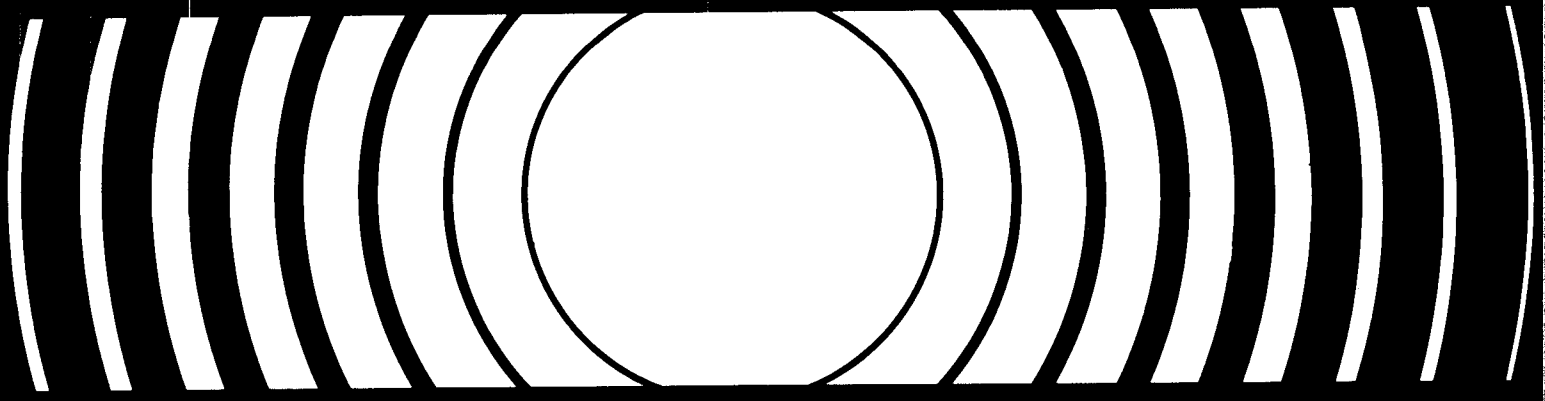
United States
Environmental Protection
Agency

Air And Radiation
(ANR-464)

EPA 520/1-91-015
September 1990

EPA

1989 Summary Of State Radon Programs



1989 SUMMARY OF STATE RADON PROGRAMS

Office of Radiation Programs
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

September 1990

ACKNOWLEDGEMENTS

This report was prepared by the U.S. Environmental Protection Agency (EPA), Office of Radiation Programs in Washington, D.C. Technical support was provided by Scientific and Commercial Systems Corporation (SCSC) and by Battelle Memorial Institute, under subcontract to SCSC.

TABLE OF CONTENTS

EXECUTIVE SUMMARY iv
Objectives and Approach iv
Findings v

CHAPTER 1. INTRODUCTION 1
Objectives and Approach 1
Information Sources 2
Summary of EPA Radon Activities 3
Organization of the Report 4

CHAPTER 2. AN OVERVIEW OF STATE RADON PROGRAMS 5
Factors in State Program Development 5
Program Elements 6
Classification of State Program Development 7

CHAPTER 3. SUMMARY OF STATE PROGRAMS 11
Core Programs 11
Moderate Programs 19
Extensive Programs 23

CHAPTER 4. REVIEW AND CONCLUSIONS 28
Core Programs 28
Moderate Programs 30
Extensive Programs 30

CONCLUSIONS 31

LIST OF FIGURES

Figure 1. Level of State Radon Program Activity 10

LIST OF TABLES

Table 1. Current Level of State Radon Program Development 12
Table 2. Summary of Core Program Activities 13
Table 3. Summary of Moderate Program Activities 20
Table 4. Summary of Extensive Program Activities 24
Table 5. Summary of All State Program Activities 29
Table 6. Program Mangement: Organization, Resources, and Legislation 33
Table 7. Program Management: Local Initiatives 38
Table 8. Public Information Activities 40
Table 9. Problem Assessment. Radon Surveys 44
Table 10. Problem Assessment: State Testing Programs and State-Subsidized Testing 48
Table 11. Problem Assessment: State Measurement and Database Activities 50
Table 12. Problem Response Activities 56

EXECUTIVE SUMMARY

OBJECTIVES AND APPROACH

The purpose of the report is to characterize State radon programs as of September, 1989, before implementation of activities under the State Indoor Radon Grants (SIRG) Program administered by the U.S. Environmental Protection Agency (EPA). The SIRG program, authorized under the Indoor Radon Abatement Act of 1988, is intended to assist the States to develop and enhance programs for the assessment and mitigation of radon.

This report is based on information collected by EPA regional offices from the States. The report extends and updates a 1987 study of State radon programs jointly produced by EPA and the Conference of Radiation Control Program Directors (CRCPD). This report presents a snapshot of the range of State radon program activity. With the support of SIRG, further enhancement of these activities is anticipated.

The report characterizes State radon activities in four areas:

- **Program Management** - basic organizational and management activities designed to establish a strong program framework.
- **Public Information** - activities designed to inform the public about the health risks of radon and encourage testing.
- **Problem Assessment** - activities designed to identify the level of radon in dwellings.
- **Problem Response** - activities designed to prevent or mitigate a radon problem.

Because there is considerable variability in State program activities, the report is organized to describe activities for different levels of State programs:

- **Core Programs**. These are programs in which States have basic capabilities in some or all of the four program areas. For example, such States may have a plan and a staff to manage a radon program, a mechanism to respond to public inquiries, some data on the extent of the indoor radon problem in the State, and/or the ability to refer citizens needing radon control services.

- **Moderate Programs**. These are programs in which States have undertaken expanded activities in one or more program areas in a proactive manner, including identifying high risk areas and/or populations, and actively providing information on availability of measurement, mitigation, and prevention resources.

- **Extensive Programs.** These are programs in which States have an established proactive radon program to address the radon problem in a manner appropriate to the State by fostering local initiatives, refining knowledge of radon in homes, schools and public buildings, and promoting prevention by encouraging adoption of new construction techniques.

The sections which follow describe findings for these three types of programs.

FINDINGS

Core Programs. States at the core level of program development are beginning to actively address radon issues and have developed some capability in at least one program element. The development of program management capability was a major emphasis in the 40 States with programs at the core level. However, there is a fair degree of variability in the range of program activities conducted by core States. Most States in this category have a designated agency to handle radon related problems, but in only a few core States does responsibility for radon-related activities extend beyond the designated agency. These State radon programs tend to have a minimal amount of staff and funding. For example, only twelve core States reported any radon-specific funding, and sixteen of them had less than 1 FTE committed to the radon program. Only 9 (AL, GA, ME, MO, NE, NH, RI, TN, VA) of these States have enacted radon-related legislation.

All States in this category provide information and referrals to citizens who contact them by telephone. However, 22 States with core programs estimated that they respond to fewer than 100 calls per month. All these States distributed EPA publications, most commonly "A Citizen's Guide," and 16 of the 40 core States produce their own State materials for distribution.

Efforts have been made to characterize the extent of the radon problem in the majority of the States with core programs. EPA/State surveys have been undertaken in 72% of the States with core programs. As in the other areas of program development in core States, there is a wide range of State activities in problem assessment. In some States, private companies such as the Bonneville Power Administration were involved in radon measurement. Slightly more than half of the core States (20 of 40) reported sponsoring State surveys and approximately 25% of core States (10 of 40) provided subsidized measurement assistance.

Problem response capability is often limited in States with core programs. These States were usually able to provide a State list of mitigation companies. States with core programs (18 of 40)

used EPA courses to provide training to State and local officials in radon response and, in addition, five core States reported developing their own training courses.

Moderate Programs. Seven States have moderate level radon programs: California, Colorado, Connecticut, Delaware, Illinois, Indiana, and Iowa. These programs are characterized by increasing program resources. Average funding for these programs was approximately $198,600 in 1989 and all States had 1-2 staff working on the radon program in 1989. A major difference between core and moderate programs is that the majority of the States with moderate programs have legislation requiring registration or certification of measurement and mitigation contractors. Five of the moderate program States have established linkages with other State agencies and all but Connecticut have enacted radon-specific legislation.

Most of the moderate States have expanded their radon public information and outreach activities. Five of these States with moderate programs have a telephone hotline to handle between 20 and 600 radon-related inquiries a month. Five of the States distribute EPA materials, and six States reprint EPA materials with the State logo or send out State-developed fact sheets.

The characterization of the amount and distribution of radon is well underway in the States with moderate programs, with seven States reporting sponsoring surveys, and two reporting sponsoring school surveys. One State, Colorado, is also conducting a survey of radon in water. Three moderate States provide measurement assistance subsidies.

Activity in the area of problem response in States with moderate programs has also expanded beyond the capability reported by core States. Six of the seven moderate States maintain State lists of measurement companies, and three have also compiled State lists of mitigators. Three moderate States conducted measurement or mitigation courses.

Extensive Programs. Four States have extensive radon programs. These include States in the Reading Prong area where radon problems were first identified in New Jersey, New York, and Pennsylvania, and one southern State, Florida.

These four States are characterized by comparatively high levels of program staff and funding – a mean staff size of 16 FTE's and a mean budget of $1.4 million in 1989. The States with extensive programs tend to have a lead agency with strong ties to other agencies as well as with universities and State extension services. All of the extensive States have enacted radon-specific legislation.

The four States with extensive programs are proactive in their public information capability. These States handled an average of 1,375 telephone inquiries each month in 1989. All these States

have developed and distribute their own and EPA materials. In total, copies of radon education materials have been sent to more than 500,000 households in two of the five States. Several of these States are involved in targeted public information activities; for instance, New Jersey has distributed 400,000 letters to homes in high risk areas urging radon measurements.

The extent of the radon problem has been well characterized in States with extensive programs. Efforts in this area range in size from a survey of 3,400 homes in New York to a Pennsylvania survey of 29,000 homes in the Reading Prong area. Two of the States with extensive program activities (New Jersey and New York) also provided free or at-cost testing. All of the States with extensive programs except New York were involved in geological studies and/or health risk studies as well. All the extensive program States had laboratory facilities to analyze radon measurement data, although New York relies primarily on private lab contacts. All States except Florida had operational computerized data systems that provided radon data at the zipcode level.

In terms of problem response, State-specific lists of measurement and mitigation companies are maintained by all four of the extensive program States. Florida has mandatory and New Jersey has voluntary certification of measurement and mitigation companies. All of the States with extensive programs provided training in measurement and mitigation. For instance, Florida reported training more than 800 professionals in 200 companies. One of these States, New Jersey, offered low interest loans for radon mitigation. Florida and New Jersey both have enacted legislation regarding standards for radon resistant building techniques.

In conclusion, States throughout the country are actively involved in the development of programs representing a range of activities and approaches to reduce radon risks. In many parts of the country, considerable activity has been undertaken to provide information to the public about the risk of radon. In most States, surveys have been conducted by EPA to characterize the nature of the indoor air radon problem, and some States are sponsoring their own surveys. Many States are actively involved in the provision of, and training in, testing and mitigation procedures; however, the number of homes where testing and mitigation has actually taken place is still small. With the support of SIRG, States are undertaking activities which will lead to further program development.

CHAPTER 1. INTRODUCTION

OBJECTIVES AND APPROACH

The objective of this report is to characterize State radon programs at the outset of the State Indoor Radon Grants (SIRG) Program. This chapter describes the SIRG program, summarizes recent EPA actions to assist in developing State radon programs, and presents an orientation to the remainder of the report.

This report expands and updates an earlier report, Summary of State Radon Programs, published by EPA in cooperation with the Conference of Radiation Control Program Directors (CRCPD), in August of 1987. The 1987 report described the range of State radon activities in place as of July 1987, the administrative and legislative mechanisms used to support these activities, and the resources devoted to them. The current report provides a snapshot of the range of State radon program activity prior to implementation of the SIRG program.

There are several differences between the 1987 baseline radon report and the current report in terms of classification categories. For instance, the 1987 report described four levels of State program activity (Information, Formative, Developing and Operational) as opposed to the current classification of State program development as core, moderate, and extensive. In this report the "Information" and "Formative" categories of the 1987 report are combined into a single "core" category. The "moderate" category used in this report is essentially the same as the "Developing" category of the 1987 report, and the "extensive" category in the current document corresponds to the "Operational" category of the 1987 report.

There are also several changes in the labels given to program elements. The activities described as "Program Management" in the current report were described under the category "Capability Development" in the 1987 document, and "Mitigation and Prevention" activities are now described under the category "Problem Response". Public Assessment and Public Information have retained their 1987 definitions for the current report.

Public awareness of radon has increased significantly since preparation of the 1987 report. However, translation of this awareness into program responses varied considerably by State and in most States actual risk reduction through testing and mitigation has been limited. In October, 1988 the Federal Indoor Radon Abatement Act (IRAA) was signed into law, endorsing and expanding EPA's existing radon program and authorizing a new program to provide federal financial assistance to developing state radon programs - the SIRG program. SIRG is authorized under Section 306 of Title III (IRAA, 15 U.S.C. 2661 et. seq.) which authorizes the Administrator of EPA to award grants to the

States "... for the purpose of assisting the States in the development and implementation of programs for the assessment and mitigation of radon."

The major long-term goal of the SIRG program is to achieve a significant reduction in the health risk in the United States due to radon exposure. Specific goals are:

- to achieve widespread participation of States in the Program,
- to establish core capabilities for radon response in all States,
- to stimulate innovation and expansion in States which have already initiated programs,
- to foster development of radon programs appropriate to the scope and severity of the problem in individual States, and
- to strengthen the Federal/State partnership by helping States to develop radon activities that will maintain their effectiveness in reducing radon risk beyond the life of SIRG.

INFORMATION SOURCES

This report is based on a review of information collected by EPA regional offices from States in September 1989. Information regarding each State radon program was collected directly from the States via EPA Regional Radiation Program representatives. State radon programs are rapidly evolving, so it is possible that activities are now underway in States that are not included here, because they were not initiated at the time this report was prepared. Still, the descriptions herein are intended to provide a useful indication of the scope of each State program and the organization which administers it.

Questions relating to a specific State should be directed to the State contact shown in the Appendix. Questions regarding this summary report should be directed to:

Public Information & Policy Branch
Radon Division
Office of Radiation Programs
U.S. Environmental Protection Agency
401 M Street, S.W. (ANR-464)
Washington, D.C. 20460
(202) 475-9617

SUMMARY OF EPA RADON ACTIVITIES

The goal of EPA's Radon program is to reduce public health risk from radon by reducing exposure in existing structures and preventing exposure in new construction. SIRG is one part of a total program of activities conducted by EPA to achieve this goal.

The most important EPA initiative benefitting States is the SIRG Program itself, which will provide States with funding to assist them in developing and operating their own radon programs. State radon programs can benefit from the SIRG program through enhanced capability in the four program elements discussed in this report. For example, program management activities supported by SIRG grants include training for State staff, development of data management systems, and efforts to coordinate with other State programs.

States play an important role in disseminating information about radon and promoting informed citizen risk reduction. To aid the States in this capacity, EPA has developed a number of brochures and publications for distribution to the public. The best-known EPA publications were targeted to homeowners: "A Citizen's Guide to Radon: What it is and What to do about it" (1986) and "Radon Reduction Methods: A Homeowners Guide" (1986). These two publications were provided to States in camera-ready form for production and distribution in response to inquiries. As of the end of FY 1989, at least 450,000 copies of "A Citizen's Guide" had been distributed by EPA through all the States. An update of "A Citizen's Guide" is in progress, and should be available in 1990. EPA has also produced a number of technical guidance documents for use by contractors, including "Radon Reduction Techniques for Detached Houses: Technical Guidance" (1986) and "Radon Reduction in New Construction: An Interim Guide" (1987). Another information source is a brochure prepared by the National Ad Council, which is sent in response to calls to the national hotline (800-SOS-RADON). The brochure and other materials were prepared as part of the larger public information campaign conducted by EPA and the National Ad Council to educate the general public about the potential health risk posed by radon, to publicize the existence of a national radon hotline, and to motivate a response in terms of testing and mitigating. In addition, EPA conducts cooperative outreach activities with national organizations, including the American Lung Association, the American Medical Association, the National Association of Homebuilders, Parent Teachers Association, and various national school organizations.

EPA has worked with States to conduct statistically valid radon surveys under the EPA/State Radon Survey Program to characterize their own radon potential. Thirty-four States participated or are currently participating in the survey between 1985 and 1990. In 1989, EPA began addressing the problem of radon in schools with a preliminary investigation and preparation of guidance for school administrators.

EPA initiatives have also served to improve the state-of-the-art of techniques for radon measurement by supporting ongoing development of standardized measurement protocols for residences, schools and workplaces. Standardized protocols help to ensure that measurements are comparable from site to site and assure the public that measurements are made accurately. These protocols must be used to obtain measurements for EPA/State radon surveys. The voluntary Radon Measurement Proficiency Program (RMP), begun in 1986, tests the proficiency of radon measurements from laboratories and commercial firms. Lists of successful participants in the RMP are maintained by most States for use in referral to the public.

EPA support of States also includes training and development of technical information to support mitigation. Training courses in mitigation have been offered to State and local government officials and the private sector. EPA supports three Regional Radon Training Centers at which courses are conducted for States and the private sector. In 1989, EPA initiated the Radon Contractor Proficiency Program (RCP) which evaluates the proficiency of mitigation contractors, and generates lists which can be used by State and local governments for referral of inquiries.

The EPA House Evaluation Program (HEP) is designed to assist the States in providing house evaluations and mitigation recommendations. The New House Evaluation Program (NEWHEP) is an ongoing project to validate the effectiveness of construction techniques that reduce radon in new homes. Administered through a cooperative agreement with the National Association at Home Builders National Research Center, the program currently involves eight builders in six States and will produce data on about 50 new homes. The project includes evaluation of building sites prior to construction and post-construction analysis of indoor radon levels. EPA is also working to develop model standards and techniques to reduce or prevent radon exposure in new construction.

ORGANIZATION OF THE REPORT

In order to facilitate comparisons of programs across States, program activities will be assigned to one of the four program elements presented in the previous section. State radon program data are presented in several ways. Chapter 2 will introduce three levels of program development - core, moderate and extensive. Chapter 3 provides an overview of the baseline status of State radon programs at the inception of the SIRG program. Chapter 4 summarizes the findings of the status of State radon programs by development level. A series of tables listing radon-related activities by State (Tables 6-12.) is appended to this document. In addition, a detailed description of the radon program in each State is provided in a separate Appendix volume.

CHAPTER 2. AN OVERVIEW OF STATE RADON PROGRAMS

This chapter will outline factors which may govern program development, and will define program elements and program levels to be used to classify State activities in the remainder of the document. In the last section, a capsule description of State radon programs at each development level will be presented.

FACTORS IN STATE PROGRAM DEVELOPMENT

Factors contributing to the origins of State radon programs vary from State to State. The first States to explore and document the health risks due to radon were in the West, particularly in States with a significant uranium mining industry. The earliest awareness of health risks due to radon emerged in health studies done in the 1950s and 1960s which demonstrated a high incidence of lung cancer in uranium miners living in western States. Risk of indoor radon exposure in the general population also first emerged in the West when it was discovered in the late 1960s that uranium mill tailings had been removed from waste sites and used as construction materials in Grand Junction, Colorado. In 1970, the U. S. Surgeon General issued health guidelines for Grand Junction which are now being jointly implemented by the State of Colorado and the U. S. Department of Energy (DOE).

In 1978, Congress passed the Uranium Mill Tailings Radiation Control Act, and in 1983, EPA promulgated health standards for areas near uranium mines or mill tailings sites. The effort to identify these areas was aided by mapping projects of the U.S. Geological Survey (USGS) which were intended to estimate recoverable uranium ore reserves. The abundant data available on the distribution of uranium in soil and underlying rock in western States has proven valuable as an indicator for potential "hot spots" for indoor radon.

The impetus for establishment of State radon programs in the East came primarily from the 1984 discovery of highly elevated radon levels in homes on the geologic formation known as the Reading Prong in Pennsylvania, New York and New Jersey. These three States have devoted substantial resources to radon control issues, and their programs have expanded very quickly. Other concerns which have resulted in a fairly rapid State response to radon are the presence of radon in well water in Maine and in homes built on reclaimed phosphate mining lands in Florida.

Some State programs have built on energy conservation efforts. For example, DOE's Bonneville Power Administration has sponsored testing and studies of the effects of weatherization of houses on indoor air quality, including radon levels. Oregon, Washington and Idaho have used this information to set priorities for their radon programs. In Connecticut, Iowa, New Hampshire and New York, the

linkage of radon levels to energy conservation efforts has been used to justify support of State radon programs with funds made available to the State as a result of oil overcharge litigation.

Two Federal initiatives that have influenced the pace of development of State radon programs are the Superfund Amendments and Reauthorization Act (SARA) of 1986 and the Indoor Radon Abatement (IRRA) of 1988. SARA required EPA to conduct a national assessment of radon, conduct a mitigation demonstration program and establish a research program with respect to radon gas and indoor air quality.

IRRA authorizes EPA to administer grants to help States establish radon programs, conduct radon surveys, develop public information on radon, and conduct demonstration and mitigation projects. As established by IRRA, the goal of the United States is that indoor air should be as free from radon as the ambient air outside buildings. Under this legislation, EPA is authorized to provide States with a broad range of technical assistance in areas including radon surveys, mitigation demonstration projects, and public information materials. IRRA also authorizes EPA to conduct a study in the nation's schools. In addition, EPA is to establish proficiency programs for firms offering radon-related services, including testing and mitigation, develop model new construction standards and provide grants to universities to establish at least three regional training centers.

PROGRAM ELEMENTS

The Guidance for the State Indoor Radon Grants Program, developed by EPA and the Conference of Radiation Control Program Directors (CRCPD) in 1989, classifies program activities into four program elements which form the functional components of a comprehensive radon program. The description of State programs to be presented in Chapter 3 and in the Appendix will be structured using these program elements:

Program Management- basic organization and management activities designed to establish an effective program infrastructure. Examples include development of a State radon policy or strategy, designation of agency responsibilities, resource acquisition, and implementation of data management systems.

Public Information- activities that provide basic, up-to-date information to citizens concerning the sources of radon contamination, paths of exposure, health risks, assessment techniques, mitigation methods, and prevention measures so that citizens can take informed actions to reduce their risk.

Problem Assessment- the process of identifying and evaluating areas of potentially significant radon exposure and health risk. Activities in this area may range from conducting isolated measurements in houses, schools, and other types of buildings to surveying potential "hot-spot" areas or undertaking statistically valid, State-wide surveys.

Problem Response- actions designed to reduce radon exposure and risk to acceptable levels. Problem response encompasses both mitigation of risks in existing homes, schools, and other buildings and preventing radon-related problems in new structures.

An assessment of progress in these areas was used in classification of State program development, as will be described in the next section.

CLASSIFICATION OF STATE PROGRAM DEVELOPMENT

The goal of the SIRG is for States to develop a radon program that is appropriate for the extent of the radon problem in the State. The activities undertaken by State radon programs are classified into three categories of development defined as follows:

Core This category encompasses the activities assigned to the "Information" and "Formative" categories of the 1987 report. To be included in this category, the State has basic capability in at least one of the four program elements. These include a plan and staff to manage a radon program; a mechanism to respond to public inquiries; a means, planned or proposed, to gather data on the extent of the indoor radon problem in the State; and the ability to refer citizens needing radon control services.

Moderate This category was referred to as "Developing" in the 1987 report. States with moderate program development have undertaken expanded or innovative activities in more than 1 program element in a proactive manner. These activities include identifying high risk areas and/or populations and providing information on availability of measurement, mitigation, and prevention resources.

Extensive The "Operational" category in the 1987 report was changed to extensive for the current report. States classified as extensive have established, proactive radon programs which are addressing the radon problem in a manner appropriate to the State. Extensive activities include fostering local initiatives, refining knowledge of

radon in homes, schools and public buildings, and promotion of quality-assured remedial and new construction capacity.

Classification of States has been done on the basis of overall capability, rather than on the status of any one program element. Due to the many activities included in radon programs, the boundaries between these development levels are not well defined. Rather, States were assigned to a development level in order to facilitate discussion, based on broad differences the level of overall activity. With these qualifications in mind, assignment of States to levels was based on the predominance of the evidence across all program activities. A map of States by program level is provided in Figure 1.

A State is considered to have core capability when a basic capacity to address the radon problem has been developed in at least some of the four program elements. In many core states, a plan for dealing with radon has been developed, and a lead agency has been designated and funded to implement the plan. There usually is a mechanism in the lead agency to respond to public inquiries about radon, and to send out EPA publications. Most of the States have participated in EPA/State surveys and some States have sponsored additional surveys. The majority of States (40 out of 51) are classified as having core capability at the outset of the SIRG program. Because this category contains most of the States, it has a very wide range of variation in the type and degree of radon-related activity occurring in individual States. An exception to some of the core category characteristics is Maine, which is considered to have extensive program development for radon in water but as its program for radon in air is more on the core level, it is classified as core in this report.

A moderate radon program is one in which expansion and innovation beyond core capabilities is occurring. Moderate programs are characterized by a pro-active, rather than a reactive, approach in one or more program elements. The management of the program supports active enhancement of capabilities in other areas. The State has enacted radon specific legislation and produces its own particular public information materials, appropriate to the particular radon problem in the State. There is a program to support the goal of radon testing for all indoor areas in the State - including homes, schools and workplaces - and to act on known radon risk.

Extensive programs are stable and growing programs that can respond appropriately to all radon problems in the State as they arise. There is good characterization of the radon problem through surveys and private testing, and the ability of the State to identify and facilitate mitigation services, and create response activities geared to the prevention of new sources of indoor radon risk is well-developed. Innovative projects, demonstrations, and local initiatives may also be part of extensive programs. All of these activities are funded by a stable administrative structure with authority to implement policy, and adequate funding.

These levels represent stages in a dynamic process of development which does not operate in the same fashion or at the same rate across all parts of evolving State radon programs. State programs are quite variable both in terms of the activities that they choose to pursue, and in the kinds of activities which are appropriate in a specific State at a particular point in time. The next chapter presents a summary of State radon programs by level of program development.

Figure 1. Level of State Radon Program Activity

CHAPTER 3. SUMMARY OF STATE PROGRAMS

The State program descriptions in this chapter are presented in three sections: one for States with core activities in one or more of the four program elements, one for States with moderate level programs, and one for States with extensive programs. The classification of each State as core, moderate or extensive is shown in Table 1.

CORE PROGRAMS

States at the core level of program development are beginning to actively address radon issues by developing their capability in at least some of the four program elements. As summarized in Table 2, the majority (34 of 40) of the core category States have some type of policy or strategy to address radon issues. These States distribute EPA information documents to homeowners upon request and may have a hotline or other mechanism for responding to public inquiries. Limited measurements are being performed (mostly screening only or follow-up only) and data from measurement companies is being collected in some States. EPA/State surveys have been completed or are being conducted in 29 core States and, in addition, 20 States have sponsored State surveys.

Core programs were defined in terms of a State's basic capability to operate a radon program, to respond to public inquiries, to assess the extent of the radon problem in the State, and to refer citizens needing radon control services. There is a fair degree of variability among programs classified as core programs in terms of these capabilities.

Core category radon programs range in level of activity from States like Hawaii, which does not have a perceived radon problem and so has no funding or staff to manage a radon program, no hotline to respond to public inquiries, and almost no activity in the areas of problem assessment and problem response. At the other end of the spectrum of core level program activity are States like Maryland which has a budget approaching that of a moderate category State ($100,000) and one FTE allocated to radon, has enacted radon-specific legislation and has a radon hotline.

Program Management in Core Programs. Program Management capability consists primarily of designating an agency with sufficient staff and funds to operate the State radon program in that State. This also includes establishing a radon policy, enacting radon-specific legislation, and coordinating radon activities with different organizations to ensure adequate coverage. Thirty-four of the 40 States with core programs reported a radon policy, but often this was a statement of general goals rather than a specific policy statement. Twenty-four States responded "none" or "no written policy" to this question. In 18 of these 24 States, the radon program is operated under the general public

TABLE 1.

CURRENT LEVEL OF STATE RADON PROGRAM DEVELOPMENT

CORE (n=40)		MODERATE (n=7)	EXTENSIVE (n=4)
Alabama	New Hampshire	California	Florida
Alaska	New Mexico	Colorado	New Jersey
Arizona	North Carolina	Connecticut	New York
Arkansas	North Dakota	Delaware	Pennsylvania
District of Columbia	Ohio	Illinois	
Georgia	Oklahoma	Indiana	
Hawaii	Oregon	Iowa	
Idaho	Rhode Island		
Kansas	South Carolina		
Kentucky	South Dakota		
Louisiana	Tennessee		
Maine*	Texas		
Maryland	Utah		
Massachusetts	Vermont		
Michigan	Virginia		
Minnesota	Washington		
Mississippi	West Virginia		
Missouri	Wisconsin		
Montana	Wyoming		
Nebraska			
Nevada			

* Maine's program is extensive for radon in water, but is core for radon in air.

Table 2. Summary of Core Program Activities

Number of Core States n = 40	n = 40
PROGRAM MANAGEMENT	
Average Radon Budget n = 12	$62,400
Average FTE's n = 30	1
Designated Agency for Radon	100%
State Policy for Radon	85%
Legislation Enacted	22%
Legislation Proposed	28%
Linkages with Other State Agencies	30%
PUBLIC INFORMATION	
Hotline	20%
Fewer than 100 calls per month n = 22	59%
Between 100-500 calls per month n = 14	38%
More than 500 calls per month n = 1	3%
Target Outreach	0%
Average Number of EPA Citizen's Guides Distributed n = 17	7,500
State-developed Publications Produced	45%
PROBLEM ASSESSMENT	
EPA/State Survey Completed or Underway	72%
State-sponsored Surveys	50%
Water Surveys	3%
School Surveys	13%
Free, Subsidized, or At-cost Measurement Devices	25%
PROBLEM RESPONSE	
State List of Measurers	60%
State List of Mitigators	45%
State-sponsored Mitigation Demonstrations	15%
Mitigation Statistics Collected	3%
State Training Programs	13%
EPA Training Programs in Use	45%

n = Number of States reporting data for that item

health policy to protect the public from adverse health risk. Common goals described by core States included to make the public aware of radon risk, to encourage testing in the State, and to continue to develop and implement a radon program.

Nine States in this category reported radon-related legislation. In three of the States, legislation dealt with certification of measurement and mitigation firms. Maryland law requires that radon testers successfully complete the EPA Radon Measurement Proficiency Program in order to be listed as recommended testers in Maryland. A Nebraska law requires that both measurement and mitigation companies be certified by the State. Virginia requires measurement and mitigation companies be EPA listed.

Legislation in Alaska, New Hampshire and Tennessee mandates public information activities. Radon surveys were mandated in Maryland and New Hampshire. Rhode Island advises radon testing in real estate transactions, and New Hampshire requires testing of wells in new construction.

States with core programs run their radon program with a minimal amount of staff and funding. Only twelve (30%) of the States with core programs reported radon-specific funding with a average amount of $62,400. The remaining States did not report funds committed to the radon program. Staff likewise are in short supply in these States, with 30 States (75%) having a mean of 1 FTE devoted to the radon program. (The remaining 10 States have no FTEs assigned to radon).

All the States have a designated agency, named by the governor or identified in legislation as having lead responsibility for State efforts to address the radon problem. In 31 of the 40 core States, the designated agency is a health department or a joint department of health and environment. Other departments which may house State radon programs are departments of environment or natural resources (four States) and departments of human resources (three States). In Arizona, the radon program is housed in the Radiation Regulatory Agency, and in the District of Columbia, it is in the Department of Consumer and Regulatory Affairs.

With a few exceptions, in States classified as having core radon programs, responsibility for radon-related activities does not extend beyond the designated agency, although State universities and private groups may provide the State with some support in geology studies or environmental monitoring. Most of the activities reported by States for "other involved parties" involve linkages with cooperative extension services, universities, private organizations, and selected local governments. In several New England States, designated radon agencies have agreements with departments of environmental protection to provide ongoing evaluation of radon levels in drinking water.

However, even at the core level, some designated radon agencies have effectively linked with other State agencies and universities to strengthen the overall radon program. In North Dakota, for example, the Division of Environmental Engineering (DEE) in the Department of Health has lead responsibility for the radon program and provides public information, problem assessment, and problem response services. However, the Department of Public Instruction is in charge of a testing program in 276 schools. DEE maintains close contact with the State Attorney General's Office in order to refer and prosecute fraudulent practices by measurement and mitigation contractors under existing consumer fraud law. The North Dakota Geological Survey is evaluating radon testing data for geological interpretation of radon in soil.

Eighteen of the States with core programs reported local radon initiatives in their States. The majority reported local initiatives in Problem Assessment (14 States), with the next most frequent area reported being Public Information (9 States), followed by Program Management (5 States). Local initiatives in Problem Assessment consist of radon surveys other than those conducted by the State and are listed in Table 9. Local initiatives in Public Information consist primarily of public awareness seminars. However, in Alaska the University of Alaska provides weatherization and radon mitigation information, and in Oregon the Bonneville Power Administration has published a report on the potential for radon based on geological data. Wisconsin sponsors two regional information centers and plans to expand to one or two more. Local initiatives in Program Management consist of university advisory and technical assistance to the State (in North Carolina and South Carolina), local health department involvement in disseminating information and assistance (North Dakota), the involvement of the Rhode Island Saving Energy (a private non-profit organization) in assisting with the EPA/State survey in Rhode Island, and in Ohio, there is a county-level radon program in Montgomery County. These capabilities may be the result of a growing public demand for information and action that the current State radon program is unable to respond to and so other agencies are seeking to satisfy the needs for increased radon services.

Public Information in Core Programs. Providing the general public with information about radon, the importance of testing, and where to obtain assistance is a vital part of any State radon program. All States provide information and referrals to citizens and localities who contact them by telephone, and ten States with core programs have a toll-free hotline. Of 40 States with core program activities, 22 estimate that they respond to fewer than 100 calls per month. These figures are difficult to interpret because the numbers are variable and may not be tracked consistently. For example, most States report that calls go up with media exposure. During a campaign sponsored in the public interest by a television station in Washington, D.C., inquiries to the District of Columbia's radon program increased to 125 calls per week from a normal average of two to five calls per week.

The baseline data used here also do not report the staff responsible for handling telephone inquiries. However, with a mean of only 1 FTE for the entire radon program in the 30 of the 40

States with core programs that reported any staff, the amount of time that technical staff have available to respond to public inquiries is of necessity limited.

Virtually all States, whatever the level of their radon program, distribute EPA radon publications, especially "A Citizen's Guide," to the public on request. Although not all States provided estimates of the number of copies of the publication distributed, 17 States with core programs distributed an average of 7,500 copies of "A Citizens Guide" during 1989.

Development of materials at the State level is important for radon programs because the distribution of radon risk may differ from one State to another. Risk communication research suggests State or locally based materials tend to be more effective in motivating informed testing and mitigation. Sixteen States with core program produce their own publications containing information appropriate to the radon program in their State. Some of these are distributed in innovative ways. Virginia reproduced "A Citizens Guide" and "Radon Reduction Methods", added the Virginia logo and sent out 24,000 copies as bill stuffers in utility statements. In Minnesota, State-produced fact sheets were distributed at State and county fairs.

A broad spectrum approach to public information creates the foundation for development of a strong radon program. Outreach is especially important to local officials, members of the construction industry, and citizens, in order to create awareness of the health risk from radon exposure and the ways the risk can be prevented or reduced. For example, North Dakota has sent speakers to a wide range of interest groups, including the North Dakota Environmental Health Association, a group of public school administrators, the North Dakota Chapter of Farm Managers and Rural Appraisers, the North Dakota State Science Conference, the Radiological Response Team training course, the Bismarck Public Works Department, and a large number of other groups.

Problem Assessment in Core Programs. Problem assessment capability in States with core programs involves characterizing the problem, developing capability for ongoing monitoring, and maintaining a database needed to track the problem. States with core programs have conducted testing and research to characterize the radon problem primarily in homes. EPA/State radon surveys have been completed or are underway in 29 of the 40 States with core programs (72%) and State-sponsored surveys have been undertaken in 20 States with core level programs (50%). Universities, private organizations such as the American Lung Association and public utilities such as the Bonneville Power Administration, and television stations have also sponsored home radon surveys in many States with core programs. One of the most comprehensive of these efforts is the radon monitoring conducted in Washington, Oregon and Idaho by the Bonneville Power Administration as part of its home weatherization program. About 32,000 homes in these States have been evaluated under this program. Free or subsidized testing of homes or schools was reported by 10 States, always in

association with radon surveys. These subsidies were provided, for the most part, by the State (North Dakota was the only exception - assistance there is provided by the University of North Dakota).

Virtually all of the problem assessment activities in States with core programs have addressed radon in indoor air. Only Maine has conducted systematic surveys of radionuclides in water, although the New Hampshire Water Supply and Pollution Control Commission oversees a radon in drinking water program. Also, there has been a cooperative EPA/USGS survey of wells in Region IV which collected some radon in water data in Georgia and Tennessee.

Special studies of radon are also quite rare in States with core programs. An example of a geology study is the "Estimation of Radon Potential in the Pacific Northwest Using Geological Data," published by the Bonneville Power Administration. This study characterized geological risk in Washington, Oregon, and Idaho. Other geology studies in States with core programs are limited studies by individual researchers or mapping projects undertaken by the State geological survey staff. There were no health effects studies of radon reported in States with core programs. The University of Utah, under a grant from the National Institutes of Health, is searching for possible radon-related cancers in the Idaho health registry.

Five States with core programs reported State-sponsored school surveys: Idaho, Kentucky, North Carolina, Ohio, and Wyoming. In addition, North Carolina and Tennessee subsidize the purchase of measuring devices by schools. Kentucky has an especially vigorous school testing program operated by the State Department of Education. Under this program, radon levels have been screened in public schools in 150 of 178 school districts. This survey found 227 rooms in 62 schools with radon screening levels above 4 pCi/L. Expansion of the testing program and long-term followup is ongoing. In addition, three county school districts in Kentucky have started their own radon measurement programs.

State measurement capability is variable in States with core programs, with 21 of 40 (53%) core States reporting this capacity. This radiation measurement capability is housed primarily in State public health and environment laboratories. Several States reported equipment, such as working level monitors and capability to analyze charcoal canisters, without specifying the locus of this capability in the State. For instance, Texas reports existing capacity to measure radiation in labs which could be expanded to do radon. This hidden capacity to measure radon may be common in States with experience in radiation control. Few States with core programs report sufficient technical staff and funding to support radon monitoring, which is a key characteristic of core level programs. The Kansas Department of Health and Environment Laboratory and the Wisconsin Department of Health and Social Services are on the RMP list for analysis of charcoal canisters.

Management of radon measurement data is needed for a variety of programmatic purposes. However, the status of measurement data as a public database is questionable in States where there are policies restricting confidentiality of public data. A majority of States with core programs (27 States or 68%) report an operational computer database for radon test results. A policy permitting protection of confidentiality of radon test results is found in 14 of 27 core States with data management systems. Where State law or regulation requires that data be made available to the public, radon test results are coded only in the aggregate. Results are aggregated at the level of the zip code or the county in 14 of 15 core States reporting specific data elements.

Problem Response in Core Programs. Problem response capability (mitigating a radon problem) may be the last area to develop during the growth of radon programs, and is limited in States with core programs. The most common problem response activities in States with core programs are maintenance of a State list of measurement companies (reported by 60% of States with core programs), maintenance of a State list of approved mitigation companies (in 45% of States) and use of EPA programs for training of State and local officials in radon response (in 45% of States). Most States did not report data on either measurement or mitigation referrals. Only Texas (200 total), West Virginia (two per day), and Wisconsin (200 per month) reported a number of measurement referrals. None of the States with a core program reported a number for mitigation referrals.

Nebraska has a statutorily authorized program to certify mitigators. Virginia requires measurement companies to successfully participate in the RMP program. Nine (23%) States with core programs protect consumers against unscrupulous mitigators by maintaining lists of contractors known to have EPA training. Eight additional States keep lists of contractors, but have no explicit criteria for inclusion on the list. Maine maintains statistics on mitigation activity; contractors in the State report that 95 private air mitigations and more than 100 water mitigations have taken place.

Mitigation assistance in States with core programs is limited to providing technical advice, almost always in response to telephone inquiries. Eighteen States (45% of all States with core programs) reported that they provide technical consultation by telephone. None of the 40 States with core programs provide financial assistance for mitigation of any kind of structure. Kansas provides in-home technical consultation in residences testing over 20 pCi/L, and Wisconsin will perform post-mitigation assessments on request. Maine will visit homes if an air reading is 100 pCi/L or greater. Oregon refers inquiries to the Bonneville Power Administration for technical advice, and Washington refers people to the Washington Energy Extension Service. Idaho refers mitigator inquiries to the Idaho Better Business Bureau.

Attendance at training courses jointly sponsored by the State and EPA is the most widespread kind of mitigation training in States with core programs. Nine States specified that the EPA/State

courses "Reducing Radon in Structures" had been given for contractors one or more times in their State; these are Georgia, Idaho, Kentucky, Minnesota, Nebraska, New Mexico, Ohio, Tennessee and Washington. Michigan and Virginia reported sponsoring Regional Radon Training Center courses but provided no other details. Eleven States reported that they had sent staff to EPA courses, but did not specify what these were.

Five States with core programs have developed their own training for local officials and mitigation. These are Georgia, Maine, Maryland, Massachusetts and Tennessee. The Georgia and Tennessee programs were workshops directed toward school administrators and maintenance staff. Maryland conducted a course for radon contractors at a local community college and Massachusetts reports sponsoring three courses on mitigation.

Some core States use training programs made available by universities and extension services. Maine conducted workshops for mitigators that were co-sponsored by Southern Maine Technical College. Virginia runs a State-sponsored mitigation course in cooperation with Virginia Technical University. This course was given three times in 1988-1989 to a total of 200 participants. In Washington, the Washington Energy Extension Service provides mitigation and diagnostic training and consultation to the Spokane area and the eastern part of the State.

MODERATE PROGRAMS

Seven states were categorized as having moderate programs based on expanded or innovative pro-active activities in one or more program areas. These States include California, Colorado, Connecticut, Delaware, Indiana, Illinois, and Iowa. All of these States have State-wide surveys completed or underway. Other common features of States with moderate programs include enacting radon-specific legislation, developing State-specific radon materials, increasing knowledge of the extent of the radon problem in the State, and promoting remedial and new construction techniques to mitigate and prevent problems from radon. These findings are summarized in Table 3.

Program Management in Moderate programs. The goals of the radon program in the seven States with moderate-level radon programs duplicate the interest of core States in fully assessing the radon problem in their States, in informing the public and in providing information and technical assistance to citizens seeking measurement or mitigation advice. In addition, there is a focus on educating, registering, and certifying measurement and mitigation companies. This is reflected in the passage of legislation, at the time of this report, to regulate companies doing radon-related work in four of the seven States with moderate programs: Delaware, Illinois, Indiana and Iowa. Colorado has published a regulation requiring testing of schools. Radon-related legislation enacted in California requires disclosure of radon levels, if known, in real estate transactions.

Table 3. Summary of Moderate Program Activities

Number of Moderate States	n = 7	
PROGRAM MANAGEMENT		
Average Radon Budget	n = 5	$198,600
Mean FTE's	n = 6	1.9
Designated Agency for Radon		100%
State Policy for Radon		100%
Legislation Enacted		86%
Legislation Proposed		71%
Linkages with Other State Agencies		71%
PUBLIC INFORMATION		
Hotline		71%
Fewer than 100 calls per month	n = 3	50%
Between 100-500 calls per month	n = 2	33%
More than 500 calls per month	n = 1	17%
Target Outreach		0%
Average Number of EPA Citizen's Guides Distributed	n = 5	8,900
State-developed Publications Produced		86%
PROBLEM ASSESSMENT		
EPA/State Survey Completed or Underway		71%
State-sponsored Surveys		100%
Water Surveys		29%
School Surveys		43%
Free, Subsidized, or At-cost Measurement Devices	n = 6	43%
PROBLEM RESPONSE		
State List of Measurers		83%
State List of Mitigators		33%
State-sponsored Mitigation Demonstrations		29%
Mitigation Statistics Collected		17%
State Training Programs		43%
EPA Training Programs in Use		17%

n = Number of States reporting data for that item

Six of the seven States with moderate programs have the radon program housed in the State health department. Illinois is different in that it operates the radon program out of the Department of Nuclear Safety. Average funding available to the moderate programs is about $198,600, but this figure may be misleading. Only California ($350,000), Iowa ($105,000), and Illinois ($100,000) report radon-specific appropriations. The Connecticut program received $400,000 in 1987. Resources currently available at the time data were collected revealed that moderate States had an average of 1.9 FTEs with no cost estimate associated. Indiana and Delaware have no funds appropriated for radon, although Indiana estimated the value of labor devoted to radon provided by 2 staff at $10,000. A Colorado request for radon funding was turned down by the legislature, but $38,000 in general funds were spent on radon-related activities. Six of the seven States with moderate programs reported an average of one to two staff working on the radon program.

In five of the seven States with moderate programs there were linkages between the lead State radon agency and other programs. For instance, the State Geological Surveys provided survey assistance in Colorado and Indiana. In Connecticut the Department of Environmental Protection collects all air and water data and analyzes the relationship between radon levels and geologic factors. Local initiatives in these States were in providing technical information and advice and pamphlets to local governments on request, especially with regard to school testing. California staff have established linkages with the Los Angeles Health Department and the Los Angeles School District to provide advice and technical support. Colorado is working with EPA on a long-term radon risk evaluation in the Denver Metropolitan area. The Indiana Department of Health provided a training seminar for the State Bureau of Local Support Services in January, 1989 but no direct help to localities was reported.

Five of the moderate program States report the existence of local initiatives to address the radon problem in their State. California, Connecticut, Colorado, Illinois and Indiana all report local initiatives in Problem Assessment, which consists of measurement surveys sponsored by an agency other than the State.

Public Information in Moderate Programs. Five of these States, California, Connecticut, Delaware, Indiana, and Iowa, have a telephone hotline to handle radon-related inquiries. Estimates of the level of telephone activity are difficult to evaluate, because the number of calls may vary a great deal with other public information activities, such as public service announcements (PSA's). However, of six States attempting such estimates, one reported 625 calls per month, two reported between 100 and 500 calls a month, while three received less than 100 calls a month.

All of the States with moderate programs send out "A Citizens Guide" and other EPA materials, but only five reported numeric estimates (ranging from 700 to 22,000 per year) of the number distributed. California has developed its own Citizens Guide, and Delaware reprinted the EPA "Citizen's

Guide" with the State logo. Connecticut, Illinois, Indiana and Iowa sent out State-developed fact sheets and survey reports.

Indiana conducted an EPA-sponsored public outreach campaign in 1988-89 which included distribution of radon leaflets in electric bills sent to over 760,000 homes, and special presentations and videos for county health officials, health educators, school officials and real estate professionals. Illinois identified "proactive public outreach" as one of its goals for the future.

Problem Assessment in Moderate Programs. Characterization of the amount and distribution of radon in the State is well underway in States with moderate programs. Connecticut, Colorado, Indiana and Iowa have completed EPA/State surveys of indoor air radon, and California will initiate such a survey in 1990. Connecticut also conducted a State-survey to augment the EPA/State survey. California and Illinois are initiating their own State-wide surveys. Among States with moderate programs, Connecticut and Colorado have undertaken a survey of radon in water. The Colorado Health Department has cooperated with the USGS to study very high radon readings in private wells in Boulder County. In addition, local governments are conducting surveys in most of these States. In California, a small survey was conducted by DHS, and Los Angeles County School District conducted a more extensive survye of L.A. schools.

State measurement assistance programs are not yet widespread in States with moderate programs. The most extensive measurement assistance program is reported by Delaware, which offers free charcoal canister radon testing to State residents for a $5 materials fee. Illinois has placed year-long alpha track detectors in schools in two counties. The Iowa Department of Public Health has plans to conduct confirmatory testing in homes which measure over 40 pCi/L.

California is the only moderate State reporting a health effects study, in which the California Department of Health Services participated. No results are yet available from this study. Geologic Survey offices have undertaken geologic studies of radon in two States. The Indiana Geologic Survey and the Department of Health have co-authored "Preliminary Geologic Characterization of Indiana for Indoor Radon Survey" which is an ongoing project. The Colorado Geologic Survey is working with the USGS on the Conifer Mountain soil/water radon study.

Six of the moderate States are developing measurement and data management systems. State laboratories perform radon measurement assessments in Connecticut, California, Delaware, and Indiana. Other States with moderate programs report no laboratory capability, but do possess measurement equipment. Delaware reported having one staff member to operate measurement devices. Connecticut, Delaware, Illinois, Indiana and Iowa all maintain PC data bases with radon survey results. In all of these States, data are aggregated to the level of the zip code and/or the county, and the

identity of homeowners is either not recorded or is kept confidential. Colorado has only some of its survey data computerized, while California is in the planning stage of computerizing a database of radon measurement data.

Problem Response in Moderate Programs. In terms of problem response, the most important difference between States with moderate programs and those with core programs is the presence in moderate program States of legislation requiring registration/certification of measurement and mitigation contractors. As noted above, only California, Connecticut and Colorado lack such legislation. In California and Connecticut, legislation has been proposed but was not enacted at the time this report was prepared. The Radon Control Division in Colorado has chosen not to regulate companies as a matter of policy.

Registration/certification makes available to consumers State lists of measurement and mitigation companies which have met the criteria established for the State. Often these criteria include successful application for inclusion on the EPA RMP list. Not surprisingly, RMP lists are a less important resource in States which compile their own lists. All of the moderate States except California maintain State lists of measurers, Connecticut, Iowa and Illinois also have compiled State lists of mitigators.

Mitigation demonstrations were not reported in States with moderate programs with the exception of a small project to mitigate in the Illinois State Capitol Building. None of these States offer financial assistance to homeowners for the purpose of mitigation, although all of them provide technical advice over the phone or in person. Illinois and Connecticut reported the only mitigation statistics, a list of the number of homes mitigated which is voluntarily provided by mitigation contractors.

Mitigation training courses were conducted in three of the moderate program States. Iowa co-sponsored with EPA a 3-day mitigation course. The North American Radon Association sponsored two courses on mitigation in Indiana. Connecticut sponsored two courses in 1988 and 1989. Indiana and Illinois both planned mitigation courses in 1989. The Midwest Universities Radon Consortium (MURC) planned to offer radon seminars for radon measurement company personnel.

EXTENSIVE PROGRAMS

States classified as extensive have programs which are addressing the radon problem in a manner appropriate to the particular State. Four States considered as having extensive programs are: Florida, New Jersey, New York, and Pennsylvania. A key feature of this level, as summarized in Table 4, is that considerable effort has been expended in measuring and mitigating the radon problem in the State. All have funding, staff, and radon-specific legislation. All four extensive States have

Table 4. Summary of Extensive Program Activities

Number of Extensive States	*n = 4*	
PROGRAM MANAGEMENT		
Average Radon Budget	n = 4	$1,383,020
Mean FTE's	n = 4	16
Designated Agency for Radon		100%
State Policy for Radon		100%
Legislation Enacted		100%
Legislation Proposed		100%
Linkages with Other State Agencies		100%
PUBLIC INFORMATION		
Hotline		100%
Fewer than 100 calls per month	n = 0	0%
Between 100-500 calls per month	n = 0	0%
More than 500 calls per month	n = 4	100%
Target Outreach		75%
Average Number of EPA Citizen's Guides Distributed	n = 1	300,000
State-developed Publications Produced		100%
PROBLEM ASSESSMENT		
EPA/State Survey Completed or Underway		75%
State-sponsored Surveys		100%
Water Surveys		0%
School Surveys		0%
Free, Subsidized, or At-cost Measurement Devices		75%
PROBLEM RESPONSE		
State List of Measurers		100%
State List of Mitigators		100%
State-sponsored Mitigation Demonstrations		50%
Mitigation Statistics Collected		75%
State Training Programs		75%
EPA Training Programs in Use		0%

n = Number of States reporting data for that item

sponsored State surveys of homes, and three (all except New York) are conducting geological and/or health studies as well. Local initiatives in problem assessment were reported in New York and Pennsylvania. New Jersey and Pennsylvania offer some type of measurement assistance.

Program Management in Extensive Programs. In States with extensive radon programs, the extent and distribution of radon in the State has been reasonably well characterized. All have specific policy goals to reduce radon risk. There is an emphasis on reducing exposure to radon by mitigating existing structures and preventing exposure in new buildings. Radon policy is supported by legislation and regulations requiring testing of structures, certification of measurement and mitigation companies and investigation of changes in building codes. For example:

- Florida has legislation calling for mandatory testing of schools, daycare centers and 24-hour public facilities. The legislation also requires revelation of radon issues at the time of real estate transactions, and certification of measurement and mitigation contractors.

- The Radon Mitigation Construction Standards Bill, enacted in New Jersey, requires use of radon resistant construction techniques in high-risk areas, as defined by the State.

- New York has enacted radon-specific legislation mandating in-depth study of mitigation and prevention techniques and authorizing funds to support the radon program.

Probably the most striking feature of extensive radon programs is the degree to which they are well-staffed and well-funded compared to moderate and core programs. These States reported an average budget of $1.4 million and an average staff size of 16 FTEs. The radon budget in New York received a boost of almost $2 million from stripper well exemption litigation funds for three years beginning in 1987, and $525,000 from Exxon oil overcharge litigation funds in 1989.

The designated lead agency for the radon program is some branch of the State Health Department in Florida and New York. The New Jersey radon program is housed in the Department of Environmental Protection, and in Pennsylvania the program is in the Department of Environmental Resources. Both of these programs receive support in epidemiological studies and local outreach from the State Health Department. Other intra-agency linkages found in these States are with energy departments (mitigation training, measurement), Geologic Survey departments (geological studies, problem characterization), and departments of community affairs (development of model building codes). Research services are provided to the radon program by universities and State extension services.

State assistance to local government consists primarily of consultation and distribution of information packets to local governments. There may, however, be independent local initiatives which

were not reported. Training of local government officials in response to public inquiries has been provided by State programs in Florida and New Jersey. New York provides training programs and provides measurement devices to local governments at cost. No direct financial assistance to local governments was reported by any extensive program in this baseline period.

Public Information in Extensive Programs. All of the States with extensive programs maintain telephone hotlines to provide information and materials to the public. The number of public inquiries responded to in these States was quite high. For instance, Florida handles 750 calls per month, while New Jersey has handled more than 100,000 telephone inquiries since 1985.

All these States have developed and distributed their own materials, as well as EPA publications. In total, copies of radon education materials have been sent to more than 500,000 households in the four States with extensive programs. New Jersey has developed a slide show and videotape, both of which have been provided to all county libraries.

These States have also been involved in targeted education activities. For instance, Pennsylvania developed a Spanish language version of "A Citizen's Guide" and New Jersey has distributed 400,000 letters to homes in high risk areas urging radon testing.

Problem Assessment in Extensive Programs. All the States with extensive programs have conducted State-sponsored surveys of radon in households. These range in size from a survey of 2,401 homes in New York to a Pennsylvania survey of 29,000 homes in the Reading Prong area. New York is providing 20,000 detectors as part of a free/at-cost monitoring program and Pennsylvania provides free follow-up testing to homes with radon levels greater than 20 pCi/L.

Three States offer monitoring and follow-up as part of problem assessment. The Department of Environmental Protection in New Jersey provides free or subsidized testing if it is a confirmatory measurement as part of its Cluster Identification Program. New York has a similar approach: if a home measures above 200 pCi/L, the Department of Health measures 25 homes within a one mile radius as part of a cluster program. One such "cluster" has been completed in New York at the time of this report and eight were in progress. Pennsylvania provides additional testing to homeowners who have test results greater than 50 pCi/L.

In all the extensive States except New York, there is a geology/land evaluation that can be used to characterize radon risk in the State. In addition, these States are conducting health studies of risk of exposure to radon. For instance, an epidemiologic study of women in New Jersey indicated a trend of increasing lung cancer risk based on increasing radon levels.

All four States have laboratory facilities for analyzing radon measurement data, although New York relies primarily on private lab contacts. All the States with extensive programs (except Florida) have an operational database of information provided by private testing companies of radon measurements that is coded at the zip-code level. In Florida, New Jersey, and Pennsylvania reporting of this information by radon testing and mitigation firms is required by law, though the identity of records in the database remains confidential.

Problem Response in Extensive Programs. All four of the States with extensive programs routinely provide State lists of measurement and mitigation companies. Florida has a mandatory certification program for measurement and mitigation companies; New Jersey has a voluntary program. While the number of referrals to mitigation companies was not reported, and data on the number of private mitigations is not complete, these States indicated at least 8,500 in New Jersey, and 2,600 in New York. In New Jersey, the State Housing and Mortgage Finance Agency provides low-cost loans for mitigation activities.

Three of the States with extensive programs provide training courses. For instance, Florida reported that 800 professionals in more that 200 measurement and mitigation firms had participated in State radon training courses. In Pennsylvania, the Department of Environmental Resources does not provide training courses but does approve radon and mitigation training courses offered by the private sector.

CHAPTER 4. REVIEW AND CONCLUSIONS

This Chapter summarizes the characteristics of State radon program activities for programs at different levels of development. An overview of these findings is presented in Table 5.

CORE PROGRAMS

In 1989, a number of State programs were working to consolidate core capabilities. Most of the programs in the core category (70%) did not report any radon-specific funding and the average staff devoted to the radon program in 30 of the 40 core program States was just over one FTE in 1989. Although thirty-four of the 40 core States reported a State radon policy, three-fourths of the core States had not enacted radon-related legislation. There was considerable variability in States classified as having core programs. State capability in all the areas of program development ranges from limited activity to greater activity. An example is Maine, which has an extensive program for radon in water but is still at the core level for radon in indoor air.

While all these States have basic capability to respond to public inquiries, only eight of the 40 core States (20%) had radon hotlines. Most States (22 of 37 States reporting data) respond to fewer than 100 call per month. All the core States reported that they distributed EPA publications upon request, and the 17 States that provided numeric estimates sent out a mean of 7,500 copies of "A Citizen's Guide." In addition, 18 core States (45%) reported that they produced State-specific radon publications which were distributed along with EPA materials.

This variability in program activities and emphasis among core States was also seen in the areas of Problem Assessment and Problem Response. Just half of the core States (20 of 40) reported sponsoring State surveys, ranging in size from a survey of 11 homes in Wisconsin to one of 1,100 homes in Idaho. About a fourth of States with core programs (10 of 40) offered some type of measurement assistance. A majority of the core program States (27 of 40 or 69%) report computer capability for maintaining a database for tracking radon measurement and mitigation results. The majority of the core program States (24 of 40 or 60%) maintain State lists of measurement companies. Five States (13%) reported developing their own training course, while 45% of the core States (18 of 40) use EPA programs to train State and local officials in radon response.

Table 5. Summary of All Program Activities

PROGRAM DEVELOPMENT CATEGORY *Number of States*	CORE 40	MODERATE 7	EXTENSIVE 4	TOTAL
PROGRAM MANAGEMENT				
Average Radon Budget	$62,400	$198,600	$1,383,020	$356,060 n = 21
Average FTE's	1	1.9	16	3.21 n = 40
Designated Agency for Radon	100%	100%	100%	100%
State Policy for Radon	85%	100%	100%	88%
Legislation Enacted	22%	86%	100%	43%
Legislation Proposed	28%	71%	100%	36%
Linkages with Other State Agencies	30%	71%	100%	43%
PUBLIC INFORMATION				
Hotline	20%	71%	100%	33%
Fewer than 100 calls per month	59%	50%	0%	54%
Between 100-500 calls per month	38%	33%	0%	33%
More than 500 calls per month	3%	17%	100%	13%
Targeted Outreach	0%	0%	75%	10%
Average Number of EPA Citizen's Guides Distributed	7,500	8,900	300,000	20,500 n = 23
State-developed Publications Produced	45%	86%	100%	55%
PROBLEM ASSESSMENT				
EPA/State Survey Completed or Underway	72%	71%	75%	73%
State-sponsored Surveys	50%	100%	100%	65%
Water Surveys	3%	29%	0%	6%
School Surveys	13%	43%	0%	14%
Free, Subsidized, or At-cost Meas. Devices	25%	43%	75%	31%
PROBLEM RESPONSES				
State List of Measurers	60%	83%	100%	67%
State List of Mitigators	45%	33%	100%	45%
State-sponsored Mitigation Demonstrations	15%	29%	50%	18%
Mitigation Statistics Collected	3%	17%	75%	14%
State Training Programs	13%	43%	75%	18%
EPA Training Programs in Use	45%	17%	0%	37%

n = Number of States reporting data for that item

MODERATE PROGRAMS

Programs in States with moderate programs had slightly less than 2 FTEs working on radon, and an average budget of $198,600. These programs all had a State policy, two-thirds had linkages to other State programs, and radon-related legislation had been enacted in all but one (Connecticut) of the States with moderate programs.

All these moderate States have developed their own radon-related publications. Five of these States have hotlines and six of the seven moderate States handled an average of 140 calls per month in 1989, ranging from 20 to 600 calls per month. Two of the moderate program States (California and Illinois) are involved with school surveys. Aside from maintaining State lists of measurement companies, State involvement in measurement and mitigation activities and training in 1989 was more limited. However, three moderate States (Delaware, Connecticut, and Illinois) offered subsidized measurement assistance.

EXTENSIVE PROGRAMS

States classified as extensive have programs which are effectively addressing the radon problem in a manner appropriate to the particular State. The four States considered to have extensive programs are: Florida, New Jersey, New York, and Pennsylvania.

These States had large solidly funded programs (average budget of $1.4 million, and an average of 16 FTEs) that are linked to other programs in the State. The extensive States all have developed State-specific publications on radon, and have distributed large numbers of State and EPA publications. Three of these four States are responding to more than 500 calls per month and all have outreach programs targeted at high risk populations. These extensive programs have all sponsored State surveys. New York and Pennsylvania also offer free or subsidized testing. New Jersey offers free or subsidized testing only if it is confirmatory or part of the cluster program.

One of these States with extensive programs is also involved in mitigation efforts. In New Jersey, the State Housing and Mortgage Finance Agency offers low-interest loans for home improvement to include radon mitigation. All the extensive program States have lists of mitigators, and offer or approve training programs in measurement and mitigation. Mitigation statistics are being collected and maintained in some form in all four of the extensive program States.

CONCLUSIONS

The most striking difference between core, moderate and extensive States was in program funding; average budgets were $62,400 in core States, $198,600 in moderate States, and $1.4 million in extensive program States. The difference in average reported FTEs (1 FTE in core programs, 1.9 FTEs in moderate programs, and 16 FTEs in extensive programs) was in the same direction. The presence of proposed or enacted legislation and linkages to other State agencies also seems to reflect a program which is becoming more established.

The monthly number of reported calls - whether to a hotline or to the designated agency - shows a regular increase from core to moderate to extensive categories. There is a move toward development of State specific publications in the more developed radon programs. Most core States (79%) either send out EPA brochures or produce copies of EPA materials with the State logo affixed. However, 100% of both moderate and extensive programs either replace or supplement EPA materials with their own brochures or fact sheets. Several States are conducting targeted outreach-public information efforts which are geared to reach selected subgroups of the population. At this time, all targeted outreach activities reported by States are most commonly directed to homeowners in high-risk areas. There are no low-income public information initiatives as yet.

The major difference in problem characterization by level of development is in surveys sponsored by States on their own initiative. All of the moderate and extensive States have sponsored at least one, and sometimes more than one, survey of radon in homes compared to only 50% in core States. School surveys are still relatively rare even in States with extensive programs; only 24% of States have characterized the extent of the school radon problem in their States. Of the 12 States that reported any school survey activity, seven were referring to participation in the EPA School Measurement Protocol Development Study. Only eight States (five core and three moderate) are conducting State-sponsored measurement of radon in school buildings. Three States also report conducting surveys of radon in water.

Programs to provide measurement devices free or at a reduced cost to homeowners or to schools are not widespread and do not appear to vary with program level. The three subsidized measurement programs in extensive States are restricted to follow-up measurements in homes that already have demonstrably high levels of radon.

Support of ongoing measures to respond to elevated levels of indoor radon is generally more limited. Most activity in problem response is found in the four States with extensive programs. States with programs at the core and moderate levels show very little activity in problem response, and tend to rely on support provided by EPA in the area of problem response. For example, while all States

have available the EPA RMP list to respond to inquiries, extensive States have expanded their capability to provide State specific lists of both measurement and mitigation companies. Moderate States also have their own lists of measurement companies, but only three maintain lists of companies which do mitigation.

Core, moderate and extensive programs use EPA RRTC courses to deliver mitigation training to contractors and local officials. In addition, 80% of States with extensive programs have developed their own mitigation training courses as compared to about 13 percent of the core and moderate States. Likewise, State-sponsored projects to investigate and develop mitigation methods are disproportionately found in States with extensive programs. Finally, extensive States collect the mitigation statistics from contractors which form the basis of any assessment of the overall success of the radon program in reducing radon risk to their citizens.

In conclusion, this report presents a snapshot of the extent to which States throughout the country are actively involved in the development of radon programs. In many parts of the country, considerable activity has been undertaken to provide information to the public about the risk of radon. In most States, surveys have been conducted to characterize the nature of the indoor air radon problem, and some States are also sponsoring their own surveys. Many States are actively involved in the provision of, and training in, testing and mitigation procedures; however, the number of homes where mitigation has actually taken place is still small. With the support of SIRG, States are undertaking activities which will lead to further program development.

STATE TABLES

TABLE 6.

PROGRAM MANAGEMENT:
ORGANIZATION, RESOURCES, AND LEGISLATION

State	Name of Lead Agency	State Policy (Yes/No)	Appropriation	Radon FTE's	Legislation Enacted: Summary	Legislation Enacted: Effective Date
Alabama	Dept Public Health	Yes	None			
Alaska	Health & Social Svcs	Yes	$ 80,000	0.25	Radon info. prog. (HJR38)	1988
Arizona	Radiation Reg Agcy	Yes	$ 80,000	2		
Arkansas	Dept of Health	Yes	None			
California	Dept of Health Svcs	Yes	$350,000	2	Disclos. of radon in resid. real estate (AB584)	1989
					State must consider EPA radon-resis. bldg. stand. (SB364)	1989
Colorado	Dept of Health	Yes	$ 38,000		All public schools must be tested. (DOH-neg.10-102)	1989
Connecticut	Dept of Health Svcs	Yes	$400,000 (FY87)	1.5		
Delaware	Health & Social Svcs	Yes	None	2	Mea & Mit. Co. must be EPA listed; register with the State	1988
					Radon study resol.	1987
District of Columbia	Consumer & Reg Affairs	Yes	None			
Florida	Health & Rehab Svcs	Yes	$700,000	11	Radon advis. council, public info. prog., bldg. codes, funding, mand. test. schools, day care, 24-hr. facil., cert. of meas. & mitig., disclos. in real estate transac. (HB1420)	1988
					Radon stand., radon resis. bldg. tech. in new construct., info. prog. (FAC 10D-91)	1984

Blank = no activity or no data reported

TABLE 6. (Continued)

PROGRAM MANAGEMENT:
ORGANIZATION, RESOURCES, AND LEGISLATION

State	Name of Lead Agency	State Policy (Yes/No)	Appropriation	Radon FTE's	Legislation Enacted Summary	Effective Date
Georgia	Dept Human Res.	Yes	$15,000	0.5	Committee to study, report on radon (HR548)	1987
Hawaii	Dept of Health	Yes	None			
Idaho	Health & Welfare	Yes	$ 3,500/FY89	0.25		
Illinois	Dept Nuclear Sfty	Yes	$100,000	2	Prog. dvlpmnt & consumer fraud provisions (HB2709)	1989
					Regis. testers (H1611)	1989
Indiana	State Bd of Health	Yes		2	Cert meas. & mitig. firms (HA1837)	1989
Iowa	Dept of Public Hlth	Yes	$105,000	2	Cert meas. (HF2354)	1988
					Create Task Force	1987
Kansas	Health & Environ.	Yes	None	1		
Kentucky	Dept of Health Svcs	Yes		1		
Louisiana	Dept Environ Qlty	No	$ 3,000(FY88)	0.1		
Maine	Dept Human Svcs.	Yes	$121,000	3.5	Task Force to study, report on radon (HP760)	1987
Maryland	Dept of Environ	Yes	$100,000	1	Cert. radon tsters, RMP list (HB567)	1988
					Task Force to study, report on radon; survey (HJR24)	1987

Blank = no activity or no data reported

TABLE 6. (Continued)

PROGRAM MANAGEMENT:
ORGANIZATION, RESOURCES, AND LEGISLATION

State	Name of Lead Agency	State Policy (Yes/No)	Appropriation	Radon FTE's	Legislation Enacted: Summary	Legislation Enacted: Effective Date
Massachusetts	Dept of Public Hlth	Yes	None	1		
Michigan	Dept of Public Hlth	Yes	$209,600	1		
Minnesota	Dept of Health	Yes	None	1		
Mississippi	Dept of Health	Yes	None	None		
Missouri	Dept of Health	No	None	None		
Montana	Health & Env Sciences	Yes	None	None		
Nebraska	Dept of Health	Yes	None	0.25	Cert. meas. & mitig. firms (LB390)	1989
Nevada	Dept of Human Res	Yes	None	None		
New Hampshire	Health & Human Svcs	Yes	$105,000(FY87)	1	Radon survey, info. prog., tech. consult., test wells new construc.(SB260)	1988
New Jersey	Env Protection	Yes	$1.2 M/FY90	16	Radon resis. construc., builder liab. (SN2961)	1989
					Cert. of meas. & mitig. firms (AN2371)	1986
					Fund program, State survey, EPI study, confirm. monit. prog.,public info. & educ., toll free hot line (AN4112)	1986

Blank = no activity or no data reported

TABLE 6. (Continued)

PROGRAM MANAGEMENT:
ORGANIZATION, RESOURCES, AND LEGISLATION

State	Name of Lead Agency	State Policy (Yes/No)	Appropriation	Radon FTE's	Legislation Enacted: Summary	Legislation Enacted: Effective Date
New Mexico	Health & Environ	Yes	None	5		
New York	Dept of Health	Yes	$6.7 M (for three years)	15	Approp. stripper well funds (SB6496)	1987
					Studies & funds (AB9594)	1986
North Carolina	Dept of Environ	Yes	None	1		
North Dakota	Dept of Health	Yes	None	1.2		
Ohio	Dept of Health	Yes	None	0.5		
Oklahoma	Dept of Health	No	None	0.125		
Oregon	Dept of Human Res	No	None	0.25		
Pennsylvania	Dept of Env Res	Yes	$1.4 M	21	Cert. of meas. & mitig. firms (SB137)	1987
					Demo proj.; low interest loans (HB1934)	1986
Rhode Island	Dept of Health	No	None	0.33	Radon testing advisory in real estate sales (S2789)	1988
South Carolina	Health & Env Cntrl	Yes	None	<1.0		
South Dakota	Water & Nat Res	Yes	None	0.2		

Blank = no activity or no data reported

TABLE 6. (Continued)

PROGRAM MANAGEMENT:
ORGANIZATION, RESOURCES, AND LEGISLATION

State	Name of Lead Agency	State Policy (Yes/No)	Appropriation	Radon FTE's	Legislation Enacted Summary	Effective Date
Tennesse	Health & Environ	Yes	$150,000(FY87)	2	Geo. study, public educ., pilot test public bldgs, conting. on fed. funds (HJR515)	1988
Texas	Dept of Health	No	None	0.5		
Utah	Dept of Health	Yes	None			
Vermont	Dept of Health	Yes	None	0.33		
Virginia	Dept of Health	Yes	$52,700	1	Mit. co. must be EPA listed (HB1403)	1989
					Mea. Co. must be EPA listed (HB746)	1988
					Task force to study, report on radon (HJR229)	1987
Washington	Dept of Health	Yes	None	1.25		
West Virginia	Dept of Health	Yes		0.8		
Wisconsin	Health & Soc Svcs	Yes	$ 30,000	0.5		
Wyoming	Health & Med Svcs	Yes	None			

Average Radon Budget: $356,000 (n=21)
Average Radon FTE's: 2.6 (n=39)
Number of States With Enacted Legislation: 19

Blank = no activity or no data reported

TABLE 7.

PROGRAM MANAGEMENT: LOCAL INITIATIVES

State	Program Management	Public Information	Problem Assessment	Problem Response
Alabama				
Alaska		X		
Arizona			X	
Arkansas		X	X	
California			X	
Colorado			X	
Connecticut	X	X	X	
Delaware				
District of Columbia				
Florida				
Georgia				
Hawaii				
Idaho				
Illinois				
Indiana			X	
Iowa			X	
Kansas				
Kentucky			X	
Louisiana				
Maine				
Maryland				
Massachusetts			X	
Michigan			X	
Minnesota		X	X	
Mississippi			X	
Missouri		X		
Montana				
Nebraska		X	X	
Nevada				
New Hampshire			X	
New Jersey			X	
New Mexico				
New York			X	
North Carolina	X	X	X	
North Dakota	X	X	X	
Ohio	X		X	
Oklahoma			X	
Oregon		X	X	

Blank = no activity or no data reported

TABLE 7. (Continued)

PROGRAM MANAGEMENT: LOCAL INITIATIVES

State	Program Management	Public Information	Problem Assessment	Problem Response
Pennsylvania			X	
Rhode Island	X		X	
South Carolina	X			
South Dakota				
Tennessee				
Texas				
Utah				
Vermont				
Virginia				
Washington				
West Virginia				
Wisconsin		X	X	X
Wyoming				
Totals:	6	10	24	1

Total Local Initiatives: 40

States with Local Initiatives: 19 of the 40 Core
5 of the 7 Moderate
3 of the 4 Extensive

Total Number of States With Local Initiatives: 27 States

Blank = no activity or no data reported

TABLE 8. PUBLIC INFORMATION ACTIVITIES

State	EPA MATERIALS SENT OUT			STATE MATERIALS DISTRIBUTED		TELEPHONE INQUIRIES	
	A Citizen's Guide to Radon	Radon Reduction Methods	Radon Mitigation Technical Guidance	Yes/No	No Copies Sent	Hotline Yes/No	Avg. Calls Per Month
Alabama	---	---	---	No		No	30
Alaska	---	---	---	No		No	29
Arizona	4,592	4,592	---	No		No	100
Arkansas	---	---	---	No		No	50
California	---	---	---	Yes	---	Yes	---
Colorado	700	700	700	No		No	250
Connecticut	20,000	10,000	---	Yes	25,000	Yes	625
Delaware	500	400	---	Yes	---	Yes	20
District of Columbia	---	---	---	Yes	5,000	No	70
Florida	---	---	---	Yes	---	Yes	750
Georgia	---	---	---	No		No	250
Hawaii	24	6	---	No		No	2
Idaho	---	---	---	No		No	50
Illinois	1,400	500	500	Yes	250	No	300
Indiana	22,000	10,000	---	Yes	22,000	Yes	80
Iowa	---	---	---	Yes	---	Yes	50
Kansas	---	---	---	Yes	---	No	115
Kentucky	2,000	---	---	No		No	50

--- = number not reported

TABLE 8. PUBLIC INFORMATION ACTIVITIES
Continued

State	EPA MATERIALS SENT OUT			STATE MATERIALS DISTRIBUTED		TELEPHONE INQUIRIES	
	A Citizen's Guide to Radon	Radon Reduction Methods	Radon Mitigation Technical Guidance	Yes/No	No Copies Sent	Hotline Yes/No	Avg. Calls Per Month
Louisiana	---	---	---	No		No	6
Maine	15,000	8,000	75	Yes	10,000	No	300
Maryland	1,000	1,000	30	Yes	---	Yes	250
Massachusetts	50,000	---	---	Yes	50,000	No	300
Michigan	10,000	---	300	Yes	500	No	100
Minnesota	10,500	5,000	2,500	Yes	---	No	990
Mississippi	---	---	---	No		No	10
Missouri	---	---	---	Yes	---	Yes	215
Montana	---	---	---	No		No	50
Nebraska	---	---	---	No		No	66
Nevada	250	250	---	No		No	6
New Hampshire	10,000	10,000	200	No		Yes	200
New Jersey	---	---	---	Yes	55,000	Yes	1,877
New Mexico	500	500	---	No		No	25
New York	---	---	---	Yes	137,000	Yes	---
North Carolina	---	---	---	Yes	---	No	50
North Dakota	2,500	1,000	100	Yes	1,000	Yes	---
Ohio	---	---	---	Yes	---	Yes	250

--- = number not reported

TABLE 8. PUBLIC INFORMATION ACTIVITIES
Continued

State	EPA MATERIALS SENT OUT			STATE MATERIALS DISTRIBUTED		TELEPHONE INQUIRIES	
	A Citizen's Guide to Radon	Radon Reduction Methods	Radon Mitigation Technical Guidance	Yes/No	No Copies Sent	Hotline Yes/No	Avg. Calls Per Month
Oklahoma	---	---	---	No		No	25
Oregon	---	---	---	Yes	800	No	66
Pennsylvania	300,000	200,000	1,000	Yes	---	Yes	1,500
Rhode Island	500	500	---	No		No	40
South Carolina	---	---	---	No		No	20
South Dakota	---	---	---	No		No	25
Tennessee	---	---	---	No		No	450
Texas	---	---	---	No		No	30
Utah	---	---	---	No		No	---
Vermont	200	20	10	Yes	---	No	150
Virginia	7,000	---	---	Yes	24,000	Yes	160
Washington	---	---	---	Yes	800	Yes	---
West Virginia	5,000	---	---	Yes	---	Yes	60
Wisconsin	7,800	2,400	2,400	Yes	300	No	200
Wyoming	---	---	---	Yes	---	No	60

--- = number not reported

TABLE 8. PUBLIC INFORMATION ACTIVITIES
Continued

State	EPA MATERIALS SENT OUT: A Citizen's Guide to Radon	EPA MATERIALS SENT OUT: Radon Reduction Methods	EPA MATERIALS SENT OUT: Radon Mitigation Technical Guidance	STATE MATERIALS DISTRIBUTED: Yes/No	STATE MATERIALS DISTRIBUTED: No Copies Sent	TELEPHONE INQUIRIES: Hotline Yes/No	TELEPHONE INQUIRIES: Avg. Calls Per Month

Number of States Distributing State-Developed Materials:	28 (18 Core, 6 Moderate, 4 Extensive)
Number of States Reporting Less Than 100 Calls Per Month:	25 (22 Core, 3 Moderate)
Number of States Reporting 100-500 Calls Per Month:	16 (14 Core, 2 Moderate)
Number of States Reporting More Than 500 Calls Per Month:	5 (2 Core, 3 Extensive)
Number of States Not Reporting Number of Calls:	5 (3 Core, 1 Moderate, 1 Extensive)

--- = number not reported

TABLE 9. PROBLEM ASSESSMENT: RADON SURVEYS

EPA/State Radon Survey				State-Sponsored or Other Surveys			
State	Year	Homes Measured	Percent >4pCi/L	Sponsor	Type	Unit Measured	Percent >4pCi/L
Alabama	1987	1,200	6%				
Alaska	1989	1,127	8%	State/Terradex	Homes	606	17%
Arizona	1988	1,507	7%	State/ASU	Homes	200	
Arkansas	1988			State	Homes	351	
California	1990	2,000	2%	State	Homes	400	
				State	School districts	29	
Colorado	1987	1,400	41%	State/EPA	Well Water		
Connecticut	1987	1,450	19%	State	Well Water	262	11%
				State	Homes	3,409	10%
Delaware	1989				Schools	150	
					National Guard	30	
D.C.	--						
Florida	--			State	Homes	6,000	4%
Georgia	1989	1,534	8%				
Hawaii	1990	523	0.4%				
Idaho	1990	1,140	19%	BPA	Homes	1,000	
				State	Schools	1,100	
Illinois	--			State	Schools	47	25%> 4pCi/L
				State	State Bldg.	26	3>4pCi/L
				State	Homes	2,269	38%
				City of E Moline	Homes	96	80%

Blanks = no activity or no data reported
* Data not yet available
-- Survey has not yet been conducted

TABLE 9. PROBLEM ASSESSMENT: RADON SURVEYS
(Continued)

	EPA/State Radon Survey			State-Sponsored or Other Surveys			
State	Year	Homes Measured	Percent >4pCi/L	Sponsor	Type	Unit Measured	Percent >4pCi/L
				McDonough City	Homes	47	77%
Indiana	1988	1,900	28%	Peoria/ALA	Homes	10,000	77%
				Bartholomew City	Homes	461	63%
				Ball State Univ.	Homes	4,000	27%
Iowa	1989	1,381	71%	ISU & UI	Homes		
Kansas	1987	2,000	22%				
Kentucky	1987	900	17%	State	Schools	150 sch. districts	40%, at least 1 sch
Louisiana	1990	1,300	0.8%				
Maine	1989	839	30%	State	Wells	4,560	
				State	Homes	1,600	40%
Maryland	--						
Massachusetts	1988	1,659	23%	State	Homes	200	25%
Michigan	1987	1,989	12%				
Minnesota	1988	919	46%				
Mississippi	--						
Missouri	1988	1,859	17%				
Montana	--						
Nebraska	1990	2,000	54%				
Nevada	1990	1,560	10%	State	Homes	350	20%
New Hampshire	--			State	Homes	1,658	26%
New Jersey	1989			State	Homes	6,000	32%
New Mexico	1989	1,887	22%				
New York				State	Homes	2,401	10%

Blanks = no activity or no data reported
* Data not yet available
-- Survey has not yet been conducted

TABLE 9. PROBLEM ASSESSMENT: RADON SURVEYS
(Continued)

EPA/State Radon Survey				State-Sponsored or Other Surveys			
State	Year	Homes Measured	Percent >4pCi/L	Sponsor	Type	Unit Measured	Percent >4pCi/L
North Carolina	1990	1,200	7%	Forsyth Co.	Schools		
North Dakota	1988	1,600	61%	UND	Homes	1,000	
Ohio	1989	1,734	29%	Cincinnati Health Dept.	Homes	7 counties	25%
				OAQDA: Ohio	Homes	13counties	
				RAPCA: Dayton	Schools	5	
				Youngstown St. U	Homes	1,000	
				Mansfield & Richland counties	Homes	369	52%
Oklahoma	1990	1,500	3%	Private Company	Homes	112	11%
Oregon	--			BPA	Homes	10,000	
				State	Homes		10%
Pennsylvania	1988	3,000	40%	State	Homes	29,050	
Rhode Island	1987	500	21%				
South Carolina	1990	1,000	40%				
South Dakota	--	1,000					
Tennessee	1987	1,800	16%				
Texas	--						
Utah	--						
Vermont	1989	710	16%				
Virginia	--			State	Homes	735	
Washington	--			BPA	Homes	21,161	
West Virginia	1989	1,006	16%	State	Homes	6,700	
Wisconsin	1987	1,200	27%	Marathon Co	Homes	6,000	52%
				State	Homes	243	52%

Blanks = no activity or no data reported
* Data not yet available
-- Survey has not yet been conducted

TABLE 9. PROBLEM ASSESSMENT: RADON SURVEYS
(Continued)

	EPA/State Radon Survey				State-Sponsored or Other Surveys		
State	Year	Homes Measured	Percent >4pCi/L	Sponsor	Type	Unit Measured	Percent >4pCi/L
Wyoming	1987	800	26%	State	Schools	11	40%

Number of EPA/STATE Surveys Conducted through 1990: 36
Number of STATE-Sponsored Surveys Conducted through 1989: 29

Blanks = no activity or no data reported
* Data not yet available
-- Survey has not yet been conducted

TABLE 10.

PROBLEM ASSESSMENT:
STATE TESTING PROGRAMS AND STATE-SUBSIDIZED TESTING

	Free or State-Subsidized Testing	
State	Description	Number of Units
Alabama		
Alaska		
Arizona	Provide CC's* to counties	1,800
Arkansas		
California		
Colorado		
Connecticut	Free CC's	3,410
Delaware	Free CC's	
District of Columbia		
Florida		
Georgia	CC's available to vol. for State survey	
Hawaii		
Idaho		
Illinois	Annual ATD's+	All schools in 2 counties
Indiana		
Kentucky		
Louisiana		
Maine		
Maryland		
Massachusetts		
Michigan		
Minnesota		
Mississippi		
Missouri		
Montana		
Montana		
Nebraska		
Nevada		
New Hampshire	CC's at cost (prior to 1988)	2,000
New Jersey	Screen homes in cluster ID program/ confirmatory testing	1,045
New Mexico		
New York	Screening free or at cost	33,000 ATD's
North Carolina	CC's & analyt sources for schools	
North Dakota	UND distributes some CC's	
Ohio		
Oklahoma		

Blank = no activity or no data reported

TABLE 10. (Continued)

PROBLEM ASSESSMENT:
STATE TESTING PROGRAMS AND STATE-SUBSIDIZED TESTING

State	Free or State-Subsidized Testing Description	Number of Units
Oregon		
Pennsylvania	2 ATD's for Homes > 50pCi/L	
Rhode Island	At cost testing by RISE#	
South Carolina		
South Dakota		
Tennessee	Reduced cost ATD's for schools	
Texas		
Utah		
Vermont	Financial assistance to low-income	
Virginia		
Washington	Free CC's, $5 for analysis	12,000
West Virginia		
Wisconsin	Free CC's in Wausau	6,000
Wyoming		

Number Of States With Free or Subsidized Testing: 16

* Charcoal Cannisters
\+ Alpha Track Detectors
\# Rhode Island Saving Energy - a consumer group

Blank = no activity or no data reported

TABLE 11. PROBLEM ASSESSMENT: STATE MEASUREMENT AND DATABASE ACTIVITIES

State	Program for Monitoring and Follow-up (Action/Recommendation, Trigger Level - pCi/L)	Database of Measurement Results (Status, Confidentiality, Level of Detail, Number of Elements)	Collection of Private Measurement Data (Collection Method)
Alabama			
Alaska	Advice on where to purchase, how to use & interpret results	Operational, confidential	By request
Arizona		Computerized, zip code	Voluntary
Arkansas		Not computerized	U of Pittsburgh sends
California			
Colorado		Computerized	Voluntary
Connecticut	Advice to Hlth Dept on monitoring homes adjacent to structures ≥100 Pci/L Air, >100pCi/L water	Computerized, zip code	By request
Delaware	Follow-up testing, ≥10pCi/L	Computerized, county & zip code, confidential	By request
D.C.			
Florida	Under development	Planned	Required
Georgia		Computerized, zip code & county	
Hawaii			
Idaho	Advice	Computerized, confidential	Voluntary
Illinois	Confirmation of measure >50pCi/L	Computerized, confidential, zip code	

Blanks = no activity or no data
Computerized = data is accessible through a computerized database
Operational = Mechanism exists for collecting and maintaining data (computerization was not reported)

TABLE 11. PROBLEM ASSESSMENT: STATE MEASUREMENT AND DATABASE ACTIVITIES

(Continued)

State	Program for Monitoring and Follow-up (Action/Recommendation, Trigger Level - pCi/L)	Database of Measurement Results (Status, Confidentiality, Level of Detail, Number of Elements)	Collection of Private Measurement Data (Collection Method)
Indiana	AT follow-up, 10pCi/L contact homeowner >50pCi/L	Computerized, zip code, 3,000 results	Required
Iowa	Confirm survey meas. >40pCi/L	Computerized	
Kansas	Home visit if, >20pCi/L	Computerized	
Kentucky	Confirm high measurement	Computerized, zip code & county	By request
Louisiana			Voluntary
Maine	Home visit if >100 pCi/L		By request
Maryland		Computerized	Voluntary
Massachusetts	Follow-up w/AT's, >20pCi/L	Computerized, confidential, 8,000 results	Voluntary
Michigan	Follow-up school, homes screened in EPA survey, >20pCi/L	Computerized, zip code	None
Minnesota	DOH 6 month ATD in homes screened, >20pCi/L	Computerized, confidential, zip code	Pending
Mississippi		Not computerized, zip code & county	Pending

Blanks = no activity or no data
Computerized = data is accessible through a computerized database
Operational = Mechanism exists for collecting and maintaining data (computerization was not reported)

TABLE 11. PROBLEM ASSESSMENT: STATE MEASUREMENT AND DATABASE ACTIVITIES

(Continued)

State	Program for Monitoring and Follow-up (Action/Recommendation, Trigger Level - pCi/L)	Database of Measurement Results (Status, Confidentiality, Level of Detail, Number of Elements)	Collection of Private Measurement Data (Collection Method)
Missouri		Computerized	None
Montana		Computerized	
Nebraska		Computer database availability exists	
Nevada		Not computerized, data only collected for NV Bur. of Mines and Geology	None
New Hampshire	At cost CC's	Computerized, >1000 results	Voluntary
New Jersey	Free confirmation tests, or Cluster ID Program	Computerized, confidential access, limited to DOH, DEP	Required
New Mexico		Computerized	Voluntary

Blanks = no activity or no data
Computerized = data is accessible through a computerized database
Operational = Mechanism exists for collecting and maintaining data (computerization was not reported)

TABLE 11. PROBLEM ASSESSMENT: STATE MEASUREMENT AND DATABASE ACTIVITIES

(Continued)

State	Program for Monitoring and Follow-up (Action/Recommendation, Trigger Level - pCi/L)	Database of Measurement Results (Status, Confidentiality, Level of Detail, Number of Elements)	Collection of Private Measurement Data (Collection Method)
New York	Cluster Prog. - measure 25 homes in 1 mi radius of problem house which is >200pCi/L;(free or at cost CC's and ATD's) <20 pCi/L leave ATD in place for 1 yr; >20pCi/L suggests follow-up	Computerized, confidential	Voluntary
North Carolina	Limited follow-up	Computerized, confidential, county	Voluntary
North Dakota		Operational	Voluntary
Ohio		Planned	
Oklahoma		Computerized	U. of Pittsburgh sends
Oregon	Telephone advice to callers	Computerized, confidential	
Pennsylvania	Free ATD > 20pCi/L	Computerized, confidential zip code & county	Required

Blanks = no activity or no data
Computerized = data is accessible through a computerized database
Operational = Mechanism exists for collecting and maintaining data (computerization was not reported)

TABLE 11. PROBLEM ASSESSMENT: STATE MEASUREMENT AND DATABASE ACTIVITIES

(Continued)

State	Program for Monitoring and Follow-up (Action/Recommendation, Trigger Level - pCi/L)	Database of Measurement Results (Status, Confidentiality, Level of Detail, Number of Elements)	Collection of Private Measurement Data (Collection Method)
Rhode Island	Visits to "hot" houses, >50pCi/L Telephone advice	Computerized, confidential	No
South Carolina		Computerized, zip code & county	
South Dakota		USGS Radon Bulletin Board Sys.	
Tennessee	Advice, reduced cost detectors for schools	Computerized, confidential zip code & county	
Texas		Not computerized	Voluntary
Utah	ADT to houses >4 pCi/L	Computerized	Voluntary
Vermont	Advice	Computerized, confidential, zip code, county & town	Voluntary
Virginia	Advice on long term testing and health risks	Computerized, location, 735 results	Voluntary
Washington	Advice	Computerized, confidential, Bonneville data	No
West Virginia	Letters from vendors	Computerized 4300 results	No

Blanks = no activity or no data
Computerized = data is accessible through a computerized database
Operational = Mechanism exists for collecting and maintaining data (computerization was not reported)

TABLE 11. PROBLEM ASSESSMENT: STATE MEASUREMENT AND DATABASE ACTIVITIES

(Continued)

State	Program for Monitoring and Follow-up (Action/Recommendation, Trigger Level - pCi/L)	Database of Measurement Results (Status, Confidentiality, Level of Detail, Number of Elements)	Collection of Private Measurement Data (Collection Method)
Wisconsin	CC's >20 pCi\L	Computerized, confidential, zip codes, names, addresses & housecodes, 16,000 results	Collected, not entered
Wyoming			

Blanks = no activity or no data
Computerized = data is accessible through a computerized database
Operational = Mechanism exists for collecting and maintaining data (computerization was not reported)

TABLE 12.
PROBLEM RESPONSE ACTIVITIES

State	State-sponsored Mitigations	Private Mitigations
Alabama		
Alaska		
Arizona		
Arkansas		
California		
Colorado		
Connecticut	Review of H_2O mitigation	>1,000 subslabs
Delaware		
District of Columbia		
Florida		
Georgia		
Hawaii		
Idaho	1 - pending	
Illinois	3	
Indiana		
Iowa		
Kansas		
Kentucky		
Louisiana		
Maine		>95 Air; >100 Water
Maryland		
Massachusetts		10-50/yr
Michigan	RRTC, 3 Homes	
Minnesota	Dept. Public Services, 4 projects	Midwest U. Radon Consortium
Mississippi		
Missouri		
Montana		
Nebraska		
Nevada		
New Hampshire	1 project - water	
New Jersey	EPA/NAHB & DCA,* new home construction tech.	
New Mexico		
New York	NYSEO as part of hands-on training	
North Carolina		
North Dakota	schools, Forsyth County	
Ohio		

* Dept. of Community Affairs

Blank = no activity or data reported

TABLE 12. (Continued)

PROBLEM RESPONSE: ACTIVITIES

State	State-sponsored Mitigations	Private Mitigations
Oklahoma		
Oregon		
Pennsylvania		
Rhode Island		
South Dakota		
Tennessee		
Texas		
Utah		13 homes
Vermont		
Virginia		
Washington		
West Virginia		
Wisconsin	2	40-50
Wyoming		

Blank = no activity or data reported

☆ U.S. Government Printing Office : 1991 - 281-724/43576