UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
THE INSPECTOR GENERAL

MEMORANDUM

SUBJECT: Audit Report E1KAF6-05-0080-7100130
Risk Reduction Through Voluntary Programs

FROM: Michael Simmons Michael Simmons
Deputy Assistant Inspector General
for Internal Audits

TO: Mary D. Nichols
Assistant Administrator
for Air and Radiation

Attached is the report on our review of voluntary programs. The voluntary programs included in our review were Radon and ENERGY STAR® Office Equipment, Buildings, and Homes programs. The purpose of our audit was to provide the Agency with an analysis of current voluntary programs and recommendations for improving current and future voluntary programs. We concluded that the voluntary programs used good management practices and developed ways to estimate their environmental results. However, improvements are possible in several areas, as listed in the Executive Summary and Chapter 5.

ACTION REQUIRED

In responding to the draft report, the Office of Air and Radiation provided corrective actions, including milestones, for each recommendation. Therefore, no further response from you is required, and we are closing this report in our tracking system. Please track all planned corrective actions in the Management Audit Tracking System.

We have no objections to the further release of this report to the public.

This audit report contains findings that describe problems the Office of Inspector General (OIG) has identified and corrective actions it recommends. This audit report represents the opinion of the OIG. Final determinations on matters in this audit report will be made by EPA managers in accordance with established EPA audit resolution procedures. Accordingly, the findings described in the audit report do not necessarily represent the final EPA position.

We appreciate the cooperation provided by you and your staff during this review. Should your staff have any questions, please have them contact Charles Allberry, Audit Manager, Northern Audit Division, at (312) 353-4222.

EXECUTIVE SUMMARY

Voluntary, or nonregulatory, programs can be an effective tool for reducing risk and achieving environmental results. The Radon and ENERGY STAR® voluntary programs we reviewed used good management practices and developed ways to estimate their environmental results. The programs provided the impetus to overcome the barriers to energy efficiency and change consumer behavior. As a result, they were effective at achieving environmental benefits and reducing health risks, according to the Environmental Protection Agency's (EPA) statistics.

In developing and implementing the programs, EPA helped provide the information and motivation needed to get its program participants to act. The Radon and ENERGY STAR programs demonstrated several good management practices.

- Planning
- Educating people about incentives
- Providing quality support
- Working with outside organizations
- Obtaining commitments
- Evaluating progress and making adjustments

Good management does not guarantee program success, but it does increase the likelihood that a program will achieve its goals and desired results. As other EPA offices begin to plan and implement voluntary programs, they should consider the lessons learned by the Radon and ENERGY STAR programs.

An important measure of success for any EPA program is how well it protects and improves human health and the environment. This measurement is particularly true for a voluntary program, since it would be difficult to continue funding a program not required by Congress that is not achieving measurable risk reductions. The voluntary programs effectively estimated the impact their activities had on reducing risks to health and the environment. These estimates were based on information from

both EPA and outside sources. As a result, the programs were able to (1) evaluate their progress, (2) measure their performance against goals, and (3) make adjustments to better achieve their goals. Future voluntary programs could benefit from using similar measurement techniques.

Although we noted several good management practices in the Radon and ENERGY STAR programs, some improvements are needed in:

- documentation of the planning process,
- definition of market transformation, and
- maintenance of EPA logo integrity.

The Radon program should improve the accuracy of reporting its results.

Agency Actions

The Assistant Administrator for Air and Radiation agreed with all the findings in our report and proposed correction actions to address each of the recommendations. Corrective actions include expanding the annual business plans for ENERGY STAR programs to include information such as market and technical analysis, marketing plans, and plans for addressing market transformation and exit strategies. Also,

- Atmospheric Pollution Prevention Division will evaluate whether spot testing of products with the Energy Star label is needed to maintain label integrity, and

- Indoor Environments Division will clarify what the statistic for high radon areas represents in all future reports and information on radon results.

OIG Evaluation

The Agency's actions, when implemented, will address the findings and recommendations in the report.

Table of Contents

Table of Contents

EXHIBITS

APPENDIX

CHAPTER 1
Introduction

PURPOSE

We performed an audit of selected voluntary air programs. The purpose of the audit was to provide the Agency with an analysis of current voluntary programs and recommendations for improving current and future programs. Our specific objectives were to determine:

- the management practices that worked well and areas where improvements are needed in selected voluntary air programs, and
- whether voluntary programs achieve environmental benefits.

BACKGROUND

Historically, EPA has relied upon command and control regulations to achieve environmental results and risk reduction. However, in its Five Year Strategic Plan (1994), EPA identified the need to develop and implement more innovative, effective, and efficient approaches to environmental protection. Two of the seven guiding principles EPA identified were pollution prevention and partnerships. To complement its traditional regulatory programs, EPA initiated voluntary programs to prevent pollution in partnership with its stakeholders: Federal, tribal, state, and local agencies; Congress; private industry; public interest groups; and citizens.

Both global warming and radon were ranked as high risk in EPA's report *Unfinished Business and Reducing Risk.* The Office of Air and Radiation (OAR) relies upon voluntary programs to get risk reduction in several areas, including global warming and radon. To address global warming and the greenhouse effect, the Atmospheric Pollution Prevention Division (APPD) developed a number of ENERGY STAR programs which seek to encourage the use of more energy efficient technologies through partnerships with business, government, and nonprofit groups. Reductions in

energy usage reduce the carbon dioxide emissions from power plants and on-site combustion equipment, which are major contributors to the greenhouse effect. The Indoor Environments Division's (IED) Radon program uses a combination of research, information dissemination, and partnerships with industry groups to decrease exposure to radon.

ENERGY STAR

In 1993, the President signed the Climate Change Action Plan (CCAP), initiating many programs designed to reduce greenhouse gas emissions through voluntary partnerships with businesses and public institutions. The goal of the CCAP is to return U.S. greenhouse gas emissions to 1990 levels by the year 2000. EPA has the primary responsibility for 21 of the 44 actions identified by the CCAP to reduce emissions of carbon dioxide, methane, hydrofluorocarbons (HFC), and other greenhouse gases. Some of these actions are implemented jointly to capitalize on the experience and expertise of other Federal agencies, including the Departments of Energy (DOE), Agriculture, and Transportation. Exhibit 1 presents EPA's CCAP actions and the related voluntary programs. The ENERGY STAR programs support the CCAP emissions reductions goals.

The ENERGY STAR programs have a common purpose to get consumers and businesses to use more energy efficient products. The programs' goals are to:

- increase market penetration of existing energy efficient products,
- ensure that manufacturers' and homeowners' investments in energy efficiency are cost effective and product quality is sustained or improved, and
- change consumer purchasing behavior.

APPD has several ENERGY STAR programs to encourage energy efficient technologies in specific areas, such as lighting, office equipment, commercial buildings, and residential homes. The programs set targets for energy efficiency and offer the ENERGY STAR label to recognize products that achieve the targets. We

reviewed three individual programs related to office equipment, existing commercial buildings, and new homes.

In June 1992, EPA announced the ENERGY STAR Computers program, and several companies agreed to work with EPA in the program. EPA officially launched the program on June 17, 1993, at a White House press conference. After working with computers, monitors, printers, and facsimile machines, the program added copiers in April 1995 and changed its name to ENERGY STAR Office Equipment. EPA's ENERGY STAR Office Equipment program: (1) encourages manufacturers to develop office products that use less energy, (2) educates consumers on the benefits of energy efficient office equipment, and (3) encourages organizations to purchase only energy efficient office equipment and to reduce paper use. The energy consumption of office equipment represents five to seven percent of commercial sector electricity use.

The ENERGY STAR Buildings program reduces energy costs, prevents pollution, and improves comfort and air quality in commercial buildings through energy efficient building upgrades. Commercial buildings account for about 15 percent of all U.S. energy consumption. EPA secures commitments from commercial building owners to upgrade existing building systems with more energy efficient equipment, where profitable. The program leads a building owner through a five stage strategy that addresses lighting, building tune-up, heating systems, cooling systems, and air handling. In turn, EPA provides technical assistance, training, and public recognition to participants. ENERGY STAR Showcase Buildings, begun in June 1994 as the first stage of the program, implemented accelerated building energy-efficiency upgrades and demonstrated potential energy savings. EPA launched the Buildings program in April 1995, with 58 charter participants.

The ENERGY STAR Homes program, launched in April 1995, reduces energy use and prevents pollution by encouraging builders and developers to produce energy-efficient new homes. Energy improvement recommendations often include improved insulation,

tighter ducts, sealing packages, high efficiency heating and air conditioning, and high performance windows. The program motivates builders to build homes with the Home Energy Rating System five-star rating that are 30 percent more efficient than homes built using the existing Model Energy Code. The program provides consumer education and information, training, and recognition for its builder participants.

Radon

Radon is a cancer-causing, radioactive gas. It is estimated to cause thousands of deaths each year from lung cancer. In fact, the Surgeon General has warned that radon is second only to smoking as the leading cause of lung cancer in the United States.

Radon gets into the air from the breakdown of natural uranium in soil, rock, and water. Radon can be found all over the U.S. in any type of building, but its greatest exposure occurs in the home. Radon typically moves up through the ground to the air above and into the home through cracks and other holes in the foundation. Nearly 1 out of 15 homes in the U.S. is estimated to have elevated radon levels. EPA recommends that all homeowners test for radon and fix the problem if the radon level is above designated safety levels.

In response to a growing concern about elevated indoor radon concentrations, EPA established the Radon Action Program in September 1985. Since EPA lacks statutory authority to prescribe what homeowners should do about radon, EPA is working through a voluntary program to ensure that the required technical knowledge exists and is accessible to homeowners, contractors, and state and local officials.

A 1992 review by the Office of Policy, Planning and Evaluation (OPPE) became the basis for the current program strategy, developed in 1993. OPPE concluded that the Radon program had made some progress in increasing radon awareness and testing, but public information alone would not be sufficient to achieve significant long-term risk reduction. Stronger actions, such as requiring radon testing in real estate transactions and building radon resistant new homes, were encouraged and seen as cost

effective. OPPE recommended that the Radon program focus on high risk areas. A 1992 General Accounting Office report supported the findings and recommendations of the 1992 OPPE report.

The 1993 radon strategy explained how EPA would reduce radon risks, and provided a framework consisting of four key elements:

- underlying policies and scientific principles,
- a decentralized system of States and other partners for targeting the public,
- multiple strategies for achieving radon risk reduction, and
- a strong focus on key program priorities.

SCOPE AND METHODOLOGY

Our audit was limited to the Radon program and three ENERGY STAR programs: Office Equipment, Buildings, and Homes. The purpose and objectives did not include determining the cost-effectiveness of the programs.

Our first objective was to determine the management practices that worked well and areas where improvements are needed in selected voluntary air programs. To accomplish this objective, we reviewed management controls over the processes for planning, organizing, directing, and controlling program operations. We did not review contract management controls because they were covered in prior audit work (OIG Report No. 6100161, dated March 30, 1996). We evaluated the control risk exposure and identified the program internal control objectives and techniques. We reviewed EPA's process for selecting the environmental problems to be addressed with voluntary programs. Through reviews of documentation and discussions with EPA employees, we evaluated the processes used to plan and implement the programs. We judgmentally selected 10 participants in each ENERGY STAR program and surveyed them to obtain their perspectives of the program.

Our second objective was to determine whether voluntary programs achieve environmental benefits. To accomplish this objective, we identified how the programs set goals and measured their activities and accomplishments. We reviewed how the environmental benefits were computed and considered the source and reliability of information used to measure benefits. We compared the measured benefits to the program goals to determine if the accomplishments were on target.

We conducted our fieldwork from April 1, 1996, to November 8, 1996. We discussed position papers with APPD and IED officials on October 29, 1996. Their comments were used in finalizing the draft report. We issued the draft report to the Assistant Administrator for Air and Radiation on December 6, 1996. We received the Assistant Administrator's response on March 6, 1997. We incorporated the response into the report as appropriate. The Assistant Administrator's response is included as appendix 1.

We performed our audit in accordance with the Government Auditing Standards, 1994 Revision, issued by the Comptroller General of the United States.

PRIOR AUDIT COVERAGE

In 1995, the Office of Inspector General (OIG) completed a survey of APPD's voluntary Green Lights program (Report No. 5700002, dated January 17, 1995). The auditors found that the program had shown measurable progress in its voluntary approach to achieve reductions in greenhouse gases. The survey results indicated that current and planned activities, along with continued improvement to program operations, should help the Green Lights program meet established goals and milestones, as well as the initiatives stated under the CCAP.

In March 1996, the OIG completed an audit of the Agency's management and oversight of selected contracts awarded to a major EPA contractor (Report No. 6100161, dated March 30, 1996). The overall objective was to assess the adequacy, timeliness, and value of products and services procured by EPA

from the contractor. The audit had two principal findings related to the present audit:

- Different measures should be used to determine the success of the Green Lights program. Effectiveness was measured, in part, by the number of entities enrolled in the program. However, many of the enrolled entities had not actively participated in the program. OAR responded that it had a uniform policy that measured program participation by several steps, which include joining the program, completing all profitable upgrades, and allowing for the time between these to conduct the surveys and carry out the upgrades within five years of joining the program. EPA uses progress in all these stages as measures of program success.

- EPA needs to become more discerning in assigning Green Lights projects, as there were instances where the Agency authorized the contractor to perform work that was questionable from the standpoint of either cost or content. OAR responded that, since the start of the contract, APPD has required detailed work plans from its contractors. Each work assignment manager must approve all trips taken by the contractor. The purpose of this approval process is to insure that all trips taken are necessary and promote the program to key interested and appropriate program participants.

CHAPTER 2
Voluntary Programs Can Be An Effective Tool For Achieving Environmental Benefits

Voluntary programs can be an effective tool.

In recent years, EPA has used voluntary programs more frequently to reduce risks. Our review indicated that voluntary programs can be an effective tool for reducing risk and achieving environmental results. The Radon and selected ENERGY STAR programs used good management practices and developed ways to estimate their environmental results. As a result, the programs were effective and achieved environmental benefits, as shown by EPA statistics.

ROLE OF VOLUNTARY PROGRAMS IN EPA

The importance of voluntary programs has been discussed in several EPA and non-EPA documents.

- EPA stated in its five-year plan that it must develop and implement innovative, effective and efficient approaches to environmental protection. Two guiding principles in the plan are pollution prevention and creating partnerships. EPA works to prevent pollution by developing voluntary programs with the private sector. EPA creates partnerships with Federal, tribal, state, and local agencies; Congress; private industry; public interest groups; and citizens; to develop the technology and capacity for carrying out environmental programs and policies.

- EPA's Customer Service Plan states that the ultimate success in serving the public depends on how effectively its programs work with and influence the actions of the many other parties that are responsible for protecting the environment. EPA recognized the growing importance of voluntary programs and identified them as a core process for serving its customers.

- A report by EPA's Science Advisory Board, *Reducing Risk: Setting Priorities and Strategies for Environmental*

Protection, September 1990, recommended that EPA make greater use of all the tools available to reduce risk, including the sharing of information. The exchange of information can facilitate the wider use of cost-effective pollution prevention strategies.

- The Climate Change Action Plan called upon EPA and other Federal agencies to foster cooperative approaches to environmental protection with the private sector through partnerships, rather than relying exclusively on command-and-control mandates that tend to lock technologies into place and stifle innovation.

ENVIRONMENTAL BENEFITS OF VOLUNTARY PROGRAMS

The Radon and ENERGY STAR programs were effective in achieving environmental benefits by using several good management practices discussed in Chapter 3. The programs developed ways to estimate environmental results, as discussed in Chapter 4, and used the measurements to report their progress and make adjustments in program implementation. The voluntary programs provided evidence of their environmental results.

Programs provided evidence of environmental results.

- The Office Equipment program had transformed a significant percentage of the markets to ENERGY STAR by the end of 1995. This resulted in estimated savings of 2.3 billion kilowatt hours of electricity and 1,300 pounds of carbon emissions (.6 Million Metric Tons of Carbon Equivalents (MMTCE)) for 1994 and 1995.

- Studies in 1994 by the Conference of Radiation Control Program Directors (CRCPD) showed that in high radon areas, radon awareness was at 78 percent and testing was at 13 percent.

Since energy-efficient measures provide tangible benefits, such as cost savings, it is reasonable to question why they are not widely implemented in the marketplace without Federal Government intervention. In a 1991 report on global change, the Office of Technology Assessment (OTA), noted that uncertainty and the

EPA serves as a catalyst to help consumers overcome barriers.

lack of information were key barriers to greater investment in energy conservation in buildings. The large number of highly cost-effective investments in energy efficiency that are not chosen by consumers indicated that price alone did not stimulate optimal investment decisions. Barriers such as lack of information prevent full implementation of cost-effective energy efficiency measures.[1] Therefore, OTA recommended that information dissemination be a key element of any U.S. global change policy option. The ENERGY STAR programs disseminate needed information and serve as a catalyst to help consumers overcome the barriers to energy-efficiency.

Changing consumer behavior provides lasting environmental results.

Changing consumer behavior is a goal of EPA's voluntary programs. When changing consumer behavior results in lasting environmental results, market transformation has occurred. Market transformation, as discussed in Chapter 5, is the process whereby innovations are introduced into the marketplace and are increasingly accepted by the market.

The role of voluntary programs is to encourage the manufacture and consumers' acceptance of risk reduction innovations in the marketplace. By changing consumer behavior and effecting a market transformation, voluntary programs achieve lasting environmental results and reduced health risks. As the market is transformed by new environmental innovations, EPA will be able to reduce its program support and allocate its resources to other products or programs.

By developing ways to estimate environmental results and using good management practices, the voluntary programs achieved environmental benefits and reduced health risks. The programs demonstrated that they can be an effective tool for reducing risk and achieving environmental benefits.

[1] Howard Geller and Steven Nadel, "Market Transformation Strategies to Promote End-Use Efficiency" American Council for an Energy-Efficient Economy, 1994.

CHAPTER 3
Good Management Practices

Management of voluntary programs is largely influenced by their mission: educate people about a problem, and get them to act on it. The Radon and ENERGY STAR programs demonstrated several good management practices that, based on EPA statistics, helped reduce health and environmental risks.

- Planning
- Educating people about incentives
- Providing quality support
- Working with outside organizations
- Obtaining commitments
- Evaluating progress and making adjustments

These management practices enabled the programs to achieve environmental benefits of energy savings, pollution reduction, and reduction in radon exposure, as discussed in Chapter 4. In developing and implementing these programs, EPA addressed the barriers to action and helped provide the information and motivation needed to get its program participants to act. We believe other EPA offices should, where applicable, use these management practices when developing voluntary programs.

PLANNING PROCESS

Planning focused on results.

Whether a program is voluntary or mandatory in nature, good planning increases the likelihood that it will achieve the intended results. For mandatory programs, the planning, goals, and objectives are influenced by what is in the laws and regulations. When there are few or no laws and regulations to guide a program, the planning process becomes critical. For the Radon and ENERGY STAR programs, important components of the planning process were (1) evaluation of scientific, technical, and economic issues; (2) establishment of goals and objectives; and (3) development of strategies for meeting the goals and objectives. Program personnel used the strategies to identify the activities that were needed to implement the program.

According to the American Management Association, planning is the process of formulating objectives and developing strategies to achieve them. The following steps are generally included in corporate planning models:

- establish premises or assumptions;
- formulate objectives or results to be achieved;
- develop and evaluate different courses of action, weighing positive and negative outcomes;
- select a particular course of action;
- determine how the plan will be implemented;
- review the plan for feasibility and internal consistency prior to implementation; and
- commit resources to implement the plan.

ENERGY STAR Homes

Through planning, the ENERGY STAR Homes program increased the likelihood of achieving its goal of the construction of more energy-efficient homes, thereby reducing electricity, natural gas, and oil usage and the resulting greenhouse gas emissions. To reach its goal, EPA analyzed the available technologies, developed yearly plans for achieving the goal, and identified areas of the country to target its marketing effort.

Studied options for achieving significant energy savings.

- The Homes program looked at the options available for implementing the program. To do this, the program analyzed studies of the different technologies that were available for making homes more energy efficient. These studies were from other EPA offices, and external organizations such as the American Society of Heating, Refrigeration, and Air-conditioning Engineers; DOE; Energy Information Administration (EIA); and the American Council for an Energy-Efficient Economy. The program found that there was a potential to achieve significant energy savings with existing technologies.

- The program developed yearly plans to meet its goal to have 10 percent of new homes built in the year 2000 meet

the ENERGY STAR guidelines for efficiency.[2] These plans included the activities, due dates, resources needed to complete the activities, and measures for evaluating progress. (See Exhibit 2 for an example.)

- The Homes program identified 18 states with the highest potential for building energy efficient homes. The program considered factors such as the number of new home starts in 1994, utility costs, types of heating fuel (electricity, gas or oil), availability of an energy rating system, and the frequency of heating and cooling use. The program focused its initial outreach efforts in those 18 states.

Radon

Developed a strategy for addressing radon issues.

The goal of the Radon program is to reduce exposure to indoor radon. In order to meet this goal, the program studied the causes and effects of radon, technology to mitigate radon, other public health programs, and alternatives for communicating radon risk. In 1993, the program refined their strategy for addressing radon issues. The 1993 strategy was used to develop yearly workplans and to prioritize activities.

- The Radon program researched the radon problem to determine the extent of the problem and how best to correct it. The program supported research covering the health effects of radon, radon testing techniques, ways to reduce radon levels in homes, and methods to inform and enable the public to reduce its exposure to radon. This research was used to analyze different approaches for the Radon program and select the most cost-effective means of reducing risk.

Studied other public health programs.

- In developing options for implementing the program, the Radon program studied other public health programs, such as the seat belt and anti-smoking campaigns. From these programs, EPA learned that changing human behavior

[2] ENERGY STAR homes use 30 percent less energy than a standard house, as defined in DOE's Voluntary Residential Energy Efficiency Rating Guidelines.

only came from strong national and local networks delivering consistent information. Therefore, in developing its approach to addressing radon, the program collaborated with state governments and many national organizations, such as the American Lung Association and National Safety Council, to communicate the risks of radon and to promote actions that consumers can take to identify and reduce the risks.

- In developing the 1993 strategy, EPA obtained extensive comments from state and local governments, the scientific community, Federal agencies, health organizations, consumer groups, and others. This resulted in the identification of the most effective strategies for implementing the program and extensive buy-in from important stakeholders.

EDUCATING PEOPLE ABOUT INCENTIVES

Incentives increase the rate of adoption.

Educating people about incentives is an effective way to get people to act, especially when just information about the problem is not enough to get the desired action. Financial and market incentives are strong motivators for consumers and corporations. The more value corporations and consumers place on the incentives, the higher the rate at which they will take the desired action, thereby decreasing risk. In the Energy Star programs, EPA educated the public about advantages of adopting energy efficiency measures through use of a logo on qualifying products and by providing information about the financial benefits that arise through adopting energy efficiency measures. Radon program partners provided free or reduced price test kits and other incentives, such as rebates on new home construction fees.

ENERGY STAR

The ENERGY STAR labeling programs seek to change consumer behavior with the ENERGY STAR logo. The logo indicates that a product meets EPA's specifications for energy-efficiency. The logo provides an incentive to program participants by offering an environmental label that identifies products that save energy and money and help preserve the environment. Program participants that offer cost-effective and energy-efficient products have an

opportunity to gain a marketing advantage over competitors that do not offer similar energy-efficient products. However, consumers need to understand what the logo represents before they will change their behavior. EPA's role is to instruct the public about the logo and increase consumer awareness of the energy-saving products and benefits.

The ENERGY STAR Buildings program shows building owners and operators how to take advantage of the significant dollar savings available from energy efficient building upgrades. The program's goal is to attain a 30 percent energy savings through building upgrades. A case study of one of the ENERGY STAR Buildings Showcase buildings reported annual energy cost savings of $90,000, or 39 percent of total energy costs, and a 59 percent internal rate of return on its investment in upgrades. For program participants, cost savings was the main incentive for joining the program. In spite of the significant dollar savings and high rate of return on investment, the program found that the largest barrier to energy-efficient upgrades is building owners' and managers' resistance to budgeting the required funds. To help overcome this barrier, EPA provides building owners and managers with information about the cost benefits of upgrades. EPA also developed a scheduling tool to help owners plan and budget the building upgrades.

Radon

The Radon program works with its partnership network to use incentives as a means of encouraging public action and risk reduction on radon. Many Radon program community based partners provide free or reduced price test kits and other incentives, such as rebates on new home construction fees.

- In East Moline, Illinois, a city health department employee received radon training and support as part of the cooperative agreement with the National Environmental Health Association. After completing the training, the employee decided to pursue an incentive-based program for encouraging radon resistant new construction in East Moline. The City Council passed a resolution granting a rebate of $150 on the fee that the city assesses for new

homes, if they are built radon resistant. Since the rebate program was begun in June 1994, all but one or two of the new homes had been built radon resistant.

PROVIDING QUALITY SUPPORT

One of EPA's key roles in voluntary programs is to provide support and be a facilitator to those who are acting to reduce risks to their health or the environment. In EPA's 1995 Customer Service Plan, two of the eight customer service standards for voluntary programs directly address EPA's commitment to provide quality support:

- We will proactively provide our customers accurate, up-to-date, and reliable information, products, and services, including high quality documents and publications.
- We will actively listen to our customers' concerns and needs regarding services and will develop technical assistance services designed to address those needs and concerns.

Information, products and services meet the needs of customers.

The Radon and ENERGY STAR programs facilitate action by providing (1) information, (2) tools to aid the decision making process, and (3) training sessions. To ensure that the support met the needs of participants and consumers, EPA used focus groups to identify their needs. After identifying customer needs, the programs produced several types of support to program participants:

- public education efforts to increase consumer awareness,
- assistance in determining what action was needed to reduce risk, and
- training on the program so that they could assist EPA in disseminating information about the program.

ENERGY STAR Buildings

Quality support helps overcome barriers.

The ENERGY STAR Buildings program met in focus groups with representatives of companies that had commercial buildings and identified barriers to upgrading building systems. To help program participants overcome their barriers, EPA offered several

support tools, such as the ENERGY STAR Buildings Manual with recommended building upgrade strategies. Since the program is based on energy-saving technology, it was important to provide customers with the technical information needed to complete building upgrades.

WORK WITH OUTSIDE ORGANIZATIONS

Due to the Agency's limited resources, voluntary programs need to use outside organizations to get consumers and corporations to take a desired action, whether it is testing for radon or buying energy efficient computers. In many voluntary programs, EPA is trying to reach a large number of people but cannot accomplish the task on its own. There are organizations, both government and non-government, that are interested in achieving the same environmental goals. EPA needs to work with these other organizations to meet their common goals.

Radon

Resources from outside organizations help EPA reach more people at less cost.

Outside organizations are a key component in the Radon program's strategy for communicating the message about radon to the public. EPA found that it needs to provide a clear definition of its mission and a clear message for the outside organizations to communicate to others. The strategy recognized that different people respond to information messages from different sources. The Radon program recognized that it should not be the sole source for communicating radon risks for several reasons.

- EPA messages on radon had a limited effect on many audiences.
- Informational materials produced by bureaucracies were often untimely and generic, reducing the number of audiences they reached.
- EPA had only a few effective channels for sending out radon information to the public.
- Other sources were more closely associated with target audiences, which put them in a better position to evaluate the success of communication efforts.

By leveraging resources, a small amount can be used to achieve substantial results. For example, the Radon program works with Consumer Federation of America (CFA) to produce public service announcements (PSAs). The advertising company that prepares the PSA and the television stations that play the PSA donate their services. Therefore, the only cost to EPA is the cooperative agreement. Over the last six years, the cooperative agreements for PSAs have cost EPA about $2.28 million. EPA estimated the cost of the donated time to be $118.7 million. The PSAs resulted in increased consumer awareness and phone calls to the radon hotline.

Similarly, the Radon program sustains a comprehensive network of over 550 state and local community based risk reduction programs. These state and local affiliates of national Radon program partners conduct local radon media campaigns, provide targeted education to homebuilders, urge state and local adoption of radon resistant building code changes, and secure commitments from real estate agents and associations to disclose radon information in home transfers. National, state, and local Radon program partners draw extensively on their own resources and infrastructure in doing this work. EPA's investment through cooperative agreements with national organizations in recruiting, training, supporting, evaluating, and refining the more than 550 community-based risk reduction programs is only about $2.5 million annually.

ENERGY STAR

Work with other federal agencies and outside organizations.

The ENERGY STAR programs used outside organizations to help program participants achieve their goals and to help promote energy efficiency to a larger audience. While historically EPA and DOE administered separate programs in the areas of environment and energy, today they are coordinating their programs. For example, the ENERGY STAR Office Equipment program is coordinating its efforts with DOE in marketing energy-efficient retail products, to leverage their resources and meet their common goals.

The ENERGY STAR programs also work with people or organizations, referred to as allies, who provide the program participants with products or services that help them achieve their energy-reduction goals. These organizations voluntarily work with EPA to promote and endorse the ENERGY STAR programs and recruit new participants. For example, ENERGY STAR Buildings allies provide lighting systems, energy management systems, windows and films, energy-saving services, financial services, and consulting to participants. Homes allies provide home energy inspections, promote the program to builders and developers, and recruit home builders as participants in the program. These organizations assist EPA in meeting ENERGY STAR goals by disseminating program information to a larger number of people.

OBTAINING COMMITMENTS

Voluntary programs such as ENERGY STAR and Radon rely upon citizens and corporations to voluntarily take action to reduce risk to their health and the environment. Gaining commitments increases the likelihood that action will be taken. The ENERGY STAR programs use memorandums of understanding (MOUs) to obtain commitments to reduce energy usage. The Radon program obtains commitments from its partner associations to communicate radon risks and urge public action.

Commitments increase the likelihood of risk reduction.

The report *Market Transformation Strategies to Promote End-Use Efficiency* commented on the benefits of voluntary commitments:

> Some companies and agencies are willing to make voluntary commitments to implement energy-efficiency measures in order to obtain recognition and other benefits. Programs that promote such voluntary commitments can accelerate the market introduction of new technologies and/or can stimulate consumers to increase implementation of cost-effective efficiency measures.[3]

[3] Howard Geller and Steven Nadel, American Council for an Energy-Efficient Economy, 1994.

ENERGY STAR

In addition to getting voluntary agreements from participants, the ENERGY STAR programs use commitments to provide direction to the participants for the types of actions to be taken. Commitments increase the likelihood that the programs will be completed.

The ENERGY STAR Buildings MOU describes the specific agreed-upon actions and time frames. By providing clear directions with the terms of the commitment, EPA increased the likelihood that participants would take action. Program participants commit to upgrading one pilot building within two years. They also commit to completing within seven years:

- all profitable lighting upgrades in a minimum of 90 percent of eligible facility space, and
- all profitable heating, ventilation, and air conditioning (HVAC) upgrades in a minimum of 50 percent of eligible facility space.

The commitment process addresses the largest barrier to program success: committing funds for investment in energy efficiency.

Radon

The radon training program prepared participants to make their own radon presentations in different types of outreach activities. EPA asked the participants to commit to specific approaches to promoting action on radon, such as running a radon hotline, supplying discount-priced radon test kits, speaking at community meetings, providing education and outreach to the real estate community, and urging adoption of state and local radon resistant building codes.

EVALUATING PROGRESS AND MAKING ADJUSTMENTS

Evaluating progress and making adjustments is as important to the planning process as establishing goals and objectives. In order to evaluate progress, programs need to establish quantifiable and measurable goals; obtain information to measure progress; regularly evaluate progress; and be flexible to make adjustments in program implementation. The Radon and ENERGY STAR

Programs achieve results by evaluating progress and making adjustments.

programs evaluated progress and made adjustments to program activities as needed.

Modern management techniques require three elements: (1) a plan that states the goal, (2) a method of achieving the goal with ways of monitoring progress, and (3) a series of comparisons to be performed periodically. Since plans are based on assumptions about the future, it is important to have a process that helps anticipate, detect, identify, and measure deviations from anticipated results.

Radon

The Radon program used the results of OPPE's 1992 review to determine if changes were needed in its program strategy. Prior to the review, the program's strategy was to rely on providing public information to increase radon awareness and testing. OPPE's review concluded that while the program had made some progress in increasing radon awareness and testing, providing public information would not, by itself, be sufficient to cause significant long-term risk reduction. OPPE encouraged stronger actions, such as requiring radon testing in real estate transactions and building new homes radon resistant. OPPE recommended that the Radon program focus its efforts on high risk areas. The Radon program agreed that changes were necessary and, therefore, made adjustments using the review as the basis for its new 1993 radon strategy.

The Radon program also used the results of the CRCPD study to adjust its program activities. For example, the program learned from the 1993 CRCPD study that Hispanics were the ethnic group least likely to have heard of radon. To address this need, the Radon program began working with the National Coalition of Hispanic Health and Human Services Organizations to raise awareness and increase testing for radon in Hispanic communities. The coalition established a Spanish-language radon hotline and prepared a Spanish adaptation of *A Citizen's Guide to Radon.* These actions caused a marked increase in awareness among Hispanics from 27 percent in 1993 to 47 percent in 1994. By evaluating its progress and targeting high risk areas, the Radon program effectively increased radon awareness.

CONCLUSION

Good management does not guarantee program success, but it does increase the likelihood that a program will achieve its goals and desired results. Although the Radon and ENERGY STAR programs are trying to achieve very different results, each program has a number of common management practices. As other EPA offices begin to plan and implement voluntary programs, they should consider the lessons learned by the Radon and ENERGY STAR programs.

CHAPTER 4
Estimating Environmental Results

Measuring environmental results is important to good management.

The ENERGY STAR and Radon programs effectively estimated the impact their activities had on reducing risks to health and the environment. These estimates were based on information from both EPA and outside sources. As a result, the programs were able to (1) evaluate their progress, (2) measure their performance against their goals, and (3) make adjustments to better achieve their goals.[4] Future voluntary programs could benefit from using similar measurement techniques.

While environmental results are the goal of EPA programs, estimating those results is often difficult.

An important measure of success for any EPA program is how well it protects and improves human health and the environment. This measurement is particularly true for a voluntary program, since it would be difficult to continue funding a program not required by Congress that is not achieving measurable risk reductions. Nevertheless, it is difficult to directly attribute changes in the environment to a particular statute, regulation, or program. The Radon and ENERGY STAR programs focus on measuring activities that have a direct effect upon the environment and public health. The ENERGY STAR programs promote energy savings in the public and private sector, and estimate environmental results as reductions in greenhouse gas emissions. The Radon program estimates benefits to human health by the extent of radon awareness, testing, and mitigation in homes.

ENERGY STAR PROGRAMS

The Climate Change Action Plan includes many programs to reduce greenhouse gas emissions to 1990 levels by the year 2000, including the ENERGY STAR programs. EPA established annual performance targets for the ENERGY STAR programs to meet CCAP goals. Accordingly, the programs estimate environmental results in terms of greenhouse gas emissions reductions.

[4] See Chapter 3 for an example of how the Radon program evaluated its progress and made adjustments.

Environmental results are estimated in terms of reduction in greenhouse emissions.

The calculation of environmental results involves two steps: (1) estimating energy savings, and (2) converting energy savings to emission reductions.

The Office Equipment program developed formulas to calculate energy savings from energy-efficient computers and office equipment. The program uses industry statistics to determine the percent of office equipment sales that are energy-efficient. DOE provides information on energy use of office equipment. In calculating total energy savings, the program considers: (1) number of energy-efficient computers sold, (2) percent of computers with the ENERGY STAR feature activated, (3) amount of time that computers are in use and in a power down mode that uses less energy, and (4) the price of electricity. (See Exhibit 3 for additional details on how the program estimates environmental benefits.)

EPA used standard conversion factors from sources such as the EIA to convert the energy savings to emissions reductions. Using the conversion factors, EPA calculated the yearly pollution prevented in terms of MMTCE.[5]

The ENERGY STAR programs report annually their results against the CCAP targets. Table 1 presents the Office Equipment program's energy savings and emission reduction achievements for 1994 and 1995, and the target for 2000.

[5] MMTCE refers to million metric tons of carbon equivalent, a standardized measure of greenhouse gas reductions that accounts for the relative contributions of each gas to global warming over a 100-year period.

Table 1: ENERGY STAR Office Equipment Environmental Benefits

	Annual Energy Savings (Billion kilowatts per hour)		Greenhouse Gas Emission Reductions (MMTCE)	
	Target	Actual	Target	Actual
1994	0.2	0.3	0.1	0.1
1995	2.4	2.0	0.6	0.5
2000	24.0		6.0	

The annual targets for energy savings and emissions reductions are low in the early years of the program when consumers are beginning to accept the energy-efficient products. After the early years, the targets were set higher due to the expected rapid acceleration of a market transformation to energy-efficiency. (See Chapter 5 for further discussion of market transformation.)

The ENERGY STAR Buildings and Homes programs did not have achievement targets during their development stage in fiscal 1994 and 1995. Starting in fiscal 1996, they began reporting energy savings and risk reductions achieved through program activities. The ENERGY STAR Buildings program will estimate the energy saved and emission reductions from energy-efficient building improvements by analyzing the actual energy reports from program participants. The ENERGY STAR Homes program will estimate the energy saved and emissions reductions based on the number of actual homes built as reported by builders.

RADON PROGRAM

Levels of radon testing and mitigation used to estimate environmental impact.

The Radon program estimates environmental results through increases in radon awareness, testing, and mitigation. The program uses information from the Conference of Radiation Control Program Directors' (CRCPD) Radon Risk Communication and Results Study to measure the levels of public awareness, radon testing, and radon mitigation. The results for 1993 and 1994 are

presented in Table 2.[6] (See Exhibit 3 for additional details on the study scope and methodology.)

Table 2: CRCPD Radon Risk Communication and Results Study

Level of Public	National			High Radon Potential Areas		
	1993	1994	Targets 2000	1993	1994	Targets 2000
Awareness	67%	73%	75%	77%	78%	90%
Testing	8.6%	10.3%	31%	12.7%	12.5%	57%
Mitigation		2%	13.5%		2%	20%

Educating people and convincing them to change their behavior for any health promotion campaign is difficult. The experience of other national health promotion efforts like anti-smoking or seat belt campaigns shows that societal behavior change is gradual. The Radon program has made consistent, steady progress in increasing public awareness and testing on radon from essentially zero in 1986 to the levels shown in Table 2.

Program officials believe that their current strategy of targeting high radon areas for communicating radon risk will result in increased levels of testing. Radon program officials stated that sustained awareness is needed to affect consumer action. Testing rates in east coast states, which are as high as 25 percent, are generally higher than in west coast states. The radon problem was found in the East, and consumers in those states have been aware of the problem for a longer period of time. The experiences of these Eastern states suggest that at least comparable radon results could be achieved in the rest of the nation.

[6] In 1995, the program went to a survey over two years, and the 1996 results are not yet available.

CONCLUSION

The ENERGY STAR and Radon programs developed ways to estimate environmental results and reduced health risks. This enabled the programs to calculate their achievements, monitor and report their progress, and evaluate their effectiveness. Other EPA programs could benefit from using similar measurement techniques.

CHAPTER 5
Improvements Needed

Although we noted several good management practices in the Radon and ENERGY STAR programs, some improvements are needed. The ENERGY STAR programs should improve their:

- documentation of the planning process,
- definition of market transformation, and
- maintenance of EPA logo integrity.

The Radon program should improve the accuracy of reporting its results.

IMPROVING DOCUMENTATION OF THE PLANNING PROCESS

While the ENERGY STAR programs had a good planning process, they can improve how they document the process. Documentation of the planning process serves to (1) clearly communicate to all parties what is expected of them, (2) provide a framework for evaluating progress, and (3) provide support for decisions made during the planning process. The documentation should also be filed in a way that prevents loss.

The ENERGY STAR programs documented their overall goals and supplemented them with detailed annual goals and activities. The programs used the documents primarily as planning and tracking tools. The programs need additional types of documentation to fully support their planning processes. The information would also be useful when planning other voluntary programs.

- The ENERGY STAR programs need to improve documentation of the steps they followed during the planning process, including (1) assumptions that the programs made, (2) the different alternatives for implementing the program that were considered, and (3) the courses of action selected and the reasons for their selection. The documentation should be prepared before program implementation and should be revised when the

approach to the program significantly changes. This type of documentation would (1) support the decisions made during the planning process, (2) aid the understanding of those who were not involved in the planning process, and (3) explain the program's approach for the benefit of other voluntary programs.

- Although the ENERGY STAR programs evaluated their progress toward meeting goals throughout the year, a written year-end evaluation of progress would strengthen program controls. The evaluation should include a comparison of goals and objectives with actual accomplishments and any changes to program implementation that are needed. A year-end evaluation (1) makes management accountable for meeting goals and objectives, (2) provides the basis for annual reports on program accomplishments, and (3) supports decisions made regarding changes to program implementation.

- The information on program goals, objectives, and strategies was maintained in employees' offices. However, filing in employees' offices may result in loss of information when an employee leaves the program and makes the information less accessible. The program should consider filing information such as (1) documentation of the planning process, (2) long and short term goals and objectives, and (3) year-end evaluations, so that it is not lost and is more accessible.

Recommendations

We recommend that the Director, APPD, require the ENERGY STAR programs to:

5-1. document the planning process when developing future programs,

5-2. prepare written year-end evaluations, and

5-3. file program information in a way that makes it readily available and prevents loss.

Agency Actions

The Assistant Administrator, in responding to the draft report, agreed with our recommendations and stated APPD had taken, or will take the following actions.

1. Future annual business plans, depending on program maturity, will include such things as a market analysis, technical analysis, marketing plan and evaluation plan.

2. Issue, by June 1997, an annual report for fiscal 1996 that will include a year-end of evaluation of each program's accomplishments and budget evaluations.

3. In a memorandum dated January 7, 1997, the director of APPD instructed program managers to take actions to ensure that key program documents are accessible and do not become lost.

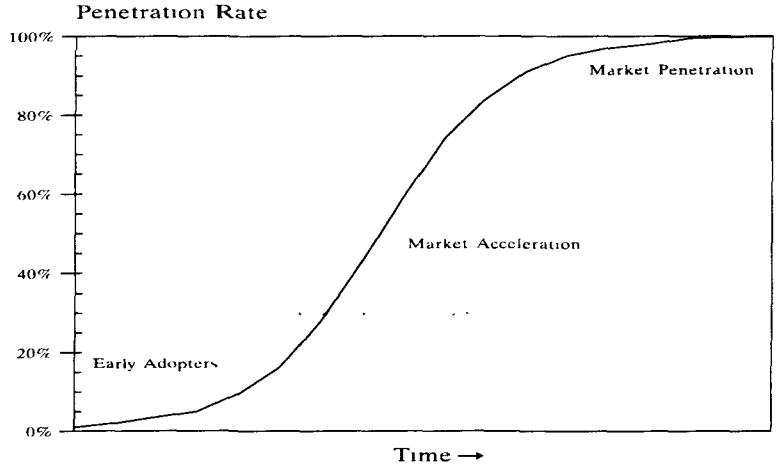
OIG Evaluation

The Agency's actions, when implemented, will address our finding and recommendations.

DEFINING MARKET TRANSFORMATION

The ENERGY STAR programs use market transformation as a tool to reach their emission reduction goals. Market transformation is the process whereby innovations are introduced into the marketplace and are increasingly accepted by a large portion of the market. The ENERGY STAR programs attempt to transform their markets from non-energy-efficient products to energy-efficient products. Market transformation can be visualized in terms of the S-shaped curve shown in Table 3.

Table 3: Market Transformation Curve



When a new product or innovation is introduced, its acceptance by consumers, or market penetration, begins to rise through early adopters. During the early years, consumer acceptance rises slowly. Over the next several years, more consumers begin to purchase energy-efficient products as the public becomes more aware of the technology and its advantages. The market penetration rate increases rapidly until most of the consumers have adopted the innovation. Achieving the last increments of market penetration occurs more slowly. The incremental cost of achieving market penetration is higher in the final stages than in earlier stages because the diminishing rate of penetration causes a smaller return on the incremental investment.[7]

EPA's Role in Market Transformation

EPA's role in market transformation is to encourage the manufacture of energy-efficient products and increase consumer awareness of energy-efficient products and their benefits. EPA serves as a catalyst to help start the market transformation process and build its momentum. Promoting a product or idea requires a higher amount of resources in the early years to build the

[7] Information on market transformation was obtained from *Market Transformation Strategies to Promote End-Use Efficiency*, by Howard Geller and Steven Nadel, American Council for an Energy-Efficient Economy, 1994.

momentum of public acceptance than in the later years when it reaches acceptance. When market transformation of a product occurs, the product will remain in demand in the marketplace without the same level of support from EPA. EPA should determine the point during market transformation to reduce its program support and allocate its ENERGY STAR resources to other products or programs.

Although the ENERGY STAR programs had considered the consequences of market transformation, they did not have written plans for adapting to it. EPA should consider the following in developing these plans.

- At what point, in terms of market penetration, can EPA reduce its program support?
- What level, if any, of continuing support for the program will be needed as market penetration increases?
- Who will provide the continuing program support, EPA or another organization?
- If another organization will provide continuing support, what transition activities and time frame will be required for EPA to transfer program control?

While a market may be sufficiently transformed for EPA to reduce its involvement, there are other reasons for EPA to devote resources to achieving further risk reductions. The ENERGY STAR programs also consider:

- new technology making further pollution reduction possible,
- new scientific data on greenhouse gases requires more aggressive efforts to meet CCAP goals, and
- changes in the economy may increase the amount of energy usage and the generation of greenhouse gases.

While there are many factors that affect when EPA can reduce its program support, preparing written plans can be valuable. There is a tendency for any established program to continue operating after it has reached its goal and completed its mission. Written plans would serve as an internal control to prevent the continuation of an ENERGY STAR program when it is no longer achieving significant environmental benefits. Without this control mechanism, the ENERGY STAR programs might continue to operate after market transformation, when resources could be better used in other programs..

Recommendations

We recommend that the Director, APPD, require the ENERGY STAR programs to:

5-4. develop written plans to define a target level for market transformation, and

5-5. establish plans to phase out EPA's program support after the target is reached.

Agency Actions

The Assistant Administrator, in responding to the draft report, agreed with our recommendations. Starting with the next update of the annual business plans for each program, which will be before December 1997, the plans will address market transformation objectives and appropriate exit strategies. In developing the exit strategies, the program will consider (1) whether the market is stable or fast changing, and (2) if there is cost effective potential to push for further energy saving advancements.

The Assistant Administrator provided an example of how APPD has considered market transformation and exit strategies for the ENERGY STAR Homes program. The program plans to continually reduce EPA's program support, including a significant phase out of program resources, after a 10 percent market penetration level has been reached. This level was identified as a critical point for reducing program support because over 100 mid-size and large builders are expected to be profitably producing ENERGY STAR

homes at that time. Based on historic market shifts led by preeminent, successful builders to new technologies and features, the program believes that the success of these builders will facilitate a shift to the steep slope of the diffusion curve. EPA's support will evolve from direct and frequent contact with many builders to interactions through fewer program allies. EPA will organize most of the continuing support for the program through its network of program allies. EPA expects that this transition will significantly reduce the need for government resources to support the program. EPA will yearly reevaluate the specific market penetration targets and timing in light of actual program and market performance, and adjust the program plan accordingly.

OIG Evaluation

The Agency's actions, when implemented, will address our finding and recommendations.

MAINTAINING ENERGY STAR LOGO INTEGRITY

The ENERGY STAR Office Equipment program's practice of allowing manufacturers to self-certify their products for ENERGY STAR compliance might not preserve the integrity of the logo. As consumer demand for ENERGY STAR products increases, there will be increasing pressure on manufacturers to provide these products. There will also be increased potential for misuse of the ENERGY STAR logo.

EPA created the ENERGY STAR logo to recognize achievement of its energy-efficiency specifications. EPA provides guidance for product testing and requires computer and office equipment manufacturers to test their products for ENERGY STAR compliance. The MOU manufacturers sign sets out the requirements for power usage. EPA also provided additional guidance which discusses how to measure power usage, specifications for testing equipment, and other testing issues.

EPA does not certify the products for meeting ENERGY STAR requirements because it considers that effort to be too costly and time-consuming. Instead, EPA allows the manufacturers to self-certify their products, following the MOU and additional guidance. EPA believes this is sufficient because in the computer

industry, manufacturers may test their competition for ENERGY STAR compliance. EPA does monitor how companies use the logo in advertising.

Use of the logo on products that do not meet ENERGY STAR requirements may degrade the value of the logo and negatively impact the ENERGY STAR program. According to an EPA report on labeling, successful acceptance of a product certification program depends on an accurate and clearly understood presentation of the product attributes.[8] Misuse of the logo also may cause ENERGY STAR compliant products to lose any competitive edge the logo provides.

EPA is expanding the number of products that will use the ENERGY STAR logo to identify energy efficiency. In 1996, DOE and EPA agreed to work jointly on the ENERGY STAR Retail Program to educate retailers and consumers. DOE will use the ENERGY STAR logo on appliances, and EPA will use it on office equipment, and HVAC equipment. The joint retail program will expand the range of products carrying the ENERGY STAR logo to increase consumer exposure and recognition. As use of the logo expands and consumer recognition increases, the potential for misuse increases. EPA needs to consider whether controls on the use of the logo may be needed in the future.

Recommendation

5-6. We recommend that the Director, APPD, require the ENERGY STAR programs to consider the need for additional efforts to maintain ENERGY STAR logo integrity, as the program applies the logo to new products.

Agency Actions

The Assistant Administrator, in responding to the draft report, agreed with our recommendations and described actions APPD has taken, or will take, to protect the integrity of the ENERGY STAR logo.

[8] EPA Office of Pollution Prevention and Toxics, *Determinants of Effectiveness for Environmental Certification and Labeling Programs*, April 1994.

The ENERGY STAR name is already a registered service mark, and APPD is working with the Office of General Council to register the ENERGY STAR logo. These registrations provide a strong legal basis to pursue entities who may misuse the logo. APPD is considering whether random spot testing of labeled products would be warranted to ensure logo integrity. This analysis will be completed in 1997, and if testing is deemed necessary, it would likely begin in late 1997 or 1998.

The ENERGY STAR Buildings program allows allies and program participants to use the logo. APPD will issue logo use guidelines for allies by May 1997. Program participants must receive approval from EPA before the logo can be used on a building. Program participants can also use the logo on reports and letterhead, but EPA has not experienced problems with misusing the logo in this way.

EPA ensures the integrity of the ENERGY STAR logo on homes through allies which provide quality assurance and warranty programs.

OIG Evaluation

The Agency's actions, when implemented, will address our finding and recommendations.

REPORTING RADON RESULTS

The Radon program was not reporting its progress clearly because they did not explain the statistic for high radon areas. A program must report its progress accurately in order to effectively estimate its accomplishments against its goals.

The Radon program adopted a policy in its 1993 program strategy of targeting the greatest risks first to reduce exposure to radon in high radon potential areas. EPA surveyed the entire country and identified those areas where radon levels were most likely to be elevated. The result of the survey was the radon potential map, which placed all U.S. counties into one of three zones, as shown in Table 4.

Table 4 Radon Zones

Zone	Average Predicted Screening Level Picocuries per Liter (pCi/L)
1	Greater than 4
2	Between 2 and 4
3	Less than 2

When reporting program progress, the Radon program reports statistics on a national basis and for high radon areas (Zone 1). The Radon program reports the statistic for high radon areas to demonstrate that the program is targeting high risk areas first. However, the reported statistic for high radon areas includes more areas than zone one. The statistic includes other areas designated as high risk by twelve states that have no zone one areas. EPA did not describe this reporting methodology in the Radon program reports.

The report statistic might mislead readers who are unfamiliar with the reporting methodology. Those readers might not understand that the statistic includes some areas that are not zone one areas. Without a clarification of the statistic, the Radon program is not accurately reporting its results.

Recommendation

We recommend that the Director, IED, require the Radon program to either:

5-7. clarify in its reports what the statistic for high radon areas represents, or report only zone one areas in the high radon areas statistic.

Agency Action

The Assistant Administrator, in responding to the draft report, agreed with our recommendation. IED agreed to clarify what the statistic for high radon areas represents in all future reports and information on radon results.

OIG Evaluation

The Agency's actions, when implemented, will address our finding and recommendation.

Exhibit 1
Page 1 of 1

CCAP Actions and Supporting EPA Programs

Action Number	Action Name	EPA Program
1	ENERGY STAR Buildings	ENERGY STAR Buildings
2	Green Lights	Green Lights
6	Golden Carrot Partnerships: (Offer financial incentives for the development of more efficient appliances)	ENERGY STAR Office Equipment ENERGY STAR Homes ENERGY STAR HVAC
16	Accelerate Source Reduction, Pollution Prevention, and Recycling	Waste Wise
19	Employee Parking Cashout	Commuter Choice/Parking Cashout
20	Increase Transportation System Efficiency	Transportation Partners
24	Encourage Seasonal Gas Use for Controlling Nitrous Oxide	Seasonal Gas Use for the Control of Nitrous Oxide
30	ENERGY STAR Transformers	ENERGY STAR Transformer
32	Natural Gas Star	Natural Gas Star
33	Increase Stringency of Landfill Rules	Landfill Methane Outreach
34	Expand Landfill Outreach Program	Landfill Methane Outreach
35	Coalbed Methane Outreach Program	Coalbed Methane Outreach
38	Partnerships with Livestock Producers	AgSTAR
39	Improve Ruminant Productivity and Product Marketing	Ruminant Livestock Methane
40	Reduce Emissions of High Global Warming Potential Chemicals	CFC (Chlorofluorocarbon) Substitutes
41	Partnerships with HCFC-22 and HFC-23 Producers	HFC-23 Reductions
42	Partnerships with Aluminum Producers	Voluntary Aluminum Industrial Partnership
	Umbrella Program for CCAP Initiatives	Climate Wise
	State and Local Outreach	State and Local Outreach
	Joint Implementation - Cooperative Projects among Countries	U.S. Initiative on Joint Implementation

ENERGY STAR Homes Business Plan

The ENERGY STAR Homes program developed yearly plans to meet its program goals for number of ENERGY STAR Homes constructed. As shown below, the yearly plans included subgoals, activities, resources and measures.

Example from an ENERGY STAR Homes Business Plan

Overall Program Goals - Annual ENERGY STAR Homes Constructed: 1995: 500 Homes 1996: 5,000 Homes 2000: 100,000 Homes 2010: 1,000,000 Homes			
Sub-Goals to Reach Overall Program Goals	Activities	Spending: Committed/ Incremental	Measures
Commit builders by 1/97 to build a minimum of 12,000 ENERGY STAR homes in targeted high-growth areas, including a minimum of 12 large builders and 20 small to medium builders.	Regional builder recruiting binder. Sales calls to large home builders in targeted states. Coordinate with allies.	Committed: $3.5K travel.	Completed recruiting binder. Expanded recruiting binder for new target cities. # of builders: contacted by EPA, recruited by EPA, contacted by allies, recruited by allies.

Estimation of Environmental Results

ENERGY STAR Office Equipment Program

In office equipment, energy savings are obtained when the products power down when they are turned on, but not in use (suspend mode). For example, monitors use an average of 85 watts per hour, but only 20 watts per hour in the suspend mode. The Office Equipment program estimates environmental results in two steps: (1) estimating energy savings from energy efficient office equipment, and (2) converting the energy savings to emission reductions.

There are several steps to estimating energy savings from office equipment.

- Using information from Dataquest, EPA determines the yearly sales for office equipment and ENERGY STAR office equipment.[9]

- EPA computes the energy savings, in terms of kilowatt hours, that is achieved by the ENERGY STAR office equipment, as compared to regular office equipment. In making this calculation, EPA considers:

    - energy usage in regular and suspend modes,
    - average number of days computers are used a year,
    - average number of hours a day the computer is in use and in the suspend mode,
    - percent of computers left on for 24 hours, and
    - percent of computers left on during the day.

[9] Dataquest is a Dun & Bradstreet Corporation and offers market research for more than 25 specific information technology markets.

EPA obtains information on the energy usage of computers and computer usage patterns from Lawrence Berkeley National Laboratory.[10]

Kilowatt hours of energy savings are converted to million metric tons of carbon equivalent (MMTCE) using a scientific formula:

1 billion kilowatt hours = .25 MMTCE

While the conversion of energy savings to reduction in carbon emissions depends upon many factors, the above formula was used in preparing the CCAP. The formula reflects the average impact of emission reductions from all CCAP programs in the year 2000.

Radon

The Radon program estimates the impact its activities have on human health by measuring the activities of others, primarily homeowners, in reducing their exposure to radon. Biennially, EPA sponsors the Radon Risk Communication and Results Study, which is performed by the Conference of Radiation Control Program Directors (CRCPD).[11] The objectives of the study are to determine:

- overall awareness of radon,
- incidence of testing and mitigation,
- prevalence of testing during real estate transfer, and
- estimates of the above statistics by demographic group.

[10] The University of California manages the Ernest Orlando Lawrence Berkeley National Laboratory for DOE. The laboratory focuses on national needs in technology and the environment.

[11] Prior to 1994, the study was performed annually.

The results are obtained through questionnaires and the results are statistically valid with error rates for each state of between four and six percent.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR -6 1997

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: Comments on Revised Draft Audit Report E1KAF6-05-0080
Risk Reduction Through Voluntary Programs

FROM: Mary D. Nichols
Assistant Administrator
for Air and Radiation

TO: Michael D. Simmons
Deputy Assistant Inspector General
for Internal Audits

The Office of Air and Radiation (OAR) has reviewed the revised draft audit report on Risk Reduction Through Voluntary Programs, received February 4, 1997. Overall, we were pleased by the findings and are particularly gratified that the Radon and Energy Star Office Equipment, Buildings and Homes were recognized for their good management practices, success in developing ways to estimate environmental results, and overall effectiveness in achieving environmental results.

Attached are the Office of Atmospheric Programs and the Office of Radiation and Indoor Air responses to the revised reports' recommendations. We would appreciate it if the responses could be included in the final report, in order to indicate to the reader that we have taken the suggestions seriously and have made important progress to continue to improve the programs. It is not necessary to include in the final report copies of the documents that we provided to substantiate our response.

Should you have any questions, your staff may contact Jeanne Briskin at 233-9135.

Attachment

Printed on Recycled Paper

ATTACHMENT

Response to Recommendations in Draft Audit Report EIKAF6-05-0080
February 6, 1997

Office of Atmospheric Programs Comments:

p. 29 Please insert the following responses to recommendations 5-1, 5-2, and 5-3:

(5.1) APPD has been implementing this recommendation for some time. Since FY 96, all ENERGY STAR programs have prepared an annual business plan for all current and new programs. In the future, depending on program maturity, the annual business plans will include such items as a market analysis (number and type of companies in the market, assessment of technical potential for energy savings and possible market penetration for the program), technical analysis (list of cost effective product improvements, determination of reliability or quality issues), marketing plan (options to stimulate demand, message, target audience), and evaluation plan (what to track to measure success, how to get information, compilation and interpretation of results). The content of program plans changes as each program evolves, and is customized to suit the needs of each particular program. In addition, current programs update their plans on an annual basis. These documents are kept for future reference.

We have provided you with an example business plan for the new ENERGY STAR home electronics program.

(5.2) APPD began work during FY 96 to prepare an annual end of year report. We estimate that the report will be available in final form by approximately June 1997. The report contains a year end evaluation of each ENERGY STAR program, including highlights of accomplishments and budget evaluations. In addition, the division will document year end summaries of annual accomplishments for each program.

(5.3) Through a memo dated January 7, 1997 that was delivered to all staff, the director of APPD has instructed each program manager to identify and manage with special care important program documents (such as key early documents used to assist in program design, business plans, evaluations, and budgets) to assure that the documents are accessible and do not become lost. The agency's official documents management protocols will be followed for the long term disposition of the documents. We have provided you with a copy of the memo.

p 32 Please insert the following response to recommendations 5-4 and 5-5:

Since FY 96, the APPD Director has instructed each Branch Chief to prepare annual business plans for each program area. As they are updated, each plan will also address market transformation objectives and appropriate exit strategies. The next set of updates will apply to the FY 98 plans and is expected to be completed approximately 12/97.

One factor considered when developing exit strategies is: Is themarket stable or fast changing? A stable market may be transformed more permanently and we could exit with some confidence that our results would be sustained. In a fast changing market, however, our work could unravel when next generation products are introduced if our efforts are phased out prematurely. In such cases, we might reduce our efforts to a lower level, rather than exit completely. A second factor considered is: Is there still a cost effective potential to push for further significant energy saving advancements? In other words, we would compare the marginal benefits of more efforts with marginal costs (to EPA and industry) of going further, in the context of the government's overall goal in reducing emissions of greenhouse gases and the suite of activities underway for that effort.

For example, the ENERGY STAR Homes Program has a plan to continually reduce EPA's program support including a significant phase out of program resources after a 10% market penetration level has been reached. This level was identified as a critical point for reducing program support because over 100 mid-size and large builders are expected to be profitably producing ENERGY STAR homes at that time. Based on historic market shifts led by preeminent, successful builders to new technologies and features, we believe that the success of these leading builders in the ENERGY STAR program will facilitate a dramatic shift to the steep slope of the diffusion curve. Once the 10% ENERGY STAR Home market penetration level is reached, we expect that the program will already have dropped from a cost to the government of over $600 per home in 1996 to less than $10 per home. Shortly after, we forecast program costs to drop rapidly to less than $1 per home in the program. The nature of the support provided by EPA will evolve, from direct and frequent contact with many builders to interactions through many fewer program allies. In fact, most of the continuing support for the program will be organized by EPA through its network of program allies who promote the program to meet their own business objectives (utilities, manufacturers, industry associations, state and local governments,

home energy rating providers.) EPA plans and expects that this gradual transition to a more hands-off approach will significantly reduce the need for government resources to support the program. The program will periodically (probably at least once per year) reevaluate the specific market penetration targets and timing in light of actual program and market performance, and adjust the program plan accordingly.

p. 34 Please insert the following response to recommendation 5-6:

The ENERGY STAR name is already a registered service mark, and APPD is working with the Office of General Counsel (OGC) to receive registration for the ENERGY STAR logo. These registrations provide a strong legal basis to pursue entities who may mis-use the logo. APPD works closely with trademark attorney in OGC to discuss proper methods for protecting our marks. The program already performs general literature searches to check for inappropriate uses of the logo. Violators are notified in writing. The program managers are currently considering whether random spot testing of labeled products would be warranted to ensure logo integrity. This analysis will be completed in 1997, and if testing is deemed necessary, it would likely being in late 1997 or 1998. We plan to document this process in an appropriate manner.

The logo is protected when it is used in the Energy Star Buildings program through several means:

1. The Energy Star Buildings Ally MOU stipulates the requirements that Allies must follow to assure the logo is not altered and used in accordance with logo use guidelines. All uses of the logo by Allies must be approved by EPA. Such guidelines have been in place for the Green lights program for several years, with the latest revision being in 1996. Because the Energy Star Buildings Ally program is new, these logo use guidelines are currently being expanded to include the Energy Star Buildings Ally program. We will have a final copy of these guidelines by May 1997.

2. In the Energy Star Buildings Partner MOU, EPA informs partners that they can use the Energy Star Buildings logo on a specific buildings that they have upgraded, as long as it meets certain performance measures. Partners must apply to use this logo and EPA's approval is based on the reports that they submit to EPA. Approval must be given by EPA before the Partner can use the logo on a building.

3 We encourage other organizations that are part of Energy Star Buildings to publicize their participation and encourage them to use the logo on materials such as annual reports and letterhead Partners are free to use the logo in this manner with no prior approval from EPA. This policy has been in place for over 6 years with the Green Lights program and we have never had a problem with a logo being misused by a Partner. In fact, it is our participants use of this logo that helps educate other about these programs. We will insure that this policy is an included in the Account Managers handbook by Summer of 1997.

Extra efforts will be made to protect the integrity of EPA's ENERGY STAR label in the ENERGY STAR Homes program. First, allies provide quality assurance and warranty programs. In addition, EPA will monitor program performance through a detailed evaluation process assessing energy savings, builder satisfaction and home buyer satisfaction. Feedback from this process will allow EPA to assess progress towards critical program goals and make necessary adjustments.

We have provided you with a copy of the ENERGY STAR Ally Logo Use Guidelines, and Questions and Answers About The Green Lights and ENERGY STAR Registered Marks.

Office of Radiation and Indoor Air Comment:

P. 35 Please insert the following response to recommendation 5-7:

The IED Division Director supports the report's recommendation and intends to make changes in reporting the radon survey results to clarify what the statistic for high radon areas represents. This change will be implemented immediately for any reports or other information produced on radon results.

ABBREVIATIONS

APPD	Atmospheric Pollution Prevention Division
CCAP	Climate Change Action Plan
CFA	Consumer Federation of America
CRCPD	Conference of Radiation Control Program Directors
DOE	Department of Energy
EIA	Energy Information Agency
EPA	Environmental Protection Agency
HFC	Hydrofluorocarbons
HVAC	Heating, Ventilation, and Air-Conditioning
IED	Indoor Environments Division
MMTCE	Million Metric Tons of Carbon Equivalents
MOU	Memorandum of Understanding
OAR	Office of Air and Radiation
OIG	Office of Inspector General
OPPE	Office of Policy, Planning and Evaluation
OTA	Office of Technology Assessment
PSA	Public Service Announcement

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