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**RADON RANGER CHILDREN'S GUIDE TO RADON**

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**ABSTRACT**

This paper discusses the research, development and completion of the *Radon Ranger Children's Guide To Radon*, a risk communication tool for educating school children in grades 4 and 5, their teachers and parents. This guide seeks to encourage and empower children to take action and talk to their parents about testing their home for radon. Research for this project was augmented by site visits and recorded presentations to over 50 elementary school classrooms throughout the state of New Mexico. Much of the booklet's text comes directly from the new 1992 *Citizen's Guide to Radon*. A two-year review process involved many leaders in the radon industry and education fields. The addition of a survey form helps to evaluate the booklet. A lesson plan with booklets, test kits, EPA Guides, and other materials were consolidated into a "classroom packet". A fund-raising component was added to provide school administrators, service organizations and others in the radon industry an option for making money to initiate or sustain a radon testing, mitigation or educational program. A toll-free phone number was established to facilitate public action. Results show a very favorable response from the initial marketing efforts.

## INTRODUCTION

Environmental health education in schools is a relatively new arena. Past experience with educating the public in radon awareness has shown how difficult it is to overcome people's apathy and lack of motivation to take radon seriously and test their homes. Most adults have only recently become aware of the radon health risk and they have a difficult time accepting the fact that a serious carcinogen may be present in the safety of their own home. The education, health and welfare of our children have always been very important, and when parents and teachers become aware that their children may be exposed to dangerous radiation from naturally occurring radon, they feel more inclined to take action. If children receive meaningful information about radon in school, they will be inclined to take action and protect themselves and their family from radon immediately and in the future when they become responsible adults.

This paper summarizes the extensive research, development and review processes that resulted in publication of the *Radon Ranger Children's Guide To Radon* in May, 1993. This booklet seeks to build upon research experience and information contained in the new *EPA Citizen's Guide To Radon* (1992), to continue to deliver a consistent and clear message about health risks from radon, and to empower school children to take action and talk to their parents about testing their homes.

## RESEARCH AND DEVELOPMENT PROCESS

The idea for a children's guide to radon began in early 1990 during discussions with the author's four children (ages 7 to 12) about the dangers of radon. They knew that radiation affected familiar comic book and television characters like Superman, the Hulk, and the Teenage Mutant Ninja Turtles. It was easy to communicate how radiation can cause harmful "mutations" in people based on their knowledge of these comic book heroes.

The development process continued slowly until November 1991, when the author began working for the state of New Mexico Environment Department School Radon Testing Program. Testing over 150 elementary schools statewide involved many site visits to place alpha track detectors in classrooms while school was in session. Numerous presentations with question and answer sessions were requested by interested school administrators, teachers and students. It was learned that children begin learning about abstract concepts like

invisible radon in the 4th and 5th grades, and this group became the target audience for these presentations.

A pocket recorder was used to tape the sessions in over 50 classrooms and the tapes were reviewed and notes taken to help improve the delivery of radon health risk information to children. References to radiation's effect on comic book characters initiated lots of questions and provided a good reference point to explain radon's effect on people. Having this opportunity to both teach and learn from enthusiastic young students in a classroom setting was very rewarding and added to the author's experience in communicating radon health risk information to children.

Simple, straightforward answers were developed to the following commonly asked questions: What is radon? Where does it come from? Who is to blame for it? Why is radon bad for you? How do you know if you have it in your home or school? Does the test kit cost much? Is it easy to test? Where can I get a test kit? and, What is a picoCurie? When formulating responses to these questions, current EPA risk communication research results were kept in mind to achieve the following: Eliminate unnecessary background information, outline specific steps for action, encourage direct action through empowering students, and personalize the radon problem with tangible comparisons to familiar risks. (Smith et al. 1987)

With the year of experience gained in New Mexico, the author began work on assembling a children's guide to radon for grades 3 to 5. The booklet had to contain accurate and simple information, be easy to read, entertaining, prescriptive in direction, and empowering to cause students to take action and test their home.

#### **DEVELOPMENT OF THE CHARACTERS**

After consultation with leaders in the radon industry and the education field it was clear that a teaching tool for elementary school children would be subject to the following restrictions: No characters that look like ghosts, demons, or anything scary, evil, or mysterious should be used. Nothing sexy or revealing, sexist or male chauvinist, no guns, weapons, or violence should be shown. It became clear that it would be difficult to characterize radon as a dangerous health threat (in an affirmative manner) without offending someone.

Development of a simple story with entertaining characters required an innovative approach. Characters with easy to remember and relevant names were chosen as follows: "Radon Ranger," his sidekick, "Pico", and their horse

"Liter" were selected as the main characters not only for radon related reasons, but because of similarities between their names and those of the TV heroes called The Lone Ranger, Tonto, and their horse, Silver. These characters, familiar to most adults, would serve to stimulate interest in the kid's teachers and parents. A school teacher named "Ms Curie" who was "curious about radon" completed the group. The names of the Ranger's friends also represent radon measurement terms to introduce students to unfamiliar scientific terms. They now represented the EPA "Take Action" Level of 4 picoCuries per Liter in an innovative way (see figure 1).

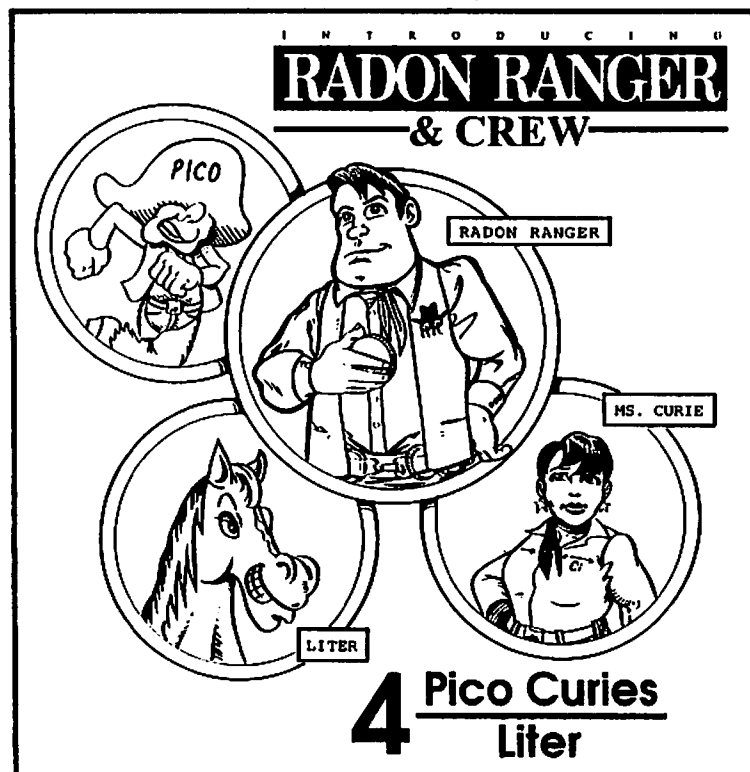


Figure 1. Radon Ranger and Crew Representing the EPA "Take Action" Level of 4 pCi/L.

#### CHANGES IN THE BOOKLET'S EMPHASIS

When the Radon Ranger Concept was introduced to the radon industry during the 1991 International Symposium it was a much different document than its present form. In the following two years of subsequent development, these changes occurred:

The radon character began as a demon (no ghosts or goblins are allowed in the classroom), he was changed to a space age villain with a black hat (do not personalize radon), and finally radon became a mean looking bull. It's a force of nature and like a bull it is relatively benign outside, but trap it in your home and you may have a problem. (see Figure 2.)

References to radon testing and possible problems in schools were minimized to help gain the support of school administrators who would not like to call attention to possible (expensive) school radon issues. A child's exposure to radon is generally higher at home because they spend much more time there, so home testing was the focus.

The artwork was changed many times to eliminate sexist influences and for other reasons that became apparent as the work progressed. The *Radon Busters* artwork was revised from a personalized radon character being assaulted and stepped on, to showing a bull being roped and drawn up from under the floor. This is analogous to using common radon mitigation techniques which pull radon out with suction pipes.

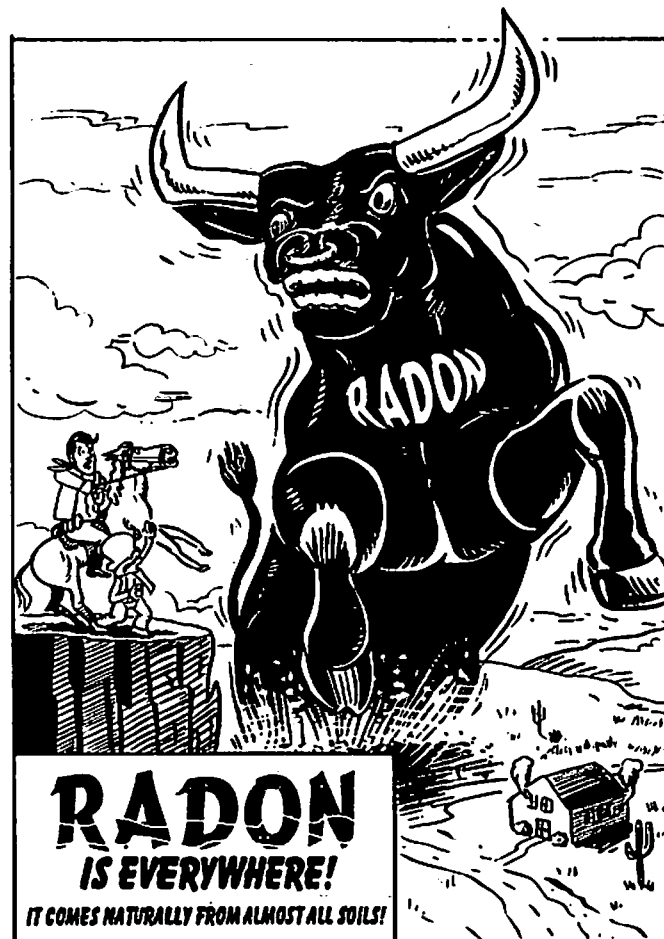


Figure 2. Radon Is Everywhere!

References to radon's progeny were eliminated, although it was difficult to let go of the "Polonium Twins". A second edition of the *Radon Ranger* is being developed to provide further information with more scientific detail for older students, continuing to use the *EPA Citizens Guide* as a reference.

Continued focus on a simple radon risk message was aided by eliminating information on indoor air quality and other issues. Artwork was revised to conform to text borrowed from the new *EPA Citizens Guide*.

A front page was added to introduce the four characters and explain that *Radon Ranger's* friends are named after units of measurement of radon gas (see Figure 3).



Figure 3. Introducing The Characters

The 50 state radon contact phone numbers were added, along with the national hotline number for radon information. Prescriptive directions to call for help from these contacts were repeated five times in the booklet.

Simple, concise recommendations and directives were repeated to encourage action, for example: The fact that radon can not be seen or detected by the senses is repeated on pages 1,3,4,5,6, and 9 (six times). Radon is defined as a dangerous substance five times, and the ease and low cost of radon testing is mentioned three times.

The addition of a survey form to be completed as part of the classroom lesson on radon was designed to help evaluate and modify the effectiveness of the message.

An additional page designed to be used as a fund-raiser for schools or organizations to make money during a science or health fair event was added. A radon test kit or T-shirt with a test kit is sold and 25% of the gross sales are donated to the sponsor of the event. With total flexibility in mind, this page with the commercial intent is perforated for removal if needed. Space was made available on the last page for individual state or EPA regional radon offices, schools or testing companies to include their specific information in the booklet.

A teacher's note was included on the last page listing the objectives of the lesson plan that accompanies the Radon Ranger classroom packet. This packet augments the communication of school radon risk information by providing children's guides, test kits, T-shirts, EPA guides, reference materials and a lesson plan to allow complete hands-on experience in integrated learning activities.

Partial sponsorship was accepted for the publication costs from a nationwide testing company, (Air Chek, Inc), to help keep the cost of the first printing as low as possible (65 cents each in quantities).

Registration of the copyright was achieved in December 1992 to protect the authorship of the booklet.

To facilitate public response, obtain low-cost information on the Radon Ranger Concept, or for ordering test kits (for \$8.50), or other requests, a toll-free phone number was established (1-800-RADON 41). This gives the readers an immediate pathway for "taking action."

The response from interested adults was quite good, and in the author's experience they would read the booklet from cover to cover before putting it down. The colorful, non-threatening children's information was revised to communicate simple radon facts more effectively to them, also.

## **THE REVIEW PROCESS**

Two draft copies of the children's guide were distributed to over 100 radon contacts throughout the industry in 1991 and 1992. Many well thought out suggestions were incorporated into the booklet during this two year review process. Please review the reference section of this paper for a partial listing of people who took the time to review the material. Three trial printings of 1000 copies each, called "collector's editions" were produced to give away to schools and other interested parties. These booklets were used in a successful pilot radon program in Houston, Texas. Although there was low potential for radon exposure in this area, administrators felt that a large number of their students might move to other regions where radon hazards could exist. Therefore, creating an awareness of radon health risk information was important. Classroom review sessions were also conducted in Oregon and Colorado. Many examples of student artwork and writing samples were received from these activities and the student's input was then included in the revised text.

## **PRODUCTION, MARKETING & DISTRIBUTION TO DATE**

In January 1993, 105 information packets including hand-colored copies of the final draft were sent to the state and national radon contacts. A request to consider using the Radon Ranger to assist in implementing the recent EPA mandate to target high risk areas was included.

In April, 1993 the author shared a booth with Air Chek Inc. at the National Science Teachers Association annual convention in Kansas City, Missouri. With more than 10,000 attendees, over 1,000 booklets were given away. The "Emanations" newsletter of the Regional Radon Training Centers included an article on the Radon Ranger which provided excellent national exposure. Information requests increased considerably.

Twenty thousand copies of the booklet were published in May 1993, and over 300 packets containing descriptions of the improved Radon Ranger concept with price lists and three copies of the "production issue" booklet were included. EPA contacts in Washington and the 10 EPA regions, state radon contacts, regional training centers, American Lung Association and American Public Health Association Radon Grantees, and other partners in outreach were included in this mailing.



In June 1993, the National Parent Teacher (PTA) Convention was attended in Cincinnati, Ohio. An exhibitor's booth was shared with Air Chek Inc., and 600 guides were distributed (7,000 attendees).

To date, over 10,000 *Radon Ranger* guides have been purchased for distribution. Six thousand have been sent to Louisiana, 3,200 copies have been delivered to Michigan. Many smaller orders for booklets, classroom packets, T-shirts and detectors have been sent to Kentucky, Florida, New Mexico, Wyoming, Illinois, Ohio, Tennessee, New York, Pennsylvania, Colorado, Texas, Arizona and California.

In July 1993, the American Lung Association approved the *Radon Ranger* guide for inclusion in its list of suggested educational materials. Other state radon contacts and EPA partners in outreach are expressing interest as this paper is being produced.

### CONCLUSION

The *Radon Ranger Children's Guide To Radon* endeavors to emphasize, repeat and reinforce the consolidated message contained in the 1992 *EPA Citizen's Guide To Radon* for elementary school children in grades 4-5. The children's guide builds upon results of extensive and state-of-the-art research on radon risks and communication strategies contained in the *EPA Citizen's Guide*. The goal of the booklet is to help change public behavior through children's education and promote increased home radon testing. Developed by the private sector, this guide is intended to be purchased by state radon offices, the EPA and its partners in outreach, schools, other service and consumer organizations, and the radon industry. These entities would then distribute the booklet to schools and the public in (Zone 1) counties where the potential for radon is highest. The *Radon Ranger* concept was designed to be as flexible as possible, and can also be used by schools and other service organizations (or the funds-limited state radon offices) to promote home radon testing while raising money to initiate or sustain a radon testing, education or mitigation program. The simple message contained in the *Radon Ranger Children's Guide To Radon* can be summarized as follows: Radon is everywhere! You cannot see or feel it. Radon is a dangerous substance that can make you sick later in your life. It is easy to test for. Take action and test your home soon!

The booklet will stimulate interest and deliver an empowering message on important environmental health information about radon to school children, their teachers and parents.

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The following individuals have contributed to the *Radon Ranger Children's Guide To Radon* during a lengthy review process:

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