



## Project Summary

# Proceedings: 1988 Symposium on Radon and Radon Reduction Technology

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**The 1988 Symposium on Radon and Radon Reduction Technology, jointly sponsored by the U.S. Environmental Protection Agency's Air and Energy Engineering Research Laboratory and Office of Radiation Programs was held in Denver, CO, October 17-21, 1988. The symposium had as its objective the exchange of technical information on radon and radon reduction technologies in the indoor environment. Oral papers and poster presentations describing recent advances in radon research and radon reduction methods provided a pertinent forum for consideration of: regulatory agency activities in radon, radon health studies, radon surveys, radon measurement methods, soil/geology and radon source potential, house dynamics, and radon diagnostics. The Symposium Proceedings, published in two volumes, include 52 oral papers and summaries of 35 poster presentations.**

***This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in two volumes of the same title (see Project Report ordering information at back).***

### Introduction

The 1988 Symposium on Radon and Radon Reduction Technology was held October 17-21, 1988, in Denver, CO. Sponsored jointly by the U.S. Environmental Protection Agency's Air and Energy Engineering Research Laboratory (EPA-AEERL) and Office of Radiation

Programs (EPA-ORP), the symposium was devoted to the exchange of current research developments on radon and radon reduction technology in the indoor environment. Education in radon research and the dissemination of technical information were the primary objectives of the meeting.

Fifty-two oral papers and 35 poster papers were presented, with the keynote address focusing on medical issues and health risks related to radon exposure. The papers addressed a wide range and variety of radon topics: federal and state regulatory agency radon activities, health studies and radon exposure risks, nationwide and state surveys of radon levels, radon measurement methods, soil/geology and radon source potential, house dynamics and radon diagnostics/mitigation research, radon reduction techniques/methods in existing houses, reduction of radon in water, radon prevention in new construction, and radon measurement/mitigation in schools.

The symposium speakers included EPA personnel, as well as representatives from federal and state environmental/health agencies, research and development groups conducting radon testing, academic and medical personnel, manufacturers of testing equipment, and construction and real estate groups. Participants from Sweden, Switzerland, Finland, Denmark, and Ireland provided a European update on technological developments and an international perspective on radon and radon reduction technology issues.

The welcome addresses were given by Richard Fleming, President of the Greater Denver Chamber of Commerce, and

Frank T. Princiotta, Director of the EPA-AEERL. The keynote address was given by William R. Hendee, Vice President, Group on Science and Technology, American Medical Association.

The symposium has been published in two volumes: the first includes symposium oral papers, and the second, poster papers.

## **Oral Papers**

Fifty-two papers were presented in the 10 oral sessions:

### **Session I: Regulatory Agency Activities in Radon**

- "The U.S. Environmental Protection Agency Radon Action Program"
- "State Radon Program Development in Region II"
- "Status of the New Jersey Radon Program"
- "Local Radon Research: Meaningful and Cost Effective"

### **Session II: Radon Health Studies**

- "Radon Exposure and Lung Cancer Risk"
- "Correlation Between Mean Radon Levels and Lung Cancer Rates in U.S. Counties--A Test of the Linear-No Threshold Theory"
- "The New Jersey Radon Outreach Program"

### **Session III: Radon Surveys**

- "Nationwide Distribution of Indoor Radon Measurements"
- "A Comparison of Nationwide Indoor Radon Measurements by Home Dwellers and by Real Estate Testing Firms"
- "Residential Radon Survey of Fourteen States"
- "Distribution of Radon Levels in New York State Homes"
- "Radon Measurements in New Jersey"
- "Seasonal Variability and Bilevel Distribution of Radon and Radon Progeny Concentrations in 200 New Jersey Homes"
- "Seasonal and Annual Average Radon Levels in 70 Houses"

### **Session IV: Radon Measurement Methods**

- "Pennsylvania's Radon Certification Program"
- "Effect of Indoor Radon Variability on the Duration and Interpretation of Radon Measurements"
- "Realistic Uncertainties for Charcoal and Alpha-Track Radon Monitors"

- "Performance of Methods for Measuring Radon and Radon Decay Products"
- "Glass as a Retrospective Radon Detector"
- "Boundary Conditions Affecting Radon Estimation Based Upon Daughter Deposition"

### **Session V: Soil/Geology and Radon Source Potential**

- "Correlation of Airborne Radiometric Data and Geologic Sources with Elevated Indoor Radon in New Jersey"
- "A Closer Look at the Natural Radioactivity in Soils"
- "Anomalous High Radon in Shear Zones"
- "Radon Emanation and Transport in Porous Media"
- "Spatial and Temporal Variation in Factors Governing the Radon Source Potential of Soil"
- "Gravelly Soils and Indoor Radon"

### **Session VI: House Dynamics and Radon Diagnostics**

- "Radon Dynamics in a House Heated Alternately by Forced Air and by Electric Resistance"
- "Specialized Instrumentation Packages for Radon Field Research"
- "Intensive Radon Mitigation Research: Lessons Learned"
- "Radon Diagnostics: Subslab Communication and Permeability Measurements"
- "Pennsylvania Radon Gas Remediation Research and Demonstration Project"

### **Session VII: Radon Reduction in Existing Homes**

- "Radon Reduction Efforts in New Jersey"
- "Preliminary Results from the New York State Radon-Reduction Demonstration Program"
- "Passive Radon Reduction Techniques for Existing and New Structures"
- "Radon Mitigation Techniques in Crawl Space, Basement, and Combination Houses in Nashville, Tennessee"
- "Sub-Slab Depressurization Demonstration in Polk County, Florida, Slab-On-Grade Houses"
- "Testing of Indoor Radon Reduction Methods in 16 Houses around Dayton, Ohio"
- "Monitoring and Evaluation of Radon Mitigation Systems Over a Two-Year Period"
- "Analysis of Indoor Radon in Different Ventilation Systems"

- "Application of Air Cleaning Methods for the Removal of Radon Decay Products"
- "Removal of Radon Daughters by Filtration and Electrostatic Plateout"

### **Session VIII: Radon in Water**

- "Preliminary Results of a Nationwide Waterborne Radon Survey"
- "New Developments and Considerations for Radon Removal From Water Supplies"
- "Radon Removal From Drinking Water Using Granular Activated Carbon, Packed Tower Aeration and Diffused Bubble Aeration Techniques"
- "Removal of Radon From Residential Water Supplies by a Unique Aeration Method"

### **Session IX: Radon Prevention in New Construction**

- "Overview of Radon Resistant New Construction"
- "New House Evaluation Program (NEWHEP)"
- "Radon Mitigation in New Construction: Four Case Studies"

### **Session X: Radon in Schools**

- "A Preliminary Radon Risk Assessment of Three Florida Schools"
- "Radon and Radon Progeny Measurements in Five Schools"
- "Characteristics of Schools with Elevated Radon Levels"
- "Radon Reduction Systems in Schools"

## **Poster Papers**

Thirty-five papers were presented in the four poster sessions:

### **I. Poster Papers for Sessions I and III**

- "The Growth of the National Radon Measurement Proficiency (RMP) Program"
- "House Age, Substructure and Heating System: Relationships to Indoor Radon Concentrations"
- "Results From the National Park Service Indoor Radon Sampling Program"
- "Year Long Radon Survey in Virginia and Maryland: Results From 1500 Homes"
- "Radon in Canada's Capital Region"
- "Statewide Radon Surveys: Screening vs Long-Term Measurements"
- "The Colorado State Indoor Radon Gas Survey Results and Their Geologic Implications"

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## **II. Poster Papers for Session II and IV**

"Worker Protection for Radon Mitigators and Diagnosticians"  
"Psychosocial Issues in the Perception of Radon Gas Exposure"  
"Risk-Taking Tendencies and Radon Messages: A Field Experiment"  
"Problems in Radon Measurements in Homes With the Diffusion Barrier Charcoal Adsorption Collector"  
"The Overresponse of Open-Faced Charcoal Adsorbers Used for Measurements of Indoor Radon Concentrations"  
"The Effect of Moving Air on the Accuracy of Radon Measurements Made With Charcoal Canisters"  
"The Accumulator Method For Measuring Flux Density of Radon and Thoron From Soil"  
"The Performance of Charcoal-Based Radon Detection Under Time-Varying Radon Conditions: Experimental and Theoretical Results"  
"Results of the Orange Environment, Inc., Radon Testing Program"

"State-Specific Radon Risk Assessment"

## **III. Poster Papers for Sessions V and VI**

"Weather Factors Affecting Soil-Gas Radon Concentrations at a Single Site in the Semiarid Western U.S."  
"A Tentative Protocol for Measurement of Radon Availability from the Ground"  
"Regional NURE, Geology and Soils Data as Predictors for Indoor Radon"  
"Radium Distribution Map and Radon Potential in Northwestern United States"  
"Technique for Rapid Field Assessment of Radon Soil-Gas Concentrations"  
"Radon Hot Spots Caused by Bed Rock Fracturing or Proximity to Shallow Uranium Mineralization in Ohio"  
"Rapid Diagnostics: Subslab and Wall Depressurization Systems for Control of Indoor Radon"  
"Field Measurements in the EPA/AEERL Radon R&D Program"

"Radon Mitigation Performance Monitoring in Three Houses"

## **IV. Poster Papers for Sessions VII, VIII, IX, and X**

"Reduction of Radon Working Level by a Room Air Cleaner"  
"Coatings and Sealants as Tools in the Radon Mitigation Process"  
"Evaluation of the Dranjer Corporation Anti-Radon Floor Drain Cover Plate"  
"Experimental Room Studies on the Reduction of Radon Progeny Concentrations Using Unipolar Ions and Electric Fields"  
"Filtration for Control of Exposure to Radon Progeny: Theory and Experimental Results"  
"Radon Wall Coatings Test Facility: Design and Development Phase"  
"Radon Removal Unit Development"  
"Assessment of the Effectiveness of Radon-Resistant Features in New House Construction"  
"Radon Remediation of a Pennsylvania School Administration Building"

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The complete report consists of two volumes, entitled "Proceedings: 1988 Symposium on Radon and Radon Reduction Technology:"

"Volume 1. Symposium Oral Papers," (Order No. PB 89-167 480/AS; Cost: \$61.95)

"Volume 2. Symposium Poster Papers," (Order No. PB 89-167 498/AS; Cost: \$42.95)

The above reports will be available only from: (Costs subject to change)

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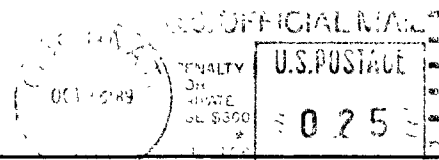
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