

United States Environmental Protection Agency
National Radon Proficiency Programs

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ABSTRACT

This paper describes the U.S. Environmental Protection Agency's voluntary *National Radon Proficiency Programs: Radon Measurement & Reduction Proficiency*, including their history and development, current status and future directions. The *Radon Measurement Proficiency (RMP)* and *Radon Contractor Proficiency (RCP)* programs are fundamental to the Agency's program to reduce the health risk associated with exposure to elevated radon levels in indoor air.

Originally developed to provide technical assistance to States, the proficiency programs now offer U.S. consumers assurance of the quality of their radon measurements and reduction jobs. In other words, the proficiency programs provide a means to consumers for deciding from which organizations or individuals to purchase radon services. This is especially important in the United States where most radon services are acquired through private enterprises rather than through the public sector.

The Agency encourages the public to purchase radon measurement and reduction services only from organizations or individuals that have met the requirements of EPA's proficiency programs. An increasing number of States require an EPA proficiency listing for their radon registration, licensing, and certification programs. EPA estimates that about 85% of U.S. companies offering radon services are participating in its proficiency programs. Consequently, the Agency believes that the development and growth of quality radon services has kept pace with consumer demand.

The United States marketplace for residential radon measurement and mitigation services has been dynamic since its inception in the mid-1980's. The fluidity of the market is likely to continue, with some significant changes appearing imminent. The U.S. Congress is now considering legislation that would require participation in the Agency's radon proficiency programs. In addition, this legislation contains provisions that would encourage consumer testing. Increased testing, coupled with a mandatory national proficiency program, is likely to result in an increase in the quality of radon services available to the U.S. public.

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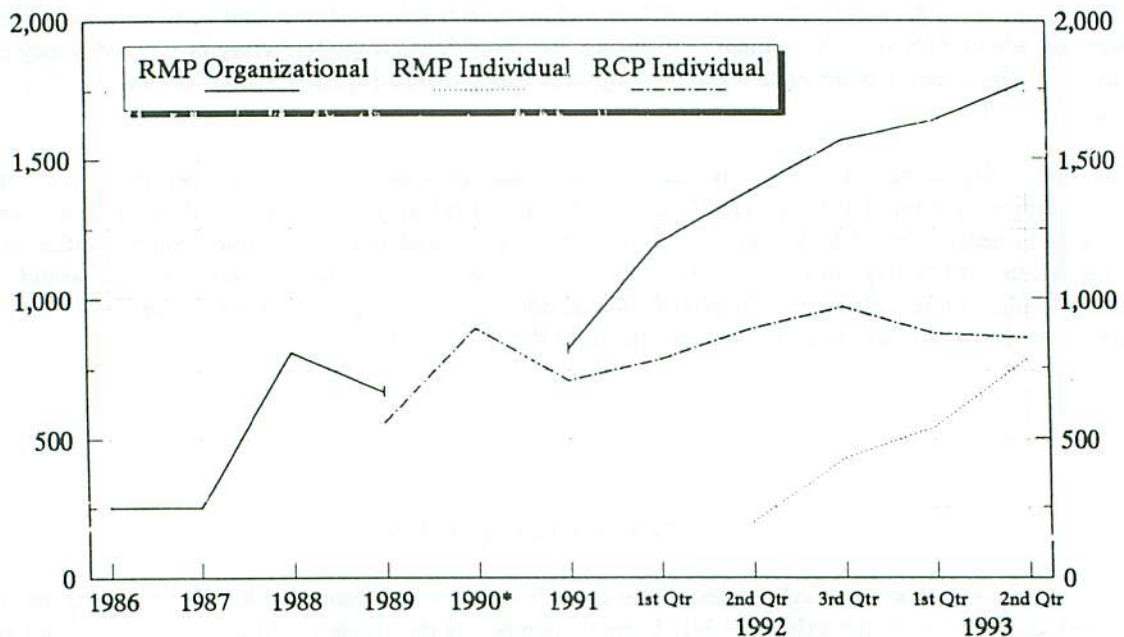
1. Introduction

The Environmental Protection Agency administers and operates programs designed to determine the proficiency of organizations or individuals offering radon measurement and radon reduction services in the U.S.. Participation in these programs is voluntary; in other words, a company or individual may decide whether to participate or not. At the moment, there is no Federal government regulation that requires participation in EPA's proficiency programs. The American consumer is encouraged to purchase radon services only from providers who have met the requirements of these programs.

In the mid-1980's, public recognition of the health risk posed by elevated levels of indoor radon led to a rise in the demand for radon measurement services. The Agency and the States soon began to hear rumors of radon tests being conducted with glass jars. These and other stories of obvious consumer fraud led EPA in 1986 to create the Radon Measurement Proficiency (RMP) program. The program, which began with about 39 companies, now includes over 1,800 organizations using more than 150 types of measurement devices. The participation history in Exhibit 1-1: *Proficiency Program Participation 1986-1993*, demonstrates their recent and rapid growth.

The RMP program was modified in 1991 to include a proficiency component for determining the ability of individual testers to provide reliable radon measurement services in the home. The need for the individual component of the RMP program arose due to the large number of organizations using measurement technicians to place and retrieve measurement devices, as part of their measurement services.

Exhibit 1-1: Proficiency Program Participation 1986-1993.



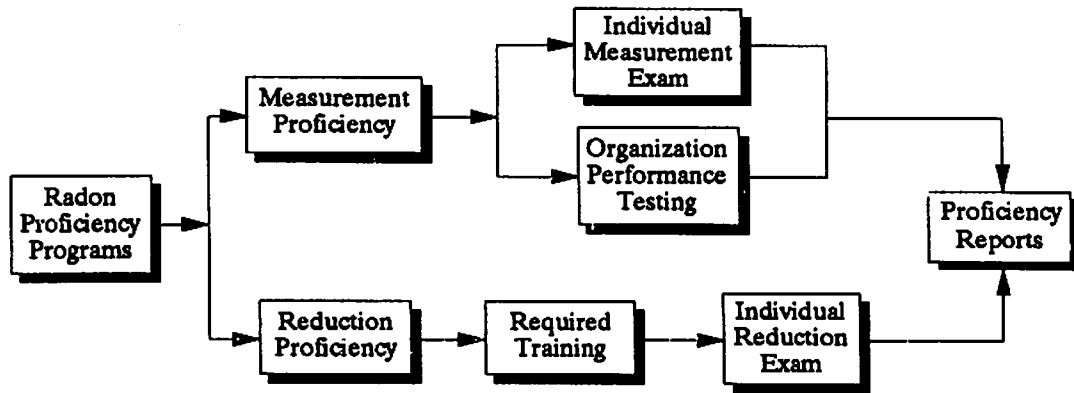
Notes: (1) In September 1991, some RCP participants were delisted for not meeting the hands-on mitigation training requirement; (2) In January 1993, some RCP participants were delisted for not meeting the biennial re-exam requirement; (3) The RMP program was closed to new applicants between November 1989 and April 1991, while the Agency made improvements to the program.

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By 1989, the need for a similar type of proficiency program for radon reduction contractors was felt by the Agency. The Radon Contractor Proficiency (RCP) program, which requires hands-on training and successful completion of a written examination, evaluates the proficiency of individuals offering radon reduction services. This program, like the RMP program, saw a rapid growth in participation in its early phases. Both the RMP and RCP programs are operated as required by Congress in Section 305 of the 1988 Indoor Radon Abatement Act (IRAA).

Participants that succeed in demonstrating their proficiency are *listed* by the Agency. Information on currently listed proficient organizations and individuals, is periodically compiled in a series of *Proficiency Reports*, and distributed to the States for their use in advising consumers. Exhibit 1-2: *The Path to an EPA Proficiency Listing*, is an overview of the process an applicant typically follows in the quest for an EPA measurement or mitigation proficiency listing.

Exhibit 1-2: The Path to an EPA Proficiency Listing.



2. The Radon Measurement Proficiency Program

The Radon Measurement Proficiency (RMP) program evaluates the ability of organizations and individuals to provide reliable and accurate radon measurement services. An organization may provide either primary or secondary measurement services. Companies that offer primary measurement services are equipped to provide laboratory analysis of measurement devices. Companies offering secondary measurement services must obtain the necessary measurement analysis from an EPA listed primary measurement services organization.

More stringent quality assurance requirements are placed on those offering primary measurement services. These organizations must: (1) pass a measurement performance test; (2) operate with a Quality Assurance Plan and Standard Operating Procedures, that are subject to EPA review and approval; and, (3) follow EPA measurement protocols and guidance.

Because companies can offer measurement services using a number of different measurement devices or methods, EPA requires participants to demonstrate proficiency for each device or method employed. This discourages organizations from passing the measurement performance test with one particular device and offering their measurement services to consumers using a different device. Exhibit 2-1: *Radon Measurement Methods and Initial Performance Test Pass Rates*, shows the measurement methods used in the United States.

The radon measurement performance test itself evaluates the participant's ability to use and read or analyze the measurement device used. Each device tested must be accurate to within $\pm 25\%$ of the EPA target value. If the test outcome falls beyond 50% of the target value, the test is a failure. If the outcome falls in

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the range of 25% to 50% error, the test is repeated. This retest is considered a failure if the outcome is an error > ±25%. For most devices, a performance test consists of four independent exposures to varying concentrations of radon gas.

Exhibit 2-1: Radon Measurement Methods and Initial Performance Test Pass Rates.

<u>Measurement Method</u>	<u>Performance Test Pass Rate</u>	
1. UT--Unfiltered Track Detection**	100.0%	(4)
2. GC--Grab Radon/Activated Charcoal**	100.0%	(12)
3. ES--Electret ion Chamber: Short-term**	91.4%	(1133)
4. EL--Electret ion Chamber: Long-term**	87.1%	(665)
5. CW--Continuous Working Level*	87.0%	(115)
6. CR--Continuous Radon Monitoring*	82.8%	(302)
7. GS--Grab Radon/Scintillation Cell**	82.4%	(119)
8. LS--Charcoal Liquid Scintillation**	78.8%	(137)
9. AC--Activated Charcoal Adsorption**	78.0%	(819)
10. GW--Grab Working Level**	56.1%	(132)
11. AT--Alpha Track Detection**	50.5%	(105)
12. RP--Radon Progeny Integrating Sampling Unit*	50.0%	(2)

Notes: The numbers shown in parentheses--for 13 of the 15 methods--represent the total of the individual devices tested. A performance test (set) usually contains four devices (**) or one device (*). For example, the data show that only one UT test has been conducted, using four individual devices. No devices in three methods have been tested since June 1991: (13) GB--Grab radon/Pump-collapsible Bag**; (14) PB--Pump-collapsible Bag*; and, (15) SC--Evacuated Scintillation Cell**.

Performance test exposures occur in EPA's radon chambers located at its Las Vegas Facility (Las Vegas, Nevada), and the National Air and Radiation Environmental Laboratory (Montgomery, Alabama). Chamber conditions are intended to simulate the environment typically found in U.S. homes. To guide these exposures the Agency has established exposure ranges for the radon concentration and five other key indoor air parameters: (1) radon (Rn) 2-200 picocuries per liter (pCi/L) (74-7,400 Bq/m³); (2) radon decay products (working level) .01-1.4 WL; (3) temperature 55-90°F; (4) relative humidity (RH) 10-90%; (5) equilibrium ratio (ER) 10-70%; and, (6) air velocity (v) 0-30 feet per minute (fpm).

The performance test can be either an announced test or a blind test. In an announced test, the participant knows the test is taking place, but does not know what the target values of the chambers are. Typically, the announced test is used to qualify organizations entering the program. In addition, participants are subjected to an announced test every two to three years to ensure their continued proficiency.

In a blind test, a company is unaware that it is being tested by EPA. This is yet another way in which the Agency can check the services being provided to the consumer. Blind testing not only evaluates a company's ability to analyze a measurement device, but also its ability to accurately communicate this information to the consumer. In some cases, we have discovered that companies confuse one client's results with that of another.

Individual Proficiency. To answer the needs of States and consumers, the Agency added the individual component of the RMP program in 1991. A new subset of the radon industry had developed which was comprised of individuals that specialized in placing and retrieving measurement devices in the home, particularly with the increase of testing associated with real estate transactions. The Agency was concerned that these individuals might not have sufficient knowledge of EPA measurement protocols and might not be able to answer basic homeowner questions about radon, its health risks, the meaning of the test results, and the nature of mitigation approaches to fix the problem.

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The individual component of the RMP consists primarily of a written examination. The exam is designed to evaluate an individual's knowledge of measurement practices in six major subject areas: (1) evaluating the purpose of the test, and pre-test conditions; (2) performing measurements; (3) performing measurement analyses; (4) interpreting measurement results; (5) reporting results and findings; and, (6) professional standards of conduct and ethics. Individual testers must also be affiliated with an RMP-listed organization, and similarly, RMP-listed organizations must use individuals who have passed this exam to deploy measurement devices in the home.

3. The Radon Contractor Proficiency Program

Once the RMP Program was established and consumers began to perform more tests, the increasing number of homes found to have elevated radon levels indicated a possible nationwide trend. There arose a need to identify radon reduction contractors who could provide consumers with quality mitigation services. In October 1989, EPA expanded its proficiency program by establishing the voluntary Radon Contractor Proficiency (RCP) program.

The RCP program was originally designed to provide a minimum national standard for radon mitigation proficiency. It was intended as technical assistance to States, which were encouraged to use it as part of their radon certification programs. State certification programs could be based solely on EPA's proficiency programs, or used as a foundation upon which to build a State program with more stringent requirements.

Initially, the key elements of the RCP program were the national exam, interim mitigation guidelines and recommended continuing education. The Agency considered the need for mandatory training and continuing education requirements but felt that States could better require such conditions as part of their certification programs. Therefore, the Agency took a position of strongly recommending mitigation training, but did not require it during the program's first two years of operation.

In August 1991, the Agency instituted a 16-hour, hands-on mitigation training requirement; it's a prerequisite to taking the mitigation exam. The Agency made this change after carefully evaluating the exam scores of participants with and without prior training. EPA also considered State concerns over the need for mitigators to have consistent hands-on mitigation system installation knowledge. EPA established criteria for hands-on courses and for the approval of mitigation training providers and lead instructors. The Agency is still evaluating its recommendation for continuing education activities, but at this time believes it unnecessary to require continuing education.

Today, the RCP program has several elements that are--collectively--the basis for mitigation proficiency, and provide a measure of quality assurance for the public: (1) completing required hands-on training; (2) passing a national proficiency exam; (3) adhering to mitigation standards; (4) completing the recommended continuing education; and, (5) passing a re-examination every two years.

The centerpiece of the RCP program is the mitigation proficiency exam. The exam was developed to set a national baseline measure of proficiency by evaluating a contractor's knowledge of radon and radon reduction methods. The exam is comprised of 150 multiple-choice questions covering six major areas of mitigation practice: (1) evaluation of measurements; (2) diagnosis of radon entry; (3) mitigation strategy selection; (4) implementation of mitigation strategy; (5) evaluation of the mitigation system; and, (6) professional standards of conduct and ethics.

Individuals participating in the RCP program must adhere to the EPA mitigation standards. These standards include specific procedures relating to the application of various radon reduction methods. They also outline the basic minimum performance expected of mitigation contractors for the reduction of radon in residential buildings. The mitigation standards are periodically revised and updated to incorporate changes in technology, practice and policy.

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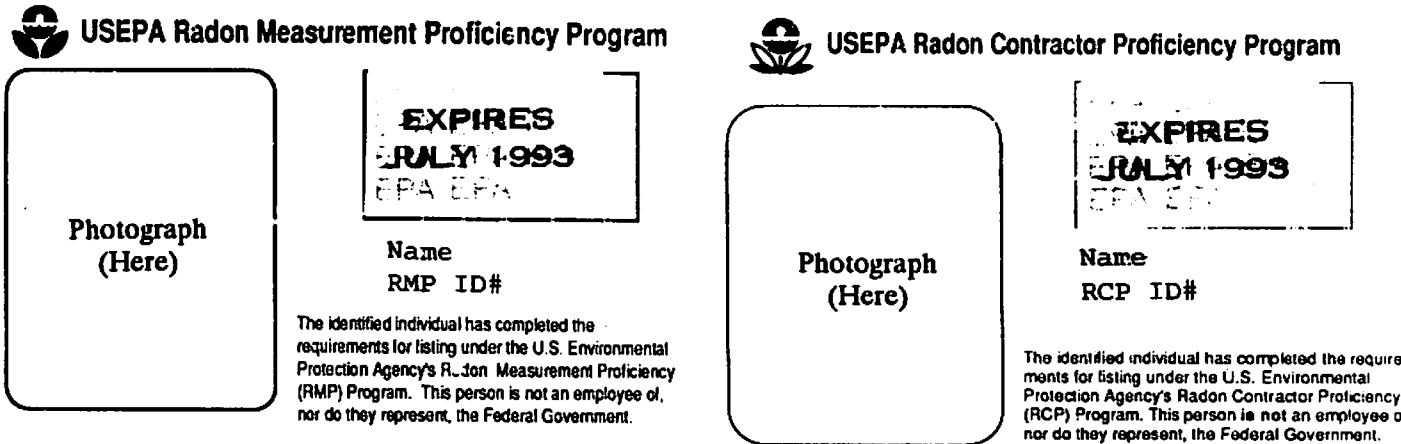
4. Regional Radon Training Centers

EPA established the (four) Regional Radon Training Centers in October 1989, to provide training and information services to government agencies and the radon industry. As a specialized network, the centers serve a wide variety of organizations involved in the radon issue. The centers currently provide training in support of EPA's proficiency programs, including the required RCP hands-on training, and preparation for the radon measurement and mitigation exams. Pass rates are averaging 80% for the mitigation exam, and 70% for the measurement exam. Since their inception, the centers have trained more than 3,400 participants by delivering more than 270 measurement and mitigation training courses. Also, more than 4,000 candidates have participated in more than 357 measurement and mitigation exam offerings, at locations in 44 States.

5. Consumer Protection

The ultimate purpose of EPA's proficiency programs is to provide assurance to consumers that the measurement and mitigation services they seek are accurate and reliable. To this end, the Agency strongly encourages consumers to use EPA-listed companies and individuals. To facilitate their ability to do so, the Agency regularly publishes lists of proficient testing organizations and individuals, and mitigation contractors. Consumers can get copies of these lists from their State radon office or EPA free of charge. Exhibit 5-1 are examples of the Agency's *RMP and RCP Program Individual Identification Cards*.

Exhibit 5-1: RMP and RCP Program Individual Identification Cards



(↑ Front -- Back ↓)

The EPA Radon Measurement Proficiency (RMP) Program is voluntary and it evaluates the proficiency of individuals that provide radon measurement services. EPA does not accredit, certify, recommend, or endorse listed individuals, nor is it responsible for work done, or liability incurred by the individual. Listed individuals must pass an initial written examination, and a re-examination every two years, and be affiliated with an RMP Listed Organization. To verify current listing status or to report problems, please call your State Department of Health or Environmental Protection.

The EPA Radon Contractor Proficiency (RCP) Program evaluates the proficiency of radon mitigation contractors. This voluntary program does not accredit, certify, recommend, or endorse listed contractors, nor is it responsible for work done, or liability incurred by the contractor. Contractors must pass a written examination, keep records on mitigation work, adhere to mitigation guidelines, complete continuing education requirements, pass a reexamination every two years and maintain a current listing on the RCP National Radon Contractor Proficiency List. To verify current listing or to report problems, please call your State Department of Health or Environmental Protection.

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EPA also provides individual testers and mitigation contractors with identification cards which let the consumer know immediately if they are dealing with an RMP or RCP-listed individual. When presented with this ID card, a consumer can be assured that his or her contractor is qualified to provide reliable radon services.

As a complement to the National program, a number of States have initiated their own certification programs for organizations or individuals offering radon services within their jurisdiction. This system provides an additional level of quality assurance to consumers. Individual States have tailored their certification programs to meet their own consumer needs. However, most States continue to rely on EPA's proficiency programs as the cornerstone of their own programs.

6. Future Directions

There is little doubt that EPA's proficiency programs will continue evolving. Changes in the proficiency programs come from many directions, most notably consumer demand for quality services and for protection from fraudulent practices and providers. Other key sources of change include Agency improvement initiatives and Congressional directives. Several such changes are either in progress or contemplated:

Oversight of Calibration Services. A number of private laboratories now offer calibration services to radon measurement companies. To date, EPA's RMP program has not overseen the delivery of these services, relying on its performance test to evaluate the ability of an organization to analyze radon detectors. One possible change would be to establish criteria for these calibration laboratories and a requirement that individual measurement companies demonstrate regular calibration by an EPA-approved calibration facility. This could reduce the need for measurement performance tests, while at the same time maintaining or improving measurement quality.

Specialized Individual Certification. Current emphasis in the proficiency programs is on residential services, i.e., the measurement and mitigation of single family residences. However, the level of testing and mitigation activity in schools and large buildings is growing. Recently, EPA released the results of its national school survey that demonstrates the existence of elevated radon levels in schools across the United States, and the need for qualified individuals to test and reduce radon levels in these schools. Experience has shown that testing and mitigation of these types of buildings differs from that in residences. EPA is now looking at the feasibility of creating specialized certification requirements for individuals wishing to provide radon services in a school or large building.

Reauthorization of the 1988 Indoor Radon Abatement Act. Legislation now being considered by the U.S. Senate would require participation in EPA's National proficiency programs for anyone offering radon services in the country. It is likely that the U.S. House of Representatives will consider similar legislation. Passage of such a law will likely increase the scope of the now voluntary RMP and RCP programs, and will provide the Agency with enforcement authorities. This can only enhance consumer confidence in radon measurement and mitigation services.

7. Conclusions

The Agency's proficiency programs continue to serve as the quality assurance standard for radon services for the Nation. One measure of this success is their increasing adoption by the States as a programmatic and regulatory requirement. Also, consumer demand for, and confidence in, radon services from EPA and State listed organizations and individuals is greater than ever. Participation in is at an all time high. The Agency believes that the overwhelming majority of radon services firms in the Nation are participating in the program. Also participating in the program, are several foreign based radon measurement device manufacturers, that lend an international flavor to the proficiency programs.

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This success is all the more remarkable given the voluntary nature of the programs. Many other factors have also contributed to this success. Perhaps some of the most important are the radon measurement and mitigation training; administration of the measurement and mitigation exams; and, information activities delivered by the States; and, the Regional Radon Training Centers. Another factor was the development and implementation of an individual proficiency component for residential radon measurement.

As a tool, the Agency's proficiency programs are now an even stronger model for the States in their efforts to develop and establish State radon certification programs. Although it's difficult to accurately predict the near-term future for the proficiency programs, continuing change is one certainty. The dynamics of the radon marketplace, the national economy, the outcome of pending Congressional legislative action, and the Federal budget for fiscal 1994, will all influence the character of the proficiency programs in the future.

8. References

8.1 National Radon Proficiency Program Documents

Strategy On Federal/State Cooperation For Radon Certification Program Development, EPA/CRCPD 22A-5000, January 1992.

Indoor Radon and Radon Decay Product Measurement Device Protocols, EPA 402-R-92-004, July 1992.

National Radon Proficiency Programs, Fact Sheet, EPA 402-F-93-002, 27-April-1993.

8.2 Radon Measurement Proficiency (RMP) Program Documents

RMP Handbook, EPA 520/1-91-006, February 1991.

RMP Application and Instructions, EPA 520/1-91-008, February 1991.

RMP Application Device Checklists, EPA 520/1-91-007, February 1991.

RMP National Proficiency Report, EPA 402-R-93-020-1N, July 1993 (tentative).

RMP State Proficiency Reports, EPA 402-R-93-020-1S, July 1993 (tentative).

Cumulative Data for Performance Test Outcomes, Fact Sheet, EPA 402-F-93-003, 2-February-1993.

RMP Measurement Exam Application, EPA 520/1-91-028, December 1991.

RMP Individual Proficiency Report, EPA 402-R-93-006, January 1993.

RMP Individual Proficiency Report: Indices, EPA 402-R-93-006, January 1993.

8.3 Radon Contractor Proficiency (RCP) Program Documents

RCP Handbook and Application, EPA 520/1-91-021, December 1991.

RCP Proficiency Report, EPA 402-R-93-005, January 1993.

RCP Proficiency Report: Indices, EPA 402-R-93-005, January 1993.

Interim Radon Mitigation Standards, 15-December-1991, as amended, October 1992.

Note: The *Standards* are contained in the January 1993 *RCP Proficiency Report*.

8.4 Radon Program Consumer Oriented Documents

Citizen's Guide to Radon, EPA 402-K-92-001, May 1992.

Consumer's Guide to Radon Reduction, EPA 402-K-92-003, August 1992.

Home Buyer's and Seller's Guide to Radon, EPA 402-R-93-003, March 1993.