

As radon levels soar in Pa. Homes, action lags

By Steve Stecklow
Inquirer Staff Writer

When technicians measured the radiation levels in the Berks County home of Stanley and Diane Watras around Christmas, they did not believe the test results. Not only were the readings higher than they had ever seen, but they also were well beyond what scientists had thought was possible in a residence.

"It surprised the heck out of everybody because nobody had ever seen anything that high," said Bill Belanger, a radiation specialist with the U.S. Environmental Protection Agency.

The numbers turned out to be accurate. The Watras' split-level home on Indian Lane in Colebrookdale Township had the highest levels of naturally occurring radiation ever recorded in a home in the United States. The levels of a potentially dangerous radioactive gas called radon, which is emitted by trace amounts of uranium beneath the Earth's surface,

were so high that, according to statistics in a 1984 report prepared for Congress, if the Watrases and their two young sons had lived in the house for just a few more years, they probably would have developed lung cancer.

Stanley Watras, 34, a construction engineer at the Limerick nuclear plant in Montgomery County, quickly moved his family out of the house, where they had lived for a year. Meanwhile, state officials set about testing hundreds of other homes in the area to determine whether they, too, were dangerously radioactive.

The results to date are startling. Although none of the homes approached the radiation levels found at the Watras residence - most have less than one-hundredth the radon contamination - nearly 48 percent of 650 homes tested had radiation levels higher than what would require, under federal regulations, corrective action at a uranium mine. (The radon levels in the Watras home

were about 675 times the maximum level permitted in a uranium mine.)

Many of the Berks County homes are more contaminated than several hundred houses surrounding an old uranium mill in Canonsburg, Washington County, Pa., that are being cleaned up by the federal government at a cost of \$24 million, according to state officials. The Berks County radon levels are also higher than those at houses in Grand Junction, Colo., that were built on radioactive waste from uranium milling, officials say.

High levels of radon in Pennsylvania are not limited to Berks County. Excessive radon levels also were found in 38 of 100 homes tested near Bloomsburg, Columbia County, last year by the U.S. Department of Energy.

Such findings have spread concern among residents in Berks County and other areas of eastern Pennsylvania where uranium, believed to be the source of radon in the Watras home and hundreds of others,

is known to be concentrated in the soil. The state Department of Environmental Resources (DER) has more than 600 pending requests, mostly from Berks County, to test homes for radon.

Moreover, many experts are predicting that the Watras incident will have national significance as well. They say it will finally prod federal officials to act on something they have been warned about for years but basically have ignored - that more than one million American homes may be dangerously radioactive.

Last year, the National Council on Radiation Protection and Measurements, an independent scientific body chartered by Congress to study radiation health issues, estimated that radon may be responsible for more than 9,000 annual deaths from lung cancer in the United States and that more than one million American homes may have dangerous levels of the gas. Other experts speculate that as many as 10 million U.S. homes may have dangerous radon levels.

"Heads have been buried in the sand for too long," said James Stebbings, a radiation expert at

the federally funded Argonne National Laboratory in Argonne, Ill.

"The social implications are horrendous, because what you are saying is that a very large number of houses in the country are unsafe," he said. "You're talking about a cleanup here that would make the EPA's toxic-waste cleanup program look like chicken feed."

Uranium is more common in the earth than silver and gold. Traces of the radioactive mineral can be found in all rock, especially granite. In the United States, quantities of uranium large enough to mine are found mostly in the West, although large deposits also have been located in other regions, including Texas and southern Virginia.

In eastern Pennsylvania, a narrow belt of uranium-rich granite runs from Easton to Reading. Known by geologists as the "Reading Prong," it was discovered by the Department of Energy in the early 1970s, during a research project to find possible sources of radioactive fuel for nuclear power plants. Although the uranium in the Reading Prong

is not dense enough to mine, it is believed to be the source of the radon problems in Berks County.

By its nature, uranium is in a constant state of decay, breaking down into a variety of radioactive substances, including radon, a colorless, odorless and tasteless gas. Radon, which can seep into a home through cracks or holes in its foundation, is not necessarily hazardous to humans, many scientists say. But radon decays into highly dangerous radioactive particles, which can lodge in the lungs when inhaled.

Studies of miners show that these particles, known as radon daughters, can cause lung cancer. The debilitating disease, usually fatal, can take anywhere from five to 20 years to develop and does not usually appear until after the age of 40.

Experts say that all buildings contain some traces of radon gas, but it is impossible to determine without testing whether a particular home has levels that are considered unsafe. A variety of factors - including the amount of uranium in the

soil beneath the house, the permeability of the soil, the design of the house and how well the structure is insulated - can affect how much radon is seeping in.

One house can be dangerously radioactive, while the house next door can be perfectly safe, experts say. In fact, some of the houses in the Watras neighborhood had normal radon levels, state officials reported. Radon levels can also vary greatly by the season and even by the time of day, because radon concentration can be significantly reduced by air circulation.

To test homes for radon, DER technicians have been taking "grab sample tests," in which radioactivity in a home is quickly measured from a small air sample. But because these readings can vary in accuracy, technicians have been leaving in the homes long-term radon-detection devices manufactured by Terradex Corp. of Walnut Creek, Calif. The sampling devices are supposed to be left in the homes for one to three months before being sent to the company for analysis.

DER does not charge a fee to test homes, but the agency has a lengthy backlog of requests, which is expected to grow longer as news of the problem spreads. Richard Oswald, an official with Terradex, said homeowners who do not want to wait for DER can order their own detectors from the company and test their homes themselves. The firm recommends that two detectors be used - one in the basement and one in a first-floor living area. The total cost is \$80, including a lab analysis, he said.

Reducing radon in a house is not as simple as measuring it and is usually more expensive. In addition, the costs must be borne by the homeowner, because state and federal officials say they have no funds at the moment to subsidize such work.

Although experts say that radon levels can often be drastically reduced simply by opening a window or a door and letting air circulate, such a solution is not permanent. Tell Tappan, a health physicist at Arix Corp., said permanently reducing radon in a house can cost from several hundred dollars to \$20,000, depending on the severity of the problem. The architectural and engineering

firm, which is based in Grand Junction, Colo., has been paid \$48,000 by the DER to develop low-cost techniques for homeowners to reduce radon levels, he said.

In most cases, Tappan and other experts say, radon can be reduced by finding and sealing the main source of the gas leak. Often, some means of venting the gas from the footings of the house also is required.

Dr. Joel Noble, who operates a radon-testing lab in Plymouth Meeting, said blowers suitable for venting radon are available for about \$40 and usually are simple to install.

"There is rarely a house that you can't fix the problem in at a relatively low cost," said Noble, whose own underground house in Montgomery County was found to be highly radioactive in 1981 and has since been made safe.

Noble said he was disillusioned with the state and federal governments' responses to findings of high radon levels in homes. As a result of his own experience with radon, he established the

National Indoor Environmental Institute three years ago. The research organization developed informational brochures about radon for the public, distributed Terradex sampling devices and tried to persuade state and federal officials to survey thousands of homes in eastern Pennsylvania for radon pollution.

But Noble said he and his colleagues had little success in interesting government agencies, including the DER and the federal Environmental Protection Agency, in the problem. Eventually, the institute was disbanded.

"We spent close to a quarter million dollars trying to bring this to broader attention," Noble said. "The response by homeowners and public agencies was zilch."

Pennsylvania state officials have known about dangerous radon levels in homes since 1981, after it was discovered inadvertently by the Pennsylvania Power & Light Co., a utility based in Allentown.

The discovery was made while the utility was studying a proposed energy

conservation program for its customers that included the use of heavy insulation to reduce heating bills. Before instituting the program, PP&L decided to test what effect improved insulation would have on air quality.

According to Heinz Pfeiffer, PP&L's manager of technology and energy assessment, the utility placed air-sampling devices in 36 of its employees' homes throughout the company's service area. In analyzing the results, the utility found that radon levels in some of the homes were well beyond levels considered safe - in at least one case nearly 20 times the standard for uranium mines.

Upon further study, Pfeiffer said, the utility determined that the soil around the homes played a much larger factor in radon levels than insulation, so PP&L eventually went ahead with its energy conservation program. But Pfeiffer said he and other officials presented a report of their results to the DER and the EPA in 1981.

But the state failed to take immediate action.

According to Thomas Gerusky, director of DER's Bureau of Radiation Protection, the agency was preoccupied at the time with the nuclear accident at Three Mile Island and was unable to devote any resources to the radon problem. Gerusky said his department, in fact, had been planning to study the Reading Prong in the spring of 1979, but the study was postponed indefinitely after the March 1979 nuclear accident. In an interview in 1982 with *The Inquirer*, Gerusky said the responsibility for dealing with radon rested with the federal government.

But the federal government had problems of its own at the time. Although officials had discussed taking action on the radon issue, any hope of that disappeared in 1981, when the Reagan administration severely cut the EPA's budget. Thus, virtually nothing was done on the state and federal levels for several years.

Last year, the National Council on Radiation Protection and Measurements called for a nationwide survey of homes to determine the magnitude of the radon problem. The organization also recommended establishing a standard for safe levels of radon

in homes at half the level permitted in uranium mines.

But to date, the federal government has not adopted such a safety standard and, with the exception of the testing being done in Pennsylvania, little work is being done about radon. Federal officials say the EPA has been allocated only \$300,000 by Congress to study radon in homes - a small percentage of its budget.

"The government really has been slow mobilizing," said Naomi Harley, a radiation researcher and member of the National Council on Radiation Protection and Measurements.

Government responses to radon problems have also been marred by a lack of coordination among agencies.

In Pennsylvania, for example, officials at the DER, which is conducting the radon testing in Berks County, were unaware until about two weeks ago that the state Health Department had been participating in similar radon testing in Columbia County for more than a year. A DER spokesman said the agency learned of the Health

Department's activities from a reporter.

The Health Department's role stems from a proposed \$7 million, seven-year radon health study of eastern and central Pennsylvania by the U.S. Department of Energy's Argonne National Laboratory.

According to James Stebbings, an Argonne epidemiologist involved in the study, the Department of Energy discovered there was a radon problem in the Bloomsburg area after testing former workers of a radium-dial plant there and their spouses as part of another radiation study. The tests disclosed that many of the employees' spouses, who had not worked at the plant, were also contaminated with radon. The researchers speculated that the source of the radon was the workers' homes and decided to investigate.

To confirm their theory, Argonne researchers, under the auspices of the state Health Department, spent about four months in the winter of 1983-84 testing about 100 homes in the Bloomsburg area for radon. The results showed that radon

levels in at least 38 homes were higher than the standard recommended by the National Council on Radiation Protection and Measurements, Stebbings said. Immediate venting was suggested in more than 20 homes, he said.

Stebbing said the Department of Energy now wants to study 2,000 lung cancer cases from eastern and central Pennsylvania to see whether the disease can be linked to high radon levels in the patients' homes. Until now, the only radon health studies that have been performed have been on miners.

Stebbing said that the project has not been formally approved by the Department of Energy but that he expects to get an official go-ahead shortly.

Stanley Watras and his family now live in a rented house near Boyertown. They are still hoping to move back into their contaminated house in Colebrookdale - they just don't know when.

Upon learning about the record levels of radon in his house in Colebrookdale Township in January, Watras

said, he and his wife became distressed about the possible health consequences for themselves and their sons, Michael, 3, and Christopher, 1. The fears have subsided, however.

"Right now, we're pretty calmed down," Watras said.

Nevertheless, Watras said, he gave up smoking after learning that many scientists believe the habit could exacerbate his chances of getting lung cancer. He also said he had been contacting radiological experts to learn as much as he can about the health effects of radon, and had been in touch with federal officials to see what, if anything, can be done about the problem.

Despite his family's ordeal, Watras said he remains thankful that he was able to discover the radon problem at his house at all. The problem surfaced after Watras, whose body was contaminated with radon, repeatedly set off radiation monitoring alarms at the Limerick nuclear plant construction site, where he works for Bechtel Corp.

"I just thank God that if it was going to be anybody living in that house, it would be me, somebody who could, through their work activities, discover the situation," he said.

Caption:

PHOTO (1)

1. The Watras home in Colebrookdale, where radiation levels 'nobody had ever seen' were found (Special to The Inquirer / GERALD E. ELLSON)

MAP (1)

1. Pennsylvania (The Philadelphia Inquirer / KENNETH MILLER)

PHOTO AND MAP

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