

I'm Richard Guldi from Dallas. I have a PhD in engineering and I worked for 35 years making reliable integrated circuits that don't crash your airplane. We did this without poisoning our neighbors with toxic chemicals.

I'm appalled that the fracking industry has poisoned water and air all over America but still tells us that they have never contaminated anything.

During the March EPA TeleConference, "Before the advent of unconventional fracking in 2009, Schlumberger reported that 5% of all fracked wells leaked within their first year of operation and 50% leaked within 15 years. However, since unconventional fracking began, the first year failure rate increased from 5% to 12%. We should expect all of these wells to fail within 15 years." References to the Schlumberger and Ingraffea articles are in my written comments.

Schlumberger article: Slide-9 of http://www.chesapeake.org/stac/presentations/208_Ingraffea%20Part%201.pdf

Ingraffea article: <http://www.pnas.org/content/111/30/10955.full.pdf> See Conclusion

In 2011 alone, sixty-five Marcellus Shale gas wells were cited for faulty cement casings.

http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html?_r=0

The literature is full of images illustrating how gas wells leak. I refer you to images in my written comments.

<http://www.sciencedirect.com/science/article/pii/S0264817214000609#fig4>

The BP + Deep Water Horizon blow-out resulted from a failed blow-out preventer, bad judgment all-around, and a sloppy cement job, meant to save a couple of days and a few hundred thousand dollars.

<http://www.forbes.com/sites/jamesconca/2012/09/10/the-fracking-solution-is-a-good-cement-job/#1e6ab65d4460>

The oil and gas industry has little incentive to not cut corners. Blog comments describe examples where concrete workers race to complete the greatest number of jobs in a day and where drilling workers lament having to "fix" their problems. The conventional fix is to reapply cement to a damaged area. Such "fixes" may provide cosmetic improvement or even the ability to pass an initial pressure test, but there is no way that concrete reapplied to a trouble spot deep in a well can make a lasting seal.

It's easy to understand why gas wells leak. Any civil engineer will tell you that concrete cracks sooner or later. Consider the difficulty of pouring concrete to create an annulus a foot in diameter, hundreds of feet deep with a 1 inch wall thickness, without micro-cracks. That is impossible. These microcracks will enlarge and grow into fractures as the result of stress over time.

A University of Houston paper reports that the gas flow rate through a 100 um diameter micro crack (the size of a human hair) in a well casing allows gas to escape at the rate of 5 feet per minute.

Reference: Taylour Burton et al, Science of the Total Environment, Volumes 545–546, 2016 pages 114-126.

<http://www.sciencedirect.com/science/article/pii/S0048969715312389>

Concrete Fractures - Layman's Viewpoint

We have all seen steel reinforcing rod (Rebar) placed into roads and sidewalks before concrete is poured to provide strength. Gas wells casings do not have rebar.

We have all seen stress relief recesses formed as joints in roads, bridges, and sidewalks. These recesses allow cracks to terminate at specific locations so that they do not propagate indefinitely. Gas well casings do not have any stress relief recesses along their depth.

Roads and sidewalks crack under normal usage, even though they have rebar and stress relief recesses. Do you think that gas well casings won't crack?

We are all aware that ground shifts, creating stress on overlying structures.

Clay soils, such as we have in North Texas are prone to extensive expansion and contraction as moisture content varies.

- Eighty percent of homes in North Texas show shifted door frames and misaligned cabinet doors within a few years of construction.

- In hot dry summer months, our local school playground shows cracks so deep that I can't reach the bottom.

- Our home suffered brick cracking after ten inches of rainfall in October 2015.
- Future weather extremes, exacerbated by climate change resulting from fossil fuels, will bring even greater risks of earth stresses on gas well casings.
- Increasing earthquake frequency and intensity will further weaken gas well casings. Stresses cause microcracks, which provide pathways for gas migration. Continued stresses lead to material rupture and large cracking, as in the familiar example of bending a coat hanger back and forth until it breaks.

In conclusion, the EPA used to work for public good, but now it is a shill for the fracking industry. It shouldn't take a reprimand by your Scientific Advisory Board for the EPA to tell the truth.

End of Oral Presentation

Supplementary Information:

Steve Lipsky told me today that as part of an ongoing lawsuit, a local attorney obtained original records from the Texas Railroad Commission Records railroad commission showing that the well casing depth goes only 500 feet deep, while the aquifer extends down to 538 feet. The attorney also has another record dated one month after the explosion showing that the 500 foot number was penciled out and replaced by 1000 foot. The Texas Railroad Commission argues that the number was not changed. Steve said that Brett Shipp of WFAA has more details.

The tests conducted by the Texas RRC showed Lipsky's water contained 8.6 milligrams per liter of methane, just under the federal government's unacceptable limit of 10. But tests recently conducted by UT- CLEAR scientist Zac Hildebrand measured 83 milligrams per liter, the highest methane contamination level Hildebrand has ever seen. <https://web.archive.org/web/20140607093525/http://www.wfaa.com/news/investigates/Scientists-say-state-tests-prove-fracking-to-blame-for-Parker-Co-flaming-wells-262056131.html>

Insufficient Casings Depth - Another Avenues for Well Contamination

As reported by Brett Shipp or WFAA, a Texas man and his family nearly died when his water filled with natural gas exploded. Look at the picture of Cody Murray's hand 1:49 into the video. Allegations of improper well casing are likely true. Denial by the Railroad Commission is just another case of cover-ups to support the fracking industry.

<http://legacy.wfaa.com/story/news/local/investigates/2015/08/31/family-left-shaken-pump-house-explosion/71497030/>

Consequences of Water Contamination from Fracking Operations

Beth Voyles of Amwell Township PA reported that her boxer, Cummins, had just died. She saw the dog drinking repeatedly from a puddle of road runoff, and she thought that the water the gas company used to wet down the roads probably had antifreeze in it. A month later, Haney's dog, Hunter, also died suddenly. Soon after, Voyles found that her barrel horse, Jody, was dead. Lab results revealed a high level of toxicity in her liver. Range Resources did acknowledge that the vet suspected the horse died of poisoning by heavy metals. Shortly after, Voyles's boxers began to abort litters of puppies; six were born with cleft palates. They died within hours. Others were born dead or without legs or hair. By December, Boots, the grand-champion goat, aborted two babies. About a year before Haney's dog died, in the summer of 2009, she began to notice that sometimes her water was black and that it seemed to be eating away at her faucets, washing machine, hot-water heater and dishwasher. When she took a shower, the smell was terrible - like rotten eggs and diarrhea. Haney started buying bottled water for drinking and cooking, but she couldn't afford to do the same for her animals. Later that summer, her son, Harley, was stricken with mysterious stomach pains and periods of extreme fatigue, which sent him to the emergency room and to Pittsburgh's Children's Hospital a half-dozen times. "He couldn't lift his head out of my lap," Haney said. Later her neighbor, Bill Harley, had elevated levels of arsenic.

Haney's tests results showed small amounts of heavy metals like arsenic and industrial solvents like benzene and toluene in their blood. Dr. Philip Landrigan of Mount Sinai said that "These people are exposed to arsenic and benzene, known human carcinogens. There's considered to be no safe levels of these chemicals."

Haney's neighbor, Ray Day, pointed to where there had been a truck spill of chemically treated water used in fracking. Every hour while fracking, workers walked the temporary plastic pipeline, full of chemical water, that ran between his site and the pond near Stacey Haney's home. While walking the line, workers discovered several cracks that spilled frack water on the frozen ground. Such cracks are not unusual. "We all know they leak," one Range employee wrote in an internal e-mail, which has become a matter of public record pending a lawsuit.

<http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html>

In 2008, a United States Steel plant in Clairton, Pa., complained that the water from the Monongahela River was unfit for use. Loaded with salts, the water tasted and smelled odd and was corroding not only industrial equipment but also dishwashers and kitchen faucets. For several months, the Monongahela River, which provides most people in the Pittsburgh area with drinking water, no longer met state and federal standards. Following a request from the State of Pennsylvania, the U.S. Army Corps of Engineers found it would require five times the amount of water in their reservoirs to dilute the river. It took five months to clean it up.

<http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html>

Gov. Tom Corbett reportedly received at least \$1 million in campaign donations from gas interests.) amount to a tax of 1 percent per well on gas extraction, significantly lower than Arkansas (3.54 percent) and Texas (5.4 percent).

<http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html>

Among those, the well water at the home of Carl Stiles and his wife Judy was contaminated with heavy metals. A toxicologist found barium, arsenic, and VOCs (volatile organic chemicals) in Carl's blood. Strontium, uranium and radium were found in their water. The radiation level in the home is 13.7 or 7 times that set by EPA as a standard not to be exceeded. Carl died of intestinal cancer on January 26, 2012. He blamed the cancer on the contaminated water. Judy developed stomach pain and skin rashes and continues to be afflicted with pain after moving from the home. Both Judy and Carl were told by their doctor to expect to die of leukemia within 2 years.

<http://www.frackcheckwv.net/impacts/the-human-story/>

Ethylene Glycol, "a component of numerous compounds that Range uses in Washington County," was also found in the springs. No problem though, because Microbac set the Reporting Limit to 20.0 mg/L, twice the reporting limit consistent with the national laboratory standard of 10 mg/L, and twice the Reporting Limit that Microbac itself uses in all other testing it has done prior to and at the same time of the analysis. Of course, if it's below this limit, one doesn't have to report it. In addition arsenic at fifteen times the level suggested by the EPA as well as glycol was found in testing of Voyle's water well.

<https://web.archive.org/web/20160415195032/http://www.marcellus-shale.us/Beth-Voyles.htm>

The new DEP Agent said that there were so many problems created by Range Resources contractors that he had a difficult time keeping up with all the phone calls... All the problems on my property are still existing to this day. The pond vegetation has never grown back.

<https://web.archive.org/web/20160415195032/http://www.marcellus-shale.us/Beth-Voyles.htm>

As Jane Anne Morris put it "Regulatory agencies are the corporations' response to people's calls for democracy and self-governance. Corporate officials who once hired Pinkerton's goons to do their dirty work and protect them from an activist public can now rest assured that much of that burden has been assumed by regulatory agencies. They work as the barriers they were designed to be."

<https://web.archive.org/web/20160415195032/http://www.marcellus-shale.us/Beth-Voyles.htm>