

TWO YEARS OF RADON TRAINING  
AT THE  
REGIONAL RADON TRAINING CENTERS

By:

Alan Appleby \*\*  
Rutgers University  
Eastern Regional Radon Training Center  
Building 4087, Livingston Campus  
New Brunswick, New Jersey 08903

William Angell  
Midwest Universities Radon Consortium  
University of Minnesota  
1985 Buford Avenue (240)  
St. Paul, MN 55108-1011

Richard Beardmore  
Western Regional Radon Training Center  
Department of Industrial Sciences  
Colorado State University  
Fort Collins, CO 80523

Steve Sanders  
Southern Regional Radon Training Center  
Auburn University  
Housing Research Center  
Harbet Engineering Center  
Auburn University, AL 36849-6261

Bruce Snead  
Midwest Universities Radon Consortium  
Engineering Extension  
Ward Hall  
Kansas State University  
Manhattan, KS 66506

\*\* Author for correspondence.

## Introduction

In October 1989 the U.S. Environmental Protection Agency (EPA) established three Regional Radon Training Centers (RRTC) to provide training in all aspects of radon. A fourth Center was added a year later to serve the Southern Region. These Centers were established under the provisions of the 1988 Indoor Radon Abatement Act.

Figure 1 shows the geographical coverage of the four Centers. In this paper we intend to present an overview of our EPA-University partnership in providing for the nation's radon training needs during the last two years.

## Training Activities

Table I shows the range of courses that the Training Centers have presented. The 273 courses amount to 10,912 participant-days of instruction, and participants total 6,857.

EPA's emphasis from the onset was that the RRTC's would provide training and administer examinations in support of the Radon Contractor Proficiency Program, since this was the vehicle that had been established by Congress to ensure a high standard of proficiency in the radon mitigation industry. Previously, the 3-day course "Reducing Radon in Structures" had been available through EPA. It was felt that this course was in need of revision, both to update it technically, and to add a component of hands-on experience. Accordingly, the "flagship" course of the Centers entitled "Radon Technology for Mitigators" was

developed.

Figure 2 is a typical agenda for this course. The course runs for an average of 4 days, during which time students learn about the properties of radon, its health effects, how it enters a building and factors affecting its concentration in buildings. They learn about the various ways to detect and measure radon and its progeny, how radon levels can be reduced in existing and in new construction, and the regulatory aspects of radon, including worker health and safety.

Major emphasis in this course is placed on hands-on aspects of radon mitigation. At some of the Centers this involves field trips to houses to diagnose the radon problem and design remediation plans. The Centers also have several kinds of training mockups that are engineered to simulate fields situations. For example, the "super-slab" facilities at Rutgers University, University of Minnesota and Colorado State are simulated combination basement-crawl space foundations. Tracer gas, to simulate radon, can be controlled to various locations and students can play "hunt the radon" using real-time instrumentation in a "sniffer" mode. The sub-slab permeability conditions can also be changed, to provide a wide range of conditions for diagnostic exercises. Other mockups are used to demonstrate the effectiveness of various types of fans as they work against soils of different permeability. Appropriate ways of installing piping for depressurization mitigation methods, and attic fan installations, are also

demonstrated by actual examples. Actual buildings (homes, commercial or University buildings) are also used at all the Training Centers, for training in diagnostic procedures for radon mitigation.

Following these hands-on experiences, the students work in small groups to design mitigation systems for particular cases. They then present their design plans, including cost estimates to the rest of the class- usually for lively criticism! Frequently, training involves installing and testing a mitigation system.

#### Administration of the Proficiency Examination

The "Radon Technology for Mitigators" course is probably the best preparation for the Radon Contractor Proficiency Examination. The Training Centers do not set or mark this exam, but they do administer it in their respective regions for the EPA. The examination is provided in conjunction with EPA-approved training, as well as on monthly National Examination dates. To date the Centers have administered the RCP exam over 100 times to over 1500 applicants, at about 26 locations nationwide.

Table II shows the pass rates for those who have taken the RCP examination. It shows that RTC training indeed has a positive effect on success in this examination. Interestingly, the improvement in exam performance is most pronounced for those who have prior experience as mitigators.

## New Course Development

In addition to the Radon Technology for Mitigators course, many other courses have been developed and taught by the Regional Training Centers. Several States have their own certification requirement for radon professionals which in some cases go beyond the EPA listing, and involve examinations. The Training Centers have responded to these needs by developing special courses for them. These are included in Table I under the heading of "State Certification." Examples of these would be courses for Certification of Diagnosticians in Michigan, and Measurement Specialists and Technicians in Pennsylvania, New Jersey and Illinois. Special Audiences courses would include courses addressing the needs of public officials, real estate agents, mortgage bankers, school administrators, teachers, home inspectors, etc. The Centers have also presented Radon awareness seminars to general public audiences, especially in the Southern Region.

## Co-Sponsorships

The Centers have co-sponsored many of their courses with States, Indian Nations, industry (such as Honeywell), trade organizations, including local AARST chapters, and health organizations, such as the American Lung Association. These co-sponsorship arrangements help the Centers to reach a wide audience. They also help the co-sponsoring States and organizations to fulfill their mandate of providing appropriate and in

most cases customized training programs for their needs. In the same spirit of collaboration with the Industry, the Midwest Universities Radon Consortium is currently working with the AARST Education Committee to prepare training for the September 1992 Radon Symposium in Indianapolis.

#### Future Plans

1. The EPA's Radon Measurement Proficiency Examination is scheduled for introduction in January 1992. The Centers will administer this exam, as they have done with the RCPP exam. In preparation for this, the Centers have developed a 2-day course, "Radon Measurement Operator Proficiency" that has been presented at least four times to date. Figure 3 is a typical agenda for this course. This course will be offered on a regular basis in 1991/92.

2. With increased emphasis on radon mitigation in large buildings, especially schools, the Centers have been working on courses for mitigation specifically to address this need. It is clear that much remains to be done technically to determine the most effective way to deal with radon problems in large buildings, but much is already known, and a course has been piloted on mitigation of schools (St. Paul in May, 1991) and at least five more will be offered in Colorado, Georgia, Minnesota, New Jersey and Ohio in 1991-92. We expect this course to undergo fairly continuous upgrading and revision as more field experience is acquired from the EPA and the Industry.

Individual Centers are working on new and revised courses in a variety of areas. These include:

Radon-Resistant Construction  
Standards & Techniques

Quality Assurance/Quality Control

Indoor Air Quality

Radon in Water

Sampling & Measurement of Rn Progeny

Preparation for RCP Reexamination

Radon Worker Health & Safety

Radon Impacts on the Real Estate Industry

In summary, the Regional Training Centers are eager to cooperate with the Radon Industry in our important task of reducing the Nation's radon exposure. The Training Centers can support the industry by:

- Providing EPA-approved training in preparation for EPA and State Proficiency Examinations
- Providing training in emerging technologies of radon mitigation and measurement
- Encouraging awareness of radon issues in other professionals, through course offerings
- Administering the EPA Proficiency Examinations

- Performing special demonstrations, and research projects
- Working with building code officials to develop and implement codes for radon-resistant construction
- Assisting in Public Awareness Seminars
- Providing advice on business opportunities and conditions



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Figure 1 Geographical coverage of the four Regional Radon Training Centers.

Figure 2 A typical agenda for "Radon Technology for Mitigators"

Figure 3 A typical agenda for "Radon Measurement Operator Proficiency"

Table I Statistics on courses that the Training Centers have presented.

Table II Pass rates for the RCP examination.

TABLE I  
 SUMMARY OF COURSES PRESENTED BY THE  
 REGIONAL RADON TRAINING CENTERS

10/89 - 7/91

COURSE	TIMES PRESENTED	TOTAL ATTENDEES	ATTENDEE- DAYS
Radon Tech. for Mitigators	55	829	3381
Reducing Rn in Structures	5	97	291
1-day Intro. or Refresher	20	353	353
Other Mitigation Courses	21	228	446
State Certification Prep.	27	420	1195
Special Audiences	62	2403	2696
Measurement Courses	6	138	161
Public Awareness	77	2389	2389
<b>TOTALS</b>	<b>273</b>	<b>6857</b>	<b>10912</b>

TABLE II  
PASS RATE FOR RCPP EXAM

(as of 05/91)

	All Participants	Participants w/o Mitigation Experience	Participants with Mitigation Experience
Trained at RTC's	78%	73.5%	87%
Not Trained	68%	65%	73%
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Increase Attributed to RTC training	+10%	+ 8.5%	+14%

**Figure 1**  
**EPA REGIONAL RADON TRAINING CENTER NETWORK**

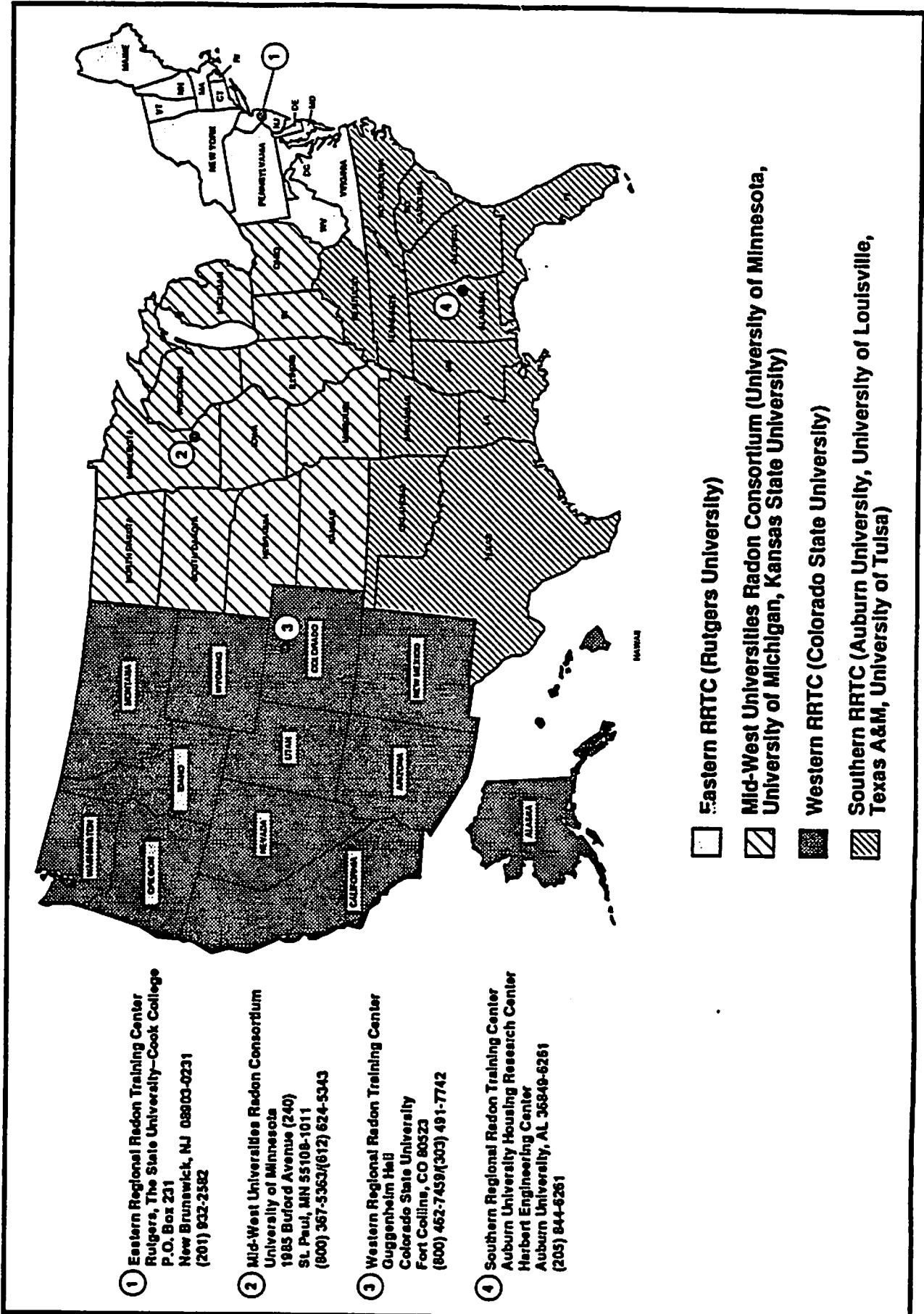


Figure 2. Typical Agenda:

RADON TECHNOLOGY FOR MITIGATORS

DAY 1

8:00 Registration  
8:30 Course Introduction and Objectives  
8:45 Unit 1 - Radon Occurrence and Health Effects  
10:00 Coffee Break  
10:15 Unit 2 - Radon Entry and Behavior  
12:00 Lunch  
12:30 Radon Measurement Video  
1:00 Unit 3 - Radon Measurement  
3:15 Break  
3:30 Unit 4 - Building Investigation/Diagnostics  
5:00 Adjourn

DAY 2

8:30 Unit 4 continued  
9:30 Unit 5 - Radon Mitigation  
12:00 Lunch  
2:00 Unit 6 - Radon in Water  
2:45 Break  
3:00 Unit 7 - Radon Resistant New Construction  
3:45 Unit 8 - Worker Health and Safety  
5:00 Adjourn

DAY 3

8:30 Introduction to Hands-on Practicum  
9:00 Advanced Radon Diagnostics and Mitigation  
11:30 Radon Contractor Proficiency Program and  
RCP Examination Preparation  
12:00 Lunch  
12:30 Diagnostics/Mitigation Mock-ups  
4:30 Adjourn

**DAY 4**

**8:30** Travel to Farmhouse Diagnostics Location  
**9:15** Farmhouse Diagnostics Exercises  
**12:00** Travel to Classroom  
**12:30** Lunch  
**1:00** Selecting Mitigation Strategy and Designing  
the System  
**3:00** Break  
**3:15** Presentation and Evaluation of System Proposals  
**4:15** Course Evaluation and Closing  
**4:30** Adjourn

Figure 3. Typical Agenda:

**RADON MEASUREMENT OPERATORS COURSE**

**DAY 1**

8:00 Registration  
8:30 Introduction and Course Objectives  
9:00 Radiation, Radioactivity and Ions  
10:00 Break  
10:15 Sources of Radiation Exposure  
10:45 Radon and Its Decay Products  
12:00 Lunch  
1:00 Health Effects of Radon and its Progeny  
2:00 Break  
2:15 Overview of Radon Measurement (Video)  
3:00 Screening and Follow-up Measurements  
4:00 Radon/Radon Decay Product Measurement Protocols  
4:30 Adjourn

**DAY 2**

8:30 Review of Day 1 Discussion  
9:00 Radon Measurements with Activated Charcoal  
9:45 Break  
10:00 Radon Measurements with Alpha Track Detectors  
10:45 Radon Measurement with E-PERMS  
11:30 Continuous Radon Measurements  
12:00 Lunch  
1:00 Continuous Radon Decay Product Measurements  
1:30 Grab Sampling for Radon/Radon Decay Products  
2:00 Calibration and Quality Control Techniques  
3:00 Break  
3:15 Worker Health and Safety  
3:45 Course Evaluation  
4:00 Adjourn