throughout industry to maintain sanitary conditions and by governments to ensure the public health. Consumers who benefit from a cheaper, plentiful and safe food supply. Benefits also accrue to society in general with the availability of pesticides and antimicrobials that protect health and homes. A less tangible benefit is the extent to which regulations establishing dietary standards for pesticide regulations improve markets for agricultural commodities and for pesticides. The value of a safe food supply may be inestimable.

Lead Safe Housing

For the purposes of this exercise only one portion of the social benefits of lead abatements have been monetized: the avoided loss of IQ in young children. The present value of the avoided IQ damages in the 11,000 housing units abated in 2002 is \$171 million.⁸ Additional health benefits that are unquantified include other neurological-related benefits to children, and all benefits to adults living in the abated housing or who conduct the abatements.

Asbestos

The asbestos regulations not only reduces the exposure and health risk during the normal use of the asbestos-containing products, but also reduces the much higher exposures and health risks associated with the eventual removal and disposal of the asbestos materials. Estimates are not currently available for the amount or value of avoided health effects of EPA's asbestos actions

New Chemicals Program

Benefits arise through both direct and indirect regulatory effects as well as Pollution Prevention-like effects. The immediate public benefits of the PMN program are realized as human health risks and environmental damages that are avoided from the restrictions or bans placed on new chemicals. Indirectly, manufacturers sometimes decide not to actually begin use of a chemical once they receive the feedback of the PMN review or subsequently chooses not to submit, and therefore not to produce, potentially risky chemicals. Over the 20 plus years of this program, if one were to prepare a graph with risk on the vertical axis and time on the horizontal axis, and plot two lines, one showing risk through time *without* the PMN program and another *with* the PMN program, we would see an ever widening wedge of risk reduction resulting from the program. That wedge would represent the growing benefits from the program.

Existing Chemicals Program

The Existing Chemical program serves to correct major information market failures related to human health and ecosystem risk. Prior to these programs the information on the risks of toxic chemicals which was available to citizens, firms, or government organizations dealing with toxic chemical issues was incomplete and inconsistent. Without a basic understanding of the hazards and

⁸ Sources: Average benefits/abatement from TSCA §402/404 Training & Certification Program for Lead-Based Paint Activities Economic Analysis (2000) adjusted to \$2002 using the GDP price index.

exposures of chemicals, it is impossible to assess their risks and how to manage them. Thus, the benefits of these information programs flow through their contribution to risk assessment and risk management to reductions in risk to human health and the environment. Having available current and accurate information on these chemicals lets not only government decision makers, but also the public, assess the risks from chemicals in their communities, thus helping to support rapid and informed decision making at all levels.

Brownfields Redevelopment

Using data from 142 sample brownfields sites, the report "Public Policies and Private Decisions Affecting the Redevelopment of Brownfields: An Analysis of Critical Factors, Relative Weights and Areal Differentials" estimates that every acre of brownfields development preserves 4.5 acres of greenfield space. However, OSWER was unable to estimate the level of annual greenfield preservation attributable to brownfields since no data are available on the amount of land redeveloped through brownfields programs on an annual basis. Additional benefits that are not estimated by the report include: increased economic activity, human health improvements, restoration of ecosystems, improved regional land-use patterns, and the preservation of open spaces that would otherwise be developed.

TRI

The industries that have reported to TRI since its inception have reduced their on- and off-site releases of TRI chemicals by a total of 48 percent or 1.55 billion pounds. The information reported to TRI increases knowledge of the levels of toxic chemicals released to the environment and the potential pathways of exposure, improving scientific understanding of the health and environmental risks of toxic chemicals; allows the public to make informed decisions on where to work and live; enhances the ability of corporate leaders and purchasers to more accurately gauge a facility's potential environmental liabilities; provides reporting facilities with information that can be used to save money as well as to reduce emissions; and assists federal, state, and local authorities in making better decisions on acceptable levels of toxic chemicals in the environment.

Strategic Goal Area: Goal 5 - Compliance and Environmental Stewardship

Discussion

Social costs and benefits related to Goal 5 result primarily from two types of EPA activities. First, EPA's Office of Enforcement and Compliance Assurance (OECA) uses a mix of compliance assistance, compliance incentives, monitoring, and enforcement to address environmental risks and patterns of noncompliance. These activities produce direct environmental benefits that result in better protection of human health and the environment; and, they provide a general deterrent to noncompliance that is the foundation of the Agency's regulatory and voluntary programs. Second are EPA's various pollution prevention programs within the Office of Pollution Prevention and Toxics (OPPT) and the Office of Solid Waste (OSW). The Pollution Prevention Act of 1990 recognized that one of the most effective ways of reducing public health risks from exposure to toxic chemicals, as well as lowering the risk to the environment, is to prevent pollution from being created in the first place. Rather than relying on traditional regulatory approaches, EPA's Pollution Prevention (P2) programs use a broad array of cooperative approaches, working closely with industry, state and local governments, and citizens who volunteer to work with EPA to find better, smarter and cleaner ways of doing business. Examples of EPA's P2 programs include:

OPPT's Design for the Environment (DfE) Program is a voluntary partnership program that works with individual industry sectors to develop and integrate cleaner, cheaper, and smarter environmental solutions into everyday business practices.

OPPT's Green Chemistry Program promotes the research, development, and implementation of innovative chemical technologies that prevent pollution in both a scientifically sound and cost-effective manner.

OPPT's Green Engineering Program promotes consideration of exposure, fate, and toxicity – in addition the more traditional waste minimization concerns – in the design, commercialization, and use of chemical products and the development of feasible, economical processes that minimize generation of pollution at the source.

OPPT's Healthy Hospitals for the Environment Program is a voluntary program centered on reducing the amount of mercury used in hospitals and improving the efficiency of handling hospital wastes in general.

OPPT's Environmentally Preferable Purchasing Program is a federal government-wide program that encourages and assists Executive agencies to prevent waste and pollution by considering environmental impacts along with price and performance and other traditional factors when deciding what to buy.

OPPT's Pollution Prevention Grants are comprised of two programs: the Pollution Prevention Grant Program, which provides \$5 million annually to states to help administer Pollution Prevention programs, and the Pollution Prevention Resource Exchange (P2Rx), which partially sponsors a consortium of eight regional pollution prevention information centers which provide pollution prevention information, networking opportunities, and other services to states, local governments and technical assistance providers in their region.

OSW's Voluntary Waste Reduction Programs include efforts focused on both hazardous waste and municipal solid wastes. The RCRA Hazardous Waste Minimization Program, in OSW seeks to reduce the generation of hazardous waste in the United States. The program targets a list of 30 "priority chemicals" that, due to their persistence, bioaccumulation potential, and toxicity, are of significant concern when released to the environment. Reductions of wastes that contain one or more of these chemicals are thus of particular focus in the program. We accomplish reduction goals by a combination of regulatory actions, voluntary waste reduction partnerships, and technical support initiatives. The Hazardous Waste Minimization Program tracks the progress toward national reduction goals via the Toxics Release Inventory database. Municipal solid wastes are similarly targeted through voluntary programs for reductions in waste rates and increases in recycling. Results are measured in terms of reduction in waste generation rates as compared to growth in the economy.

Methodology

Enforcement and compliance activities

There are three main categories of costs imposed by the national enforcement and compliance assurance program: administrative and judicial penalties, injunctive relief, and Supplemental Environmental Projects (SEP's); but not all of them qualify as social costs. Though penalties do impose a monetary burden on those required to pay them, they are a transfer payment and do not incur a social cost. Regulated entities involved in enforcement activities are required to pay injunctive relief to bring a facility back into compliance and redress environmental harm caused. Since injunctive relief is offsetting environmental harm, or represents a cost that would have been incurred if the facility had been in compliance, it does not represent a social cost attributable to the enforcement and compliance program. SEP's are voluntary projects undertaken by violators as part of the settlement of an enforcement action. Examples of past SEP's include: upgrading equipment or processes to reduce the amount of pollution produced, habitat restoration in the area impacted by past noncompliance, and agreeing to assist other facilities to help them reduce the amount of pollution they are producing. Though not legally required to perform a SEP, EPA may reduce the magnitude of a penalty if the violator agrees to undertake an acceptable SEP. The social cost of SEP's amounted to approximately \$56 million in 2002.

Pollution prevention activities

Participation in EPA's pollution prevention programs are voluntary and therefore have no social costs. Monetized estimates of social benefits attributable to these programs are not available. A

description of the social benefits of pollution prevention programs along with quantitative indicators of their success are summarized in the Social Benefits section below.

Limitations

Enforcement and compliance activities

As is noted above, the simplifying assumption of full compliance made in analyses for Goals 1 through 4 make it impossible to aggregate the estimates of social costs and benefits attributable to OECA's activities with those of the program offices. The assistance and incentive programs and the monitoring and enforcement activities carried out by OECA serve not only to bring facilities back into compliance, but to deter and prevent facilities from operating outside the law. A social cost for which we currently have no data are the costs to states of state inspectors monitoring for compliance with federal environmental regulations, although part of this cost is funded by EPA.⁹

Pollution prevention activities

Since participation in P2 programs is voluntary, there are not expected to be any social costs entailed by P2 participation. Monetized estimates of the benefits of P2 programs is scarce and therefore only quantitative and qualitative descriptions are provided below.

Social Costs

Enforcement and compliance activities

Annualized social costs arising from SEP's is approximately \$56 million in 2002.

Pollution prevention activities

P2 programs are true "win-win" programs involving nearly zero net social costs. As they are voluntary programs, private industry and/or municipalities will only participate if they believe it is in their own best interest. Industry and government organizations are motivated to participate because of the opportunity of finding ways to increase profits or lower costs by creating more output with fewer inputs, reducing disposal of hazardous materials, increasing worker protection and productivity, reducing liability, or lowering environmental compliance expenses. All of the programs mentioned in this objective, therefore, can be assumed to generate no net social costs.

Social Benefits

Enforcement and compliance activities

⁹ 24% of total state environmental spending was funded by EPA in 2000 and so would not count as a social cost as defined in this appendix.

The direct human health and environmental benefits of the federal air, water, and hazardous waste laws are addressed in the social benefits section for Goals 1 through 4. However, the public benefits of clean air, water, and land are only achieved through regulated entities compliance with environmental laws; and compliance is achieved through a system that depends on the activities of media programs and the national compliance and enforcement program working in concert. The compliance assistance, compliance incentive, monitoring and enforcement activities carried out by Office of Enforcement and Compliance Assurance (OECA) serve not only to bring facilities back into compliance, but to deter and prevent facilities from operating outside the law. Thus, a percentage of the social benefits outlined in Goals 1 through 4 are attributable to the activities of the national enforcement and compliance assurance program. Determining the relative impacts of the media and enforcement and compliance programs would require additional analysis.

There are also social benefits that accrue to the public solely as the result of OECA activities. The environmental outcomes resulting from the conclusion of enforcement cases (e.g., pounds of pollutants reduced, groundwater treated and contaminated soil to be cleaned) are a direct result of enforcement activity, and would not have been achieved in the absence of enforcement actions. During FY 2002, the compliance and enforcement program secured 261 million pounds of pollutants to be reduced through settled enforcement cases. In addition, enforcement cases resulted in 2.8 billion gallons of polluted groundwater to be treated, 503 million pounds of contaminated soils to be cleaned up, 40,000 acres of wetlands to be protected, and 3.15 million individuals served by drinking water systems brought back into compliance.

OECA's internet-based Compliance Assistance Centers provide information to help facilities achieve, maintain, and exceed compliance requirements. Seventy-four percent of the users of the Compliance Assistance Centers report having made one or more environmental improvements as a result of that use. EPA's Audit and Self-Policing Policy provides incentives for regulated facilities to detect, disclose and correct environmental violations in exchange for a waiver or significant reduction in penalties. In FY 2002, more than 247 companies used the policy to resolve violations at 902 facilities. The social benefit of this policy and the Compliance Assistance Centers is that they bring facilities into compliance more quickly and with the use of fewer government resources, and ultimately reduce environmental impacts.

One other note is relevant concerning enforcement cases: although Supplemental Environmental Projects (SEP's) do impose some social cost, they also produce significant offsetting social benefits, and these accrue only in the presence of an enforcement action. Regulated entities agree to undertake SEP's because of pending enforcement activity, and consequently those offsetting social benefits are a direct result of enforcement as well.

Regarding enforcement and monitoring, while there are costs associated with fines and penalties, the benefit to society is the resulting deterrent effect that this action has upon negative corporate behavior. Although it is difficult to determine the degree of this effect, and even more difficult

to determine what might be the effect of marginal increases in enforcement levels, in general, the research appears to show that increased monitoring and enforcement deters violations and improves environmental performance.

Pollution prevention activities

Social benefits arising from P2 programs include both private and public components. The private components include the net cost savings mentioned above that motivate industry, municipalities, or Federal Agencies to participate in these voluntary programs. The public components flow from the lowering of exposure and risks from toxic chemicals. By helping develop and adopt P2 approaches throughout the economy, EPA is permanently lowering the risks from toxic chemicals. If one were to prepare a graph with risk on the vertical axis and time on the horizontal axis, and plot two lines, one showing risk through time *without* EPA P2 programs and another *with* those programs, we would see an ever widening wedge of risk reduction. That wedge would represent the growing benefits from the P2 program. Adopting P2 has put society on a different path, with steady reductions in environmental risks as innovative P2 programs lead to lowered amounts of toxic chemicals produced, used and ultimately released into the environment. Examples of EPA's P2 programs along with indicators of their benefits include:

OPPT's Design for the Environment (DfE) Program -- DfE partnerships have reached over 2 million workers at over 170,000 facilities; evaluated over 500 chemical substances; reduced diisocyanate exposure, formaldehyde use, lead and mercury use and exposure, perchloroethylene use, VOC and HAPs emissions, and toxic chemical releases; and conserved millions of gallons of water and Btus of energy each year.

OPPT's Green Chemistry Program -- Twenty-eight firms have won Green Chemistry awards since the program began in 1996. In 2002, these award winners reported 114,103,260 pounds of hazardous substances eliminated; 2,131,000 gallons of hazardous substances eliminated; 55,000,000 gallons of water saved; and 57,000,000 pounds of CO₂ eliminated. Significant additional reductions occurred in 2002 from the many other firms that actively participated in the Green Chemistry Program, that year and in prior years, but have not been recognized as award winners.

OPPT's Green Engineering Program -- Like other P2 programs, the Green Engineering Program produces both private and public benefits. In particular, the Green Engineering program has produced a textbook and other instructional material to incorporate environmental considerations into engineering curricula. Human health and environmental risk reduction will become mainstreamed as students who are trained in the principles of Green Engineering move into the workforce and change the way that firms approach the design of chemical processes.

OPPT's Healthy Hospitals for the Environment Program -- Benefits of this program include reduced private costs (associated with toxic materials) to health care facilities, as well as public benefits arising from the decrease in human health and environmental risks from exposure to mercury

and other toxic chemicals which may have been otherwise incinerated and dispersed into the atmosphere. With less frequent and intensive operation of incinerators to dispose of regulated wastes, including mercury, there is less risk to the public and also a reduction in the amount of energy needed to operate the incinerators.

OPPT's Environmentally Preferable Purchasing (EPP) Program – The social benefits of the EPP program are the reduced health and environmental risks from decreased use and release of toxic chemicals. In addition, once these preferable products are available for the federal market, it becomes economically feasible, due to the economies of scale generated by federal purchasing, for manufacturers to also offer the EPP products to other purchasers of these goods and services, including consumers, industry, and other levels of government.

OPPT's Pollution Prevention Grants – Benefits include the aforementioned private and public benefits that arise from the adoption of P2 approaches. The P2 Grants support states in their P2 outreach and technical assistance efforts. A recent study of only thirteen of the programs funded by the P2Rx found the program produced significant benefits. Quantified private benefits of the thirteen programs include total cost savings of \$32.8 million. In addition, public benefits through pollution prevention reductions included 39.8 million lbs. in air, 155 million lbs. in water, and 1.5 billion lbs. of waste. In addition, resource conservation benefits were 8.8 million kWh of energy and 368.4 million gallons of water.¹⁰

OSW's Voluntary Waste Reduction Programs – The waste reduction programs provide social benefits in terms of reductions in waste generation rates for both hazardous waste and municipal solid waste streams. Municipal waste generation is increasing at only half the rate of GDP growth. Additionally, there has been a 44 percent reduction in disposal of Waste Minimization Priority Chemicals between 1991 and 1998. Voluntary waste reduction programs have also helped to achieve an increase in municipal waste recycling on a per capita basis. Waste generation reduction and waste recycling help to bring about long term protection of ground water and both scarce resources and land for future use.

¹⁰ *An Ounce of Prevention is Worth Over 159 Billion Pounds of Cure: A Decade of Pollution Prevention Results 1990-2000.* National Pollution Prevention Roundtable, November 24, 2002

Appendix 2

Proposed Future Program Evaluations

Goal 1

A schedule of evaluations to be conducted in FY 2003, FY 2004, and FY 2005 will be developed and included in the final draft of the *Strategic Plan*.

Goal 2

A Study of Public Awareness of Required Consumer Confidence Reports (CCRs) by PWSs of Varying Sizes. Study would involve national survey research, or focus group research, to examine how CCRs have impacted awareness of drinking water quality. (Project timeframe: 2003)

An Assessment of the Source Water Protection Costs, Benefits, and Effectiveness. Scope of the evaluation would include: (a) Investigate cost/benefit tradeoffs to source water protection compared to treatment and contamination clean up/restoration for ground water and surface water-based public water supplies; (b) Investigate cost/effectiveness tradeoffs in different communities given different measurable goals (such as water quality goals), possibly using different regulatory and non-regulatory techniques, over time; and (c) Develop methodologies for estimating treatment cost avoidance where source water protection can avoid new treatment costs being incurred for unregulated contaminants (e.g., pharmaceuticals, unregulated endocrine disruptors, unregulated bacteria and viruses). (Project timeframe: 2003-05)

Verifications of SDWIS Compliance Data and Compliance Determinations. Annual evaluations of: 1) discrepancies between PWS data in State files or database and the data reported to SDWIS and 2) whether primacy agencies are determining compliance in accordance with federal regulations. (Project timeframe: 2003-2006)

Regional Evaluation of State DWSRF Programs. Annual Regional evaluations of State DWSRF programs to determine compliance with statutory and regulatory requirements for the disbursement and tracking of infrastructure loan funds. (Project timeframe: 2003-2006)

Evaluation of Effectiveness of State/Regional Water Monitoring Councils. The purpose of project is to determine the factors that contribute to an effective water monitoring council. The project will assess nine monitoring councils through a combinations of literature reviews and interviews.(Project

timeframe: FY 2003)

An Assessment of State NPDES Program Integrity and Regional Oversight. This evaluation will assess the factors that contribute to the weaknesses and vulnerabilities, as well as strengths, of State NPDES programs. It will also analyze to what extent EPA Regional Offices have adequate tools to effectively oversee and assess the integrity of State Programs. The project approach will include reviewing information on state legal authorities and Regional evaluations as well as site visits to selected state and regional offices. (Project timeframe: FY 2003)

Regional Evaluation of State CWSRF Programs. Annual Regional evaluations of State CWSRF programs to determine compliance with statutory and regulatory requirements for the disbursement and tracking of infrastructure loan funds. (Project timeframe: 2003-2005)

An Assessment of Innovation and Business Generation as a Result of Compliance with Drinking Water Regulations. The project will examine the extent to which regulations prompt development of new technology, consulting services, and other types of economic development as well as improved management practices. Also study other ancillary benefits for the economy (e.g., reduced disposal costs). (Project timeframe: 2003-2004)

An Evaluation of the Non-Point Source Pollution Control Program. Evaluation will assess whether CWA section 319 funds are being spent in a way that (a) will result in protection and restoration of watersheds from non-point source pollution and (b) effectively leverages other available Federal, State, and local funds for protection and restoration of watersheds? The study will specifically address how well the States are implementing EPA's FY 2002 and 2003 319 guidelines regarding the use of incremental section 319 funds to develop watershed-based plans and implement them to restore 303(d) - listed waters. Methodology of the evaluation will include a review of program documents and discussion sessions and interviews with selected Regions, states, and local NPS project managers. (Project timeframe: 2004)

A Review of State 303(d) Lists and Methodologies. This project will attempt to review the 2002 lists of impaired waters approved by the Regions and compare them with the 1998/2000 list to (a) evaluate whether more or fewer waters were listed, (b) categorize the reasons for listing fewer waters, and (c) evaluate whether methodologies provided with the lists were more or less detailed. Methodology will include review of document and discussions with regions. (Project timeframe: 2004)

An Evaluation of the Water Quality Analytical Methods Program. Project includes support for development and promulgation of analytical methods under the CWA and review of the alternate test procedure (ATP) approval process. Evaluation includes cross-cutting technical, resource and coordination issues with ORD, OGWDW, and the Regions. (Project timeframe:

FY 2004/5)

An Evaluation of State Implementation of Water Quality Standards. As a follow-up to the assessment of the water quality standards development and review process conducted by the Office of Water in FY 2001, OW plans to evaluate whether water quality standards are being implemented effectively in assessments, permits, TMDLs, and drinking water source protection. (Project timeframe: FY 2005/6)

An Assessment of the Effectiveness of the On-Site/Decentralized Treatment Guidelines and other program activities in Achieving Public Health and Environmental Results. This project would look at the On-Site/Decentralized Treatment Guidelines and other program activities to determine their effectiveness in achieving public health and environmental benefits. (Project timeframe: FY 2005/6)

A Regional Evaluation of State Drinking Water Programs The proposed project is designed to be a process/implementation evaluation on the effectiveness of State programs as they implement the Safe Drinking Water Act. The project will involve site visits in selected States and would be integrated with existing annual Data Verifications and DWSRF evaluations.

Goal 3

A schedule of evaluations to be conducted in FY 2003, FY 2004, and FY 2005 will be developed and included in the final draft of the *Strategic Plan*.

Goal 4

Pre-Manufacture Notice Review Program EPA is conducting an assessment of the Pre-Manufacture Notice (PMN) review program's performance in meeting its zero-tolerance risk-based performance goal in the face of increasing demands for adoption of additional review criteria, aging work force, and declining contract funding support. The study is targeting one of EPA's biggest and most visible new chemicals programs for evaluation. (Project timeframe: FY 2003-4)

An Assessment of the Effectiveness of Participatory Processes in Achieving Environmental Results This project would look at the National Estuary Program, the Fisheries Management Councils, and other relevant models to determine their effectiveness in achieving and maintaining ecological protection. (Project timeframe: FY 2005)

An Evaluation of State Wetland Protection Programs Evaluate the factors that lead states and tribes to develop and implement no net loss programs for all wetlands/waters, including those not regulated by the Clean Water Act, barriers to those programs, and ways to overcome barriers. (Project timeframe: FY 2006)

Great Lakes Programs Great Lakes programs and progress will be evaluated every two years by the International Joint Commission (Project timeframe: FY 2004, FY 2006, and FY 2008) and will be evaluated through the State of the Lakes Ecosystem conferences (Project timeframe: FY 2003, FY 2005, and FY 2007).

Goal 5

A schedule of evaluations to be conducted in FY 2003, FY 2004, and FY 2005 will be developed and included in the final draft of the *Strategic Plan*.

Schedule Of OMB PART Assessments For EPA Programs

The Program Assessment Rating Tool (PART) is a series of questions designed to provide a consistent approach to rating programs across Federal government. The PART is a diagnostic tool developed by OMB that relies on objective data to inform evidence-based judgments to assess and evaluate programs across a wide range of issues related to performance. As an assessment of the program overall, the PART also examines factors that the program or agency may not directly control but which are within the influence of the program or agency.

Programs that have already been assessed will be reassessed in each of the following years. Thus approximately 20% of EPA's programs were assessed as part of the FY 2004 budget formulation process, 40% will be assessed during the FY 2005 process, 60% during the FY 2006 process, 80% during the FY 2007 process, and 100% during the FY 2008 process.

FY 2004

Leaking Underground Storage Tanks
Air Toxics
Nonpoint Source
Superfund Removal
Drinking Water SRF
Pesticides Registration

Pesticides Reregistration
New Chemicals
Existing Chemicals
Tribal GAP
Civil Enforcement

FY 2005

RCRA Corrective Action
RCRA State Grants
Ecosystem Research
Clean Water SRF
(including CWSRF Indian Set Aside
Program)
Criminal Enforcement
PM Research
Brownfields
Pollution Prevention Research
Acid Rain

Drinking Water Regulations
Drinking Water Implementation
Toxic Release Inventory
Regulatory Development Research
Science Advisory Board, Science Policy &
Coordination, Science Advisor
Homeland Security
UST State Grants and UST Program

FY 2006

Superfund R&D
Superfund Remedial Actions plus other
Superfund
National Estuary Program
Stratospheric Ozone Programs
Compliance Assistance Programs
Air State Grants (except Radon)
High Production Volume Chemicals Challenge
Program
Climate Change Programs
Mexico Border
Alaskan Native Villages

FY 2007

State Water Pollution Control Grants
Clean Water Regulations
Clean Water Implementation
Environmental Information
Human Health Research
Indoor Air
Ozone and PM Implementation

FY 2008

Public Water System Supervision Grants

Appendix 3

Summary of Consultation Efforts

This is a placeholder page.

Consultation is continuing; the full effort will be summarized in the final draft of the *Plan*.

Appendix 4

Coordination with Other Federal Agencies

This is a placeholder page.

We continue to coordinate development of this *Strategic Plan* with our federal agency partners. We will summarize all of our efforts in the final draft of the *Plan*.