



I-Team: Radiation in your tap water - part 1

by Mark Greenblatt / 11 News Chief Investigative Reporter

khou.com

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HOUSTON -- Hundreds of water providers around the Gulf Coast region are providing their customers with drinking water that contains radioactive contaminants that raise health risks, according to state lab results and public health scientists.

The revelations came to light during a four-month KHOU-TV investigation, which examined thousands of state laboratory tests from water providers across Texas. The data, provided by the Texas Commission on Environmental Quality (TCEQ), ranged from 2004 to the present.

The radiation was first discovered as a part of required testing, under federal regulations, of all drinking water provided by community water systems in America.

[Click here to check radiation levels in your water system.](#)

In Texas, the Department of State Health Services provides an independent lab to test the water for potential contaminants of all kinds and forward results to both the water system and TCEQ. Much to the surprise of many people, hundreds of water companies along the Gulf Coast and all across Texas pump water with some amount of radiation inside.

One particular type of radiation that popped up again and again in water provided

by utilities all across Texas, was something called alpha radiation, which public health scientists say can be particularly problematic when consumed.

“The alpha particle -- this is the 800-pound gorilla of radioactive particles,” said Dr. David Ozonoff, an environmental health professor and chair emeritus of the Boston University School of Public Health.

Ozonoff obtained a medical degree from the Cornell University School of Medicine and serves on the Massachusetts Cancer Advisory Committee.

He said drinking water with any amount of alpha particles, even when consumed in amounts below federal legal limits, raises your risk to develop health problems or, in rare cases, cancer. Examples of alpha particles found in the Gulf Coast region are those from uranium, radium and other minerals.

Ozonoff describes alpha particles as a type of radiation that would not typically harm you unless inhaled or ingested. He warns, once you take it inside your body, your health risks immediately begin to rise.

“It can't penetrate very far, but when it hits something it does a ferocious amount of damage,” he said. “If I were to drink it, then many parts of your body are within knife-wielding distance of an alpha particle.”

Ozonoff said the danger in drinking alpha particles is that you bring them inside your body and right up against sensitive organs, where the alpha particles can damage DNA and create a possible mutation in your cells. He says the more you drink, the more you raise your risk for cancer.

In fact, even the EPA says “a single ‘wild’ cell can give rise to a cancer,” and that “a single alpha passing through a cell is sufficient to induce a mutational event.”

The EPA made the disclosure in the federal register as part of the National Primary Drinking Water Regulations 2000 final rule that regulates all forms of radioactive elements in drinking water.

The “zero-threshold” allowance for radionuclides, from a health-based standard, is one reason why the EPA set the drinking water federal health goal, called the MCLG (Maximum Contaminant Limit Goal), at zero for all forms of ionizing radiation. Other potential contaminants in drinking water such as copper, selenium, barium, chlorine residuals, trihalomethanes, and many others that are

not radioactive elements, all have goals set above zero.

The EPA notes there are some who disagree with its conclusion that any amount of radiation has the ability to cause a mutation. However, it states in the federal register that EPA “believes its position is based on weight of evidence and support from national and international groups of experts interested in radiation protection.”

Many of America’s largest water systems attain the public health goal with no detectable amounts of radiation in their water supplies. Many, but not all of these water systems, depend on surface drinking water sources, like rivers, lakes and streams, to supply their communities. Most radioactive alpha particles end up in drinking water only after it is pumped up from groundwater wells in regions of the country with natural uranium, radium or other radioactive deposits underground. In some cases, that are less common, radioactive elements do end up in surface water.

However, the EPA sets a “legal” limit for these contaminants above zero, which it calls the MCL (Maximum Contaminant Level). The government cannot force a water system to take action to clean up radioactive drinking water until the system exceeds that legal limit. However, as it pertains to radioactive materials in particular, Ozonoff says you are still put at risk if they are present, even in quantities below that legal limit.

“All you need is one cell to go bad,” he said, to initiate the beginning stages of a cancerous event.

While potential mutations could take place at any time when radionuclides are consumed, the risks are relatively small. For instance, the EPA estimates “a radiogenic cancer risk of slightly less than one in 10,000” for communities that consume drinking water over a lifetime with enough alpha radiation from uranium to reach the MCL of 30 micrograms. The odds have been calculated to be even lower for alpha derived from other isotopes.

However, Ozonoff warns those risk levels are calculated in isolation from your other daily exposure to all types of carcinogens, with which we regularly come into contact. For example, he points out that water can also have other radioactive elements, and that the risk from those compounds with whatever cancer risk you are already receiving from alpha.

While nearly every major city in Texas has no detectable amounts of radiation in their purified water, according to United States Geological Survey officials, the Houston region and surrounding counties are prone to having natural uranium deposits that are near the aquifers that provide well water.

Lab reports reveal radiation in Harris County Municipal Utility District #105's (MUD #105) water dates as far back as the early 1980s. MUD #105, a suburban water provider outside the city limits of Houston, did not receive a formal "legal" violation notice until it exceeded federal limits in 2008 and 2009.

But MUD #105 did disclose those violations to residents in two annual water-quality reports. However, neighborhood resident Karen Tolbert thinks both the MUD and regulators had a moral obligation to do more.

"Screw the fine print," Tolbert said. "Something this serious, it should be mandatory that everybody in this district knows what's going on."

Attorney Taylor Goodall, who represents the board of directors for MUD 105, says the MUD also began mailing out more detailed warning notices in December of 2009. The notices contained language in capital letters saying "THIS IS NOT AN EMERGENCY" and also telling residents "you do not need to use an alternative water supply."

"I don't think there's a reason to panic," Goodall said.

KHOU: "Do you think the 'Average Joe' knows there's radiation in the water?"

GOODALL: "Well I can't speak for the 'Average Joe,' but I know that we sent out mailers."

Goodall says as soon as the MUD's board was notified of a legal violation, it also began to take steps to limit the flow of water from the most radioactive water well that the utility owns, which he says still remains in limited service during high-demand times.

But residents like Felicia Byford and Tolbert, who both have young children, believe the MUD should have reduced the flow of that well long ago.

State tests show the well has always tested above the federal health goal for radioactive alpha and has consistently come close to exceeding the "legal" limit for

alpha, and in more recent years, tested in similar levels for radioactive radium, too.

KHOU: “Scientists say that this amount of radiation over a number of years, leads to an increased risk of cancer in your community. Does that concern you?”

GOODALL: “Any issue of public health concerns me. But what I’m saying is...”

KHOU: “You’re saying there is no reason to panic.” (Referring to flier sent out to community residents.)

GOODALL: “There isn’t a reason to panic. I am firm in my belief that there isn’t a reason to panic.”

Byford, however, disagrees. She’s an embalmer by profession and says she sees every day what can happen to someone who comes down with cancer, and wants to lower her exposure to anything that might raise the risks to her own family.

“You come here and you drink this water,” she said. “Then you tell me how you feel in two years.”

But KHOU found out that MUD 105 is not alone. In fact, there are water providers all over Harris County that show alpha particles, according to state testing. Such is the case with Municipal Utility District 238, Municipal Utility District 23, the City of Katy and hundreds of other small water systems that depend mostly -- or entirely -- on groundwater.

One of those local water systems, known as the Suburban Mobile Home Park 2, violated federal legal limits for alpha radiation in 2003, 2004 and 2005. Yet, the Texas Commission on Environmental Quality allowed the drinking water to continue to flow to residents there for years after that, despite consistently testing with some of the highest readings for alpha-particle activity and uranium in Texas.

For instance, in all four tests performed in the last two quarters of 2009 and the first two quarters of 2010, the Suburban Mobile Home Park 2 had so much radium in its water it surpassed the federal “legal” limit for combined radium by 200 percent.

In the water system’s last six tests for alpha, performed in 2009 and 2010, it more than doubled the legal limit for that type of radiation as well. The federal legal

limit is set at 15 picocuries (a measurement for radiation), and the water system measured between 33 and 43 picocuries in all six of its most recent tests. In addition, the Suburban Mobile Home Park 2 exceeded the federal legal limit for uranium in eight of its last 10 tests.

The only two test results that did not exceed the legal limit for uranium include one where the result equaled the legal limit and another where it fell one microgram below the legal limit.

All of these recent readings came after the TCEQ put the Suburban Mobile Home Park on a “compliance agreement” dated July 27, 2007. The TCEQ, the agency charged with enforcing federal safe-water drinking regulations in Texas, has continued to allow the radioactive water to flow.

When KHOU asked TCEQ why it had not taken any further enforcement action in all this time, TCEQ spokesperson Terry Clawson released a statement from the agency saying:

“The TCEQ placed the Suburban Mobile Home Park on a Compliance Agreement which began on July 23, 2007 and ended on July 23, 2010. The TCEQ is awaiting monitoring results to evaluate the system’s compliance performance status to determine further action.”

KHOU also obtained a database of every enforcement action TCEQ has taken over the last six years and noted no actions had been taken against Harris County MUD #105. However, seven days after TCEQ released its database of enforcement actions to KHOU, the agency then entered into a compliance agreement with MUD 105, but has not fined the utility.

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I-Team: State 'lowballs' radiation scores in drinking water - part 2

by Mark Greenblatt/11 News Chief Investigative Reporter

khou.com

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Recommend 2

HOUSTON—For more than 20 years, the Texas Commission on Environmental Quality under-reported the amount of radiation found in drinking water provided by communities all across Texas. As a result, health risks to people consuming the water have been underestimated in many water systems where radioactive contaminants are present.

The TCEQ regulates water systems for compliance with federal safe-water drinking regulations. However, KHOU has learned the state regulating agency consistently took radiation readings it received from the water testing lab run by the Department of State Health Services and lowered the "official" radiation readings reported by the independent lab. The TCEQ would do this by subtracting off the margin of error for all radiation readings it would receive. The subtractions helped some utilities avoid radiation violations that could have forced them to clean up their water decades ago.

Harris County Municipal Utility District No.105 is one of those utilities that benefited from the TCEQ "math." The utility did receive two official violation notices, in 2008 and 2009, for having too much radiation in the water supply it provides to thousands of residents. However, KHOU has learned the MUD would have exceeded federal regulations for radiation in its water as far back as 1988, had the state not subtracted off the margin of error for radiation readings.

The TCEQ confirmed in an e-mail to KHOU that MUD 105's actual lab result in 1988 for radioactive alpha radiation came in at 17.6 picocuries (a scientific unit of measurement for radiation). The measured level came in above the federal legal limit of 15 picocuries/Liter (pCi/L) for alpha radiation in the water and would have triggered a violation. ☒

However, the lab's 17.6 measurement also came with a margin of error of 5.3. That meant the lab felt the real radiation measurement for alpha radiation in 1988 could have been as high as 22.9 (5.3 points above the measured 17.6), or as low as 12.3 (5.3 points below the measured 17.6). TCEQ confirmed in an e-mail that it chose the lowest possible radiation number, 12.3, for regulatory purposes. The choice to subtract out the margin of error, instead of simply reporting the result, helped MUD 105 avoid a violation in 1988. ☒☒☒

TCEQ's Linda Brookins, who oversees all drinking water safety regulation for the state of Texas, confirms the agency consistently subtracted off margin of error for water systems across Texas, since the beginning of state testing for radioactive materials in drinking water. The state began that testing more than 20 years ago. She says the TCEQ stopped the practice in 2009, after an EPA audit instructed the agency to stop subtracting margin of error from radiation readings. Brookins believes the agency's actions did not impact human health.

A KHOU analysis of "Texas math" concludes that TCEQ's under-reporting helped MUD 105 repeatedly avoid testing above the federal legal limits for alpha radiation in drinking water. It didn't receive a violation until 2008, when it was found to have too much alpha radiation in its water, even after TCEQ subtracted out the margin of error. ☒

However, if you take away the state's subtractions for all of its historical tests for alpha radiation, the MUD would have tested above the legal limit for alpha radiation in water at least 12 times dating back to 1988. In addition, the MUD has never received a formal violation from TCEQ for radiation in its water that comes from radium. However, nine out of the last 15 tests for radium in its water would have scored above the federal legal limit for radium (5 pCi/L) without TCEQ's subtraction of margin of error. ☒

"I think, from a public health standpoint, it's hard to defend," Dr. Joshua Hamilton said. "It's certainly not defensible from a scientific standpoint."

Hamilton is a toxicologist and public-health scientist currently working as the chief academic and scientific officer at the Marine Biological Laboratory in Massachusetts. Hamilton received his doctorate from Cornell University in New

York, has previously taught as a professor at Dartmouth Medical College and was the director of the Center for Environmental Health Sciences at Dartmouth.

"You're not really getting an accurate picture of what your health risk might be. Nor does your community know what the actual exposures are," he said. "I don't see how it could be accidental."

While TCEQ says it began the radiation subtractions in the 1980s, a federal rule regulating radiation in drinking water, written 10 years ago in 2000, should have put a stop to "Texas math" then. However, KHOU has learned the agency continued subtracting for nine more years until an EPA audit told them to stop.

"The word that comes to my mind is cover-up," said Dr. David Ozonoff, an environmental professor and the Chair Emeritus of Boston University's School of Public Health. "It sure looks that way."

☒ Ozonoff says an easy way to understand what TCEQ did was to think of a political poll during election season. He suggests, if political pollsters measured the president's popularity at 50 percent, plus or minus 5 percent, the president's popularity rating would be reported as 50 percent. He says you would not report the president's popularity as 45- or 55 percent, or risk being seen as being biased toward one political party. ☒

However, when it comes to radiation in drinking water, Ozonoff says, if there should have been any bias at all, it should have leaned conservatively toward protecting human health (which would have meant adding in the margin of error, if any calculations were to be performed at all).

KHOU asked TCEQ's Brookins about it all.

KHOU: "What would you tell me if I told you that I have talked with numerous scientists across the nation that would say that what TCEQ did was bad science?"

Brookins: "Well, I guess I would have no comment on that."

"I do not believe that what TCEQ was doing at that time has impacted human health," she added.

KHOU also asked Brookins about the state's continued subtractions for margin of error, even after the EPA published a federal rule banning the practice.

KHOU: "Did you happen to skip over page 76,727 of the federal rule? Because right here in 2000 EPA told you, 'don't subtract margin of error.' Did you skip that

part?"

Brookins: "It doesn't say not to subtract."

KHOU: "It doesn't?"

Brookins: "It is silent."

KHOU: "I'd like you to hold this in your hand for a moment and read the part underlined in blue."

Brookins: "I'm not going to do that on camera."

For the record, here is the complete text of the relevant portion we quoted from on page 76727 of the **EPA's federal rule that regulates radiation in drinking water**, which was published on December 7, 2000:

5. Interpretation of Analytical Results

The Agency recognizes that States have interpreted radionuclide analytical results in a variety of ways, including adding or subtracting standard deviations from the analytical results. The Agency believes that compliance and reduced monitoring frequencies should be calculated based on the "analytical result(s)" as stated in § 141.26(c)(3). It is EPA's interpretation that the analytical result is the number that the laboratory reports, not including (i.e. not adding or subtracting) the standard deviation. For example, if a laboratory reports that the gross alpha measurement for a sampling point is 7 ± 2 pCi/L, then compliance and reduced monitoring would be calculated using a value of 7 pCi/L.

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