

Approved 3-19-87  
Date

MINUTES OF THE SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES

The meeting was called to order by Senator Merrill Werts at  
Chairperson

8:00 a.m./~~PM~~<sup>XX</sup> on March 12, 19<sup>87</sup> in room 123-S of the Capitol.

All members were present except:

Senator Eric Yost  
Senator Fred Kerr

Committee staff present:

Ramon Powers - Research  
Don Hayward - Revisor  
Nancy Jones - Secretary

Conferees appearing before the committee:

Harold Spiker, Kansas Department Health & Environment  
Janet Stubbs, Home Builders Association  
Shaun McGrath, Sierra Club

A motion was made to approve the minutes as corrected of the March 5 and 6 1987 meetings by Senator Daniels, seconded by Senator Martin. Motion carried.

HCR 5007 - concerning radon gas

Ramon Powers briefed the committee on the radon problem in Kansas and gave an assessment of testing proposed by KDHE. Radon is produced from the decay of uranium and moves as a gas through the atmosphere. Human exposure to radon decay products by inhalation is known to cause lung damage and cancer. As radon concentrates in homes, a number of methods have been developed to measure the pico curies/liter, a canister of activated charcoal for grab sampling in homes the means most often employed. Radon exposure can be reduced in a home by sealing cracks and openings in floors and foundations, and by ventilating areas of entry such as sump and drain systems. Since studies indicate the eastern border of Kansas may have the potential for high radon concentration, KDHE will undertake a more extensive sampling in this area with the 3000 testing cannisters provided by the EPA for statewide testing. Mr Powers stated the interim subcommittee recommends the creation of an Advisory Committee on radon and also introduction of a bill draft for certification of testers for radon contamination if needed. (Attachment A)

Harold Spiker reveiwed the characteristic of radon and dangers it presents in homes. It is not known at this time from data accumulated if radon is a serious problem in Kansas. KDHE has requested a grant to purchase additional cannisters, more sophisticated monitoring equipment plus staff to conduct a thorough survey. KDHE urges the passage of HCR 5007 to bring experts from different fields together to study the problem and make recommendations. Efforts to form a committee already have been initiated with representatives from seven entities appointed. (Attachment B)

Mr. Spiker stated 3,000 cannisters are just now being mailed out and the study could be completed by the end of May. Laboratory data will not be compiled until mid summer. In answer to questions, Mr. Spiker stated the cannisters are used only once and it is not known if furnace filters are beneficial. KDHE would be able to purchase cannisters for approximately \$2.50 each through EPA. KDHE has a concern regarding the possibility that testing companies might take advantage of frightened home owners unless there is legislative control. A map will be provided for committee members detailing the number of samples taken in each county. Mr. Spiker also explained the structure of the sampling plan.

CONTINUATION SHEET

MINUTES OF THE SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES,  
room 123-S, Statehouse, at 8:00 a.m./~~a.m.~~<sup>p.m.</sup> on March 12, 1987

Janet Stubbs testified there are many unknowns about radon and the home-builders are concerned about attention given by the media to the issue. The liability factor for homebuilders must be addressed. Mrs. Stubbs stated the national educational arm of the Homebuilders Association has been working very closely with the EPA on the issue for several years. More time is needed to determine if the radon testing technique proposed will be successful or is in fact, the best method. (Attachment C)

Shaun McGrath stated the Sierra Club members living in eastern Kansas have expressed a great concern about radon and urges support of this resolution. (Attachment D)

Meeting adjourned. The next meeting will be March 17, 1987.

Junk Energy - Guest List  
3-12-87

Harold L. Spiker	KDH+E	Topeka, KS.
Ed Reuert	KS League Women Voters	913/862-9360
Shaun McGrath	Sierra Club	Topeka
Jayeb Stubbs	ABA K	"
Karen <del>McClain</del> McClain	KAR	Topeka

## REPORT OF SELECT COMMITTEE

On motion of Rep. Fox, the following report of the Subcommittee on Radon of the Special Committee on Energy and Natural Resources, was spread upon the Journal.

### RE: RADON IN KANSAS

The Subcommittee was directed to review the radon problem in Kansas and assess the radon testing proposed by the Kansas Department of Health and Environment (KDHE).

#### *Background*

Radon is a radioactive gas produced by the decay of radium, which, in turn, evolved through the decay of uranium. As radium and uranium are common elements in most rocks and soil, radon is being constantly emitted from the surface of the earth. As a gas, radon moves easily through small spaces and between particles of soil and rock.

Of greatest concern to human exposure are the radon decay products, since throughout the decay process, the radioactive particles attach to dust and other elements in the atmosphere and are inhaled. Alpha particles produced by decay of the radon decay products can strike cells in the lungs and damage them. It is known that this damage can lead to the formation of cancerous cells. Therefore, the potential risk from radon is mainly through the development of lung cancer from exposure to the short-lived decay products.

Estimates of the risk of lung cancer due to radon exposure are based on studies of miners who work in underground mines where uranium is prevalent. The mine workers developed lung cancer at a higher rate than the general populations; therefore, it has been argued that long-term exposure to large concentrations of radon decay products is associated with an increased incidence of lung cancer.

Radon has a half-life of 3.5 days which means that one-half of any group of radon atoms will have decayed into atoms of other elements within that period of time. After radon escapes from the earth's surface, it is dispersed into the atmosphere. Radon concentrates in homes when the colorless, odorless, radioactive gas is trapped by the closed structure. Radon may enter buildings through any cracks, holes, or openings in the floors or basement walls, and may be transported by water in which it has been dissolved.

During periods of pleasant weather, the windows and doors of houses are often open which allows radon to disperse into the atmosphere; however, during the winter or periods of bad weather when houses remain closed, radon concentrations can increase significantly. Radon concentrations in homes can vary greatly from season to season and even from day to day. Barometric pressure also has an affect on radon concentrations in buildings. According to some sources, the weatherization and construction of houses to conserve energy has greatly increased the potential health risks from indoor radon.

Radon concentrations are measured in pico curies per liter (pCi/l). One pCi/l of radon in the air is equal to 2.2 radioactive alpha particles emitted per minute per liter of air. Concentrations of radon decay products are measured in Working Levels (WL). One WL is defined as that concentration which has a certain

potential alpha energy release per liter of air. In houses, one pCi/l of indoor radon is assumed to result in 0.005 WL under typical conditions in a building. The Environmental Protection Agency (EPA) has suggested that additional measurements be performed to determine the annual average radon level in homes and public buildings where radon levels have been measured at greater than 4 pCi/l or radon decay products greater than 0.02 WL.

The EPA has estimated that there are between 5,000 and 20,000 deaths per year in the United States due to lung cancer caused by the exposure of indoor radon.

Radon and radon decay products can be measured in a number of ways. A sample can be collected over a brief period (grab sample) and the measurement can be made in a relatively short time. Activated charcoal, usually contained in a small canister, is often used in the grab samples to measure radon concentrations in homes. Since radon levels vary over time, long-term measurement systems, such as the alpha track detector, measure levels during periods as long as one year. Various private companies sell radon measurement kits and the EPA is engaged in a sampling program (to be discussed later). A list of companies in the United States which have successfully demonstrated satisfactory measurement capabilities has been published by the EPA.

There are two approaches to reducing radon exposure in homes. First, measures can be taken to prevent radon from entering a building by sealing cracks and openings in the floors and foundations. Second, radon can be removed from the structure by ventilating places where radon enters the building such as sumps or drain systems, or basements generally, or by facilitating increased air exchange.

#### *Radon in Kansas*

There has been increasing public concern in Kansas about the potential threat to human health from radon concentrations in private homes. That concern was intensified when an EPA map was reproduced in the newspapers indicating that areas along the eastern border of Kansas were likely to have high radon concentrations.

The EPA asserts that the radon issue is to be handled by the states. In Kansas, the Department of Health and Environment is the agency presently engaged in evaluating the radon problem in the state. KDHE does not have the resources to undertake an extensive radon survey. To date the agency has received data on approximately 130 tests of homes from the University of Pittsburgh's (Pa.) Radon Project and private testers. The mean of all 40 tests performed in Kansas by the University of Pittsburgh was 4.58 pCi/l. A private tester recorded a mean of 5.9 for four houses in Fairway, 4.8 for 17 houses in Leawood, 8.1 for 19 houses in Lenexa, 6.1 for four houses in Mission, 4.2 for 20 houses in Overland Park, and 14.9 for eight homes in Shawnee.

More extensive sampling by EPA and KDHE is to be undertaken in late 1986 or early 1987 to more fully examine the nature and magnitude of indoor radon in Kansas homes. Kansas was selected by EPA as one of ten states in which this additional testing will take place. Three thousand charcoal canisters will be provided for use in the state. There is presently some debate about the sampling technique to be used. In addition, KDHE has requested that \$394,000 in federal Petroleum Overcharge Restitution Program (PORP) funds, administered by the State Corporation Commission, be used to provide 5,000 additional canisters for testing areas with a high probability of having radon concentrations in excess of the levels recommended by EPA. If properly structured, the KDHE request for PORP funds for radon testing will likely be approved by the U.S. Department of Energy, which has oversight of such funding.

### *Subcommittee of Activities*

The Subcommittee held meetings, including public hearings, in Overland Park, Topeka, and Pittsburg. Presentations were made by the following: the Director of Air and Toxics Division, U.S. Environmental Protection Agency, Region 7, Kansas City, Kansas; the Director of the Division of the Environment, Kansas Department of Health and Environment; the Director of the Johnson County Pollution Control Department; an Associate Professor of Preventive Medicine, the University of Kansas Medical Center; the State Geologist and staff of the Kansas Geological Survey; the Director of the State Cancer Registry, the University of Kansas Medical Center; several professors of nuclear engineering from Kansas State University; and the Attorney General.

The State Geologist and staff of the Kansas Geological Survey described the presence of uranium, the parent of radon and radium, in the rock formations within the near-surface environment in Kansas. The Survey, which is working on a geological characterization for radon in Kansas for KDHE, has developed a map of the state identifying the most probable high risk areas (Strata 1), the areas of probable moderate risk (Strata 2), and the remaining areas of no major risk, or about which no relevant information is available (Strata 3).

In addition, the Survey reviewed a sampling design for radon gas measurements in Kansas. The Survey recommends that sampling be done to gather information on the background level of radon independent of data gathered concerning within-house concentrations and that random sampling should be done to determine the "hot spots" which would be sampled in a second stage. It was strongly recommended that the sampling be undertaken by trained field investigators.

KDHE staff reviewed the testing that had already taken place in the state and the proposed testing by both the EPA and the Department over the next few months. The Subcommittee learned that the current staffing level is not sufficient to monitor and test radon, given the agency's other responsibilities, such as the Central Interstate Low-Level Radioactive Waste Compact, emergency preparedness, and Wolf Creek environmental monitoring.

The associate professor from the University of Kansas Medical Center described his epidemiological research in southeast Kansas, which included some radon testing, and expressed concern about radioactivity in the water supply in Baxter Springs, Kansas.

The Director of the State Cancer Registry at the University of Kansas Medical Center expressed the view that extrapolating lung cancer fatalities from fatalities of European miners who worked in mines with radon concentrations a hundred times higher than those found in private dwellings would be a leap of faith. He stated that to undertake a study to prove the connection between radon and lung cancer would be so costly that it will never be done.

Three professors at Kansas State University described their work relating to radon, including research on instrumentation to test radon, the collection of air (and radon) samples at KSU, and estimates of costs of measures to reduce radon concentrations in houses.

The Attorney General told the Subcommittee that the Consumer Protection Act would protect Kansans from deceptive business practices involving the purchase of radon testing kits. He noted that the Legislature could consider licensing radon testers.

### *Conclusions and Recommendations*

The Subcommittee endorses the actions by KDHE in response to the public health concern relating to radon. The testing of homes that will soon be under-

taken by EPA and KDHE should provide some indication of the nature and extent of any radon problem in Kansas; however further testing undoubtedly will be needed to further isolate problem areas and determine what homeowners should do to minimize any risk associated with exposure to radon.

The Subcommittee concludes that there is no evidence, at this time, to justify adoption by the state of any extraordinary measures to deal with the radon issue. Careful and systematic study and testing should be conducted to ensure that the public's health will be protected.

It is the Subcommittee's view that the results of the EPA/KDHE testing should be reviewed first by the Legislature before further testing is approved. In addition, it is recommended that the standing Committees on Energy and Natural Resources should continue to monitor the radon issue.

The Subcommittee recommends the introduction, by a standing committee, of the concurrent resolution which recommends that the Secretary of the Department of Health and Environment create an Advisory Committee on Radon, consisting of the Director of the State Cancer Registry, the Director of the Center of Environmental and Occupational Health at the University of Kansas Medical Center, and a representative from each of the following: the Kansas Geological Survey, the Nuclear Engineering Department at Kansas State University, and the Homebuilders Association of Kansas. The Secretary could assign to the Committee other individuals or representatives of other organizations deemed useful in studying the radon issue. The Secretary, after consultation with the Advisory Committee, is requested to report to the Legislature before March 15, 1987, concerning the agency's activities related to radon, particularly those concerned with the EPA/KDHE testing program.

Finally, the Subcommittee recommends introduction, by a standing committee, of the bill draft that provides for the certification of testers for the presence of indoor radon contamination. It is the opinion of the Subcommittee members however, that the necessity for such legislation is not clear at this time. Nonetheless, with the advent of the EPA/KDHE testing program, the Subcommittee notes that there will likely be increased concern about radon and the desire to have homes tested. As public concern increases, there may be a need to guarantee that radon testing is conducted by qualified individuals.

Testimony on HCR 5007

Presented to the  
Senate Energy and Natural Resources

March 12, 1987

Harold Spiker, Public Health Physicist  
Bureau of Air Quality & Radiation Control  
Division of Environment  
Kansas Department of Health and Environment

Thank you, Mr. Chairman and members of the committee for the opportunity to testify on HCR 5007. As you are aware, radon has become the subject of great public concern in recent months. Radon is a colorless, odorless, radioactive gas that occurs from the natural breakdown of uranium and uranium-containing materials in the soil. Radon seeps from the soil into the indoor home environment through cracks in the basement and other openings in the home. Numerous studies suggest that radon in some homes accumulates to levels that can present potentially serious health risks to persons residing in those homes. Radon is a particular concern in modern, energy-efficient homes where air circulation is poor. The Environmental Protection Agency estimates that 5,000 to 25,000 lung cancer deaths in the United States are caused by indoor radon.

We do not have adequate data at the present time to determine whether radon is a sufficiently serious problem in Kansas. Governmental testing to date has been minimal because of a lack of resources. However, as a result of the recent publicity on radon, many homeowners in northeast Kansas are having their homes tested by private contractors. The results suggest that homes in some areas have levels which exceed four picocuries per liter -- the minimal health risk level established by EPA. KDHE is now gearing up to conduct a survey of 3,000 homes in Kansas using charcoal canister devices supplied by EPA. Although the survey will be statewide and will include testing in each county, more canisters will be distributed in the eastern one-fifth of the state, where, because of the particular geology, there is a greater potential for release of radon. In addition, KDHE has filed a grant application with the Kansas Corporation Commission to receive \$334,000 from the Petroleum Overcharge Restitution Program (PORPP). The grant would be used to purchase 5,000 additional canisters and more sophisticated radon monitoring equipment and to hire staff to conduct a more thorough survey. The grant has been approved by both the KCC and the Federal Department of Energy and will next require the Governor's and the Legislature's approval before the grant can be awarded.

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KDHE endorses the passage of HCR 5007. The occurrence of indoor radon and the health risks posed by it are affected by many different, complex variables that are not well understood. HCR 5007 would bring together experts from different fields to study the scope and seriousness of the problem, if any, and to recommend appropriate governmental response. The one concern we do have is with the timing; HCR 5007 requires the Secretary of Health and Environment to report to the legislature, after consultation with the advisory committee, on or before March 15, 1987. This is a relatively short span of time, and it may be that not much additional data may be available by then. Outside of this concern, however, we support the passage of HCR 5007.

In fact, the Department has already initiated efforts to form such a committee. On February 23, 1987, letters were sent to nine individuals, asking them to serve on an advisory committee on radon. Those who have already been appointed are representatives from --

- The Center for Environmental and Occupational Health at the University of Kansas
- The Kansas Geological Survey
- The Nuclear Engineering Department at Kansas State University
- The Kansas Home Builders Association
- The Kansas Association of Realtors
- The Kansas Chapter of the Sierra Club
- EPA's Region VII Office

We are waiting for someone to be appointed from the State Cancer Registry and from the American Lung Association. As soon as committee appointments have been completed and a chairman selected, a meeting will be scheduled to formulate the Committee's assignment and set an agenda.

TESTIMONY BEFORE  
ENERGY COMMITTEE  
MARCH 12, 1987

BY  
JANET J. STUBBS, EXECUTIVE DIRECTOR  
HOME BUILDERS ASSOCIATION OF KANSAS

CHAIRMAN WERTS AND MEMBERS OF THE ENERGY COMMITTEE:

MY NAME IS JANET STUBBS AND I AM EXECUTIVE DIRECTOR FOR THE HOME BUILDERS ASSOCIATION OF KANSAS APPEARING IN SUPPORT OF HCR 5007.

IN DECEMBER, 1984, STANLEY WATRAS OF BOYERTOWN, PA., TRIPPED A RADIATION MONITOR AS HE WAS REPORTING TO WORK AT THE LIMERICK NUCLEAR POWER PLANT. IT WAS DETERMINED THAT HE HAD NOT BEEN CONTAMINATED AT WORK, BUT RATHER AT HIS HOME WHICH CONTAINED A READING OF 13 WL, AN EXTREMELY HIGH LEVEL OF RADON GAS.

THIS WAS THE BEGINNING OF THE DISCOVERY OF RADON GAS IN AN AREA KNOWN AS THE "READING PRONG", WHICH REACHES FROM PENNSYLVANIA THROUGH SOMERSET AND MORRIS COUNTIES IN NEW JERSEY AND ON UP INTO NEW YORK.

THROUGHOUT 1985, THE NEW JERSEY HOUSING INDUSTRY FACED PUBLIC FEARS FANNED BY INFLAMMATORY MEDIA REPORTS AND ONE LENDER WHO ANNOUNCED THERE WOULD BE NO FURTHER LOANS WITHOUT A RADON-FREE TEST RESULT. THIS RULE WAS SOON RESCINDED.

THE NEW JERSEY HOME BUILDERS ASSOCIATION WORKED WITH A STATE SENATOR WHO EVENTUALLY OBTAINED PASSAGE OF A BILL TO ALLOCATE \$2 MILLION FOR TESTING AND STUDY OF THEIR LOCAL RADON PROBLEM.

IN JANUARY 1986, THE NEW JERSEY HBA'S EXECUTIVE DIRECTOR AND JOHN SPEARS, SENIOR ARCHITECT FOR THE NATIONAL ASSOCIATION OF HOME BUILDERS RESEARCH FOUNDATION, ACCOMPANIED A DELEGATION FROM NEW JERSEY TO SWEDEN TO MEET WITH SWEDISH SCIENTISTS AND OFFICIALS TO DISCUSS WHAT THAT COUNTRY HAS DONE TO ADDRESS RADON POLLUTION IN HOUSES.

THE RESEARCH FOUNDATION AND NEW JERSEY BUILDERS ARE WORKING WITH THE STATE OF NEW JERSEY TO CONSTRUCT 100 "RADON-PROOF" HOUSES IN NEW JERSEY. THE PURPOSE IS TO DEVELOP LOW-COST CONSTRUCTION METHODS TO PREVENT RADON FROM ENTERING NEW HOMES.

EPA HAS GIVEN A GRANT TO THE RESEARCH FOUNDATION TO SERVE AS A CLEARING HOUSE ON RADON INFORMATION FOR THE HOUSING INDUSTRY.

NAHB HAS ALSO BEEN WORKING WITH THE AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE), TO DETERMINE STANDARDS FOR THE MAXIMUM ALLOWABLE LEVELS OF CONTAMINATES IN INDOOR AIR, INCLUDING RADON.

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NAHB'S MARTY MINTZ, DIRECTOR OF TECHNICAL SERVICES, CAUTIONS THAT THE 1986 EPA BOOK OF MITIGATION TECHNIQUES SOUNDS REASONABLE BUT, NOT ENOUGH DATA HAS BEEN COLLECTED TO ESTABLISH WHICH WORKS BEST. ECHOING THE CONSENSUS OF THE SCIENTIFIC COMMUNITY, NAHB'S JOHN SPEARS SAYS, "THERE'S NO IMMEDIATE ANSWER. IT'S GOING TO TAKE YEARS."

I HAVE ATTACHED FOR YOUR REVIEW AN ARTICLE FROM A BUILDING INDUSTRY PUBLICATION IN SEPTEMBER 1986, WHICH QUOTES MARTY MINTZ.

IN THIS ARTICLE HE STATES THAT "POSSIBLE NEGATIVE HEALTH EFFECTS FROM EXPOSURE TO RADON HAVE BEEN BLOWN OUT OF PROPORTION TO THE ACTUAL OR POTENTIAL DANGER. WRONG OR UNSUBSTANTIATED INFORMATION ABOUT RADON AND ITS POSSIBLE DANGER IN HOUSES COULD CREATE A PANIC THIS YEAR".

DR. ROSLYN YALOW, NOBEL LAUREATE, IS QUOTED AS SAYING, THAT THE ESTIMATE OF 15,000 RADON LUNG CANCER DEATHS PER YEAR "IS CLEARLY AN EXAGGERATION".

IN AN INTERVIEW WITH THE WASHINGTON POST, DR. YALOW URGED AGENCIES SUCH AS THE EPA TO "RE-EXAMINE THE BASIS ON WHICH THEY ARE GIVING THESE NUMBERS THAT COULD END UP COSTING THE COUNTRY TENS AND HUNDREDS OF MILLIONS OF DOLLARS UNNECESSARILY, TO CLEAN UP SOMETHING THAT IS PROBABLY NOT NEARLY AS HAZARDOUS AS THEY THINK IT IS".

MARTY MINTZ IS AFRAID THE NEGATIVE PUBLICITY WILL SPUR GOVERNMENTS TO DRAW UP REGULATIONS BEFORE ALL THE DATA ARE IN. HE EXPRESSES CONCERN THAT A MAXIMUM PERMISSIBLE LEVEL OF RADON MAY BE ESTABLISHED WHICH HAS NOTHING TO DO WITH REALITY.

SINCE YOU CANNOT SEE OR SMELL RADON, SPECIAL EQUIPMENT IS NEEDED TO DETECT IT. THE TWO MOST POPULAR, COMMERCIALY-AVAILABLE RADON DETECTORS ARE THE CHARCOAL CANISTER AND THE ALPHA TRACK DETECTOR. BOTH OF THESE DEVICES ARE EXPOSED TO THE AIR IN YOUR HOME FOR A SPECIFIED PERIOD OF TIME AND SENT TO A LABORATORY FOR ANALYSIS.

THERE ARE OTHER TECHNIQUES-REQUIRING OPERATION BY TRAINED PERSONNEL-WHICH CAN BE USED TO MEASURE RADON LEVELS, BUT SUCH TECHNIQUES MAY BE MORE EXPENSIVE.

THE PUBLIC AND THE MEDIA NEED TO BE REMINDED THAT THE RESULTS OF THE CHARCOAL TEST BEING USED BY EPA IN KANSAS, GIVES, AT BEST, A "SNAPSHOT" READING OF THE RADON LEVEL AT THAT SPECIFIC TIME, AND IS AFFECTED BY BAROMETRIC PRESSURE, VENTILATION, ETC., WHILE THE RISK FACTOR IS BASED ON A 70 YEAR EXPOSURE FACTOR.

Radon Risk Evaluation Chart					
pCi/l	WL	Estimated number of lung cancer deaths due to radon exposure (out of 1000)	Comparable exposure levels		Comparable risk
200	1	440—770	1000 times average outdoor level		More than 60 times non-smoker risk 4 pack-a-day smoker
100	0.5	270—630	100 times average indoor level		20,000 chest x-rays per year
40	0.2	120—380			
20	0.1	60—210	100 times average outdoor level		2 pack-a-day smoker 1 pack-a-day smoker
10	0.05	30—120	10 times average indoor level		5 times non-smoker risk
4	0.02	13—50			
2	0.01	7—30	10 times average outdoor level		200 chest x-rays per year
1	0.005	3—13	Average indoor level		Non-smoker risk of dying from lung cancer
0.2	0.001	1—3	Average outdoor level		20 chest x-rays per year

THE AUGUST 1986 EPA JOURNAL ARTICLE ON RADON STATES THEIR RESPONSIBILITY IS TO DETERMINE HOW LARGE THE THREAT OF RADON IS TO THE PUBLIC, HOW THAT THREAT CAN BE LESSENED AND PROVIDE THE INFORMATION TO THE PUBLIC WHO CAN ACT ON THEIR OWN BEHALF.

HBAK SUPPORTS ESTABLISHMENT OF AN ADVISORY COMMITTEE ON RADON TO DETERMINE THE APPROPRIATE STEPS TO BE TAKEN BY KANSAS TO ASCERTAIN THE DEGREE OF PROBLEM IN THIS STATE AND UTILIZE THE EXPERTISE AVAILABLE TO DEVELOP A RATIONAL COURSE OF ACTION.

LAST NOVEMBER THE TOPEKA PAPER PUBLISHED AN ARTICLE REPORTING RADON LEVELS IN HOUSES BELONGING TO EMPLOYEES. RESULTS OF OTHER PRIVATE STUDIES ARE SURE TO BE PUBLISHED IN THE NEXT FEW MONTHS BECAUSE THERE ARE THOSE WHO WANT TO CAPITALIZE ON THIS SUBJECT FOR PERSONAL GAIN OR RECOGNITION.

COSTS AND METHODS OF REMEDIAL WORK VARIES DEPENDING ON THE CONSTRUCTION OF THE HOUSE AND THE LEVEL OF RADON EXISTING VS. THE DESIRED LEVEL.

FOR EXAMPLE, EPA HAS LOOKED AT MANY REDUCTION TECHNIQUES THAT REDUCE RADON BY ABOUT 90%, BUT IT IS DIFFICULT TO PREDICT EXACT COSTS UNTIL THE CONSTRUCTION OF THE HOUSE IS DETERMINED. IT'S ALSO DIFFICULT TO BE SURE THAT CONTROL MEASURES WORK ALL THE TIME. TAKE, FOR EXAMPLE, EPA'S BILL BELANGER'S OCTOBER 1985 VISIT TO BOYERTOWN, PA., WITH A U.S. SENATOR WHO WAS INSPECTING ONE OF THE HOMES IN EPA'S REMEDIATION RESEARCH PROGRAM. IT TURNED OUT TO BE A CLASSIC EXAMPLE OF MURPHY'S LAW THAT ANYTHING THAT CAN GO WRONG, WILL.

BELANGER RECALLS THAT, AFTER EXPLAINING TO THE SENATOR SOME OF THE THINGS THAT HAD BEEN DONE TO THE HOUSE, HE WAS ASKED TO TAKE A RADON MEASUREMENT.

"THIS HOME ORIGINALLY HAD A CONCENTRATION OF 7 WL," SAYS BELANGER, "AND MY OWN MEASUREMENTS TAKEN SOON AFTER THE HOUSE WAS FIXED SHOWED ONLY A LITTLE ABOVE 0.02 WL. BUT THIS DAY, I GOT A MEASUREMENT OF 3 WL!"

"ALL OF US THERE--THE SENATOR, THE HOMEOWNER, AND I - REALIZED SOMETHING WAS VERY WRONG," BELANGER CONTINUES. "SINCE THE HIGHEST READING WAS PREVIOUSLY IN THE BASEMENT, I WENT DOWN THERE TO TAKE A READING. IT WAS 15; MORE THAN TWICE AS HIGH AS THE HOUSE HAD BEEN BEFORE WE DID ANYTHING TO IT."

"AT THIS POINT, THE HOMEOWNER WAS AT THE POINT OF TEARS," SAYS BELANGER.

AFTER THE SENATOR LEFT, BELANGER SPENT SOME TIME LOOKING AROUND THE HOUSE AND FOUND A BEDROOM WINDOW OPEN ON THE DOWNWIND SIDE OF THE HOUSE. NO OTHER WINDOWS WERE OPEN, YET AIR WAS RUSHING OUT OF THAT WINDOW.

"I FIGURED THAT, SINCE THE REST OF THE HOUSE WAS SEALED, THE AIR GOING OUT MUST BE COMING THROUGH THE FOUNDATION, BRINGING RADON WITH IT." BELANGER CLOSED THE WINDOW, WENT DOWN TO THE BASEMENT, AND OPENED UP ONE OF THE BASEMENT WINDOWS ON THE UPWIND SIDE, ALLOWING FRESH AIR TO ENTER THE HOUSE. WITHIN AN HOUR, THE LEVEL OF RADON HAD BEEN REDUCED BY A FACTOR OF TWO.

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THAT AFTERNOON STATE OFFICIALS TOOK MORE MEASUREMENTS, AND THE LEVEL HAD DROPPED TO UNDER 0.1 WL. THEY RETURNED THE NEXT DAY AND TOOK READINGS UNDER .01 WL - WELL WITHIN THE STATE AND PROPOSED FEDERAL GUIDELINES.

ENERGY EFFICIENT HOMES HAVE BEEN ACCUSED OF BEING MORE PRONE TO HAVE A HIGHER RADON LEVEL THAN OLDER HOMES. THIS IS NOT NECESSARILY TRUE. MOST SUPER INSULATED HOMES BEING BUILT TODAY HAVE AIR EXCHANGERS INSTALLED TO ELIMINATE CONCERNS OF INDOOR AIR POLLUTANTS. THIS SHOULD BE A BENEFIT WITH REGARD TO RADON AS WELL. AS ALREADY EXPLAINED, SO MANY FACTORS ENTER INTO THE RADON LEVEL.

AGAIN, WE SUPPORT ESTABLISHING AN ADVISORY COMMITTEE FOR THE REASONS ALREADY STATED. WE BELIEVE THE EXPERTISE OF THE SCIENTIFIC COMMUNITY WHICH TESTIFIED BEFORE THE INTERIM SUBCOMMITTEE WILL BE VALUABLE TO THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT.

WE FURTHER BELIEVE THAT A REASONABLE SCIENTIFIC COURSE SHOULD BE CHARTED AND FOLLOWED AS IT IS DETERMINED IF THERE IS A RADON PROBLEM IN KANSAS AND THE ACTION NECESSARY.

## WASHINGTON

# Radon Testing Is A Government Priority



By David Heinly  
Professional Builder  
Washington Bureau

The nation's latest and perhaps scariest "scare"—radon—looms as another double-edged sword for home builders. Like the energy crisis of a decade ago, the radon issue poses both a serious problem for builders and, at the same time, perhaps a unique if less than glamorous new marketing tool.

The first guy to come up with a "radon safe" house is likely to have to beat buyers off with a stick. On the other hand, he better be sure his claim is accurate.

Radon, as everyone must surely know by now, is a colorless, odorless, tasteless gas. It is a byproduct of the decay of radium, and, as such, may be found anywhere and everywhere in the environment. In the backyard or patio, it is no problem, since it is quickly diluted and dissipated in the open air.

In the family room, it can be a killer.

Radon is a carcinogen. It causes lung cancer and is at least as bad as moderate cigarette smoking. Recent studies by the Environmental Protection Agency suggest radon may be responsible for between 5000 and 20,000 of the 130,000 lung cancer deaths each year in the United States alone.

While the prime source is the soil, radon, because it is a gas, can be

absorbed and released by anything in contact with the soil—or anything made from the soil such as bricks, cement, paving blocks and so forth.

EPA has found alarming levels present in drinking water, presumably absorbed from contaminated reservoir beds, wells and perhaps conduits. While concentrations vary geographically, radon can and has been found virtually everywhere in the country.

Radon has always been present in the environment. But it is only in the last few years that its life-threatening properties have been recognized.

In December 1983, the Inter-agency Committee on Indoor Air Quality was set up, including among the 15 agencies represented EPA, HUD, OSHA, the Department of Energy and the Consumer Product Safety Commission.

At that time, radon held no higher priority on the committee's agenda than did formaldehyde, fireplaces, cigarettes or aerosol sprays. In

in sealing porous foundation materials.

The National Association of Home Builders, in cooperation with a number of local builder associations, has already begun experimenting with various techniques to minimize exposure and to provide improved ventilating systems that will retain as much energy efficiency as possible. It is a paradox that hardly needs mention that one of industry's earliest responses to the energy crisis was to limit outside air infiltration in buildings and homes. Those "sealed" rooms and building have now suddenly become potential death traps.

At the same time, astute builders are alert to a different kind of hazard: tort liability. Perhaps because that is already a "raw nerve," several associations are warning members to rewrite sales contracts with an escape clause absolving the builder from responsibility for "environmental or ecological conditions."

Builders also are being urged to try to head off hasty efforts by local governments to impose costly new code requirements before the best (most effective) and least costly protective measures can be documented.

Toward that end, EPA is about to launch a three-year, \$15 million research effort to define more accurately the radon hazard as well as to develop im-

proved detection and mitigation techniques. In response to appeals from, among others, the Consumer Federation of America, EPA is also publishing a list of laboratories and businesses offering "approved" radon testing services.

So far there have been few regulatory mandates at the federal level bearing on radon. EPA has set standards for water emissions under the Safe Drinking Water Act. But the agency's other applicable mandate, the Clean Air Act, so far covers only outdoor air pollution. □

*Radon is the nation's latest and perhaps scariest 'scare.' But at the same time, astute builders are alert to a different kind of hazard: tort liability.*

just the last few months, however, with the publication by EPA of the results of several tests and other research, radon has moved to the head of the list.

The housing industry has been quick to respond, of course, prodded by EPA's warning that the threat of radon contamination is greatest in homes built on or near contaminated soil. The agency has published simultaneously guidelines on remedial measures to minimize indoor air pollution, chiefly in venting foundations and basements and

# A Home Builder's View of Radon

David C. Smith

The question builders most frequently ask about radon is, "How do I know if I have a problem?" Builders would prefer to deal with radon at the preconstruction stage, because preventive measures tend to be less expensive and easier to incorporate than techniques for reducing radon levels in a completed home.

Unfortunately, trying to assess the likelihood of a radon problem for an unimproved piece of land is extremely difficult. Using existing testing procedures results in a tremendous variability of measurement. Even digging to test the soil can create a radon problem that might otherwise not have existed. Land in different sections of the same development may have different radon measurements. There have been instances of homes with serious radon contamination next door to homes with no problem at all.

The best available tests for determining radon levels within existing homes require long-term assessments—usually over six months to a year. Concentrations may vary depending upon the season. A single short-term test could yield different results in February, when windows are likely to be tightly shut, than in April. However, you may be able to obtain meaningful results if you conduct a few short-term tests at different times of the year under carefully controlled conditions. The Environmental Protection Agency currently knows of only one company offering the general public long-term radon detectors with the necessary pro-

cessing devices—the Terradex Corporation, 410 N. Wiget Lane, Walnut Creek, Calif., 91598. The cost is roughly \$50. Consumers should be wary of using the services of anyone who offers to give a house a "fast and simple" radon check.

Radon is an inert radioactive gas that is a by-product of the breakdown of uranium. As radon breaks down, it produces radioactive decay products, commonly called radon "daughters," which become attached to dust particles and other surfaces. There is currently no economical, accurate and practical method of measuring these radioactive decay products.

The NAHB Research Foundation has taken a leading role in helping builders to address radon issues. Before radon became a widely-publicized concern, the Research Foundation had worked with utility companies and the U.S. Department of Energy on indoor air quality issues, such as the effect of air infiltration on indoor air quality.

In 1985, the NAHB leadership asked the Research Foundation to write a general paper about indoor air quality. Because of the importance of some of the issues in the paper, the Research Foundation organized a meeting in December between NAHB's elected officers and officials from EPA and DOE. Although the meeting was intended to deal with all aspects of indoor air quality, the major topic of discussion that emerged was radon.

In January 1986, the Research Foundation began to work with EPA to coordinate its activities with builders. A meeting was arranged for rep-

resentatives from New York, New Jersey and Pennsylvania (which have all experienced serious problems with radon). The meeting was attended by state and local government officials, builders, Realtors, members of the Chamber of Commerce and officials from EPA. The agency discussed some of its radon-related activities with the attendees, who in turn briefed EPA on what private industry is doing.

Sweden has also had to address problems with radon pollution in houses. John Spears of the Research Foundation accompanied a delegation from New Jersey to Sweden to discuss some of these issues. The group consisted of Sen. Frank Lautenberg (D-N.J.) and staff, State Senator John Dorsey and staff, and representatives from builders associations and boards of Realtors. Richard Guimond, director of EPA's Radon Action Program, was also a member of the delegation. The group was briefed by top Swedish officials and scientists about radon issues, including techniques for reduction and prevention, health effects and government policy. The group also met with representatives of Sweden's real estate industry to discuss the impact of radon on real estate values in Sweden.

The Research Foundation hopes to monitor the construction this summer of 100 radon-proof houses in New Jersey. The project could involve \$140,000 in funding from the state, with builders from New Jersey contributing labor and materials, and the state and local home builders associations contributing staff time and in-kind services to help monitor the results. The purpose of the project is to develop low-cost construction methods to prevent ra-

don from entering new homes. Similar projects have been proposed in New York and Pennsylvania.

EPA has given a grant to the Research Foundation to serve as a clearinghouse on radon information for the housing industry, including builders, Realtors and manufacturers. EPA provides regular updates to the Research Foundation regarding developments in radon research and, in turn, is apprised of developments from the housing industry. For further information, contact John Spears, Radon Information Clearinghouse for the Housing Industry, at (301) 762-4200.

NAHB has also been working with the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) to determine standards for the maximum allowable levels of contaminants in indoor air, including radon. The ASHRAE standards are incorporated into many building codes, thereby becoming the standards to which contractors must build their homes. Martin Mintz, as NAHB's director of technical services and a member of an ASHRAE subcommittee, is providing builder input to ensure that the standards are reasonable and workable.

Many prevention and reduction techniques have been attempted, but not enough data has been collected to establish which works best. We will be in a better position to deal with the radon issue as soon as some of the basic research and analysis is complete. In the meantime, NAHB will continue to work with EPA and other government and industry groups to find solutions to radon problems.

*David C. Smith is president of NAHB.*



# Health Effects Of Radon Are Overblown, Official Says

*Stories that link radon to cancer may spur governments to impose restrictive building codes.*

By Dan McLeister, Senior Editor

The director of technical services for the National Association of Home Builders said possible negative health effects from exposure to radon have been blown out of proportion to the actual or potential danger.

Wrong or unsubstantiated information about radon and its possible danger in houses could create a panic this year, said NAHB's Marty Mintz in an interview with *Professional Builder*.

"My biggest fear at this point is that you are going to see reactions. People will be afraid to purchase homes or build homes in areas that may or may not have a radon problem to some degree or another. I think that is the biggest single danger," Mintz said.

(*Professional Builder* first described the radon problem in February 1986, pages 72 and 74.)

But others think radon is a problem. In testimony to Congress, University of Pittsburgh professor Bernard L. Cohen said that "there is unanimous agreement in the scientific community that the cancer risk from radon far exceeds that from all of the other widely publicized radiation threats in our society combined," reported the Washington Post. He said he continued to believe that, but noted that the evidence is indirect so far.

Mintz, however, agrees with a Nobel laureate who downplays the ill effects of radon. Dr. Roslyn Yalow said that estimates attributing an average of 15,000 lung cancers a year to radon "is clearly an exaggeration."

She urged agencies such as the Environmental Protection Agency, the Center for Disease Control and the National Council on Radiation Protection to "re-examine the basis on which they are giving these numbers that could end up costing

the country tens and hundreds of millions of dollars unnecessarily, to clean up something that is probably not nearly as hazardous as they think it is," she said in an interview in the Washington Post.

Cohen is now measuring radon levels and comparing them to lung cancer rates in Pennsylvania counties with the highest radon emissions. He estimated that it would be two years before any conclusions could be drawn.

Mintz is afraid the negative publicity will spur governments to draw up regulations before all the data are in.

"You are going to see regulators jumping the gun. They will establish maximum permissible levels of radon that probably have nothing to do with reality at all," Mintz said.

He named some states that already have laws on the books or are studying the situation: New Jersey, Florida, Pennsylvania, New York, Connecticut, Rhode Island, Maine, North Carolina, South Carolina, West Virginia, Ohio, Illinois, Indiana and Alabama.

"One of the big problems with radon is that there are more things we don't know than we do know at this point," Mintz said.

When it comes to new-home construction, the problem is the inability to measure concentrations of radon before the houses are built, he said. "There is no reliable method at this time for open-site testing

of radon. Even if you could tell how much radon is going to come out of that site, the act of building a home on that site changes the amount," he said.

A house actually pumps radon because the house has a slight negative pressure in it, causing it to suck radon from the ground. As the house does that, it changes the amount of radon that comes up through the ground, Mintz explained. (All soil contains radon. It is a natural product. Soil has always emitted radon, Mintz said.)

With existing houses, the situation is also uncertain. The Environmental Protection Agency has come up with what Mintz called a whole textbook full of "mitigation" techniques to prevent radon from entering a house. "The problem is

"People will be afraid to purchase homes or build homes in areas that may or may not have a radon problem to some degree or another. I think that is the biggest single danger," Mintz said.



that not one of them has ever been tested to see if they work. They sound reasonable," Mintz said. But the mitigation techniques have only been assembled by EPA in 1986.

Officials still don't know what the average levels of radon are in

*Continued on page 96*

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## The 16 Items Builders Consider Important For Success

**W**hat do small builders think about and what do they consider important?

Specifically, 16 items are considered very important: estimating a job, scheduling a job, directing and controlling a job, selection of subcontractors, quality of workmanship, dealing with personnel, written contracts, use of professional services, importance of customer service, understanding finance, use of a general ledger and journal, maintaining current financial records, double-entry accounting system, estimating cash flow, dealing with lender and maintaining separation of business expenses from personal living expenses. Twelve of those skills were used on a daily basis.

That's what H. Stephan Egger found out when he surveyed 60 Texas builders as part of his doctoral research while a student at Texas A & M University. Egger

now is in the Dept. of Industrial Technology at the University of Northern Iowa.

Egger studied contractors with one to four employees. The main object of the study was to identify business techniques and skills utilized by this group of contractors as well as the relative importance of the items and their frequency of use.

According to the data collected, the average number of homes built in 1984 per contractor surveyed was 10.2 and the average number of years in business was 12.5.

In regard to the 26 items on the questionnaire, contractors had the opportunity to eliminate or add items and then to rate the relative importance of the items from very important to irrelevant and to rate the frequency of use from daily to never.

All of the respondents found the use of customer services to be im-

portant to very important, with 58.1 percent indicating very important. Of the sample, 87.5 percent reported its use on a daily, weekly, or monthly basis.

Directing and controlling a job was rated very important by 83.3 percent. In regard to frequency of use, 92.9 percent reported that it was utilized on a daily basis.

And 88.1 percent of the respondents found projecting future needs on past performance to be important to very important. The majority of the respondents, 69.1 percent, said that they used it on a monthly or semi-annual basis.

Ninety-three percent of the respondents found determining market need to be important to very important. Almost 81 percent of the respondents reported utilization on a daily, weekly, or monthly basis, with 35.7 percent for monthly and 26.2 percent for weekly. □

### *NAHB official urges deliberation in dealing with radon*

*Continued from page 94*

homes across the country. EPA is now in the process of trying to determine those levels. A national survey will take a year, Mintz said, and data collection and analysis will take another year.

In the meantime, EPA will provide technical assistance to those states that request it. The federal agency will be developing measurement techniques to help states with quality assurance programs. "EPA is going to develop a series of tests to test the testers to see if they know what they are talking about," Mintz said.

While better statistical data is being gathered, a Radon Information Council has been set up by various construction industry groups. The head of the organization is John Heslip, executive vice president of the National Concrete Masonry Association in Reston, Va. Its basic purpose is to make sure the radon story gets balanced coverage in the media. □

### Construction Tips For Dealing With Radon

**T**he NAHB Research Foundation is working with the EPA on the development and testing of mitigation techniques to reduce radon levels.

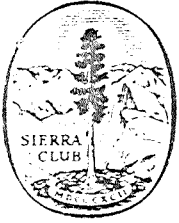
Some of the techniques EPA has suggested might mitigate radon build-up but they can introduce other problems into a house, Mintz said. For example, EPA suggests introducing pressure within the block cell wall to suck up the radon. The side effect, though, is that negative pressure on the wall is going to suck water into the wall and create water problems.

Currently there are several methods of dealing with elevated radon levels in homes. First there is prevention of the entry of radon gas by sealing cracks around utility openings by caulking and sealants, sealing

tops of concrete block with concrete and covering exposed earth with vapor barriers or concrete slabs. Secondly, there is the removal of radon gas by ventilating crawl spaces and under floor areas, by increasing the ventilation rate of the home and dust removal by filtration.

One new-home builder is taking precautionary steps where radon might pose future problems. A Pennsylvania builder brings up a couple pipes from gravel beneath the concrete basement slab and caps them. Then, if the homeowner later finds radon levels are too high, he can attach fans to the pipes at a minimal cost compared to digging up the slab and putting in pipes, according to Mike Ondra, president of ConSolarNation (PB, February 1986). □

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SIERRA CLUB

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*Kansas Chapter*

February 3, 1987

To: House Energy and Natural Resources Committee  
From: Shaun McGrath

re: HCR5007 establishing an advisory committee on radon

The Sierra Club is a non-profit organization concerned with the preservation and protection of the environment. Our Kansas Chapter membership is over 1500. I am here today in support of HCR5007.

The problems associated with the naturally occurring releases of radon in the environment are not well understood, but are increasingly attracting concern.

The establishment of an advisory committee to study this phenomenon and the hazards it creates, in order to inform the legislature and advise you of appropriate action, is a move the Sierra Club supports.

The Resolution does allow the Secretary of Health and Environment "to include on the committee other individuals or representatives of other organizations deemed useful in studying the issue..." The Sierra Club urges the Secretary to include a representative of a public interest group on the committee, and we support the adoption of HCR5007.

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